# Kingdom of Cambodia Nation Religion King



Ministry of Agriculture, Forestry and Fisheries



Ministry of Water Resources and Meteorology

Technical Working Group On Agriculture and Water

FINAL

# PROGRAM DESIGN DOCUMENT ANNEXES

# FOR

# STRATEGY FOR AGRICULTURE AND WATER 2010-2013

PREPARED BY TASK MANAGEMENT SUPPORT GROUP WITH FINANCIAL SUPPORT FROM THE AGENCE FRANÇAISE DE DÉVELOPPEMENT (AFD) AND TWGAW

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Box 1 Structure of Cambodia Budget System
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# ABBREVIATIONS

ACIAR	Australian Center for International Agricultural Research
ADB	Asian Development Bank
AEA	Agro-Ecosystems Analysis
AFD	Agence Française de Développement
AFTA	ASEAN Free Trade Agreement
AIC	Agricultural Inputs Company
AMO	Agricultural Marketing Office
AQIP	Agricultural Quality Improvement Program
ARS	Agroenterprise Resource Service
ASDP	Agriculture Sector Development Program
ASEAN	Association of South East Asian Nations
ASP	Agriculture Sector Program
AusAID	Australian Government's Oversea Aid Program
BAMS	Bureau of Agricultural Materials and Standards
CAASP	Cambodia Agriculture and Agri-business Support Program
CARD	Council for Agricultural & Rural Development
CARDI	Cambodian Agricultural Research and Development Institute
CC	Commune Councils
CDRI	Cambodian Development Research Institute
CFW	Cash-for-Work
	Canadian International Development Agency
CMDG	Cambodian Millennium Development Goals
COM	Council of Ministers
	Department of Agronomy and Agricultural Land Improvement
DAALI	Department of Agronomy and Agricultural Land Improvement
	Department of Agricultural Extension
	Department of Agro-Industry
DANIDA	Danish International Development Agency
DPSIC	Department of Planning, Statistics & International Cooperation
DIIS	Diagnostic Trade Integration Study
EA	Executing Agency
EC	European Commission
EDP	External Development Partners
EU	European Union
FA	Field Agents
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FFS	Farmer Field School
FFW	Food-for-Work
FG	Farmer Groups
FIP	Food Insecure and Poor
FO	Farmer Organizations
FS	Feasibility Study
FSN	Food Security and Nutrition
FSNIS	Food Security and Nutrition Information System
FSSP	Food Security Support Program
FSSPCC	Food Security Support Program Coordination Committee
FSSPMC	Food Security Support Program Management Committee
FWUC	Farmers' Water User Community
GDP	Gross Domestic Product
GSP	General System of Preferences
Ha	Hectare
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IPM	Integrated Pest Management
IFPR	Japan Fund for Poverty Reduction
	Japan International Constration Aganay
JICA KAMEIMEV	Kampuchea Fishery Import and Export Company
	Land Management and Administration Dreight
LANT	Land Management and Administration Project

Mer	Monitoring and Evolution
MAE	Ministry of Apriculture Expectry and Eisbories
MAFF	Ministry of Agriculture, Forestry and Fisheries
MEF	Ministry of Economy and Finance
MFI	Micro-Finance Institution
MIME	Ministry of Industry, Mines and Energy
MIS	market information service
MLMUPC	Ministry of Land Management, Urban Planning & Construction
MOE	Ministry of Education
MOEF	Ministry of Economy and Finance
MOH	Ministry of Health
MOI	Ministry of Industry
MOP	Ministry of Planning
MOWRAM	Ministry of Water Resource and Meteorology
MOWVA	Ministry of Women & Veteran Affairs
MPNAR	Master Plan for National Agricultural Research
MRD	Ministry of Rural Development
MTEF	Medium Term Expenditure Framework
NCDD	National Committee for Decentralization and Deconcentration
NDC	National Divestment Committee
NEC	National Executive Committee
NGO	Non governmental Organizations
NDRS	National Poverty Reduction Strategy
NGDD	National Stratagic Development Plan
NWD	National Water Delicy
DR A	Program Based Approach
	Program Coordination Unit
DAFE	Provincial Departments of Agriculture Ecrostry and Eicherics
	Program Degian Degument
FDD DDT	Program Design Teem
PDI	Program Design Team
PFI	Poor and Food Insecure
PFS DMC	Prenninary Feasibility Study
PMC	Program Management Committee
PMSU	Program Management Support Unit
PRDC	Provincial Kural Development Committee
PS PSU	Program Secretariat
PSU	Program Support Unit
RGC	Royal Government of Cambodia
RS	Rectangular Strategy
SAW	Strategy on Agriculture and Water
SDS	Socio-economic Development Strategy
SEDP I	First Socio-economic Development Plan (1996-2000)
SEDP II	Second Socio-economic Development Plan (2001-2005)
SFFSN	Strategic Framework for Food Security and Nutrition
SME	Small and Medium Enterprises
SOE	State Owned Enterprises
SPS	Sanitary and Phyto-Sanitary
SRI	System of Rice Intensification
TA	Technical Assistance
TL	Team Leader
TMSG	Task Management Support Group
TOR	Terms of Reference
TOT	Training of Trainers
TWG-AW	Technical Working Group on Agriculture and Water
TWG-FSN	Technical Working Group on Food Security and Nutrition
WB	World Bank
WFP	World Food Program of the United Nations
WTO	World Trade Organization

#### 1. INTRODUCTION

#### **1.1 Outline of Report**

1. The outline of the report is as follows; Sections 2 to 6 present the supplementary annexes detailing the background reviews from each of the original 5 program designs. Section 2 presents the review of Program 1 (Institutional capacity building and management support program for agriculture and water resources). Section 3 presents the review of Program 2 (Food security support program). Section 4 presents the review of Program 4 (Water resources, irrigation management and land program) Section 5 presents the review of Program 3 (Agricultural and agri-business (value-chain) support program) and finally Section 6 presents the review of Program 5 (Agricultural and water resources research, education and extension program).

#### 2 ANNEX 1: INSTITUTIONAL CAPACITY BUILDING AND MANAGEMENT REVIEW AND CONTEXT

#### 2.1 Current Institutional Structure

2. The institutional setting of the agriculture and water sector is complex. The lead RGC agencies are MAFF and MOWRAM in agriculture and water resources respectively; see Table 1. However, a number of other ministries hold a stake; such as Ministry of Land Management, Urban Planning and Construction (MLMUPC), Ministry of Rural Development (MRD), and Ministry of Commerce (MoC). Others, such as the Ministry of Economy and Finance (MEF) and the Cambodia National Mekong Committee (CNMC), have a less direct but important interest<sup>1</sup>. Because of the linkage of agriculture and water to rural affairs "at the grassroots", other important stakeholders are provincial and sub-provincial administrations, as well as community-based organizations and NGOs.

3. The Tonle Sap Authority (TSBA) is not reviewed in this report due to the Authority just being created and it is still in its inception phase. Although its area of operation is the Tonle Sap Region and related regions, it was identified in 2009 as a development and project monitoring agency and was not preparing at that time to be engaged in water resources management activity as such. However, TSA is still undergoing development and the roles may change. Other organizations of mechanisms with a coordinating role or involvement in agriculture and water resources are The Council for Agriculture and Rural Development (CARD); and The Technical Working Group on Agriculture and Water (TWGAW) (Taylor 2009).

4. The Agriculture and Water Sector reform process also needs to consider the roles of: (i) Academic and training institutions; (ii) NGOs involved with agriculture irrigation, water use and water environment, (iii) Farmer organizations involved with agriculture and irrigation, and (iv) Social organizations with interests in agriculture and water.

5. The academic sector is particularly important to future capacity in agricultural development, water resources management and irrigation. Academically qualified engineers are vital for future functioning in irrigation and engineering-related specializations such as hydrology, flood management, river management and water resources planning (Taylor 2009).

6. For the purposes of this review section, the institutional structure for only the lead agencies of MAFF and MOWRAM are discussed, in addition to the budgeting process for the two ministries as laid down by MEF procedures.

<sup>&</sup>lt;sup>1</sup> The CNMC coordinates the involvement of the Government of Cambodia with the Mekong River Commission (MRC) and manages some elements of projects under the Mekong River Commission, but does not have a management role. The coordination arrangements between CNMC, MOWRAM and MAFF are relevant to the performance of the water sector, as is the significance of MRC programs to water resources management in Cambodia.

Organization	Major roles
MAFF	Agriculture related functions – support for dryland agriculture, upland and lowland crops, rice
	production and marketing, agricultural support services including research, extension and
	education.
	Water resource related functions – support for irrigated agriculture support, fisheries
	development and forest/catchment programs
	Reports to the Minister for Agriculture, Forestry and Fisheries
MOWRAM	Development and management of all water resources according to the Law on Water
	Managements of 2007
	Reports to Minister for Water Resources and Meteorology
CNMC	Liaison between the Government of Cambodia and the Mekong River Commission (MRC) and
	facilitating programs of MRC
	Reports to Minister for Water Resources and Meteorology
MOE	Responsible for protection of the water environment and regulation of pollution, including
	discharges into water bodies
	Reports to the Minister for Environment and Water Resources and Meteorology
NCDM	Flood and drought included among disasters for which the NCDM provides support programs
	and organizes response to events

Table 1 Government Organizations with Agriculture and Water Management Roles

Source: (Taylor 2009)

#### 2.1.1 Ministry of Agriculture, Forestry and Fisheries

7. The roles, responsibility and organization of MAFF were established by Council of Ministers Sub-decree No. 18 (dated October 2nd 1984) and have been subsequently amended several times by Sub-decree No. 17 (7 April 2000), Sub-decree No. 105 (22 August 22 2005) and Sub-decree No. 188 (14 November 2008). Overall, MAFF has the following functions and responsibilities:

- 1. To organize and operate development policies in the agriculture sector which are aimed at improvement of the living standards of population,
- 2. To participate in the preparation of land reform and utilization policies,
- 3. To direct and establish sector agricultural development plans and to coordinate, monitor and evaluate the implementation of policies and activities for development of agriculture,
- 4. To monitor and manage natural resources of the agriculture sector and facilitate activities of exploitation of these resources to meet domestic demands with respect to the stability of ecological systems,
- 5. To enact legislation and regulations on the management, maintenance and protection of the natural resources of the agriculture sector and monitor its implementation,
- 6. To evaluate and develop human resources for participation in the development of agriculture by promoting technical skills and knowledge and making effective use of these human resources,
- 7. To support and advise farmers on technologies to increase production and improve productivity,
- 8. To set up guiding principles and monitor implementation in order to enhance and improve the progress of concerned professional organizations and associations which are involved in the agriculture sector,
- 9. To conduct research, studies and extension on agricultural technology, science and economics to all sub-sectors,
- 10. To advise on agricultural land development, soil quality improvement and appropriate utilization of land, seeds, breeds, fertilizer, chemicals according to the conditions in the various geographic land units and regional climates and thereby to ensure sustainable yields and maintain balance of the natural environment,

- 11. To coordinate and cooperate with internal and external organizations and non-government organizations for the development of the agriculture sector,
- 12. To participate in enhancing and accelerating investment, export of food and agriculture products,
- 13. To participate and implement activities related to the Mekong Basin under the Ministry's jurisdiction,
- 14. To participate in the establishment of pricing policies and search out the markets for agricultural products,
- 15. To collect revenue for the national exchequer or collaborate with the Ministry of Economy and Finance for revenue collection to implement other activities as may be required by the Royal Government.
- 16. To inspect food security of all agricultural products from the beginning of planting until the final phase of primary processing.

8. The current organizational structure of MAFF is new (from November 2008) and is depicted in Figure 1. It is worth detailing the recent evolution of the department structure from the previous organizational framework depicted in Figure 2 since institutionally the departments are still undergoing their change management processes and much of the previous processes still apply. The previous institutional structure involved two General Directorates (Rubber and MAFF) under which there was no separation of departments into technical line agencies and administrative functions (as is the case with MOWRAM).

9. This former departmental structure is relevant to the discussion because of the perceived institutional weaknesses identified by successive donor funded Technical Assistance where the role and authority of the Department of Planning and Statistics was seen to be constrained by its equal status as a department. As a consequence, an effective mechanism for planning and budgetary coordination did not operate in MAFF and successive recommendations were made to address the issue of authority and legitimacy in coordinating planning activities.

10. In the period 1997-2008 various studies and planning were undertaken into the capacity of MAFF and various tools and initiatives were proposed or developed. These include:

- 1. Support to Preparation of Restructuring for Agricultural Development Institutions (FAO 1997);
- 2. Status of Strategic Planning within the MAFF (Munzinger 2002);
- 3. Institutional Development in the Agriculture Sector of Cambodia (ADB 2002);
- 4. Diagnostic Study of Selected PDAFFs (Videl 2003);
- 5. Study of De-concentration of Agricultural Services in Cambodia (Pousse 2004);
- 6. Note on the Reorganization of MAFF Services (Cheron 2004);
- 7. Budget Management Improvement & Modernization through the Introduction of Program-Based Medium-Term Expenditure Framework for the Agriculture Sector (ADB 2005);
- 8. Organizational Restructuring and Rationalizing Roles and Responsibilities to Strengthen Policy and Planning in MAFF (MAFF 2006);
- 9. Human Resource Development Strategy for MAFF (MAFF 2007); and
- 10. The development of the Strategy for Water (SAW) and its programs (TWGAW 2007).
- 11. These studies and other reports identify capacity building measures that include:
  - 1. A human resources development plan
  - 2. A strategic plan for the Ministry
  - 3. Strengthening of data collection and management activities
  - 4. Management information system
  - 5. Human resources information system



Figure 1 Organogram for Ministry of Agriculture, Forestry and Fisheries - 2009

Source: Sub-Decree 188, November 14, 2008



Figure 2 Organogram for Ministry of Agriculture, Forestry and Fisheries - Former Structure prior to Nov 2008

Note, this organizational structure has been superseded by Sub-Decree 188, depicted in Figure 1. Source: MAFF

12. In terms of the agriculture sector, long term assistance has been provided to develop the SAW and its five program areas, through the Technical Working Group on Agriculture and Water (TWGAW). The programs identify further actions that need to be taken. Although objectives were set for the period 2006-10 under the SAW, apart from more specifically identifying the programs that should help MAFF move towards those targets, not much has been done. The target date of 2010 is now close.

13. From all of the above, within MAFF, a strategic plan and a human resources information system have been developed. The strategic plan has not been followed up by the Ministry despite the approval of the plan by the Minister in May 2007. No other capacity building proposals identified in the various strategies and studies have been acted upon to date. Reasons for the relatively small amount of evident progress are discussed in the following sections.

#### 2.1.2 Ministry of Water Resources and Meteorology

14. MOWRAM is the dominant water sector ministry with overall legal responsibility for the development and management of water resources. MOWRAM was established in 1999, although it was developed from an agency that performed some of the current mandate.

15. The structure of MOWRAM is shown in Figure 3 and Figure 4. MOWRAM has main two divisions, headed by a Director-General of Administrative Affairs and a Director General of technical Affairs. Under Administrative Affairs are four departments: Administration and Human Resources, Planning and International Cooperation, Finance and the technical Service Centre (TSC) for Irrigation and Meteorology. Under Technical Affairs are seven departments: Water Management and Conservation, Hydrology and River Works, Meteorology, Irrigated Agriculture, Water Supply and Sanitation, and Engineering. The seventh, Community Water User Development is recent and offices under this department have been defined.

16. Provincial Departments of Water Resources and Meteorology (PDWRAM) have been established in each province. The departments are staffed with technically qualified personnel but remain under-resourced. Two or three staff in any PDWRAM may have some engineering qualification but the department director, who would not perform as an engineer, is normally one of the qualified staff (Taylor 2008).

17. Under the North West Sector Irrigation Project (NWSIP) provincial implementation units (PIUs) have been established in the PDWRAM in each of the four provinces covered by that project. The role of the PIU is to coordinate and manage locally the relevant aspects of the project, including liaison with other Ministries at the provincial level; in particular the Provincial Department of Agriculture (PDA) (Taylor 2008).

18. The Law on Water Resources Management (the Law) was introduced only in 2007 and some regulations have been introduced since that time. More are planned, although active work appears meager. The Law provides only heads of power. Application of the law requires an implementing decree or regulation to be issued and there are several different levels at which such instruments can be made (royal decree, prime ministerial decree, decree of the council of Ministers, ministerial decree or sub-decree or *prakhas*, decisions, circulars and letters signed at various levels).

19. The Law on Water Resources Management gives a general and inclusive overview of water resources development and management but without great detail. The preparation of four (04) sub-decrees for the Law is ongoing but not yet passed.

20. Its legal mandate includes groundwater, although almost no activity has occurred in Cambodia of an investigative or management nature in respect of groundwater (i.e. its extraction is unregulated in practice and its occurrence is unknown except for two academic studies). The example of groundwater management shows, through the lack of a department within MOWRAM mandated to cover groundwater management, that the scope of the Law is not a guide to what is actually being done or not done (Taylor 2009).

21. Key responsibilities of governments in regard to water resources management are:

- 1. To collect, record, archive and analyze information and data on climate and water resources in order to understand the occurrence, availability, behavior and quality of water and its suitability for human and environmental purposes;
- 2. To plan the development and management of water resources for all purposes and to achieve social, economic and environmental goals;

- 3. To protect and conserve water for use and to maintain its value for non-consumptive uses and the environment;
- 4. To identify the characteristics of flood occurrence and the risk to human life, property and enterprise, and to develop measures to minimize risk, including both the design, construction, maintenance and operation of flood control works, and other measures such as flood warning;
- 5. To regulate the use of water by means of water licenses to ensure that water is equitably and efficiently used for social and economic purposes.
- 22. The preliminary review of activities and functions listed above is shown in Table 2.

Responsibility	<b>Responsible unit/s</b>	Activity
1. Climate information	Meteorology Department, MOWRAM	Limited equipment and qualifications
2. Surface water information	Hydrology Department MOWRAM	Apart from MRC programs, limited data collection, qualified staff limited
	MRC Programs	Main stem of Mekong River and Tonle Sap
3. Water Planning	Planning and International Cooperation Department, MOWRAM	No sub-basin or multi-sectoral planning undertaken except as part of donor project
a. National WR plans	MOWRAM	None undertaken general targets (eg irrigation area) only
b. River basin plans	MOWRAM and CNMC for MRC programs	CNMC via BDP program of Mekong Commission
4. Water Conservation	Water Conservation Department, MOWRAM	Mainly focusing on legislation, but progress slow
5. Flood Management	Design and /construction under Engineering Department	Flood management not assigned
a. Flood assessment/plan	Not assigned	No regular activity
b. Flood control works	Engineering Department, MOWRAM	On project basis
c. Flood response	National Committee for Disaster Management (NCDM)	MOWRAM coordinate at province level
6. River protection	Hydrology and River Works Department	
a. Structural works	Engineering department	On project basis
b. Non-structural measures		Not generally undertaken
7. Water quality management	MOE and MOWRAM	
a. Water quality monitoring	MOE and MORAM	Minor monitoring activity
b. Discharge control	MOE	MOWRAM not involved in providing data or assessment
c. Other protective measures		Not assigned within MOWRAM

Table 2 Water Management Responsibilities within MOWRAM

Source: (Taylor 2009)

23. Since MOWRAM was established in 1999, it has concentrated on infrastructure development, mainly irrigation and to a lesser extent flood control works. In the period 1999-2008 various studies

and planning were undertaken into the capacity of MOWRAM and various tools and initiatives were proposed or developed. These include:

- 1. The MOWRAM Strategic Plan on Water Resources Management and Development (MOWRAM 2004);
- 2. The Master Plan for Water Resources Development in Cambodia (Korea Water, KOICA *et al.* 2007);
- 3. The study and background reports on Capacity Building in the Ministry of Water Resources and Meteorology (MOWRAM 2001b, c);
- 4. The Draft Proposal for Strengthening of the Department of Hydrology and River Works and Department of Meteorology (MOWRAM 2001a);
- 5. The development of the Strategy for Water (SAW) and its programs (TWGAW 2007).
- 6. National Policy on Water Resources Management; and
- 7. Law on Water Resources Management.
- 24. These studies and other reports identify capacity building measures that include:
  - 1. A human resources development plan
  - 2. A strategic plan for the Ministry
  - 3. Strengthening of data collection and management activities
  - 4. Management information system
  - 5. Human resources information system

25. In terms of the water sector, long term assistance has been provided to develop the SAW and its five program areas, through the Technical Working Group on Agriculture and Water (TWGAW). The programs identify further actions that need to be taken. Although objectives were set for the period 2006-10 under the SAW, apart from more specifically identifying the programs that should help MOWRAM move towards those targets, not much has been done. The target date of 2010 is now close.

26. The most relevant programs of the SAW to MOWRAM and its water management functions are:

- 1. Program 1: Institutional Capacity Building and Management Support
- 2. Program 4: Water Resources, Irrigation and Land Management
- 3. Program 5: Agriculture and Water Research, Education and Extension.

27. From all of the above, within MOWRAM, a strategic plan and a human resources information system have been developed. The strategic plan has not been followed up by the Ministry despite the approval of the plan by the Minister in August 2007. The HR information system has not been actively used since the end of the development project. No other capacity building proposals identified in the various strategies and studies have been acted upon to date (Taylor 2009). Reasons for the relatively small amount of evident progress are discussed in the following sections.



Figure 3 Organogram for Ministry of Water Resources and Meteorology

Source: MOWRAM October 2008



Figure 4 Detailed Organogram for Ministry of Water Resources and Meteorology – General Directorate Structures

Source: MOWRAM October 2008

#### 2.2 Overview of Planning and Budget Allocations to MAFF and MOWRAM<sup>2</sup>

28. The budgeting and finance system for MAFF and MOWRAM are vitally important to understand in the context of how the established procedures impact on the institutional management of the two ministries. An overview of the Cambodia Budget system is shown in Box 1.

#### Box 1 Structure of Cambodia Budget System

Cambodia's budget system consists of four linked, but distinct components: Central Administration; Provincial Administration; Governor's office and Commune. In addition to raising some of their required revenues, the majority of Provincial's Governor's Office and Commune funds are sourced from the National Budget. These different layers of government are all included in the national budget. Responsibility for budget preparation is currently divided between line ministries and provincial departments. Ministries allocate the budget ceilings approved by the Council of Ministers in June between their central agency and provincial delegations in consultation with MEF. Provincial budgets and then prepared in conjunction with provincial departments of MEF. The Governor's Office expenditure is subject to the control of the Ministry of Interior. Each commune development Plan (CDP) and three year rolling Commune Investment Program (CIP) and on the basis of basis of this Commune Budget.

Source: (ADB 2006)

29. In accordance with the Constitution<sup>3</sup>, the National Assembly is the only authority that has the legislative power to approve the National Budget and the Administrative Accounts (Public Accounts). The preparation of the National Budget is the responsibility of the Department of Budget and Finance in the Ministry of Economy and Finance. The National Assembly enacts a law each year that promulgates the approval and implementation of each year's National Budget.

30. The main functions of the Department of Budget and Finance in MEF in respect of the management and implementation of the State budget are to:

- 1. Develop laws and public finance regulations
- 2. Set revenue and expense indices for implementation by ministries, institutions, provinces and municipalities
- 3. Release budgeted funds to ministries and institutions at the central level and to provinces and municipalities according to their line items, articles and chapters in the Table of the National Budget
- 4. Maintain a record of the National Budget in the account book to indicate the status of its implementation
- 5. Cause the preparation of accounting reports and to participate in the development of the monthly financial balance sheet
- 6. Issue instructions concerning financial, technical, and budgetary needs for specialized entities at all levels
- 7. Follow up on the accounting for of all revenues and expenses in the National Budget
- 8. Summarize and conclude all budget performances, including project performance, and evaluate the economic and financial situations for the coming year

<sup>&</sup>lt;sup>2</sup> See (ADB 2006) for a full discussion.

<sup>&</sup>lt;sup>3</sup> Article 57: Taxation, Budget, and Finances - Tax collection shall be in accordance with the law. The national budget is implemented by law. The national budget shall be determined by law. The management of the monetary and financial system shall be defined by law. (The Kingdom of Cambodia adopted its Constitution on September 21, 1993, which was then promulgated by the Head of State on September 24, 1993).

9. Create financial control of national expenditure, and prepare a monthly reconciliation of control against administrative accounts and revenue and expense accounts

31. The following procedures apply, in general, for the preparation of the National Budget (at the line ministry level:

- 1. The MEF and the National Bank of Cambodia (NBC) draft an analysis of the budget after taking into account the previous year and the budget estimation for the last six months of the current year.
- 2. The MEF and the NBC draft a comparison of revenue and expenditures.
- 3. Based on this comparison, the MEF estimates maximum ceilings of expenditures and submits the first budget plan to the Council of Ministers.
- 4. Based on this plan the Council of Ministers defines the budget ceilings of each ministry.
- 5. The MEF requests all ministries, including MAFF and MOWRAM, to prepare a budget proposal based on the Circular of Technical Work of the Budget (usually issued in June).
- 6. All departments, provincial offices, agencies, institutions and ministries prepare a budget proposal.
- 7. Each ministry reviews and centralizes the budget proposal and then forwards it to MEF.
- 8. The budget department of the MEF centralizes all budget proposals and calculates the total budget requirement.
- 9. A meeting is held between MEF and each ministry to discuss the budget proposal based on each ministry's appropriate supporting documents for expenditure.
- 10. After discussion with all ministries involved, the MEF prepares a proposal for the National Budget for submission to the Council of Ministers.
- 11. Following the Council of Ministers approval, MEF then prepares the Finance Law for submission to the Council of Ministers. The Finance Law (entitled The Law of the Year ... Financial Management) is prepared each year and includes the National Budget for that year.
- 12. Discussions are then held between the MEF and the Council of Ministers before approval of the Finance Law.
- 13. The National Assembly considers the Finance Law for approval.
- 14. Following National Assembly approval, the Finance Law is signed by the Head of State.
- 15. The Council of Ministers approves the distribution of the Finance Law.
- 16. The MEF allocates budget credits amongst all ministries and other government institutions.
- 17. The National Budgets Book, detailing revenues and expenditures of the RGC National Budget, is set up by the MEF.

32. The Law contains the general provisions on Revenues and Expenditures of the State budget. There are further sub-decrees issued which formally approve the division of Revenues and Current and Capital Expenditures into the various ministries and quasi-public institutions. MAFF and MOWRAM are allocated its current budget by the MEF on two levels (i) a central level, and (ii) a provincial level.

33. At the central level the two ministries receive the right to raise revenue and spend public funds through the issue by the Minister of Economy and Finance of a "Prakas" which in turn is issued on the authority of a MEF sub-degree and the Council of Ministers Budget Law, which is embedded in the Finance Law signed by the King. In essence this constitutes a Mandate to MAFF and MOWRAM from MEF to commence spending.

34. At the provincial level MAFF and MOWRAM receive a further "Prakas" from MEF to inform its provincial department that they may commence with revenue collection and spending of public funds. MAFF merely endorses this "Prakas", circulates it to all provincial Governors and

Provincial Departments of MAFF and MOWRAM, which then confers a mandate at the provincial level to commence operations for the year using and raising public funds<sup>4</sup>.

35. While the above planning and budgeting process applies to all ministries, MEF has also initiated a Public Financial Management Reform Program throughout the whole of Government. The essential elements are a new chart of accounts with new economic classifications for budgeting and recording of expenditure and resources, a financial management Information System (FMIS) and the introduction of Program budgeting, utilizing the MTEF.

36. The introduction of Program budgeting is being undertaken on a pilot basis in a few Ministries one of which is MAFF. This work has resulted from the intention of introducing MTEF to the budgeting system; however as an interim step the government has decided to introduce the Medium Term Strategic Budgeting Framework (MSBF) to the existing Performance Against Plans (PAP) structure. This will assist ministries later on in adapting to the MTEF. The pilot has six objectives:

- 1. Establish a uniform approach to the identification of Programs, sub-Programs and activities derived from a common strategic planning process and specific Program budgeting guidance;
- 2. Streamline the MAFF PAP structure into a new simplified and more easily understood Program structure consisting of no more than five Programs with no constraint placed on the number of sub-Programs and their activities;
- 3. Ensure that each Program and each sub-Program has only one manager, so that budget holder lines of accountability are identified and clearly understood;
- 4. Design new performance indicators for these new Programs and sub-Programs capable of measuring achievement against previously determined Program and sub-Program indicators;
- 5. Establish the use of the new Program profile for the presentation and submission of Program budget requests; and
- 6. Lay the basis for the reintegration of PAP into the reformed mainstream budget procedures using the Program budget vehicle, so as to obtain an integrated and comprehensive budget preparation and budget execution process.

37. The MTEF provides the "linking framework" that allows expenditures to be "driven by policy priorities and disciplined by budget realities" (World Bank 1998, pg. 32). If the problem is that policy making, planning, and budgeting are disconnected, then a potential solution is an MTEF. Given that this disconnect between policy making, planning, and budgetary processes is a common condition of developing country governance, the MTEF has increasingly come to be regarded as a central element of PFM reform programs.

38. The value of the MTEF approach comes from integrating the top-down resource envelope with the bottom-up sector Programs. Once the strategic expenditure framework is developed, the government defines the sectoral resource allocations, which are then used by ministries to finalize its Programs, sub-Programs, activities and hence budgets; see Figure 5. Key to the review process is the notion that within the broad strategic expenditure framework, which reflects the resource constraint as well as government policy, the ministries will have autonomy to manage by making decisions that maximize technical outcomes like efficiency and effectiveness.

<sup>&</sup>lt;sup>4</sup> Refer to MEF Sub-degree 82.



Figure 5 Outline of Annual Timeline for MTEF Process - MAFF

Source: Based on MTEF/MSBF Budget Guidelines issued by the Ministry of Economy and Finance

Source: (ADB 2006)

#### 2.3 SWOT Analysis for MAFF and MOWRAM

#### 2.3.1 Summary SWOT Analysis

39. Under the Strategy for Agriculture and Water a SWOT analysis was carried out on the agriculture and water sectors. A summary of those findings relevant to Program 1 are presented in Table 3.

Table 3 Summary SWOT Analysis for Institutional Capacity and Management of the Agriculture and Water

	Sect	ors	
Strengths		Weaknesses	
1.	MAFF and MOWRAM have good human	1.	Institutional capacity, management and project
	resources potential		implementation by MAFF and MOWRAM
2.	Policy and/or strategic frameworks are developing	2.	Technology transfer problems and farmers and
	for MAFF and MOWRAM		extension workers have a low level of
3.	Stakeholders are committed to and recognize the		knowledge, access to technology, and skills
	importance of the sector (Government, EDPs,	3.	Information asymmetry (inconsistency) among
	NGOs and farmers)		stakeholders
4.	Developing focus on community empowerment	4.	Legal instruments for A&WR are not fully
	and engagement, through inter alia Community		drafted and implemented.
	Councils FWUCs and FOs		
	Coulons, 1 to CCs and 1 OS.		
Op	portunities	Th	reats
<b>Op</b> 1.	portunities Improvement of governance, including RGC	<b>Th</b> 1.	reats Political circumstances, including competing
<b>Op</b> 1.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and	<b>Th</b> 1.	reats Political circumstances, including competing demands for RGC funds from other sectors
<b>Op</b> 1.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and political stability.	<b>Th</b> 1. 2.	reats Political circumstances, including competing demands for RGC funds from other sectors Legal circumstances, including continued failure
<b>Op</b> 1. 2.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and political stability. Market development and integration with the	<b>Th</b> 1. 2.	reats Political circumstances, including competing demands for RGC funds from other sectors Legal circumstances, including continued failure to enforce laws on land, water, forests etc.
<b>Op</b> 1. 2.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and political stability. Market development and integration with the regional and global economy.	Th   1.   2.   3.	reats Political circumstances, including competing demands for RGC funds from other sectors Legal circumstances, including continued failure to enforce laws on land, water, forests etc. Failure to implement governance, judicial and
<b>Op</b> 1. 2. 3.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and political stability. Market development and integration with the regional and global economy. Strong support from External Development	Th     1.     2.     3.	reats Political circumstances, including competing demands for RGC funds from other sectors Legal circumstances, including continued failure to enforce laws on land, water, forests etc. Failure to implement governance, judicial and other reforms
<b>Op</b> 1. 2. 3.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and political stability. Market development and integration with the regional and global economy. Strong support from External Development Partners for investment in A&W	Th     1.     2.     3.     4.	reats Political circumstances, including competing demands for RGC funds from other sectors Legal circumstances, including continued failure to enforce laws on land, water, forests etc. Failure to implement governance, judicial and other reforms Decreasing EDP support for A&W
<b>Op</b> 1. 2. 3. 4.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and political stability. Market development and integration with the regional and global economy. Strong support from External Development Partners for investment in A&W Science and new technologies	Th     1.     2.     3.     4.	reats Political circumstances, including competing demands for RGC funds from other sectors Legal circumstances, including continued failure to enforce laws on land, water, forests etc. Failure to implement governance, judicial and other reforms Decreasing EDP support for A&W
<b>Op</b> 1. 2. 3. 4. 5.	portunities Improvement of governance, including RGC commitment (the GAP), policy definition and political stability. Market development and integration with the regional and global economy. Strong support from External Development Partners for investment in A&W Science and new technologies Decentralization and de-concentration policy	Th     1.     2.     3.     4.	reats Political circumstances, including competing demands for RGC funds from other sectors Legal circumstances, including continued failure to enforce laws on land, water, forests etc. Failure to implement governance, judicial and other reforms Decreasing EDP support for A&W

Source: (TWGAW 2007)

40. Following on from the overall SWOT findings, specific institutional and managerial issues have been identified from discussions with MAFF and MOWRAM staff and from previous institutional reviews of the two ministries<sup>5</sup>. These are presented in the next sections of the report.

#### 2.3.2 Strengths

#### 2.3.2.1 Process

41. MAFF and MOWRAM remain a valuable source of strategic direction and guidance for the agriculture and water sectors, and retain a broad, multi-disciplinary cadre of technical and administrative specialists in their respective fields.

42. With support from the Technical Working Group on Agriculture and Water (TWGAW), MAFF and MOWRAM are fully engaged in an ambitious initiative to design a cohesive and comprehensive Agriculture and Water Strategy. This Strategy provides a single, transparent strategic

<sup>&</sup>lt;sup>5</sup> See (MAFF 2006; Taylor 2008, 2009) for example.

framework that will guide policy and planning processes in both ministries, and the various departments and sub-sectors within both.

43. The evolving Local Planning Process (LPP) under the Organic Law is providing the foundations for generating genuine bottom-up planning, particularly in the agricultural, water and rural sectors. An effective planning process has been established linking commune-level priorities, through district- and provincial-level integration forums, with decentralized allocation of public funds. The LPP is generating locally relevant agricultural and water sector development information and priorities that can be used to better inform the sector policy process.

44. There is widespread recognition within the senior and middle management of MAFF and MOWRAM of the need for better and more effective policy formulation and activity planning. The limitations of the prevailing means by which MAFF and MOWRAM plan and develop policy are well known and documented, and there is political will for the investigation and adoption of new approaches.

## 2.3.2.2 Functions

45. Established planning and finance units operate in each department of MAFF that fulfill the functions of sub-sector and departmental planning, and support the overall process of policy and planning.

46. A dedicated department (i.e. DPS and DPIC in MAFF and MOWRAM respectively) provide the ministries and individual departments with a source of support, advice and guidance on policy and planning activities, and fulfils the function of coordinating departmental plans and providing basic monitoring and evaluation data.

47. Dedicated departments (i.e. DAF) provide both ministries and individual departments with a source of support, advice and guidance on Program budgeting, and fulfils the function of coordinating and monitoring departmental budgets and expenditure.

48. DPS in MAFF has established and staffed a monitoring and evaluation office to support the monitoring of activities and services and their effectiveness, and thereby inform the policy and planning process of the ministry. In addition, for both MAFF and MOWRAM considerable supplementary monitoring and evaluation activities are supported through donor project and Program activities.

#### 2.3.2.3 Capacity

49. A cadre of planning specialists are available in all departments. Many have been recipients of both external and workplace training and skills development supported through a range of donor-funded project and Program activities. Support to planning, monitoring and evaluation skills is continuing under a number of donor-supported initiatives in the agriculture sector.

50. Through the LPP, understanding and skills in basic planning, including needs prioritization and development plan formulation, is increasing at sub-national levels. With the support of donor projects, a growing resource for planning at provincial, district and commune level is available to support the identification of agricultural development priorities, and the formulation of appropriate Programs and initiatives to address those priorities.

51. MAFF and MOWRAM continue to be recipients of a number of significant donor and nongovernment supported projects and Programs in support of agricultural and irrigation development. With many of these initiatives comes capacity building support for policy and planning processes, including formulation and development of sub-sector policy objectives; planning skills development; and monitoring and evaluation data generation and analysis.

52. Both MAFF and MOWRAM have developed a Human Resource Strategy upon which it can build to strength human resource management and capacity building.

### 2.3.3 Weaknesses

#### 2.3.3.1 Process

53. Multiple national and agriculture and water sector strategic plans and policy documents provide a rich and diverse policy environment for the agriculture sector and its stakeholders. Policy documents currently impacting on the agriculture and water sector include:

- 1. Rectangular Strategy for Growth, Employment, Equity and Efficiency in Cambodia
- 2. National Strategic Development Plan 2006-2010
- 3. Second 5 year Socio-Economic Development Plan
- 4. National Poverty Reduction Strategy
- 5. Agricultural Sector Strategic Development Plan, 2006-2010
- 6. Strategy for Agriculture and Water 2006-2010
- 7. Strategic Plan on Water Resources Management and Development 2005-2008
- 8. Master Plan of Water Resources Development 2007
- 9. MAFF Priority Action Plan
- 10. Agricultural Development Plan, Long, Medium and Short-term, 1999-2010
- 11. Action Program for Development of Agriculture in Cambodia 2001-2010
- 12. Policy statements derived from the Annual Conferences on Agriculture, Forestry and Fisheries

54. The process of formulating agricultural policy and strategies in MAFF and MOWRAM could be strengthened and improved. The policy formulation process is not fully inclusive of all stakeholders and is at times heavily influenced and/or distorted by the respective agendas of donors to the sector. A time-bound, rolling cycle for strategy formulation has been developed under MTEF but guidelines have not been provided to all departments in MAFF on effective policy formulation and implementation, and has yet to be implemented at all in MOWRAM.

55. Linkages between policy and policy formulation, and the annual planning process are not sufficiently strong. Activity planning is largely based upon plans and priorities of previous years, and tends to reflect the existing service suite of MAFF and MOWRAM and the existing capabilities of ministry personnel. Without a common and consistent set of policy indicators, the contribution of activities to policy goals is hard to measure, and the effectiveness of activities difficult to assess.

56. The evolving decentralization and de-concentration (D&D) process has established a clear structure for decentralized planning and decision making at the commune level through a participatory and community-orientated Local Planning Process. While this D&D process goes a long way towards institutionalizing planning processes at the local level, currently there is no existing strategy or framework for linking the decentralized planning process at commune, district and provincial levels with MAFF and MOWRAM policy and planning at the national level. There is a risk that parallel and disjointed processes for agricultural development planning may form whereby national policy and planning is not sufficiently linked with the local planning process.

57. Policy and Program implementation and impact is monitored and assessed by the M&E Unit under DPS for MAFF. While data generation on key performance indicators are sparse, the ability of the M&E unit to adequately carry out their mandated tasks is reduced. The effectiveness of the

ministries and individual departments is often assessed on the basis of inputs and activities, rather than impact or development outcomes, and there is a risk that not all lessons are learnt as a result. Subsequent policy and planning activities continue to be less than fully informed about what works and what does not, and remains less than fully informed about experience and lessons being learned at provincial, district and commune levels.

## 2.3.3.2 Functions

58. Guidance on planning procedures or processes could be improved. Planning activities are not systematically implemented, and annual plans are, as a result, largely reflective of the preceding annual plan taking insufficient account of both changing client needs and implementation lessons.

59. Functions for activity planning and budget formulation could be better linked. The development of activity plans at department level, subsequently coordinated by the Departments of Planning in both ministries, is separate to the operational (recurrent) budget formulation process by the Departments of Finance. Development plans, incorporating donor-funded Program activities, sometimes do not account for operational budget constraints. In turn, operational budgets are based on historical patterns and not systematically linked to development plans.

60. The separate planning and budgeting functions hinder effective performance monitoring and evaluation. The Departments of Planning in both ministries thus find it difficult to fulfill their role in assessing the feasibility of activity plans without access to basic information on budget allocation and availability, whilst the Departments of Finance are equally constrained in fulfilling their role in assessing the appropriateness of budget proposals without access to corresponding activity plans. Similarly, during the implementation of some activities the progress reports from departments are submitted to the Minister, Secretary of State and Under-secretary, but not necessarily all of these reports are submitted to the Departments of Planning; where responsibility for monitoring and evaluation lies.

61. Policy and planning functions may not have mechanisms either for ex-ante collective policy planning or ex-post integration of policies and plans. The current authority afforded DPS to coordinate planning activities does not enable it to impose an effective coordination or integration of planning. The roles of the Departments of Planning are essentially one of collation rather than pro-active integration.

62. The responsibilities and functions of some departments overlap with other departments. This is sometimes a result of independently drafted and un-coordinated mandates, but in other cases there are good reasons for an apparent duplication of activities (in the case of MAFF, such as the mandate of CARDI and DoF to conduct aquaculture research, or CARDI and DAE to conduct demonstration trials). In the former examples there remains considerable risk of service duplication and inconsistencies, as well as inefficiencies in resource allocation and expenditure. In the latter examples it is not an issue of a duplication of effort but more of a need to ensure close collaboration and coordination between departments to maximize efficiencies.

#### 2.3.3.3 Capacity

63. Planning, monitoring and evaluation capacity and skill levels are not as high as they could be. This situation is confounded by inadequate remuneration levels that ensure that many of the most able and qualified staff leave if not temporarily then permanently for private sector, donor or NGO opportunities.

64. Human resource management is sometimes less than optimal. Task allocation is increasingly ad hoc and only loosely based on any form of position descriptions. Many staff do not have clearly defined Terms of Reference and in the context of policy and planning, individual planning skills do not necessarily correspond to the allocation of planning duties and functions.

65. Both MAFF and MOWRAM's human resource development strategies remain unimplemented. The HR strategies should support a comprehensive recruitment, promotion and skills development process that rewards staff on the basis of ability and performance against pre-set targets. The ministries operate a staff performance appraisal system, but implementation remains incomplete, and task allocation and the targeting of training and skills development opportunities remains imperfect.

66. Decision making and responsibility for tasks should be clearly delegated and staff should be assessed on their performance in meeting those tasks.

67. Whilst an overall skills deficit impacts on most elements of operations, some of the immediate skill needs with respect to policy and planning include:

- 1. Project preparation and design
- 2. Policy formulation and strategic planning
- 3. Legal document drafting
- 4. Logical framework planning techniques, including the development of appropriate verifiable indicators and means of verification
- 5. Monitoring and evaluation
- 6. Knowledge management and information technologies
- 7. Personnel management, delegation skills, change management
- 8. Linguistic skills, where increasing capacity for written and spoken English is required if greater harmonization with donor initiatives and RGC's international commitments is to be achieved

#### 2.3.4 Opportunities

#### 2.3.4.1 Process

68. As the Local Planning Process (LPP) becomes more established, its stakeholders more skilled, and its outputs better targeted and formulated, it will become an increasingly valuable resource for MAFF and MOWWRAM's policy and planning process. Greater utilization of the LPP offers considerable potential for ensuring policy and planning is more informed by local needs and priorities and is thus better able to guide and support the LPP itself. Current programs are building capacity amongst provincial and district offices and staff for greater integration with the LPP and deconcentrated agricultural service delivery. Lessons learned about integration of national and subnation planning activities need to be consolidated and disseminated more widely.

69. The RGC Action Plan for Harmonization and Alignment provides a framework for multisector coordination and donor harmonization. The Action Plan, supported by a sound and cohesive Agriculture and Water sector strategy, will provide both ministries the opportunity to strengthen coordination, synergy and resource allocation across the agriculture and water sectors. The establishment in MAFF of a dedicated Department for International Cooperation provides a potential conduit through which improved harmonization might be achieved.

70. Evolving and improving information and communication networks offer a valuable resource in strengthening the speed and quality of information flow between national and sub-national planning processes and stakeholders.

#### 2.3.4.2 Functions

71. Closer links between plan and budget formulation will lead to significant advances in the efficiency of resource allocation, and more effective targeting of MAFF and MOWRAM's limited budgets.

72. Closer links between budget and planning will provide a more effective framework for monitoring and evaluating activities, expenditure, performance and impact, and lead to better delivery of more relevant services.

#### 2.3.4.3 Capacity

73. Resources are available for well-targeted capacity building initiatives both within MAFF and MOWRAM's own budget, and as part of various donor supported projects and Programs.

74. The foundations for a stronger human resource strategy are in place, including outputs of the National Program for Administrative Reform providing guidance for strengthening human resource management systems and procedures.

#### 2.3.5 Threats

#### 2.3.5.1 Process

75. There remains a lack of understanding of the LPP, particularly at national level, and how it impacts upon current policy planning processes in MAFF and MOWRAM. Policy and planning in the ministries are not linked with the LPP and without pro-active effort to integrate with the LPP both to benefit from that process and to contribute to it, the planning and policy process within MAFF and MOWRAM will become increasingly disconnected from agricultural and water sector development activities at the local level.

76. Lack of capacity for planning at commune and district levels may continue to limit the effectiveness of the LPP, and the value of its contribution to national agricultural and water sector policy and planning.

77. There remains a continued preference amongst some departments for retaining independence in planning and budget formulation. This will continue to undermine the quality and effectiveness of policy and planning activities, and put at risk the relevance of projects and Programs. Poorly coordinated planning results in ineffective and inappropriate service delivery.

78. The evolving agricultural economy in Cambodia is increasingly more integrated, diverse and market-oriented. The technical-oriented structure of MAFF and MOWRAM, and the tendency for some departments to operate in isolation from one another, no longer reflects the integrated nature of the farming sector or the income and livelihood focus of prevailing RGC development strategies.

79. The implementation of a comprehensive Agriculture and Water Strategy is an important, if ambitious task. The potential for conflicting agendas between MAFF and MOWRAM poses some risk of delay in the implementation of the Strategy, which in turn might delay greater coordination and synergy in the policy and planning process and thus remain a barrier to strengthening donor support for the agriculture and water sectors.

#### 2.3.5.2 Functions

80. The parallel, uncoordinated generation of activity plans and budget allocation leads inevitably to the regular rejection and/or revision of activity and development plans. Not only is this a considerable waste of planning time and resources, the delays caused are disruptive to operations and personnel.

81. Efforts to strengthen the level of coordination and cooperation in planning and budget formulation may continue to be constrained by continued institutionalized resistance from some departments to providing both the relevant Departments of Planning and Departments of Finance in respective ministries stronger powers in integrating planning and budgeting activities.

82. Institutionalized resistance to the process of decentralization and the shift in MAFF and MOWRAM's role from one of sector management to facilitation may continue to constrain active engagement with the LPP.

#### 2.3.5.3 Capacity

83. Incomplete application of a coherent human resource development strategy within MAFF and MOWRAM will prevent effective targeting and efficient utilization of its limited training resources. Existing emphasis of capacity building initiatives as part of donor-supported initiatives continues to skew skills and approaches toward individual donor requirements and systems rather than prevailing MAFF and MOWRAM process and procedure.

84. Inadequate remuneration levels (linked to excessive staffing numbers) remain a fundamental barrier to the recruitment and retention of capable, well qualified personnel.

85. The more capable middle and senior management staff attract increasingly heavy workloads, often only loosely associated with their positions. Many develop competing duties for different donor-supported projects and Programs. Rapid expansion and over-load of individual duties and responsibilities leads to difficulties in completing some of those duties.

86. MAFF and MOWRAM retain a centralized decision-making structure which can at times restrict its capacity to respond to service and support needs in the agriculture and water sectors. Limited delegation will constrain the process of management capacity building amongst middle managers and junior personnel.

#### 2.4 Analysis and Findings of the Institutional Review

#### 2.4.1 Analysis of MAFF Organizational and Institutional Structure<sup>6</sup>

#### 2.4.1.1 Central Ministerial Level

87. At the institutional level, MAFF has undergone a recent reorganization as part of the drive towards reducing overlapping mandates and addressing some of the institutional weaknesses in the planning and budgeting process. The reorganization carried out under Sub-Decree 188 (November 2008) is a significant step in the right direction, but more time is needed to pass before a proper evaluation of what else needs to be done is made.

88. In the agricultural planning process, MAFF retains a valuable role in strategic guidance for the agriculture sector, supported by stronger planning capacity and direction at sub-national levels as a result of the decentralization and de-concentration process. The foundations exist for a better informed, relevant and harmonized policy and planning process than was previously the case, supported by more effective communications and information systems. There is, however, widespread recognition of the need for improvement through rationalization of the prevailing strategic framework and institutionalizing a single, successor framework more closely linked to policy formulation, monitoring and evaluation, and the processes of annual national and decentralized planning.

89. Planning functions are supported by planning and finance specialists in each department, dedicated planning and finance departments, and the planning, monitoring and evaluation activities of externally supported projects and Programs. It is widely acknowledged, however, that closer links between plan and budget formulation would lead to significant improvement in both service delivery and the efficiency of resource allocation, and render the planning process itself more effective. Activity planning remains dominated by historical operations, and linkages between activities and departments or to the availability of operational funds could be improved. Monitoring and evaluation of activities is constrained. Mandates across departments retain some duplication, and continue to foster independent operations amongst those departments.

90. Policy and planning capacity is concentrated in department planning offices, and the decentralization process is strengthening skills at provincial, district and commune levels. Human resource development is supported by a number of projects, but existing human resource strategies could be improved significantly. Planning, monitoring and evaluation skills are less than robust and under-utilized as a result of approaches to personnel management and ad hoc task allocation. Where donor support is provided, this tends to be project-based and skewed to the needs of individual donors. In this environment many activities, including planning, fall to a limited number of skilled staff, many of whom are over-loaded with multiple duties.

#### 2.4.1.2 Overview of the Planning Process

91. The planning environment of the agriculture sector is changing significantly in response to the evolving decentralization and de-concentration (D&D) process. The D&D process has established a structure for decentralized planning and decision-making at commune level through a participatory and community-oriented Local Planning Process (LPP). In conjunction with this is the parallel de-concentration of service delivery to district and provincial levels, completing the process of relocating development planning and resource allocation from national to sub-national levels through a

<sup>&</sup>lt;sup>6</sup> See MAFF (2006) for an overview of the Organizational and Institutional issues within MAFF.

combination of provincial, district and commune block funding. The D&D process is further institutionalized through the Organic Law that provides the legal basis for delegating respective mandates to province, district and commune authorities.

92. The D&D Program has been instrumental in realizing Royal Government of Cambodia (RGC) strategy as set out by the National Program for Administrative Reform (NPAR). Specifically, the role of MAFF is expected to change significantly, focusing on the following responsibilities:

- 1. Policy formulation and guidance to the RGC on the agriculture sector;
- 2. Generating new technologies to support agricultural production;
- 3. Transferring new technologies to farmers and other private sector stakeholders; and
- 4. Establishing and enforcing regulatory standards related to the agriculture sector.

93. The D&D process is already facilitating these changes by shifting service delivery responsibilities away from MAFF. The ensuing discussions and analyses should be viewed in light of this reform process and the urgent need for MAFF personnel, systems and procedures to adapt to these changes, and particularly the de-concentration of service delivery.

#### 2.4.1.3 Annual MAFF Activity Planning

94. In September and October of each year, every department and all Provincial Departments of Agriculture (PDA) prepare development plans: Annual Department Plans and Provincial Agricultural Development Plans respectively.

95. At national level, chiefs of each office and unit within a department consult with their respective office chiefs in PDA on planned activities for the coming year. Each department's planning team then coordinates with office chiefs to generate a draft Department Plan for submission to the Department of Planning and Statistics (DPS) and MAFF Cabinet Office. Department Plans are used to seek supplementary funding from supporting donors and aid agencies. Annual Department Plans are independent of the respective department Budget Plans (recurrent budgets), and to that extent are an un-funded 'wish list' for circulation to potential donors.

96. At sub-national level, as noted above, planning is now driven by the LPP through which individual communes formulate and prioritize their own Commune Development Plan (CDP). The LPP is the basic framework through which communes mobilize internal and external resources and decide on their use to solve priority local problems that serve the interest of commune residents. The CDP is an annual plan consisting of 5 discrete sections , two of which (i.e. Economic; and Natural Resource & Environment Management) may incorporate agricultural development oriented plans and proposals.

97. Individual CDPs are subsequently brought together in a District Integration Workshop (DIW) that serves as a 'market place' where priority needs identified in the CDPs are matched with development resources from the Communes/Sangkats Fund (CSF) and/or the Provincial Investment Fund (PIF). The DIW leads to consolidation of each CDP, and the development of district and provincial sector plans, including agriculture, which support and service the commune development Programs negotiated at the DIW. The Provincial Agricultural Development Plan of the PDA is, therefore, now borne of the LPP, and funded directly from the PIF. The prevailing role of MAFF in this process is the provision of sector and sub-sector policy and regulatory frameworks by which provincial agricultural plans are guided and coordinated, and where it retains a competitive advantage, in the provision of technical and capacity building support.

#### 2.4.1.4 Annual Budget Planning

98. The MAFF budget planning process is conducted by the Budget Unit, which is chaired by the Secretary General of MAFF and comprises the representatives of the Director, Deputy Director and technical officers from the Department of Accounting and Finance and the Department of Planning and Statistics. The annual budget plans follow the Medium Term Strategic Budgeting Framework (MSBF) which is a rolling three year plan, thus the scope and effectiveness of MAFF's activities depends to a considerable extent upon resources made available to it each year. The annual budget is comprised of a Program Budget, the Non-Program Budget and the Revenue Program. There are three potential sources that determine MAFF's access to resources:

- 1. Recurrent budget This is MAFF's Annual Budget Plan that it uses for its basic operating costs, it comprises a Non-Program Budget (the main allocation) as well as a smaller Program Budget allocation.
- 2. Development budget This budget is usually supported by external bi-lateral and multi-lateral aid agencies in partnership with the government. It has followed the MSBF since 2007 and comprises mainly Program Budget allocations.
- 3. Non-budget activity This item refers to activities usually carried out in the sector by NGO's, bi-lateral aid agencies (either directly or indirectly through financing NGO's) and the private sector.

99. Of the first two budgets, the Development budget describes the volume of donor-supported resources managed by MAFF, and as part of its partnership contribution, includes government counterpart commitments of a capital nature. These funds are all earmarked for the respective donor-supported initiatives. What is frequently overlooked in the development budget, however, and what subsequently contributes to the lack of sustainability in the development investment is the impact on the scarce resources of the government's operational budget (recurrent budget).

100. It is the recurrent budget (Annual Budget Plan) that determines MAFF's ability to undertake its routine activities. This budget is largely derived from the operating budget of the preceding year, and is only indirectly linked to the activity plan for the ensuing year. The budget is generated from respective department budgets prepared in September each year and consolidated by DAF into a MAFF budget for submission to the Ministry of Economy and Finance (MEF) in October or November. During this period, internal review of the budget takes place between DAF, DPS and senior managers. Budget revisions do not necessarily involve departmental stakeholders.

101. At provincial level, the budgeting process followed by Provincial Departments of Agriculture (PDA) reflects the decentralization process. PDA submit annual budgets directly to MEF, and provide financial reporting to MEF. PDA are no longer obliged to submit budgets to the Department of Accounting and Finance within MAFF, although some do appear to provide copies to DAF; see Figure 6.



Figure 6 Flow of Funds Diagram for MAFF

Source: MAFF

#### 2.4.1.5 Provincial Level

102. Several studies have been conducted looking at the institutional and management capacity at the provincial level; see Videl (2003) and Pousse (2004) for examples. The reviews highlight weaknesses in the planning mechanism which link back to MAFF at central level. In particular, skills gaps in strategic planning and analysis, and procedural constraints to effective intra-institutional coordination are recognized as a limitation at all levels and which requires addressing at all levels if genuine improvement is to be realized (MAFF 2006).

103. Several issues have been highlighted which constrain the ability of PDAs to implement national and sub-national programs:

- 1. The structure and mandate of PDA, which consequently tend to reflect the structure at national level, and are as a result compartmentalized and enshrine overlap in responsibilities ;
- 2. A lack of long-term, strategic planning for provincial agricultural development with provincial priorities not translated into integrated Programs
- 3. No consolidated budget for PDA activities, with data on national-level budget allocation not available
- 4. Diversity of procedures and systems adhered to in relation to different bi- and multi-lateral projects and Programs
- 5. Lack of reliable planning data, but which nevertheless are subsequently relied upon for planning at both provincial and national levels
- 6. Lack of planning capacity amongst PDA staff and a planning process often limited to aggregation of on-going activities
- 7. Whilst PDA collect raw data for planning on behalf of DPS, they lack analytical skills to utilize those data themselves;

- 8. There is limited understanding and/or recognition of the differentiation between policy formulation and technical support at central level, and local planning and implementation at sub-nation level;
- 9. Incomplete decisions regarding the de-concentration process and the division of responsibilities and mandates between PDA and MAFF at national level;
- 10. Ineffective management approach with 'vertical lines' of reporting between provincial offices and national departments that constrain integrated provincial planning and activities and do not support inter-office collaboration or coordination;
- 11. There is no direct link between PDA budgets and development activities or Program performance. Moreover, the deconcentration process has generated two parallel systems whereby PDA participating in the D&D system are required to submit budgets and accounts directly to MEF but not MAFF; and
- 12. Field staff are under-paid and commitment/attendance is determined by involvement with donor-funded projects from which means of salary supplementation may be found.

#### 2.4.2 Analysis of MOWRAM Organizational and Institutional Structure

#### 2.4.2.1 Central Ministerial Level

104. For reasons described below, it is concluded that the main activity occurring under the MOWRAM banner is that of construction on a project-by-project basis, managed by the PMO and its subsidiary units, PMUs in head office and sometimes a PIU within the PDWRAM. These activities are conducted separately from (outside) the authority structure of the Ministry and from the Ministry's financial management systems.

105. MOWRAM at head office contains line departments that are not fully functional because they lack staff activity and budgetary capacity. Where donor funding becomes available to conduct project activities of a management nature, line departments may benefit from enhanced capacity in the form of equipment, training, software and systems. However, these frequently become inactive after the project concludes (Taylor 2009).

106. The impediments to 'normal' operation at the Ministry head office level are such that investment in capacity building at this time, and under current conditions, is not strongly supported. Investment in capacity building at the provincial, district and farmer operation levels is a more fruitful strategy for the time being (Taylor 2009).

107. Nevertheless, in the area of professional qualifications and training generally, it is very important to invest, because the flow-on will improve the capacity of Cambodia as a whole, whether or not the Ministry is capable of capturing and retaining the qualified and trained people for useful activity.

108. Decision-making in MOWRAM is centralized and budget and approval delegation to the provincial level is minimal. This situation can only persist because, apart from design and construction projects, little other activity is occurring (management, regulation). An example is the registration of FWUCs at central level instead of province or district (Taylor 2009).

109. These limitations have in turn meant that PDRAM capacities remain limited. In line with the decentralization and deconcentration policy, administrative and financial decisions should be delegated further than at present.

110. Both donor funded and nationally funded projects are managed through the central project management office and its units, and subsidiary provincial project implementation units. The PMO
and its structure is not shown on the organization chart of MOWRAM as it is outside the line management structure.

111. The PMO reports to the Minister via a project manager for each project, who may be at Secretary of State level. The PMO financial accounting system is separate from that of the Ministry and funds do not flow through the Department of Finance, or line departments (Taylor 2009).

112. The establishment of a project management office (PMO) with project management units (PMUs) and project implementation units (PIU) outside line departments has created overlapping mandates of line departments and the PMOs. Staff have been attracted from departments into PMUs, because funding arrangements are more free and workable than in the ministry itself (Taylor 2009).

113. The key issues for the management of the water sector is that the further support of the PMO system is counter-productive, as it contributes to the continuing under-utilization of the line departments and as a consequence erodes their ability to carry out their mandated tasks. The desire to place projects with the appropriate line department should be further discussed within MOWRAM (Taylor 2009).

114. In addition, it will be necessary for the financial management arrangements comply with the following (Taylor 2009):

- 1. The MTEF is introduced and operational throughout the Ministry
- 2. Project funds are routed the line department accounting system under MTEF codes;
- 3. Staff responsible for implementation activities in the Ministry are not placed in a unit that removes them from either (i) normal lines of authority under the departmental structure, or (ii) the Ministry financial system, reporting requirements and audit mechanisms.

115. These measures are designed to ensure that the project is embedded within the Ministry and that (i) knowledge and capacity transfer is improved, (ii) financial accountability is enabled.

## 2.4.2.2 Provincial Level

116. The provincial offices PDWRAM of MOWRAM need to have a strengthened capacity to implement national and sub-national level programs. There is usually no more than one member of staff with an engineering qualification and that person is usually the Director who is therefore taken up with management and does not work as an engineer.

117. The bulk of activity of PDWRAMs involves small-scale construction projects and responsibility for irrigation and other works in the province. PDWRAMs are responsible for operating dams and reservoirs and in theory for the maintenance of the works. However, they have limited funding for maintenance activity and may not have much knowledge of structures. Administration and financial management capacity may also be low (Taylor 2009).

118. Another responsibility of PDWRAMs is to organize and oversee the functioning of FWUCs after they are set-up. The PDWRAM is a joint signatory to the FWUC bank account and must agree to the expenditure of funds by the Chair of the FWUC.

119. The PDWAM structure follows the head office structure of MOWAM with departments for Water Resources Management and Conservation, Water Supply and Sanitation, Irrigated Agriculture, Hydro-meteorology and Administration and Human Resource. Some departments are more notional than real – for instance the Department of Water Supply and Sanitation (Taylor 2009).

120. The provincial level is the logical level for the main activities in the following areas (Taylor 2009):

- 1. The planning, design and construction of works that do not require central attention;
- 2. The operation of hydraulic works in the province not undertaken by farmers;
- 3. The maintenance (including asset management planning and budgetary planning) of hydraulic works in the province;
- 4. Assistance to farmers to enable them to manage their level of irrigation works and activities successfully and sustainably;
- 5. Water rights and conflict issues outside the scope of farmer organizations;
- 6. Measures to remedy provincial river channel, drainage and flooding problems, including the investigation, design and construction oversight for relevant works.

121. These (and other tasks not listed here) are logical roles for the PDWRAM and are not necessary for the central level to undertake, except in cases where large expenditures are required, high levels of technical expertise must be applied or project of national significance are involved. If undertaken at provincial level, these responsibilities would result in a considerable workload, but at present they are not being undertaken comprehensively. PDWRAMs have insufficient staff and lack budgets to undertake them. It would also be consistent with the decentralization policies of the Government to give more formal responsibility to provincial offices (Taylor 2009).

#### 2.4.2.3 District level of MOWRAM

122. The district level of MOWRAM is very limited in staff and function. District offices are usually staffed with a single person who is not technically qualified and whose function is mainly liaison (Taylor 2009). In some districts MOWRAM does not have its own office and the district officer may be located with the district office of MAFF. For this reason, irrigation scheme management and FWUCs links directly to the PDWRAM, not a district office of MOWRAM (Taylor 2009).

123. It will be more appropriate in the long term for the district function to be upgraded and for management and operation issues between irrigation schemes and MOWRAM to be handled by a district office (Taylor 2009).

124. The district level of MOWRAM should be built up to assist farmers to manage irrigation at the appropriate levels which would involve the following (Taylor 2009):

- 1. Assist farmers to form farmer irrigation organizations;
- 2. Support irrigation organization operation and management;
- 3. Provide or facilitate technical support for irrigation generally;
- 4. Facilitate training and development of farmers in irrigation skills and knowledge;
- 5. Liaise between PDWRAM and farmers regarding maintenance and refurbishment requirements;
- 6. Facilitate financing of irrigation improvements.

#### 2.4.3 Farmer Organizations

125. There has been a proliferation of committees and cooperative bodies in which farmers can to participate. At the village level it is not uncommon for the following to exist:

- 1. Agricultural farmer cooperatives
- 2. Community disaster committees (in flood and drought prone areas)
- 3. Savings committees or cooperatives
- 4. Community forest organizations
- 5. Community finance organizations
- 6. Community fisheries organizations and other commune level committees
- 7. Farmer Water User Communities

126. The two most relevant formal organizations in the agriculture and water sector are:

- 1. Farmer water user committees (FWUC), registered under the water law and regulation. In larger irrigation schemes a scheme-wide FWUC is established and sub-groups are created to report to the central committee.
- 2. Farmer Groups, established as cooperatives by MAFF, which enables them to enter into contracts and conduct business as a group. These have been operating as commercial bodies, able to attract finance in various ways.

127. The corporate structure of the farmer organizations set up by MAFF, under the law on farmer cooperatives, allows them to engage in commercial activities. A question is whether irrigation organizations would benefit from a similar legal status. For instance, the ability to contract out activities such as maintenance or construction could be an advantage for irrigation farmers (Taylor 2009).

128. The formal FWUC program results in the registration and setting up of a committee under the regulation pursuant to the water law. A chairman and committee members are formally appointed and an office building may be located or provided. For larger schemes, a system of sub-committee is organized. The main responsibilities of FWUCs are to undertaken maintenance and operation of minor canals and to organize the contribution of labor for routine main canal activity, and to collect water user fees from farmers to fund these activities (Taylor 2009).

129. FWUCs have been seen as relatively ineffective in turning over real management from the PDRAM to farmers. Reasons include the lack of training and capacity of FWUC members and the farmers. This has not been supplied by the Ministry, nor by PDRAMs, as the provinces do not have capacity themselves.

130. There needs to be a consistent and cooperative organizational set up for farmers. The creation of separate agriculture and irrigation committees or organizations is not a problem provided that (i) they are not attempting to undertake the same activities competitively, (ii) relevant activities are undertaken cooperatively or there is adequate communication between them. However, there does need to be an agreed general set up and a general understanding between MOWRAM and MAFF about who will do what (Taylor 2009).

131. The main issues with the strengthening of FWUCs are (Taylor 2009):

1. The FWUC is registered at the central level with MOWRAM and the PDWRAM in practice has joint control of the financial account and liaises with the FWUC on programs and activities. The district office does not have a defined role in supporting or overseeing the FWUC. There is not good reason why they cannot be registered by the province or even the district, provided that the regulation allows. The district office should become the main support and capacity development arm of the Ministry. At present the district office is not

capable of technical support. A strengthening strategy is required that involves staffing, training, added responsibility and budget allocation.

- 2. FWUCs are not independent of MOWRAM. The central role of FWUC as presently constituted is to empower the committee to collect fees from farmers for irrigation works. However, the account is jointly controlled by the PDRWAM which must sign off withdrawals by the FWUC chairman and treasurer.
- 3. The financial affairs of FWUCs are controlled by the PDWRAM, although the fees are collected from the farmers themselves. Although it is wise for the Ministry to exercise some oversight over the activities of the farmer organizations created by it, (and a proper audit procedure should apply to collected fees) it is desirable that the farmers become as self-determining as possible and that their finances are at their own disposal. The pilot training interventions of TSC appear to demonstrate that farmers, when properly trained are capable of more development and management work in irrigation schemes than has been assumed. Ultimately the financial control of the PDWRAM should be cut and farmers allowed to determine how the money is spent. This may not readily come about without procedures that allow the farmers to chose their leaders are regular intervals.

#### 2.4.4 Gaps in Ministerial Mandates

132. As discussed by Taylor (2008), there are gaps that fall between the mandates of MOWRAM and MAFF in respect to (i) farmers' knowledge of field water control and (ii) methods of irrigated agriculture. These two areas are related but neither MOWRAM nor MAFF cover either. As a consequence, there is limited opportunity to improve agricultural production without irrigation schemes that incorporate greater water control mechanisms. The respective roles of both ministries are closely related and both need to be operational for irrigation improvement to be seen. One way of understanding the elements is shown in Figure 7.

133. Staff of MAFF and DAFF do not consider training in improvement of field water control to be a responsibility of MAFF; arguing that MOWRAM possesses the equipment for measuring flow. At the same time, MOWRAM does not cover this area, which requires new information to Cambodia. Formal legislation and policy do not provide a guide to the Ministries' obligations in this regard (Taylor 2008). While MAFF provides information to farmers about agriculture, including rice growing and rice intensification, irrigation methods as such are not covered.



Source: (Taylor 2009)

#### 2.4.5 Management and Development of Human Resources in MAFF and MOWRAM

134. All departments in MAFF and MOWRAM interviewed by the team indicated significant concern about the status of human resources in MAFF and MOWRAM and that with an increasingly aged workforce the number of technically qualified personnel is decreasing without a pool of trained recruits being available to take their place. It was noted that MOWRAM is finding it increasingly difficult to recruit new irrigation engineers, meteorologists, hydrologists or water chemical engineers to replace staff nearing retirement age. This is even more of a problem considering the expansion of irrigation schemes in Cambodia and the concomitant increase in personnel required to build and maintain them (i.e. each irrigation scheme needs upwards of 4 engineers to design and operate, and while there are already over 1000 schemes across the country there are only around 1000 engineers).

135. Discussions with MOWRAM departments indicated that there are no Bachelor or Master degrees in water resource specialties within Cambodia (irrigation engineering, hydrology, meteorology etc) and that the current Bachelor of Rural Engineering course at ITC only provides individual subjects in these specialities rather than a dedicated set of courses. As such, new recruits into MOWRAM and MAFF have limited exposure to the skills required in designing and maintaining irrigation schemes and managing water resources at the river basin and national levels.

136. The Technical Services Center under MOWRAM has been supported by JICA and currently provides short term (several weeks to several months) non-accredited training courses in specialist

subjects (e.g. irrigation scheme design, GIS etc). These are extremely useful to the central level and provincial level staff sent on these courses. However, the courses are designed as continuing education and upgrading courses for already qualified staff and do not address the fundamental issue of a lack of basic education in the fundamentals of water resource management and engineering. Currently the sustainability of the TSC is contingent on ongoing donor commitment and RGC needs to ensure core funding from the national budget.

137. Discussions with MOWRAM and key donors indicate a strong desire for the TSC to be upgraded to an Institute under MOWRAM with possibly degree-awarding capabilities. Designating TSC as an Institute would presumably ensure continued funding from MEF, but much more needs to be done to transform the TSC from a short course vocational training center to an accredited degree-awarding Institute with comparable standing as a University. Part of the activities of the Strategy for Agriculture and Water (SAW) will be to investigate these issues, including budgetary implications and cost-effectiveness.

138. In the context of continued capacity building of technical staff, discussions with MOWRAM and donors supporting the TSC suggest that ongoing and planned donor activities in the Agriculture and Water Sector need to take into consideration the existence of the TSC (and their current and future capacity) in implementing any capacity building components under donor-funded projects. One suggestion has been to streamline donor-funded training courses and channel them through the TSC where appropriate rather than the current ad-hoc system of individual donor-led training courses. This would provide the dual-advantage of ensuring consistency across training programs and developing the institutional capacity within MOWRAM for training.

139. In this vein, it was noted in discussions with the MOWRAM and MAFF that both government and donors have difficulties in keeping track of which RGC staff have been trained in specific activities due to the proliferation of individual donor training courses. Having a centralized and streamlined training program with a corresponding centralized database of trainee names would ensure that both government and donors are aware of which staff have been trained, and in which subjects, and thus could allocate human resources properly across RGC programs and donor initiated projects.

140. While discussions with MOWRAM and MAFF departments indicated significant constraints in recruiting trained technical staff, with line departments being given new recruits with degrees in business and marketing rather than degrees in engineering, there was also widespread concern as to the lack of trained administration staff. Often senior administrative positions in the ministries are filled by staff highly qualified in technical disciplines but who lack the required skills in accountancy, human resources or legislative drafting.

141. The Royal School of Administration provides the necessary skills development and capacity building for administrative staff, but strict quotas means that only 2 staff per ministry per year are trained. This is insufficient to provide the necessary numbers of staff at the central level, let alone at the provincial level - particularly in the context of the D&D program which aims to devolve much more responsibility to the provincial level. With responsibility comes the requirement for trained staff.

142. At other technical levels (where a qualification below bachelor is involved) there is also a dearth of staff with knowledge and qualifications. This is made more severe by the fact that most of such staff are or would be located in PDWRAMs and PDA. For instance, the ability to assess the condition of irrigation structures and determine whether and what maintenance is warranted may be beyond the staff of most PDWRAMs, even for medium and minor structures. Similarly, the ability to make an asset management plan for water structures of any type is probably not able to be undertaken in any province and may not be familiar to staff at the central level (Taylor 2009).

143. In any case, it is clear that the challenges for MOWRAM (and MAFF to a lesser extent) are (Taylor 2009):

- 1. Recruiting and retaining qualified professionals in the fields of irrigation engineering, hydrology, meteorology;
- 2. The absence of the advanced technology in information management, modeling that is needed to undertake water resources planning for investment and the regulation of water use;
- 3. The need to build up knowledge and skills at provincial level in engineering and related technical understanding for irrigation management and the management of water structures including dams, reservoirs and flood control works,
- 4. The need to strengthen management skills at all levels.
- 144. There is therefore a need:
  - 1. For Cambodia as a whole (both public and private sectors) to build up academic training at bachelor degree level and above in engineering with water resources specializations and qualifications at higher levels over time;
  - 2. Within the public sector (MOWRAM) for significantly increased training in technical fields related to the operation, maintenance and management of water works;
  - 3. To increase the capacity of farmers to manage all aspects of irrigation schemes up to tertiary level;
  - 4. For improved management and financial skills at all levels including farmers.

145. Each of the four capacity areas requires a specific strategy for the medium and long term, as well as some immediate measures. The second and third of these capacity needs also require a financial strategy that goes beyond the training and human resources development. That is, the institutional functions of PDWRAMs, DOWRAMs, PDAs and DOAs need to be developed and some financial support would be appropriate. Support is also required for farmers to undertake works within their irrigation schemes (Taylor 2009).

#### 2.4.6 Planning, Budgeting and Financial Management Activities and Systems

146. Discussions with MAFF and MOWRAM indicated that there is a significant gap between the annual workplan activities being carried out by technical departments in and the information available to administrative departments which hampers the planning and budgeting functions. For example, the planning departments under MAFF and MOWRAM do not have a clear idea of the particular projects or activities being implemented by the various technical departments and thus cannot align these activities with the national strategies being developed at higher levels of MAFF and MOWRAM. Similarly, the finance departments are only responsible for being the liaison between technical departments and MEF in passing on budgetary requests and the subsequent budget allocations, but has no oversight on actual expenditures.

147. At the provincial level the gap is even more pronounced, as the D&D system has resulted in provincial departments being responsible to the Provincial Governor for expenditures and are not providing MOWRAM and MAFF at the central level with reports on plans or budgets. While the Department of Finance is responsible for passing on MEF allocations, they are unable to receive adequate feedback from the provincial level to enable a proper M&E system to be put into place. The asset management procedures follow MEF guidelines but are limited in that there are no policies on asset replacement or asset maintenance.

148. It is observed that with the separation of MOWRAM into a General Directorate of Administrative Affairs and a General Directorate of Technical Affairs, each of the technical departments had an administrative unit but did not have a dedicated finance unit; with the financial responsibilities being undertaken by administrative staff. One of the proposed solutions to the coordination issue was to establish a dedicated finance unit in each technical department staffed with a trained cadre of accountants who could then liaise directly with the Department of Finance and provide the necessary feedback to enable the Department of Finance to properly oversee financial disbursements and expenditures<sup>7</sup>.

149. Discussions with MOWRAM indicate that the Medium Term Expenditure Framework (MTEF) Financial Management Information System (FMIS) currently being piloted in MAFF needs to be expanded to include MOWRAM. The use of a consistent FMIS across Ministries and within ministerial departments will go a long way to enabling higher level financial and planning units to access information and coordinate the implementation of National Strategies throughout the system.

150. In terms of national budget expenditures, Ministries do not control government budget allocations for the most part, as these are tightly held by the Ministry of Economy and Finance (MEF) and ministries must seek MEF's approval for spending on an item by item basis before the funds are disbursed to them; see Section 2.2. Ministries receive funds for salaries directly from the Ministry of Finance, but do not have much control over expenditure for other items. Further, MEF may decide make arbitrary cuts to approved budget allocations for a project and in some cases have rendered the project ineffective.

151. Within MAFF and MOWRAM, the Finance Departments have difficulty getting full information on the spending of the line departments, receiving only general statements of monies spent. MEF therefore exert controls, not by post expenditure audit and review, but by controlling the funds disbursement stage, a strategy that hinders ministry performance. In MOWRAM the Finance Department has no role in control or review of funds assigned to the project management offices (PMOs) or project implementation units (PIUs) because they report directly to the Minister. Similarly, in MAFF the Finance Department has no oversight on PMUs from donor projects as only line departments are obligated to report budgetary expenditure<sup>8</sup>.

152. Some management consequences of these practices (in addition to the gross limits on the availability of finance) are:

- 1. Line departments may be (in MOWRAM's case it seems they generally are) severely restricted as to their funding sources and often find it difficult to operate for instance budgets allocated by the Council of Ministers are not guaranteed to be passed on by MEF;
- 2. There is no financial flexibility even at the petty cash level, so that routine activities can be restricted or halted.

<sup>&</sup>lt;sup>7</sup> The situation for MAFF is similar in that there are difficulties in coordinating budget and planning functions between departments. Under the ADB funded Agriculture Sector Development Program (ASDP) recommendations were made to separate the General Directorate of MAFF into a General Directorate of Administrative Affairs and a General Directorate of Technical Affairs in order to streamline the budget and planning functions and provide higher level oversight to individual line departments' activities. It was viewed by MAFF that such a separation was not necessary and that a Planning and Budget Formulation Unit at the General Directorate Level would provide the same functions and level of oversight. Discussions within MAFF are ongoing as to the feasibility of separating administrative and technical functions at the sub-General Directorate level.

<sup>&</sup>lt;sup>8</sup> Put simply, under the MTEF Program line departments are obligated to submit Form P4 (Activity Profiles) which detail sources of funding from Internal and External (donor) sources. Since PMUs are formed to manage donor projects and are therefore outside of the line departments mandate, ODA funding 'slips through the cracks' and the Finance Departments are unable to report how ODA funds are spent.

153. This is a second reason why ministry staff cannot work within the ministry and why they seek additional work outside – workable projects do not exist on which they can spend their time.

154. The lack of institutional improvement is serious because it means that the government ultimately has limited ability to undertake activities by normal administrative means and must use special measures to get things done. So long as construction projects are being financed by external lenders and donors, the operational inadequacies of ministries are masked to some extent.

155. The Council on Administrative Reform (CAR) has been rolling out a reform program in some ministries but it has not yet been applied to MOWRAM. It may have the potential to improve some of the difficulties described above, but will not address the salary problem.

#### 2.4.7 Salary Supplementation and Allowances

156. There are severe constraints on the performance of all government ministries in Cambodia. The chief constraint is the low level of salaries available to government staff, including director level and even above. The official salaries of technical staff (engineer for instance) are between US\$80 and \$250 per month (equivalent) depending on the seniority level. This is not enough to live on. Therefore such staff and even directors take alternative work while being registered as staff of a ministry. In the case of MAFF and MOWRAM and their technical staff, the work alternatives are provided by (i) private sector hiring, and (ii) work directly on externally funded projects where the remuneration is higher. Other sources for senior officials may include fees for participating in various committees.

157. The main consequences are: (i) staff are not available to work within departments of the ministry unless special funding is available; (ii) staff do not obtain experience in their field through the ministry, only through working outside; and (iii) while the capacity of individuals may be improved, institutional capacity is not advanced.

158. Both Donors and the RGC have recognized that donors and NGOs bear some of the responsibility in ensuring that provincial and district staff are adequately compensated for their efforts. As such, the secondment of government staff to donor and NGO projects does little to ensure the longer term sustainability of government institutions; rather the 'cherry picking' of the best qualified staff and leaving the rest behind to pick up the workload does nothing but accelerate their decline.

159. This problem is one that cannot be resolved at the level of the ministry because it is government wide and requires a significant change in policy and funding. Donors have attempted to address the problem by creating and signing up to the Merit-Based Pay Incentive program (MBPI), which was recently cancelled in December 2009. Under MBPI, some staff become eligible for additional salary incentive payments in the order of up to US\$100 per month. However, payments at these levels do not make up the difference between government and private sector pay rates, which may differ by US\$400-600 per month and, as conceived, the MBPI was likely to be of little consequence.

160. Under the Strategy for Agriculture and Water it is envisaged that a salary supplementation / allowances scheme to replace the recently cancelled MBPI scheme shall be rolled out to MAFF and MOWRAM departments. While the MBPI was rightly seen as an important initiative to address the critical salary constraints facing the civil service in Cambodia, by design it was aimed at senior managers and line staff in "Special Operating Agencies"; designated as such in Priority Mission Groups. The teams' discussions with MAFF and MOWRAM stakeholders indicate that while MBPI was seen as an extremely positive step in the right direction for administrative and pay reform in the

civil service, it did not go far enough in tackling the real issue of low salaries; that of technical staff in line agencies at the lower ends of the civil service (provincial and district level). Unless pay incentives are extended to these technical staff there is little chance of fundamental changes in performance of the system. The challenge is to find a mechanism through which provincial and district staff are adequately rewarded for their performance<sup>9</sup>.

External inputs to staff salaries could come from donors in two ways: (i) Via projects where 161. incentive payments are made or where staff are hired directly on higher salary rates, and (ii) Through budgetary support mechanisms (following the Paris Declaration).

162. These measures would be temporary only and will not solve the basic problem. In fact, if significant budgetary support is provided directly to the government for support to ministry salaries, the core responsibility of the Government to remunerate its staff adequately could be undermined.

163. There have been some efforts by donors to ensure government agencies at the provincial and district level maintain their cadre of skilled personnel. The AusAID funded CAAEP (II) Project implemented a scheme where provincial departments themselves were contracted out as an entity to provide project services (such as Agro-Ecosystems Analyses - AEAs), thereby ensuring that government staff were retained within their departments, the departments as a whole were capacity built, and that the directors of departments could manage staff time allocations across different priority areas.

The direct contracting of provincial departments, coupled with transparent contracting 164. arrangements (publishing of contract terms and conditions as well as publishing names of staff allocated to specific tasks), may provide a mechanism through which all donors can cooperate with RGC ministries and provincial departments while ensuring institutional capacity building, merit based pay incentives, and efficient project implementation.

#### 2.4.8 **Management Information Systems and Databases**

#### **Agricultural Information and Data<sup>10</sup>** 2.4.8.1

Within MAFF, agricultural information priorities are reflected in the activities of four offices: 165. the Agricultural Marketing Office (AMO) and the WTO Unit under the Department of Planning and Statistics (DPS), the Department for Agro-Industries (DAI), and the Bureau for Agricultural Material Standards (BAMS). Within the Ministry of Commerce (MOC), agricultural information is a major feature of activities under the offices promoting domestic and export trade, including those concerned with support for the establishment of export processing zones (or EPZs) and product quality standards, notably the Export Promotion Department and CamControl, and harmonization of crossborder regulations and procedures for WTO accession (Tasker 2003).

The main agricultural information and data collection activities in MAFF revolve around the 166. Agricultural Market Information Service (AMIS) under the Agricultural Marketing Office (AMO); the supporting CIDA funded Cambodia Agricultural Market Information Project (CAMIP) involved in SMS (mobile phone text messaging) technologies with traders; ongoing activities under the ADB

<sup>&</sup>lt;sup>9</sup> This scheme was temporarily suspended by the RGC on 3<sup>rd</sup> December 2009 (Sub-Decree 206) with provisions to revisit the scheme in 2011. On 21 January 2010 the RGC announced that the PMG and MBPI scheme would remain cancelled and a temporary Salary Supplementations / Allowances scheme would be instituted while a review of the incentives schemes would be carried out by mid 2010. Depending on what modality the RGC decides at this point to implement, the SAW envisages that the replacement scheme should be rolled out to provincial departments by 2011, <sup>10</sup> See (Purcell 2006) for a full review.

funded ADSP (Loan 2022-CAM); and finally data collection activities for the Annual Conference of MAFF where production and hectarage data for each crop is presented.

167. While the CIDA funded CAMIP is working closely with the AMO in providing capacity building and support to market information collection, the SMS service is ancillary to the mainstream AMIS collection system carried out by the AMO. The AMO/AMIS system is the topic of this review for institutional management and capacity building purposes.

168. The current institutional structure of the AMIS within MAFF was set up in August 1997 under the auspices of an FAO TCP. The institutional structure has remained virtually unchanged since that time; see Figure 8.

169. The AMIS starts at the provincial level with provincial data collectors who are staff of the Provincial Department of Agriculture (PDA). These staff are nominally under the Provincial Office of Planning and Statistics (POPS) and have been assigned to work with the Agricultural Marketing Office (AMO). Provinces under the AMIS are: Kampot, Sihanoukville, Battambang, Banteay Meanchey, Siem Reap, Kampong Cham, Kampong Chhnang, Prey Veng, Kandal, Takeo and Phnom Penh.



Figure 8 Current Institutional Framework for AMIS in Cambodia

170. In general, one price collector<sup>11</sup> is assigned in each AMIS province (with the exception of Kandal and Phnom Penh which is covered by AMO central staff) to provide price reports to the AMO. The duties of the Provincial staff include:

- 1. Collecting marketing information in the province;
- 2. Data entry processing and analysis of price fluctuations and marketing constraints;
- 3. Transmission of market information around 10am every Monday, Wednesday and Friday;
- 4. Preparation of monthly AMIS report and delivery to AMO;
- 5. Collaboration with the Provincial Agricultural Extension Office and the provision of marketing information; and
- 6. Dissemination of current market information to targeted communes.

171. The AMO has 18 staff at the central level (including 7 female staff) working in agricultural marketing activities. Of these 18 staff, there are 9 staff who are assigned to work on the AMIS. In general the AMO responsibilities encompass data entry and processing, analysis, dissemination, and coordination. In total there are 20 staff working on the AMIS; 11 at the provincial level and 9 at the central level.

172. In addition to the AMO AMIS, several other government organizations are involved in AMIS activities. Firstly the DAE is supposed to disseminate extension advice based on market information received from the AMO. This extension is very limited and there is no formalized system as yet. Secondly, the Domestic Trade Department under the Ministry of Commerce is involved in a market information service, mainly of retail prices, but also it collects wholesale prices of some agricultural commodities.

173. As noted above, there are 11 provincial data collection staff who collect market information from selected markets and traders in their particular province; with AMO staff covering Phnom Penh and Kandal markets. The coverage of the AMIS is based on a study of Cambodia's agricultural marketing system undertaken in 1997 (MAFF 1997). The study identified major commodity flows and highlighted key markets and market channels. In all the AMIS collects information from some 22 major markets as well as various mills, collection points and other selling venues in 11 cities and provincial centers across Cambodia. The coverage of the AMIS in most cases gives priority to provinces that produce surpluses of crops, livestock or fish. In total, some 160 commodities are tracked by the AMIS. Not all provinces track around 30 wholesale commodities and 80 retail commodities

174. Several commodities, especially certain vegetables and fruits are highly seasonal and are covered only for a few months. The price collectors have the important task to observe and report immediately on any new products that appear in large quantities on the market.

175. The institutional framework of the AMIS is relatively robust; provincial price collectors are directly funded by AMO which is a relatively autonomous body within the Department of Planning and Statistics. The provincial price collectors are actually PDA staff and so there are some issues of dual responsibilities and workloads. Within the AMIS system of collection, analysis and dissemination there are few institutional constraints apart from budgetary constraints.

176. The main constraints from an institutional point of view are the linkages between the AMO AMIS and other organizations, both at the provincial level as well as the central level.

<sup>&</sup>lt;sup>11</sup> In two provinces with a concurrent IFAD funded D&D AMIS program there are two price collectors employed.

177. At the provincial level the price collectors in some provinces are working with the other donor funded AMIS programs. This is a relatively separate activity despite the same staff working on both AMIS. There are obvious synergies and linkages which are only exploited to some extent (only in terms of data collection and data entry).

178. The AMO produces market information with the purpose of timely dissemination to relevant stakeholders, particularly farmers. However, this information is underutilized by extension officers in their extension advice to farmers (information on what to grow, when to grow and when to sell based on price fluctuations). As is the case with the AMO at the central level, linkages between the price collectors and the provincial Office of Agricultural Extension (POAE) are weak, inhibiting the flow of market information to farmers.

179. At the central level the AMO has weak formal linkages with the DAE, although this is being rectified by agreements with the Agricultural Extension and Education Office (AEEO) to collaborate on broadcasting. These weak linkages prevent the development of a set of extension modules on marketing information and the use of this information in farm management and cropping decisions.

180. In addition to the AMO, the Ministry of Commerce's Domestic Trade Department (MOC/DTD) and the Phnom Penh Municipality are also involved in market information systems (although not exclusively agricultural commodities). There is considerable overlap in operations and there is not a consistent methodology utilized by the respective organizations. In order to improve the efficiency of the (A)MIS of all three organizations and reduce total costs of operations there needs to be some coordination between them.

181. Currently the AMIS run by the AMO operates under several constraints in the data collection phase.

182. Firstly, there is a limitation in the coverage area of the AMIS, which at present only covers 11 provinces (Phnom Penh, Kampong Cham, Kampong Chhnang, Prey Veng, Kandal, Takeo, Kampot, Sihanoukville, Battambang, Banteay Meanchey and Siem Reap). While these provinces produce the bulk of tradable commodities in Cambodia, there is a desire to expand operations to other provinces (such as Svay Rieng, Kampong Thom, Kampong Speu, Pursat and Kratie). The rationale for this expansion is that the development of a commercial agriculture system in these provinces requires the delivery of relevant market information to stakeholders in those provinces.

183. Secondly, the consistency of market information collected differs between markets and between provinces. This is related to not only the differences between the type of commodity but also related to differences in sampling methodology.

184. In terms of the type of commodity, there are no formalized (official) standards and grades for commodities sold in markets across Cambodia. While traders do have a system of grading these are not consistent between traders and markets with the exception of cereals and pulses which are traded between provinces (unlike vegetables which are more likely to be consumed within the province). As an example, for soybeans (a tradeable commodity) there are 3 grades depending on color, grain size and moisture content. In contrast, vegetables have a much more subjective grading system based on perceived freshness, extent of insect damage, etc.

185. Even in commodities with an established grading system (like soybean and maize for example), market operators are flexible in their grading depending on the relative scarcity of crop (for example, when there is a shortage, traders are more likely to "grade up" a crop). The lack of consistency in what constitutes a particular grade means that it is difficult to compare prices for a commodity across markets; since any price difference could be attributed to transportation costs, arbitrage, or just being a different quality.

186. In terms of sampling methodology, price collectors have had some limited training from the AMO on collection of data but in many cases are not following established protocols. For example, most price collectors only visit one trader in the market to obtain prices rather than the 5 sample points recommended. If this trader does not sell all of the surveyed commodities then the price collector will move onto another trader to get the remaining prices. As another example, some price collection points are very far from the provincial office so the price collector may just phone a trader to get the relevant price<sup>12</sup>. While protocols for data collection have been established, they are not yet formalized (in a "price collector's manual") nor is any monitoring or enforcement of price collection carried out. As long as price collection sheets are transmitted to the AMO on time, there is no real check as to their consistency or accuracy.

187. Thirdly, accuracy of data collected is a problem. Most traders are wary of providing price and quantity information to government collectors; unsure the purpose of the data collection. Collectors prefer to find one or two willing traders and then repeatedly use them for data. This creates fatigue for the selected traders who are constantly asked for price information in the midst of trying to sell their products, and creates a sampling bias as those selected traders may not be representative of the overall market situation.

188. Fourthly, most price collectors visit the markets in the early morning so as to meet the deadline for transmission of data to the AMO by 10am. Different markets operate at different times of the day, and prices vary throughout the day. Market prices should be collected at a set time during the daily market cycle and usually at the mid-point time. This may not correspond to an early morning data collection system. Associated with this is the fact that the price collectors, as government staff, have their mandated holidays which may not match with the scheduled collection days. Currently, if a holiday falls on the same day as their price collection day, then data collection is skipped. A better system would be if the data collection were carried out either the day before or day after the holiday to ensure a continuum of price data for the AMIS.

189. Fifthly, there are deficiencies with data entry and data management protocols which result in a loss of useful information and historical data series. Provincial price collectors may collect prices from more than one trader for the same commodity, but invariably average those and only send the average to the AMO. This loses valuable distributional information and forces the AMO to disseminate "averages" which may bear no relationship to the real price variance seen in the market place<sup>13</sup>. For those provincial offices involved in other donor funded AMIS, which monitors retail prices, only the monthly summary is sent to the AMO and so valuable weekly information is not transmitted on time<sup>14</sup>.

190. Data management is a serious issue at the provincial level, but less of an issue at AMO. All provincial price collectors have been trained on the Agrimarket software and have a dedicated

<sup>&</sup>lt;sup>12</sup> For example in Kampong Cham the provincial price collector will just phone a trader to get the price of pepper in a border district rather than take the 1 hour journey to visit them. While this is certainly very reasonable and an efficient way to collect prices, in Battambang the opposite occurs; the price collector will go and spend 2 hours to collect prices at a particular rice mill rather than telephone them because the department will pay for transportation costs but not telephone costs. Compounding this is the reluctance of the rice miller to provide information over the phone during working hours as this interferes with their dealing with customers. <sup>13</sup> A common complaint from farmers and traders is that the broadcast prices are "inaccurate" and bear no

<sup>&</sup>lt;sup>13</sup> A common complaint from farmers and traders is that the broadcast prices are "inaccurate" and bear no relation to the true price in the market. In part this is due to the broadcasting of an average price, rather than a range in prices; which would give stakeholders a better idea of the distribution in prices and a higher probability that their own transacted price would fall into the range (and thereby increase the "credibility" of the price information).

<sup>&</sup>lt;sup>14</sup> For example, in the Prey Veng AMIS, retail prices are collected at an additional 3 markets on a weekly basis; which is then compiled into a monthly bulletin - a copy of which is sent to the AMO. The AMO does not incorporate this data into their Agrimarket database; only keeping the hardcopy of the monthly bulletin on file.

computer to enter the price information. However, compliance with data management protocols are lacking.

191. At the provincial level data is not always kept and the data which is kept is not usually in a format (database or excel spreadsheets) conducive to rudimentary analysis (trend charts, analysis of supply conditions). For those provincial offices which continue to use the Agrimarket software and have the facilities to actually do some rudimentary analysis, this is not done as the officers see their role as primarily a data collection service rather than data analysis and dissemination service.

192. There are several constraints in the provision of data analysis services by the AMO and at the provincial level.

193. In the AMO the analysis skills of staff are at an intermediate level and they are able to produce monthly bulletins with rudimentary time-series charts of prices as well as provide some basis interpretation of trends. However, slightly more advanced techniques, such as putting a trend line in an Excel spreadsheet and various other graphical tools, are not known. While the level of AMO analysis capacity is commensurate with the current level of dissemination, the AMO has expressed a desire to expand the scope of the analysis services they provide. As such, the AMO currently lacks the skills and capacity to conduct more advanced analytical services such as trend interpretation and forecasting. The AMO has requested more advanced statistical training (using SPSS), as well as some economics training so they can provide farm management and business advice.

194. At the provincial level the capacity and / or desire to provide analytical services is limited to non-existent. Since data analysis and dissemination responsibility is outside the mandated role of the provincial staff this is completely understandable. However, dissemination activities to the local level are more efficient if conducted by provincial staff rather than by the AMO, who should concentrate on providing more advanced analytical services rather than just price reporting. In such a case, the majority of provincial staff need significant training and capacity building in basic computer software operations in order to produce rudimentary analysis such as time series charts with trends.

195. Data dissemination services are constrained primarily from a budgetary point of view, which limits the number of monthly bulletins that can be produced and the mode of broadcast (TV and Radio) delivery. Operating guidelines for the AMO prevent payment for broadcasting and so this restricts the dissemination of market information to the state-run broadcasting system.

196. While private broadcasters normally would accept AMIS material for broadcasting, this would be under strictly commercial terms; either the AMO would have to pay for the broadcasting or advertising revenue would cover the cost. Since private broadcasters are obviously reluctant to broadcast AMIS material this implies that the advertising revenues do not cover the cost of the broadcast. This leaves open the question of why advertisers do not want to sponsor a program which should be reaching a substantial number of rural households in Cambodia. Anecdotal evidence suggests that the format of the AMIS broadcast is not conducive to garnering a large audience (i.e. long lists of prices read out aloud are not entertaining).

## 2.4.8.2 Water Information and Data

197. Two departments of MOWRAM have water information roles – Hydrology and Meteorology. The capacity of these departments is critical to the capacity of the Government as a whole to know what water the country has and what can be done with it.

198. Several reviews (MOWRAM 2001a, b; Taylor 2008, 2009) have noted there is a lack of adequate information about water resources, weather and climate to support RGC strategies for socio-

economic development. MOWRAM does not have the capability to generate accurate and timely forecasts of flooding in parts of the country beyond the Tonle Mekong/Tonle Sap floodplains.

199. As far as hydrology data management is concerned, 2 parameters are generally tracked; the water level and the discharge. The water level is the easiest parameter to follow with a range of equipment going from a manually read scale on a daily basis to an automatic recorder which enables to follow the water level continuously. Water level alone is insufficient for water resources assessment but is important information for flood management. The data collected can be transmitted in real time (if the station is equipped with a transmission system), in nearly real time (every 24 hours) or in delayed time (1 week to several months). Precise and quickly transmitted information is very useful for flood management but require a high maintenance budget (TWGAW 2008).

200. The hydrologic network is comprised of water level only stations and water level and discharge stations. Data are available for 83 stations but only 32 stations have data series longer than 10 years (which is a minimum required to make statistics) and only 40 have discharge data (TWGAW 2008).

201. Currently, there are around 50 operational stations (33 with discharge and water level and 17 with water level only) but this is very variable from one year to another depending on the budget allocation and the number of projects which support the Department of Hydrology and River Works (DHRW). It is also important to notice that the DHRW lacks of financial means to update regularly the rating curves. So, the accuracy of the discharges data is likely to be very low in some areas. For the main stations, discharge measurements are carried out under the MRC activities and are consequently more regular (TWGAW 2008).

202. MRC provides support the DHRW to manage a real and near real time transmission network for flood forecasting. Near real time network (daily human reading transmitted by cell phone) is far easier and cheaper to implement than a real time network and gives very useful information for flood management. For the moment, only 8 water levels are at least daily reported. The regional flood center of the MRC has the objective to set up 14 new daily reported water level stations (out of which 8 would be upgraded to automatic stations) (TWGAW 2008).

203. Currently, the DHRW operates 21 water quality stations (8 main stations and 13 secondary stations) with the support of the MRC. Nearly half of the stations were set up during the period 1993-1995. The other half was set up in 2004. The 8 main stations monthly operate, and the other 13 secondary stations seasonally operate. The followed parameters are pH, total suspended solids, conductivity, calcium, magnesium, sodium, potassium, alkalinity, chloride, sulphate, nitrate, nitrite, ammonium, total nitrogen, phosphate, total phosphorous, silica, dissolved oxygen, chemical oxygen demand and aluminum (TWGAW 2008).

204. The Department of Meteorology (DoM) monitors 19 manual synoptic stations and has 10 automatic synoptic stations (6 of them out of order). The rainfall network is comprised of around 175 stations out of which 125 were operational in 2006. 23 stations (19 synoptic and only 4 rainfall stations) are reported daily and the information is transferred through the global transmission system (GTS) of the World Meteorological Organization (WMO). The data coming from the synoptic stations indicates the wind direction and its speed, rainfall and temperature. Two other synoptic stations, located in the Airports of Phnom Penh and Siem Reap, are managed by the Secretary of state for civil aviation (SSCA). MAFF also monitors 8 rainfall stations in provinces. For the moment, the DoM does not collect the data from the MAFF and the SSCA but intends to do so. As for hydrology, the main comprehensive support of the DoM is the Regional Flood Center (RFC) of the MRC. In order to improve its medium term forecasts (10 days), the RFC needs mainly to strengthen the near real time rainfall stations network. To achieve this aim, the RFC is going to support the DHRW and the DoM in setting up around 28 new real time rainfall stations (TWGAW 2008).

205. Several programs have provided equipment in both weather stations and hydrographic stations. However, as noted by Charlesworth (2007) on the sustainability of meteorological equipment installed with Japanese funding, almost all weather stations were non-functioning after 1 year from installation and remained non-functioning thereafter; see Table 4. Some of the problems turned out to be minor in nature<sup>15</sup>, revealing that capacity or incentive to maintain equipment was limited.

	Table 4 Status of Automatic Weather	er Stations in Can	1bodia - 2007	
#	Weather Station	Installed	Inactive	Funding Source
1	Pochentong	2002	2005	JICA
2	Pursat	2001	2002	MRC
3	Svay Rieng	2003	2004	JICA
4	Kampong Thom	2001	2002	MRC
5	Battambang	2003	2004	JICA
6	Flood Mitigation Center (Phnom Penh)	2003	2005	JICA
7	Stung Treng	2003	2004	JICA
8	Siem Reap	2003	2004	JICA
9	Kampong Som	2003	Still Working	JICA

Source: (Charlesworth 2007), citing DoM

206. With support from AFD, MOWRAM since June 2008 has been developing the Cambodian Information System on Irrigation Schemes (CISIS) which aims to provide up-to-date information on all irrigation schemes in Cambodia<sup>16</sup> and aims to assist MOWRAM in the planning of maintenance and development of irrigation schemes and assets in Cambodia. The data base currently contains 557 irrigation schemes of which 230 schemes have been visited for data collection with the remaining data sourced from existing information within MOWRAMs project databases.

207. As with all information systems the quality of the information entered will determine the usefulness and accuracy of the information generated. During the first phase of development data collection was performed by private contractors visiting sites and gathering information against a questionnaire. In the second phase of development PDWRAM staff were trained and contracted at a price of US\$150 per irrigation system to collect data by way of the comprehensive standard questionnaire.

208. Based on accurate responses to the questionnaire information and conclusions can then be drawn from the data. These include amongst others; summary and detailed individual reports on each scheme including scheme maps (including GIS mapping); detailed information on the status of the FWUC and the condition of the infrastructure. More detailed information can also be generated in the form of a "Custom Query System" which provides data on specific queries relating to an irrigated system such as:

- 1. Management of the irrigation scheme involving a complete FWUC analysis.
- 2. Design and construction of the irrigation scheme including cropping command areas and a general assessment of the status of irrigation infrastructure.
- 3. Maintenance of the infrastructure recording expenditures on operations and maintenance.

209. The CISIS data base also contains a Maintenance Module which aims to provide MOWRAM (or any funding body) with an estimate on the potential costs associated with rehabilitating a scheme or a particular component of infrastructure within a scheme. The CISIS program then estimates the

<sup>&</sup>lt;sup>15</sup> For example, the rubber seals of the enclosures in Pursat and FMC had been eaten through by ants, and the communication cable in Battambang had been severed by a nearby construction.

<sup>&</sup>lt;sup>16</sup> There are approximately 2500 irrigation schemes in Cambodia.

cost for a new component of infrastructure based on the most recent materials/input prices (stored in the data base) to construct a structure of similar dimensions.

210. Once the repair cost data has been calculated for each individual irrigation system held in the data base a total budget estimate for sector's yearly irrigation system rehabilitation expenses can be generated for MOWRAM and MEF for planning purposes.

211. It has taken US\$120,000 to develop the CISIS data to its current level of operation and AFD is looking to hand the management of the system over to MOWRAM in the near future. The CISIS program has established an alignment with the NWSIP monitoring and evaluation system for this project to monitor future works. Currently schemes supported by JICA and NWSIP are included in the system however no information from other donor projects has been incorporated.

212. In the future it is envisaged PDWRAM staff may be able to collect the data (at US\$150 per scheme) however there may be a potential conflict of interest if data collection is used to determine the ranking of the irrigation system and hence its likelihood of receiving funding. An independent audit of scheme data<sup>17</sup> could be performed to ensure accuracy and independence of information is maintained.

213. The future of the CISIS system is questionable due to funding costs and would need sustained donor support. With 2000 irrigation schemes yet to be included in the CISIS at a cost of \$150 per scheme for data collection a further US\$300,000 is required to comprehensively cover the Cambodian irrigation sector. The issue also exists that the system will constantly require resourcing to keep the data updated. In fact the entire success of the system is based on premise it is a dynamic data base constantly requiring updating. It is of little to no value if CISIS is just a snapshot in time of the state of the irrigation sector in Cambodia.

214. Collecting comprehensive data annually would be both cost prohibitive (US375,000 per annum<sup>18</sup> to conduct questionnaires) let alone the human capacity requirements to perform such tasks. To alleviate the costs associated with the requirement to update data a 3 yearly rolling data collection process may be introduced reducing annual collection fees to US $125,000^{19}$  and only requiring one third of the time commitment from field staff<sup>20</sup>.

215. Several opportunities exist for the CISIS data base to perform a valuable role in standardizing the assessment of the performance of the irrigation sector. The key benefit from introducing a standardized continuous assessment of irrigation systems is it introduces the concept of a Best Management Practice approach to the sector. By effectively ranking irrigation systems and establishing a minimum standard of performance (agreed upon by all stakeholders) both Government and donors wishing to support the sector are able to do so with a higher degree of confidence when making investment decisions. The opportunity then exists for the introduction of a performance based funding model whereby irrigation systems that achieve a particular level of proficiency over time receive continued support<sup>21</sup>.

<sup>&</sup>lt;sup>17</sup> Audit may be on 5 percent of schemes in data base. If there is a total of 2500 schemes may be a requirement to independently audit 125 schemes annually.

<sup>&</sup>lt;sup>18</sup> 2500 schemes at a cost of \$150/scheme.

<sup>&</sup>lt;sup>19</sup> 833 schemes per annum at a cost of \$150/scheme. This represents a base field collection cost and does not include audit costs or central data systems management which could potentially add another 40 percent.

<sup>&</sup>lt;sup>20</sup> It is worth noting these figures are for data collection only and a comprehensive analysis of the financial and human capacity support required to manage the data would be required.

<sup>&</sup>lt;sup>21</sup> Where irrigation assessment is linked to funding, appropriate governance structure would need to be established to prevent exploitation of the system. Independent auditing would be advisable.

216. Another advantage of monitoring irrigation scheme performance over time is Research and Development organizations associated with the irrigation sector (including MAFF and MOWRAM) are able to better align their research initiatives with the requirements in the field. For example if the data extracted from CISIS identifies the condition of reservoir dykes within a particular region are deteriorating at a more rapid rate (indicated by consistently higher or more frequent dyke maintenance costs compared to other regions) research could be directed into analyzing the factors and offering more regional or site specific solutions. The same can be said for monitoring agronomic performance over time, FWUC performance over time and irrigation design performance over time.

217. Finally, the CISIS database may prove useful for Donors and Government to better coordinate and align their funding goals with the requirements in the field. For example a particular organization may be more focused on improving FWUC capacity rather than developing physical irrigation infrastructure. The database may identify a particular scheme that has been assessed in requiring improvement in both these components. Based on this common information donors could then establish more of a partnership approach to investment in the sector without having to perform their own assessments with differing criteria of the requirements for a scheme. If donors were unwilling to rely completely on the data from the CISIS they could at least take the original survey data back to the field with their own advisors and cross check the validity of the information before making an investment decision.

218. Despite ongoing efforts to conduct data collection activities, the main problem in Cambodia is not the quality of equipment and databases provided under various donor programs. Rather, it is the inability to ensure that the equipment and databases, once installed and working, is maintained, and used productively.

219. Examples have been identified of (i) simple breakdown problems not being remedied, so that equipment no longer operates, and (ii) data produced by automatic recorders and other devices, being captured and received but not used or transmitted to a location of use, nor archived and retained.

220. The key issue is that hydrological, irrigation and meteorological data are not actively used and its value is no understood. Failure to value the data leads to breakdown in other areas.

221. For this reason, it is important to make a close connection between those collecting information and those using it. This is the key capacity objective. If there are few active uses or users of hydrologic data, the importance of the function will not be recognized. Similarly, timeliness of data relies on an active demand for it and value to be placed on it.

## 2.4.9 Monitoring and Evaluation Frameworks within MAFF and MOWRAM

222. MOWRAM has not yet adopted the MTEF system and still operates under the old regime for monitoring and evaluation. In contrast, MAFF has already adopted the MTEF system and is receiving ongoing support from CIRAD and ADB (proposed in 2009) to mainstream the program amongst all departments.

223. Under the MTEF system adopted by MAFF, the M&E manual defines and describes a complete M&E information system, including processes and procedures, for Program budgeting in MAFF. The M&E system provides MAFF the mechanism to both prepare and plan its annual budget, and to introduce performance information into budget allocation decisions. It is an important component of the whole Program budget process (ADB 2006).

224. MAFF's Department of Planning and Statistics (DPS)'s Project Coordination, Monitoring & Evaluation Office (PCMEO) has the overall responsibility for the management of the M&E system for Program budgeting. They will operate in close cooperation with the Department of Accounts and

Finance in preparing the annual Program budget. PCMEO is also responsible for overseeing Program evaluations and producing Program Evaluation Reports (PERs) for the Ministry of Planning to assist in tracking progress of the NSDP (ADB 2006).

225. The overall organisational structure and reporting mechanism for the M&E system in MAFF is shown in Figure 9. The M&E information system is comprised of a nine reporting forms divided into three main groups - Planning, Monitoring and Evaluation as summarised Table 5.

226. Together, the forms provide a standardised means to collect and report operational data and give the Department of Planning the information necessary to conduct evaluations. These forms are to be used in conjunction other existing reporting mechanism (financial, progress reports) that are currently being used by the MTEF pilot ministries and external projects. The timeline and departments responsible for providing this information is illustrated in Figure 10.



Figure 9 MAFF Organizational Reporting Flow for M&E Systems under MTEF

Source: (ADB 2006)

Table 5 M&E Information S	ystem under MTEF
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Planning Forms	Monitoring Forms	Evaluation Forms
P1 - Ministry Program Budget Summary	M1 - Quarterly Monitoring Report	E1 - Sub-Program Evaluation
P2 - Program Profile	M2 - Annual Monitoring Report	<b>E2</b> - Program Evaluation Summary
P3 - Sub-Program Profile	M3 - Site Visit Report	
P4 - Activity Profile		

Source: (ADB 2006)



Figure 10 M&E Timeline under the MTEF Program

Source: (ADB 2006)

227. The planning forms, in particular P3, & P4, assist the line departments to define their budget structure and provide detail costing at the activity level. The planning forms are designed to be hierarchical with a direct information flow from the activity level to the Program level, with data being summarised at each level (ADB 2006).

228. The main monitoring forms, M1 & M2 are submitted by the line departments quarterly and annually respectively. M1 describes progress information for each activity within the sub-Program, and a review of problems encountered. M2 provides in-depth information, including a SWOT analysis, of the sub-Program's progress towards achieving its objective. The M2 report, along with cumulative M1 reports, provides the foundation for the evaluation of each sub-Program (ADB 2006).

229. The evaluation forms assist the DPS to annually review the progress reported by each sub-Program and to assess the likelihood of it achieving its objective. This feedback is summarized in E2 and submitted to DAF to assist in the MAFF budgetary review process in preparation for preparing its proposed budget to MEF; see Figure 11.





Source: (ADB 2006)

#### 2.5 Identification of the Core Problem for Institutional Management and Capacity Building

## 2.5.1 Factors Hindering Institutional and Management Capacity for Agricultural Development

230. On the basis of the preceding review of the key issues, the objective of this section is to identify the core problem for institutional and management capacity of MAFF and MOWRAM. The identification of the core problem, its causes and its impacts are visualized through a Problem Tree Analysis indicating cause and effect relationships. The Problem will lead to the identification of the Logical Frame of the Program. By specifying the core problem and therefore the overall purpose of the Program, the analysis provides an approach to the program design.

231. The analysis conducted in the previous sections of the report indicate a large number of constraints and problems affecting institutional and management capacity of MAFF and MOWRAM to meet the goal of *providing a sound policy, legal institutional and administrative basis for effective work performance in agriculture and water resource development and management* (TWGAW 2007, pg. 23).

232. These areas for improvement can be grouped into five overall factors: (i) the institutional framework for policy and strategy development and implementation; (ii) the availability of human resources and improvement of their capacity; (iii) financial management systems improvement; (iv) strengthening monitoring and evaluation frameworks to assess performance against plans; and (v) improving management and data information systems for basing strategic decisions. The following sub-sections summarize these different factors based on the analysis from the preceding sections of this report.

#### 2.5.1.1 Opportunities to Improve the Institutional Framework

233. In the agricultural planning process, MAFF retains a valuable role in strategic guidance for the agriculture sector, supported by stronger planning capacity and direction at sub-national levels as a result of the decentralization and de-concentration process. There is, however, widespread recognition of the need for improvement through rationalization of the prevailing strategic framework and institutionalizing a single, successor framework more closely linked to policy formulation, monitoring and evaluation, and the processes of annual national and decentralized planning.

234. Planning functions are supported by planning and finance specialists in each department, dedicated planning and finance departments, and the planning, monitoring and evaluation activities of externally supported projects and Programs. Activity planning remains dominated by historical operations, and poorly linked between departments or to the availability of operational funds. Monitoring and evaluation of activities is constrained. Mandates across departments retain some duplication, and continue to foster independent operations amongst those departments.

235. Policy and planning capacity is concentrated in department planning offices, and the decentralization process is strengthening skills at provincial, district and commune levels. At provincial level, the budgeting process followed by Provincial Departments of Agriculture (PDA) reflects the decentralization process. PDA submit annual budgets directly to MEF, and provide financial reporting to MEF. PDA are no longer obliged to submit budgets to the Department of Accounting and Finance within MAFF, although some do appear to provide copies to DAF.

236. Several issues have been highlighted which constrain the ability of PDAs to implement national and sub-national programs:

- 1. The structure and mandate of PDA, which consequently tend to reflect the structure at national level, and are as a result compartmentalized and enshrine overlap in responsibilities ;
- 2. A lack of long-term, strategic planning for provincial agricultural development with provincial priorities not translated into integrated Programs
- 3. No consolidated budget for PDA activities, with data on national-level budget allocation not available
- 4. Diversity of procedures and systems adhered to in relation to different bi- and multi-lateral projects and Programs
- 5. Lack of reliable planning data, but which nevertheless are subsequently relied upon for planning at both provincial and national levels
- 6. Lack of planning capacity amongst PDA staff and a planning process often limited to aggregation of on-going activities
- 7. Whilst PDA collect raw data for planning on behalf of DPS, they lack analytical skills to utilize those data themselves;
- 8. There is limited understanding and/or recognition of the differentiation between policy formulation and technical support at central level, and local planning and implementation at sub-nation level;
- 9. Incomplete decisions regarding the de-concentration process and the division of responsibilities and mandates between PDA and MAFF at national level;
- 10. Ineffective management approach with 'vertical lines' of reporting between provincial offices and national departments that constrain integrated provincial planning and activities and do not support inter-office collaboration or coordination;
- 11. There is no direct link between PDA budgets and development activities or Program performance. Moreover, the deconcentration process has generated two parallel systems whereby PDA participating in the D&D system are required to submit budgets and accounts directly to MEF but not MAFF; and
- 12. Field staff are under-paid and commitment/attendance is determined by involvement with donor-funded projects from which means of salary supplementation may be found.

237. The institutional analysis in the sections above concludes that the main activity occurring under the MOWRAM banner is that of construction on a project-by-project basis, managed by the PMO and its subsidiary units, PMUs in head office and sometimes a PIU within the PDWRAM. These activities are conducted separately from (outside) the authority structure of the Ministry and from the Ministry's financial management systems.

238. MOWRAM at head office contains line departments that are not fully able to carry out their mandated tasks because they lack staff activity and budgetary capacity. Where donor funding becomes available to conduct project activities of a management nature, line departments may benefit from enhanced capacity in the form of equipment, training, software and systems. However, these frequently become inactive after the project concludes (Taylor 2009).

239. There are opportunities for decision-making in MOWRAM to be improved and currently budget and approval delegation to the provincial level is minimal. This situation can only persist because, apart from design and construction projects, little other activity is occurring (management, regulation). An example is the registration of FWUCs at central level instead of province or district (Taylor 2009).

240. These difficulties have in turn meant that PDRAM capacities remain limited. In line with the decentralization and deconcentration policy, administrative and financial decisions should be delegated further than at present.

241. Both donor funded and nationally funded projects are managed through the central project management office and its units, and subsidiary provincial project implementation units. The PMO and its structure is not shown on the organization chart of MOWRAM as it is outside the line management structure.

242. The PMO reports to the Minister via a project manager for each project, who may be at Secretary of State level. The PMO financial accounting system is separate from that of the Ministry and funds do not flow through the Department of Finance, or line departments (Taylor 2009).

243. The establishment of a project management office (PMO) with project management units (PMUs) and project implementation units (PIU) outside line departments has created overlapping mandates of line departments and the PMOs. Staff have been attracted from departments into PMUs, because funding arrangements are more free and workable than in the ministry itself (Taylor 2009).

244. The PDWAM structure follows the head office structure of MOWAM with departments for Water Resources Management and Conservation, Water Supply and Sanitation, Irrigated Agriculture, Hydro-meteorology and Administration and Personnel. Some departments are more notional than real – for instance the Department of Water Supply and Sanitation .

245. There is a need to strengthen the provincial offices PDWRAM of MOWRAM to enable them to implement national and sub-national level programs. There is usually no more than one member of staff with an engineering qualification and that person is usually the Director who is therefore taken up with management and does not work as an engineer.

246. The bulk of activity of PDWRAMs involves small-scale construction projects and responsibility for irrigation and other works in the province. PDWRAMs are responsible for operating dams and reservoirs and in theory for the maintenance of the works. However, they have limited funding for maintenance activity and may not have much knowledge of structures. Administration and financial management capacity may also be low (Taylor 2009).

247. PDWRAMs have insufficient staff and lack budgets to undertake their mandates; however it is consistent with the decentralization policies of the Government to give more formal responsibility to provincial offices.

## 2.5.1.2 Opportunities for Human Resource Development

248. Human resource development is supported by a number of projects, but coordination through existing human resource strategies can be improved. Planning, monitoring and evaluation skills can be improved but at the moment under-utilized as a result of approaches to personnel management and ad hoc task allocation. Where donor support is provided, this tends to be project-based and skewed to the needs of individual donors. In this environment many activities, including planning, fall to a limited number of skilled staff, many of whom are over-loaded with multiple duties.

249. The impediments to 'normal' operation at the Ministry's head office level are such that investment in capacity building at this time, and under current conditions, is not strongly supported. Investment in capacity building at the provincial, district and farmer operation levels is a more fruitful strategy for the time being (Taylor 2009).

250. Nevertheless, in the area of professional qualifications and training generally, it is very important to invest, because the flow-on will improve the capacity of Cambodia as a whole, whether or not the Ministries are capable of capturing and retaining the qualified and trained people for useful activity.

251. All departments in MAFF and MOWRAM indicated significant concern about the status of human resources in MAFF and MOWRAM and that with an increasingly aged workforce the number of technically qualified personnel is decreasing without a pool of trained recruits being available to take their place. It was noted that MOWRAM is finding it increasingly difficult to recruit new

irrigation engineers, meteorologists, hydrologists or water chemical engineers to replace staff nearing retirement age. This is even more of a problem considering the expansion of irrigation schemes in Cambodia and the concomitant increase in personnel required to build and maintain them.

252. There are no Bachelor or Master degrees in water resource specialties within Cambodia (irrigation engineering, hydrology, meteorology etc) and that the current Bachelor of Rural Engineering course at ITC only provides individual subjects in these specialties rather than a dedicated set of courses. As such, new recruits into MOWRAM and MAFF have limited exposure to the skills required in designing and maintaining irrigation schemes and managing water resources at the river basin and national levels.

253. The Technical Services Center under MOWRAM has been supported by JICA and currently provides short term (several weeks to several months) non-accredited training courses in specialist subjects (e.g. irrigation scheme design, GIS etc). These are extremely useful to the central level and provincial level staff sent on these courses. However, the courses are designed as continuing education and upgrading courses for already qualified staff and do not address the fundamental issue of a lack of basic education in the fundamentals of water resource management and engineering. Currently the sustainability of the TSC is contingent on ongoing donor commitment and RGC needs to ensure core funding from the national budget.

254. While discussions with MOWRAM and MAFF departments indicated significant constraints in recruiting trained technical staff, with line departments being given new recruits with degrees in business and marketing rather than degrees in engineering, there was also widespread concern as to the lack of trained administration staff. Often senior administrative positions in the ministries are filled by staff highly qualified in technical disciplines but who lack the required skills in accountancy, human resources or legislative drafting.

255. The Royal School of Administration provides the necessary skills development and capacity building for administrative staff, but strict quotas means that only 2 staff per ministry per year are trained. This is insufficient to provide the necessary numbers of staff at the central level, let alone at the provincial level - particularly in the context of the D&D program which aims to devolve much more responsibility to the provincial level. With responsibility comes the requirement for trained staff.

256. At other technical levels (where a qualification below bachelor is involved) there is also a dearth of staff with knowledge and qualifications. This is made more severe by the fact that most of such staff are or would be located in PDWRAMs and PDA. For instance, the ability to assess the condition of irrigation structures and determine whether and what maintenance is warranted may be beyond the staff of most PDWRAMs, even for medium and minor structures. Similarly, the ability to make an asset management plan for water structures of any type is probably not able to be undertaken in any province and may not be familiar to staff at the central level (Taylor 2009).

257. There is therefore a need:

- 1. For Cambodia as a whole (both public and private sectors) to build up academic training at bachelor degree level and above in engineering with water resources specializations and qualifications at higher levels over time;
- 2. Within the public sector (MOWRAM) for significantly increased training in technical fields related to the operation, maintenance and management of water works;
- 3. To increase the capacity of farmers to manage all aspects of irrigation schemes up to tertiary level;
- 4. For improved management and financial skills at all levels including farmers.

258. Each of the four capacity areas requires a specific strategy for the medium and long term, as well as some immediate measures. The second and third of these capacity needs also require a financial strategy that goes beyond the training and human resources development. That is, the institutional functions of PDWRAMs, DOWRAMs, PDAs and DOAs need to be developed and some financial support would be appropriate. Support is also required for farmers to undertake works within their irrigation schemes (Taylor 2009).

259. There are large constraints on the performance of all government ministries in Cambodia. The chief constraint is the low level of salaries available to government staff, including director level and even above. The official salaries of technical staff (engineer for instance) are between US\$80 and \$250 per month (equivalent) depending on the seniority level. This is not enough to live on. Therefore such staff and even directors take alternative work while being registered as staff of a ministry. In the case of MAFF and MOWRAM and their technical staff, the work alternatives are provided by (i) private sector hiring, and (ii) work directly on externally funded projects where the remuneration is higher. Other sources for senior officials may include fees for participating in various committees.

260. The main consequences are: (i) staff are not available to work within departments of the ministry unless special funding is available; (ii) staff do not obtain experience in their field through the ministry, only through working outside; and (iii) while the capacity of individuals may be improved, institutional capacity is not advanced.

261. Under the Strategy for Agriculture and Water it is envisaged that a salary supplementation scheme such as the recently cancelled MBPI shall be rolled out to MAFF and MOWRAM departments. While the MBPI was rightly seen as an important initiative to address the critical salary constraints facing the civil service in Cambodia, by design it was aimed at senior managers and line staff in "Special Operating Agencies"; designated as such in Priority Mission Groups. The teams' discussions with MAFF and MOWRAM stakeholders indicate that while MBPI was seen as an extremely positive step in the right direction for administrative and pay reform in the civil service, it does not go far enough in tackling the real issue of low salaries; that of technical staff in line agencies at the lower ends of the civil service (provincial and district level). Unless pay incentives are extended to these technical staff there is little chance of fundamental changes in performance of the system. The challenge is to find a mechanism through which provincial and district staff are adequately rewarded for their performance<sup>22</sup>.

262. External inputs to staff salaries could come from donors in two ways: (i) Via projects where incentive payments are made or where staff are hired directly on higher salary rates, and (ii) Through budgetary support mechanisms (following the Paris Declaration).

263. These measures would be temporary only and will not solve the basic problem. In fact, if significant budgetary support is provided directly to the government for support to ministry salaries, the core responsibility of the Government to remunerate its staff adequately could be undermined.

## 2.5.1.3 Opportunities to Improve Financial Management Systems

<sup>&</sup>lt;sup>22</sup> This scheme was temporarily suspended by the RGC on 3<sup>rd</sup> December 2009 (Sub-Decree 206) with provisions to revisit the scheme in 2011. On 21 January 2010 the RGC announced that the PMG and MBPI scheme would remain cancelled and a temporary Salary Supplementations / Allowances scheme would be instituted while a review of the incentives schemes would be carried out by mid 2010. Depending on what modality the RGC decides at this point to implement, the SAW envisages that the replacement scheme should be rolled out to provincial departments by 2011,

264. There is a significant gap between the annual workplan activities being carried out by technical departments in and the information available to administrative departments which hampers the planning and budgeting functions. For example, the planning departments under MAFF and MOWRAM do not have a clear idea of the particular projects or activities being implemented by the various technical departments and thus cannot align these activities with the national strategies being developed at higher levels of MAFF and MOWRAM. Similarly, the finance departments are only responsible for being the liaison between technical departments and MEF in passing on budgetary requests and the subsequent budget allocations, but has no oversight on actual expenditures.

265. At the provincial level the gap is even more pronounced, as the D&D system has resulted in provincial departments being responsible to the Provincial Governor for expenditures and are not providing MOWRAM and MAFF at the central level with reports on plans or budgets. While the Department of Finance is responsible for passing on MEF allocations, they are unable to receive adequate feedback from the provincial level to enable a proper M&E system to be put into place. The asset management procedures follow MEF guidelines but are limited in that there are no policies on asset replacement or asset maintenance.

266. It is observed that with the separation of MOWRAM into a General Directorate of Administrative Affairs and a General Directorate of Technical Affairs, each of the technical departments had an administrative unit but did not have a dedicated finance unit; with the financial responsibilities being undertaken by administrative staff. One of the proposed solutions to the coordination issue was to establish a dedicated finance unit in each technical department staffed with a trained cadre of accountants who could then liaise directly with the Department of Finance and provide the necessary feedback to enable the Department of Finance to properly oversee financial disbursements and expenditures.

267. Discussions with MOWRAM indicate that the Medium Term Expenditure Framework (MTEF) Financial Management Information System (FMIS) currently being piloted in MAFF needs to be expanded to include MOWRAM. The use of a consistent FMIS across Ministries and within ministerial departments will go a long way to enabling higher level financial and planning units to access information and coordinate the implementation of National Strategies throughout the system.

268. In terms of national budget expenditures, Ministries do not control government budget allocations for the most part, as these are tightly held by the Ministry of Economy and Finance (MEF) and ministries must seek MEF's approval for spending on an item by item basis before the funds are disbursed to them; see Section 2.2. Ministries receive funds for salaries directly from the Ministry of Finance, but do not have much control over expenditure for other items. Further, MEF may decide make arbitrary cuts to approved budget allocations for a project and in some cases have rendered the project ineffective.

269. Within MAFF and MOWRAM, the Finance Departments need more information on the spending of the line departments, receiving only general statements of monies spent. MEF therefore exert controls, not by post expenditure audit and review, but by controlling the funds disbursement stage, a strategy that hinders ministry performance. In MOWRAM the Finance Department has no role in control or review of funds assigned to the project management offices (PMOs) or project implementation units (PIUs) because they report directly to the Minister. Similarly, in MAFF the Finance Department has no oversight on PMUs from donor projects as only line departments are obligated to report budgetary expenditure.

270. Some management consequences of these practices (in addition to the gross limits on the availability of finance) are:

1. Line departments may be (in MOWRAM's case it seems they generally are) restricted as to their funding sources and often constrained in their operating because of a lack of budget –

for instance budgets allocated by the Council of Ministers are not guaranteed to be passed on by MEF;

2. There is no financial flexibility even at the petty cash level, so that routine activities can be restricted or halted.

271. This is a second reason why ministry staff cannot work within the ministry and why they seek additional work outside – workable projects do not exist on which they can spend their time.

272. There are significant opportunities for institutional improvement because currently the government has limited ability to undertake activities by normal administrative means and must use special measures to get things done. So long as construction projects are being financed by external lenders and donors, the operational difficulties faced by ministries are masked to some extent.

273. The Council on Administrative Reform (CAR) has been rolling out a reform program in some ministries but it has not yet been applied to MOWRAM. It may have the potential to improve some of the difficulties described above, but will not address the salary problem.

274. It will be necessary for the financial management arrangements comply with the following:

- 1. The MTEF is introduced and operational throughout the Ministry
- 2. Project funds are routed the line department accounting system under MTEF codes;
- 3. Staff responsible for implementation activities in the Ministry are not placed in a unit that removes them from either (i) normal lines of authority under the departmental structure, or (ii) the Ministry financial system, reporting requirements and audit mechanisms.

275. These measures are designed to ensure that the project is embedded within the Ministry and that (i) knowledge and capacity transfer is improved, (ii) financial accountability is enabled.

#### 2.5.1.4 Opportunities for Strengthening Monitoring and Evaluation Frameworks

276. MOWRAM has not yet adopted the MTEF system and still operates under the old regime for monitoring and evaluation. In contrast, MAFF has already adopted the MTEF system and is receiving ongoing support from CIRAD and ADB (proposed in 2009) to mainstream the program amongst all departments.

277. Under the MTEF system adopted by MAFF, the M&E manual defines and describes a complete M&E information system, including processes and procedures, for Program budgeting in MAFF. The M&E system provides MAFF the mechanism to both prepare and plan its annual budget, and to introduce performance information into budget allocation decisions. It is an important component of the whole Program budget process (ADB 2006).

278. While great strides have been made in institutionalizing an effective monitoring and evaluation process within MAFF, this still needs to be adopted under MOWRAM.

279. At the provincial level more needs to be done to link the activities to the national and subnational programs. There is no direct link between PDA budgets and development activities or Program performance. Moreover, the deconcentration process has generated two parallel systems whereby PDA participating in the D&D system are required to submit budgets and accounts directly to MEF but not MAFF.

#### 2.5.1.5 Opportunities for Improving Management and Data Information Systems

280. Within MAFF, agricultural information priorities are reflected in the activities of four offices: the Agricultural Marketing Office (AMO) and the WTO Unit under the Department of Planning and Statistics (DPS), the Department for Agro-Industries (DAI), and the Bureau for Agricultural Material Standards (BAMS). Within the Ministry of Commerce (MOC), agricultural information is a major feature of activities under the offices promoting domestic and export trade, including those concerned with support for the establishment of export processing zones (or EPZs) and product quality standards, notably the Export Promotion Department and CamControl, and harmonization of crossborder regulations and procedures for WTO accession (Tasker 2003).

281. The main agricultural information and data collection activities in MAFF revolve around the Agricultural Market Information Service (AMIS) under the Agricultural Marketing Office (AMO); the supporting CIDA funded Cambodia Agricultural Market Information Project (CAMIP) involved in SMS (mobile phone text messaging) technologies with traders; ongoing activities under the ADB funded ADSP (Loan 2022-CAM); and finally data collection activities for the Annual Conference of MAFF where production and hectarage data for each crop is presented.

282. While the CIDA funded CAMIP is working closely with the AMO in providing capacity building and support to market information collection, the SMS service is ancillary to the mainstream AMIS collection system carried out by the AMO.

283. The disparate systems for data collection and analysis and the lack of integration of datasets constraints the ability of MAFF to leverage data for strategic planning purposes.

284. Two departments of MOWRAM have water information roles – Hydrology and Meteorology. The capacity of these departments is critical to the capacity of the Government as a whole to know what water the country has and what can be done with it.

285. Several reviews (MOWRAM 2001a, b; Taylor 2008, 2009) have noted there is a lack of adequate information about water resources, weather and climate to support RGC strategies for socioeconomic development. MOWRAM does not have the capability to generate accurate and timely forecasts of flooding in parts of the country beyond the Tonle Mekong/Tonle Sap floodplains.

286. The main problem in Cambodia is not the quality of equipment provided under various donor programs. Rather, it is the inability to ensure that the equipment, once installed and working, is maintained and used productively.

287. Examples have been identified of (i) simple breakdown problems not being remedied, so that equipment no longer operates, and (ii) data produced by automatic recorders and other devices, being captured and received but not used or transmitted to a location of use, nor archived and retained.

288. The key issue is that hydrological and meteorological data are not actively used and its value is no understood. Failure to value the data leads to breakdown in other areas.

289. For this reason, it is important to make a close connection between those collecting information and those using it. This is the key capacity objective. If there are few active uses or users of hydrologic data, the importance of the function will not be recognized. Similarly, timeliness of data relies on an active demand for it and value to be placed on it.

#### 2.5.2 The Core Problem

290. By developing a logical series of observations based on the preceding analysis in this report, the Core Problem has been defined as:

# Institutional and management capacity to support farmers and the agricultural sector needs to be improved.

291. The identification of a 'Core Problem' is the logical conclusion drawn from an analysis of the immediate and primary causes as presented in **Error! Reference source not found.** 

292. Opportunities to strengthen the institutional framework for strategic planning and budgeting results from a currently projectized approach to development activities and the fact that linkages between national and sub-national programs and activities could be further improved. While the devolution and deconcentration of roles and responsibilities to the sub-national level under the Organic Law is the right approach to take, provincial departments are currently unable to carry out their mandates without significant ongoing support and further capacity building.

293. There are significant opportunities to increase the human resources available in the agriculture and water sector. The amount of human resources currently available is a consequence of limited training and on-going professional development opportunities for ministry staff and the lack of budget to retain and motivate staff. Basic Civil Service activities (strategic planning, budgeting, finance and administration, policy development and legislative drafting) are difficult for staff to carry out due to the lack of ongoing training and capacity development. Within MOWRAM the human resources are even more constrained due to basic skill gaps not being supported by formal education systems within Cambodia.

294. There are opportunities to improve the financial systems within MAFF and MOWRAM. The current state of financial management systems is a consequence of the absence of the MTEF system being adopted under MOWRAM and the unfinished roll-out of the system under MAFF. The lines of financial and administrative reporting and control in the two ministries are not conducive for information sharing and the finance departments are unable to coordinate with other line departments; particularly at the provincial level. In addition, there is a lack of information on external funding arrangements since line departments devolve responsibility for donor projects to Project Management Units which are outside of ministerial financial reporting lines.

295. While MAFF has adopted the MTEF system for monitoring and evaluation, MOWRAM has yet to adopt the system and MAFF has yet to roll out the system across all departmental units. This constrains the ability for MAFF and MOWRAM to fully put in place a robust M&E framework. At the sub-national levels the M&E systems are only partially integrated with the national level M&E system due to differences in financial and reporting systems.

296. Finally, there are significant opportunities for improvement in data and information systems. The current state of information systems and poorly integrated datasets significantly constrains the ability of MAFF and MOWRAM to adequately plan strategic interventions, monitor and evaluate performance against plans, and provide timely information to their stakeholders.

## 2.5.3 Impact of the Core Problem

297. The impacts of the core problem are broken down as immediate and overall as shown above in **Error! Reference source not found.** and are briefly discussed in their bottom-to-top relationships. The ultimate, and negative, impacts to the economy are shown as the top set of boxes in **Error! Reference source not found.** At this point it seems almost redundant to explain these impacts, but they are so crucial to Cambodia's future development, they must be stressed even if briefly.



298. Agricultural ventures of every description need financial, technical, and managerial assistance aimed at improving their profitability. Primary producers are limited in their ability to diversify because of traditional cropping practices. They are unable to break into new crops or products, and to some degree are locked into them by donor and government programs which only present information on how to produce more of the same thing and have limited rates of success. With little likelihood of seeing higher profit margins, there is little incentive to invest in better high priced inputs, machinery, or infrastructure.

299. Marketing opportunities are not linked to the increased production. Since little attention is paid to quality control and assurance by anyone (except the ultimate consumer) there is no incentive to produce a premium product. There is no competitive advantage, or incentive, associated with better prices and increased demand for their products.

300. These negative aspects of the three issues, lack of diversity and competition as well as poor low success rates of agriculture and water sector programs, lead to further depression in the rural sector.

301. Income in the rural areas remains depressed in the face of poor prices and rising production costs. While daily labor wages have nearly doubled in the last few years, they have only barely kept up with the increases in food and energy costs. Rises in agricultural input costs have not been matched by higher sale prices for their produce.

302. Low employment in rural areas is a chronic problem. As daily labor costs rise, primary producers and processors look for ways to either diversify into less demanding crops. Slow growth in the rural economy is the result of all the factors mentioned. Without growth, or even the prospect of future growth, there will be a continued downward spiral.

303. The problems become indicators of the future and without meaningful interventions there is little to indicate an optimistic future for the rural residents of Cambodia. It is easier to leave the land and try their luck in the urban areas.

## 2.5.4 Turning Problems into Solutions – The Objective Tree and Improved Sector Outputs

304. As noted in the previous sub-sections, the core problem identified from the analysis was the Weak institutional and management capacity to support farmers and the agricultural sector. The challenge for the project design is to turn the core problem and the associated primary causes into solutions. Reformulating the core problem into a core objective implies that a successful project would give rise to improved institutional and management capacity to support farmers and the agricultural sector. This would have consequent impacts in a greater diversity of production, higher success rates in agriculture and water sector programs, improved competitiveness, higher income in rural areas, increased employment in rural areas, and finally higher economic growth in rural areas. The overall impact of the intervention would be a higher growth in productivity, a vibrant rural economy, and a reduction in poverty; see Figure 13.

305. The primary causes of the core problem also have primary solutions to the achieving the core objective. These are also presented in Figure 13.and form the basis for the proposed interventions outlined in Section **Error! Reference source not found.** 



#### 3 ANNEX 2: FOOD SECURITY AND NUTRITION REVIEW AND CONTEXT

#### 3.1 National Sector Review

#### 3.1.1 National Food Security Situation

306. Decades of internal conflicts and isolation resulted in destruction of almost all the areas of national life, including human resources which are most critical to underpinning the country's socioeconomic development efforts. The grave sufferings Cambodia has been experiencing is reflected in its designation as a least developed, low-income food-deficit country<sup>23</sup>. The Human Poverty Index of 2006 UNDP Human Development Report ranks Cambodia 73<sup>rd</sup> out of 102 developing countries in terms of overall poverty.

307. Restoration of peace and political stability achieved over the last decade has brought steady economic growth in Cambodia, averaging nearly 8 percent between 2002 and 2006<sup>24</sup>. This led to decline in poverty by 11 percent between 1993/94 and 2004<sup>25</sup>. Despite the progress, Cambodia still continues to face poverty and food insecurity as major challenges. Approximately, 34.7 percent of total Cambodians still live below official income poverty line, with 21 percent are food-deprived consuming less than the minimum dietary energy requirement (MDER) of 1715 kcal/person/day. Generally speaking, the figures suggest that poverty and food insecurity remain a critical issue continuing to affect a significant portion of the Cambodians, especially in the rural areas.

308. Distributions of poverty rates by agro-ecological regions are shown in Table 6. Of the country's total number of poor, 93.4 percent (4.4 million) live in rural areas while 6.2 percent (0.3 million) live in other urban areas<sup>26</sup>. As indicated in the Table 1, Phnom Penh capital has the lowest poverty rate at 4.6 percent in 2004. On the other hand, Plateau/Mountains is the poorest zone with a poverty rate of 52 percent. Tonle Sap has a poverty rate of 42.8 percent compared with 32 percent in the Plains and 27 percent in the Coastal zone. The Plains has the largest share of the poor (40 percent) followed by Tonle Sap (37 percent), Plateau/Mountains (16 percent) and the Coastal zone (6 percent). The consequences stemming from the widespread poverty and food insecurity incidences are accruing high social and economic costs for Cambodia. The country has been reported to have some of the highest malnutrition rates in Asia, with fairly large number of children under five found stunted (37 percent), underweight (36 percent) and wasted (7 percent)<sup>27</sup>.

Region	Provinces/Cities	Poverty Rate (%)
Phnom Penh	Phnom Penh	4.60
Plains	Kampong Cham; Kandal; Prey Veng; Svay Rieng; Takeo	32.07
Tonle Sap	Banteay Meanchey; Battambang; Kampong Thom; Siem	42.80
	Reap; Kampong Chhnang; Pursat	
Coast	Kampot; Sihanoukvill; Kep; Koh Kong	26.84
Plateau/Mountain	Kampong Speu; Kratie; Mondul Kiri; Preah Vihear;	52.02
	Rattanak Kiri; Steung Treng; Oddar Meanchey; Pailin	
Cambodia		34.68

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<sup>23</sup> WFP IPC Study 2007

<sup>&</sup>lt;sup>24</sup> WB Poverty Assessment 2006

<sup>&</sup>lt;sup>25</sup> Cambodia Socioeconomic Survey 2004

<sup>&</sup>lt;sup>26</sup> A Poverty Profile of Cambodia 2004, MoP 2006

<sup>&</sup>lt;sup>27</sup> Cambodia Demographic and Health Survey 2005

309. In the aggregate, food security in Cambodia concerns with all four causal dimensions of the concept of food insecurity, namely, availability, access, use/utilization and stability.

310. **Food Availability** – Rice generally symbolizes the state of food security in Cambodia. It is the staple food which contributes about 54 percent of the country's total crop production in 2007 and 68 percent of calories intake per capita<sup>28</sup>. It is noteworthy that Cambodia has regained self-sufficiency in rice production and rice exporting status for more than a decade<sup>29</sup>. It was estimated that Cambodia achieved paddy rice surplus of over 2.67 million tons in  $2007^{30}$ . The surpluses are attributable to both the steady increase in rice cultivated area (from 1.8 million hectare in 1993 to over 2.5 million hectare in 2007) and productivity (average yield per hectare increased from 2.1t/ha in 2003 to 2.62t/ha in 2007). It was also reported that production area of cash crops and industrial crops such as maize, cassava, sesame, and leguminous crops, and fruit frees has also been on the rise. In a nutshell, these considerable achievements suggest that Cambodia has achieved overall food security at the national level in statistical sense.

311. However, it is recognized that national rice "surplus" achieved does not necessarily mean that food security exists across the land and each and every single Cambodian household has full access to the food produced. At the sub-national level, rice balances are uneven among different geographical areas and socioeconomic groups<sup>31</sup>. There are also large variations in the intake of non-rice crops and livestock products, as indicated by the variable prevalence of protein-energy and micronutrient malnutrition.

312. A myriad of potential constrains facing agricultural production by smallholder Cambodians include, poor access and use of technologies and support services, poor soil fertility, insecure water availability, small and fragmented farm sizes, inadequate diversification, decline in agriculture-related natural resources (land/soil, fisheries and forestry resources), high and rising costs of production inputs, so on. Growing number of landlessness is another major constraint threatening food production in Cambodia. It was reported that an estimated 20 percent of rural households have no agricultural land at all<sup>32</sup>.

313. **Food Access -** Rural Cambodians typically are food producers engaged in agriculture. However, they are also highly dependent on buying some types of food, particularly rice, for some period every year. Therefore, having an adequately balanced diet in Cambodia is very much a matter of whether the people have cash income to purchase the types of food they need aside from what they themselves can produce on their own farms.

314. Yet, it is noticed that purchasing power to buy food on the market is limited in Cambodia and many poor rural households lack productive assets (such as land and livestock) to generate sufficient cash income to buy food to meet the recommended daily intake of 2,100 kcal per capita. For the people living below the poverty line, their expenditures are insufficient for them to obtain the kinds of food they need should it be available. In all, 34.7 percent of households live below the consumption poverty line<sup>33</sup>. Sources of income are often erratic and limited to insecure and unsafe economic activities within the informal sector of the economy<sup>34</sup>. Moreover, many rural poor households are facing many constraints such as indebtedness, limited access to credit, poor marketing/distributing systems, price variation, poor transportation and communication infrastructures, and limited off-farm

<sup>&</sup>lt;sup>28</sup> NIS/MOP 2004

<sup>&</sup>lt;sup>29</sup> Development Scenario for Agri Sector in Cambodia (3<sup>rd</sup> Draft) 2007

<sup>&</sup>lt;sup>30</sup> MAFF<sup>2</sup> Annual Report 2008

<sup>&</sup>lt;sup>31</sup> Strategic Framework for Food Security and Nutrition (SFFSN) 2008-2012

<sup>&</sup>lt;sup>32</sup> Cambodia Socioeconomic Survey 2004

<sup>&</sup>lt;sup>33</sup> Cambodia Demographic and Health Survey 2005

<sup>&</sup>lt;sup>34</sup> World Bank Poverty Assessment 2006

employment opportunities. In particular, the ongoing soaring food prices are definitely further aggravating household food insecurity among the poor and vulnerable groups.

315. **Food Utilization** - It is recognized that Cambodia has high levels of malnutrition and micronutrient deficiencies. With an average of only 1,435 kcal/person/day in the poorest quintile and 2005 kcal/person/day in the second quintile, the current calorific intake of the rural poor is extremely low<sup>35</sup>, with about 68 percent coming from rice. Nationally, over 20 percent of the Cambodian populations (about 3 million) are food-deprived in 2003-2004 consuming less than the minimum dietary energy requirement (MDER) of 1,715 kcal/person/day. These people would have to increase their food consumption by 280 kcal/person/day. The situation is further worsened by the way the food is utilized among the poor. The rural poor usually have poor nutritional knowledge and practices, limited knowledge on basic health care practices, limited access to sanitation and safe drinking water, and insufficient to affordable quality health care due to high costs and a lack of services. Expenditure on care among the poor for serious health conditions has been shown to lead to indebtedness and asset disposal, resulting in further impoverishment and chronic food insecurity<sup>36</sup>. Oftentimes, high costs of healthcare are forcing more of the poor and the destitute into selling assets such as land to pay for health services, thus pushing them closer to landlessness and into deeper poverty<sup>37</sup>.

316. **Stability** – Many types of shocks and stresses, be ecological, social, economical, political, all can wreak havoc on food security situation wherein the poor and vulnerable groups will be the most affected. Recurrent natural disasters, such as floods, droughts, and pest and disease outbreaks, for instance, directly affect agricultural production resulting in food shortages. Furthermore, in the face of growing global climate change and rising food prices, the already poor and food-insecure households are expected to become even more exposed to shocks and stresses, leading to depletion of their productive assets and increased indebtedness. The FAO Index of Commodity Prices surged 40% after 9% increase in 2006<sup>38</sup>. This has negative implications for household food insecurity of vulnerable groups. Poor households in the Tonle Sap basin, for instance, have recently lost 23 percent of their purchasing power because of the recent increase in price of food, while the figure nationwide is about 15 percent. It is generally recognized that social safety nets to provide food and other basic needs to the vulnerable groups in Cambodia, especially during period hit by stresses and shocks, remains weak.

## 3.1.2 Food Security Policy Environment

317. Agriculture is the backbone of national economy, contributing about 30 percent in national gross domestic product (GDP) in 2007. With 85 percent of the population live in rural areas, and more that 60 percent of the country's labor forces dependent on agriculture (inclusive of crops, livestock, forestry and fisheries) in 2007, improving food security is, therefore, the foremost priority of the RGC. It is crucial for not only achieving the Cambodian Millennium Development Goal 1, "Eradicate extreme poverty and hunger", but also most of other CMDGs, particularly CMDG 4 and 5 ("Reduce child mortality" and "Improve maternal health"). Causal relationships between CMDGs and FSN are summarized in Table 7 below. In achieving these, the Royal Government of Cambodia (RGC) has developed and put in place many relevant policy frameworks to guide development endeavors wherein poverty reduction and food security improvement have consistently been emphasized.

318. Some of these policy frameworks developed include, for instance, (i) the first and second phase of Rectangular Strategy (RS) adopted in 2004/2008; (ii) the National Strategic Development

<sup>37</sup> Cambodia: Participatory Poverty Assessment of the Tonle Sap Basin 2007- a study conducted by the Cambodia

Development Resource Institute (CDRI) in collaboration with the National Institute of Statistics (NIS) and the Asian Development Bank (ADB).

<sup>&</sup>lt;sup>35</sup> Cambodia Socioeconomic Survey 2004

<sup>&</sup>lt;sup>36</sup> Cambodia Demographic and Health Survey 2005

<sup>&</sup>lt;sup>38</sup> FAO's Initiative on Soaring Food Prices 2008-Guide for Country Level Action
Plan (NSDP), 2006-2010; (iii) the Strategy on Agriculture and Water (SAW), 2006-2010; and (iv) the Strategic Framework for Food Security and Nutrition (SFFSN) 2008-2012.

319. The RS is a comprehensive, sharp and focused policy framework for future development in the country toward achieving prioritized goals of the NPRS and CMDGs with four priority areas for improvement: (i) the agriculture sector; (ii) infrastructure development; (iii) private sector development and employment generation; and (iv) capacity building and human resource development. The NSDP operationalizes the RS by setting poverty reduction in the fastest possible manner as the foremost priority. It also recognizes the need for further significant progress in FSN as a key action so as to reduce persistent high levels of malnutrition and micronutrient deficiencies among women and children.

CMDGs	Causal Relationship
1. Eradicate extreme poverty and hunger	Food insecurity and malnutrition erode human capital, reduce
	resilience to shocks and reduce productivity (impaired physical and
	mental capacity).
2. Achieve universal primary education	Malnutrition reduces mental capacity. Malnourished children are
	less likely to enroll in school, or are more likely to enroll later.
	Hunger and malnutrition reduce school performance.
3. Promote gender equality and	Food secure and better nourished girls are likely to stay in school
empowerment	and, subsequently, have more control over future choices.
4. Reduce child mortality	Malnutrition is directly or indirectly associated with more than
	50% of child mortality. It is the main contributor to burden of
	disease in the developing world.
5. Improve maternal health	Maternal health is compromised by an anti-female in bias in
	allocations of food and health care. Food insecurity and
	malnutrition are associated with most major risk factors of
	maternal mortality.
6. Combat HIV/Aids, malaria, and other	Food insecure spurs coping mechanisms, such as migratory labor
diseases	and/or prostitution which increase the spread of HIV/Aids.
	Malnutrition hastens the onset of Aids among HIV-positive.
	Malnutrition weakens resistance to infections and reduced chances
	of survival for those who have malaria.
7. Ensure environmental sustainability	Food insecurity leads to unsustainable use of forest land and
	natural resources.
8. Force global partnership for	These partnership need to include international donors and
development	agencies with expertise in improving food security and nutrition.
9. De-mining, UXO and victim assistance	The food insecure and very poor are particularly affected by and
	vulnerable to mines and UXO impacts due to their higher
	dependency on forest and fisheries as food supply and for
	livelihood needs.

Table 7 Causal Relationships between Food insecurity and Malnutrition and CMDGs

Source: UN SCN 2004, FAO 2002, SFFSN 2008-2012

# 3.1.3 Agriculture, Water and Food Security

320. The existing policy frameworks suggest that a strong growth in the rural economy and a much better pro-poor distribution are needed for rapidly improving food security in Cambodia. As indicated in the NSDP, agriculture and water (A&W) have been recognized as the main driving force for this growth. As such, the NSDP lays particular emphasis on the need for a comprehensive and cooperative approach to A&W.

321. This explicitly indicates that food security has a close linkage with agriculture and water resources development. The SAW was specially developed in a way that would further facilitate the realization of the crucial roles of these two sectors in improving food security and economic growth at the household and community levels through enhancing agricultural productivity and diversification,

and improving water resources development and management. As highlighted in the Strategic Framework on Food Security and Nutrition (SFFSN) 2008-2012, peculiar contributions of the SAW cut across the four causal dimension of food security. Specifically, the SAW has the potential to:

- augment food availability for the poor and food-insecure households through improved agricultural productivity (inclusive of crops, livestock, fisheries, and forestry);
- increase food access through improved cash incomes for the poor and food-insecure households and improved efficiency of market food supply chain;
- increase food use and utilization by the poor and food-insecure households through improved dietary diversity of food and improved quality and safety standard of food bought and consumed; and
- reduce the vulnerability of the poor and food-insecure households to natural disasters, and market shifts in household income versus food costs.

322. By addressing the above causal dimensions of food insecurity, the SAW has the potential to improve food security outcomes by contributing to reductions in mortality, malnutrition and hunger, particularly among children and women in poor and food insecure rural communities and households.

# 3.1.4 Relevant Ongoing Programmes/Projects

323. Currently, there are quite a number of externally funded projects being implemented with specific purpose of reducing poverty and improving food security situation among the poor and vulnerable groups (Table 9). Table 8 below presents summary information of the projects to be completed by 2010 and between 2010 and 2015, with specific highlights on the values and agro-ecological regions where the projects are located. As can be observed in Table 8, many of the projects with significantly large values are mainly concentrated in areas or provinces around the Tonle Sap Basin. The Plateau region receives very few projects with rather small values in spite of the fact that the area has the highest poverty rate. In the Plains region, Svay Rieng and Prey Veng are the two provinces that receive significant large number of projects with significant values. The ADB is the main funding agency mainly for projects implemented in areas around the Tonle Sap Basin. Other major EDPs' who are also active in the area of food security and poverty reduction include AusAID, CIDA, AFD, IFAD, EC, GTZ, WFP, etc.

# 3.1.5 Main Lessons Learned

324. Experiences related to improving food security at the household and community levels in Cambodia abound. There are numerous small and-medium scale agricultural and rural development projects but they tend to be fragmented and not well coordinated. The nature of the needs of the poor and vulnerable groups- which are usually varied-requires a multi-sectoral approach in delivering the interventions in an integrated and targeting manner. A greater impact on well-being and poverty reduction could be realized if complementary packages of inputs, including irrigation, secure land titles, extension services and affordable credit, were provided to poor areas along with social services, such as affordable health care<sup>39</sup>.

325. High and sustainable growth in agricultural sector is necessary for making rapid impact leading to substantial reductions in the level of food insecurity in rural areas, especially the remote

<sup>&</sup>lt;sup>39</sup> Cambodia: Participatory Poverty Assessment of the Tonle Sap Basin 2007- a study conducted by the Cambodia Development Resource Institute (CDRI) in collaboration with the National Institute of Statistics (NIS) and the Asian Development Bank (ADB).

ones. Therefore, improving agricultural productivity, particularly food production (availability), should always be taken as the core strategy for improving food security situation in Cambodia.

326. Achieving sustainable food security and rural development in the long-run requires meaningful participation from the target people. As such, participatory or bottom-up planning approach is most desirable for any community development efforts. The process of providing supports to the rural communities should be carried out in a manner that facilitates the empowerment and motivation of the rural poor to effectively pull together their social and economic strengths to tackle their common constraints. In this way, different forms of community mobilization and organization such as self-help group need to always be promoted.

327. Commune councils are generally recognized as key allies for grassroots development initiatives. They, for instance, can work effectively in areas such as rural infrastructure construction (roads and bridges, etc). However, their limited capability is seen as a major hurdle for rural development. Efforts need to be intensified to upgrade their capability in terms of planning, management and coordination skills.

328. Learning-by-doing or experiential learning approach should be adopted as an integral element of any capacity building programmes designed for building self-confidence of and transferring technology to the rural poor.

No.	Project Title	Value (million)	Agro-ecological Regions		
	Completed by 2010				
1	ADRA HARVEST Project	AUD3.30	Tonle Sap Basin & Plateau		
2	Northwest Irrigation Project (irrigation component)	USD30.87	Tonle Sap Basin		
3	Northwest Irrigation Project (production component)	EUR4.00	Tonle Sap Basin & Plains		
		ELID25 00	(1 province)		
4	Economic and Social Relaunch of Northwest Provinces (ECOSORN)	EUR25.00	I onle Sap Basin		
5	CARE Integrated Rural Development and Disaster	USD4.60	Plains & Plateau (Krung		
	Mitigation Project		Pailin)		
6	Agriculture Development in Mine-affected Areas of	CAD4.48	Tonle Sap Basin & Plateau		
	Cambodia (ADMAC)		(Krung Pailin)		
7	Tonle Sap Sustainable Livelihoods Project	USD20.30	Tonle Sap Basin		
8	8. Food Aid Programme for Cambodia	USD64.00	Nation-wide		
	Completed between 2010	) and 2015			
9	Rural Poverty Reduction Project in Prey Veng and Svay Rieng	USD15.49	Plains		
10	Cambodia Agriculture Value Chain Program	USD38.50	Tonle Sap Basin; Plains;		
			Coast		
11	Rural Livelihoods Improvement	USD9.52	Plateau (3 provinces)		
12	Rural Water Supply and Sanitation	USD10.00	Tonle Sap Basin		
13	Tonle Sap Lowland Stabilization Project	USD32.26	Tonle Sap Basin		
14	Tonle Sap Rural Water Supply and Sanitation Sector	USD18.00	Tonle Sap Basin		
15	Support Food Security for Women and Rural Poor in	USD1.80	Plateau (3 provinces)		
	Cambodia				
16	Emergency Food Assistance Project for Cambodia	USD40.00	Tonle Sap Basin & Plateau		
			(1 province)		
17	Cambodia Micro, Small & Medium Enterprise	USD24.00	Tonle Sap Basin (3		
	2/Business Enabling Environment (MSME2/BEE)		provinces); Plains (1		
			province); Coast (1		
			province)		

Table 8 Distribution of Relevant On-going Projects by Agro-ecological Regions

# Table 9 Current and Ongoing Programs of Relevance

Project Title	Timefr ame	Source	Objective/Scope	Amount (in million)	Area of Operation
Northwest Irrigation Project <sup>*</sup>	2005- 2010	ADB & AFD	To reduce poverty in selected areas in the Northwest through rehabilitation and sustainable operation of small and medium-scale irrigation systems and other water- control infrastructure within priority river basin, to enhance agricultural production	USD30. 87	Siem Reap, Banteay Meanchey, Battambang, Pursat
Irrigation Sectoral Project (Northwest Irrigation Sector Project <sup>*</sup> )	2004- 2010	ADB & AFD	To reduce poverty and food insecurity in selected northwest rural areas through enhanced agricultural production; improved farming household incomes; and improved small to medium- scale irrigation schemes and other water-control infrastructure	EUR4.0 0	Siem Reap, Banteay Meanchey, Battambang, Pursat and Kandal-AFD only
ADRA HARVEST Project Implementation - NGO Cooperation Agreements*	2006- 2009	AusAID	To enhance self worth and social competence of poor rural families; to improve management of natural resources and household farming enterprises; to improve technical knowledge and skills of rural farmers in managing their resources; and to uild capacity of groups of rural farmers to help production, processing, marketing and/or social needs of their associated farming enterprises	AUD3.3 0	Siem Reap, Preah Vihear
Economic and Social Relaunch of Northwest Provinces (ECOSORN) <sup>*</sup>	2006- 2010	EC	To reduce poverty through intensification and diversification of agricultural, livestock and fisheries production; development of economic and employment opportunities; empowerment of local communities; and improvement in access to social amenities and markets, potable water and credit facilities	EUR25. 00	Siem Reap, Battambang and Banteay Meanchey
Rural Poverty Reduction Project in Prey Veng and Svay Rieng <sup>*</sup>	2004- 2011	IFAD/G TZ/ WFP/A usAID	To enable: (a) poor households to increase food production and incomes through agricultural intensification and diversification and other initiatives and to manage natural resources in a sustainable manner; (b) the rural poor to improve their	USD15. 49	Prey Veng, Svay Rieng

			capacity to plan and manage their own social and economic development; and (c) public and other service providers to support the rural poor in a participatory and gender- sensitive manner		
CARE Integrated Rural Development and Disaster Mitigation Project <sup>*</sup>	2006- 2009	AusAID	To sustainably enhance household livelihood security of the poor in the target areas though: improved access to resources and markets; strengthened operational and management capacity of target community groups and local partners; strengthened capacity of communities, CBOs and government to mitigate the impact of disasters on livelihood	USD4.6 0	Prey Veng, Svay Rieng, Krong Pailin
Cambodia Agriculture Value Chain Program <sup>*</sup>	2007- 2012	AusAID	To improve food security, increase income, and reduce vulnerability for rural poor farmers in rice-based farming systems by promoting market- oriented agricultural development and product diversification	USD38. 50	Takeo, Kampot, Kampong Thom
Agriculture Development in Mine- Affected Areas of Cambodia (ADMAC) <sup>*</sup>	2005- 2010	CIDA	To strengthen the implementation of sustainable integrated agriculture development and mine action in support of poverty alleviation; and to reduce poverty among poor and vulnerable men and women farmers by increasing food security and income	CAD4.4 8	Pailin, Battambang, Banteay Meanchey
Rural Livelihoods Improvement <sup>*</sup>	2007- 2014	IFAD- Italy WFP	To improve livelihoods of the rural poor in the target communes of the three provinces; and to make a positive and sustainable impact on agricultural development in the selected provinces	USD9.5 2	Kratie, Preah Vihear, Ratanakiri
Rural Water Supply and Sanitation <sup>**</sup>	2005- 2015	ADB	To increase percentage of rural population with access to safe water supplies (target 50%) and sanitation (target 30%), through infrastructure, community mobilization, and assistance with implementation	USD10. 00	Tonle Sap basin provinces (excl. Banteay Meanchey)
Tonle Sap Sustainable Livelihoods Project (TSSLP)**	2006- 2010	ADB Finland	To support community-driven development and delivery of demand-driven services, safeguard core areas of Tonle Sap BR, build skills and awareness for sustainable	USD20. 30	Battambang, Pursat, Siem Reap, Kampong Chhnang, Kampong Thom

			livelihoods, and strengthen		
			levels		
Tonle San Lowland	2008-	ADB	To improve livelihoods of	USD32	Battambang
Stabilization Project	2015	1 D D	target households through	26	Pursat, Banteav
(TLSP) <sup>**</sup>			community mobilization;	_	Meanchey,
			small-scale infrastructure to		Siem Reap,
			enhance rural income;		Kampong
			alternative livelihood		Chhnang,
			activities; water supply and		Kampong
			sanitation; community-based		Thom
			natural resources management		
Tonle Sap Rural Water	2006-	ADB	To provide sustained access to	USD18.	Battambang
Supply and Sanitation	2011		safe water and sanitation and	00	Pursat,
Sector <sup>**</sup>			better		Siem Reap,
			hygiene to all communities		Kampong
			and their		Chhnang,
			members, including the		Kampong
			poorest		Thom
Support Food Security	2009-	EC	To improve food and	USD1.8	Oddor Meanchey,
for Women and Rural	2011		nutritional security among the		Ratanakiri,
Poor in Cambodia			poorest especially women in		Mondulkiri
			the target provinces		
Emergency Food	2008-	ADB &	To distribute food and provide	USD40.	Phnom Penh's
Assistance Project for	2011	RGC	support for food productivity	00	slum areas, Oddor
Cambodia			enhancement for 500,000		Meanchey,
			people (including children)		Banteay
					Meanchey,
					Battambang,
					Pursat, Siem
					Reap, Kampong
					Thom, Kampong
E 1 4 1 D	2000	WED	The same in the first second second	UCDCA	Chhnang,
Food Aid Programme	2008-	WFP	I o provide food assistance	USD64.	Nation-wide
for Cambodia	2010		(including school feeding) for	00	
			1.8 million vulnerable		
Cambodia Miaro	2008	LIGAID	To aggist rural enterprises	LISD24	Pattambang
Small & Medium	2008-	USAID	(including the poorest) to	03D24.	Bantanibang,
Enterprise 2/Business	2012		become and remain cost	00	Meanchey
Enabling Environment			competitive relative other		Kampong Thom
(MSME2/BEE)			national and regional firms		Takeo Kampot
			while improving quality and		ranco, rampor
			capabilities to provide a		
			consistent supply of quality		
			products to local and national		
			markets through strengthening		
			of value chains and private		
			sector voice; improving of		
			business environment;		
			improving natural resource		
			manages; improving water and		
			sanitation services		1

Note:

\*TWGAW's database as of January 2008 \*\*Draft Final Report on Tonle Sap Lowland Stabilization Project, ADB 2007

# 3.2 Summary of Analysis and Findings

# 3.2.1 Key Features of Target People

These food insecure and poor people (FIP) are characterized by their inability not only to 329. produce and supply sufficiently the food they need but also to buy or obtain sufficient food. It is estimated that some 4.7 million people (34.7 percent) are below poverty line and 2.6 million (20 percent) are below "food poverty" line  $\overline{40}$  (daily dietary energy intake of less than 1,715kcal/day/person). Over 93.4 percent of the FIP reside in rural areas, implying that they live with USD0.79 equivalent/day/person. In particular, 63 percent of the poor are engaged in agriculture, most of them (76 percent) are self-employed small holders. Geographically, poverty rates are highest in plateau/mountain areas (52 percent), followed by Tonle Sap region (43 percent) and plain regions (32 percent) – highest poverty rates are observed for Kampong Speu (>57 percent), Kampong Thom (52 percent), Siem Reap (52 percent), and Svay Rieng and Prey Veng provinces. The FIP are likely to be among the "12-15 percent of rural population who are landless" and "close to 40 percent of rural households that have less than 0.5 ha of agricultural land". Generally, the poor, especially the very poor, tend to reside in remote and isolated areas with little access to infrastructure and basic services, and typically even when they farm, they experience rice shortage for several months of the year. However, systematic data on poverty and food security below provincial level are not available, thus it is impossible at this stage to know the location and distribution of the poor and food insecure at district or commune/village levels.

330. Thus, key features of the FIP include: (i) their number is large, some 2.6 million being the potential target; (ii) most of them are located in rural areas but over half of them have access to no land or very small area (0.5 ha or less), thus many have very little potential capacity for food and agriculture production in the short run; (iii) most of them suffer from inadequate infrastructure (especially irrigation and water control) and social services; and (iv) many are also located far away from the reaches of market economy. This implies that many of the FIP people, especially the very poor, could not be directly reached through any agriculture based programme alone: these people need to have access to land and other productive assets for food production as well as to jobs and incomegenerating activities so as to be able to buy food or to purchase access to land and other production assets. Such opportunities are generally very scarce in localities where most of the FIP people are located now.

331. This would mean that for the FSSP Programme based primarily on agriculture and water resource sector, the target groups need to be selected carefully in order to achieve its objective of making substantial improvement in FIP's access to adequate food through their own production and/or buying from other sources. Thus, the core target groups should have some potential capacity for food and agriculture production or capacity for earning income, in other words, smallholder producers. Similarly, given the major handicaps and constraints they face in terms of agricultural production, especially infrastructural constraints, this Programme's inputs should be complemented by inputs of other SAW programmes, especially for irrigation, market, agricultural extension and input services.

# **3.2.2** Main Constraints Faced by the Target Groups

<sup>&</sup>lt;sup>40</sup> Poverty Profile of Cambodia 2004, MoP (2006)

332. The main target groups for the Programme would be smallholder producers of Cambodia. After a prolonged civil conflicts for nearly three decades, the recent institutional and physical infrastructure is still an early stage of development. Public sector support to farmers in technical, financial and infrastructural is still very limited, especially in much of rural areas. In particular, the lack of adequate infrastructure for control and management of water result in frequent cycle of flooding and drought in much of the country, presenting a major constraint for agricultural development. This fact again underscores the importance of coordinated planning of complementary investments, such as for irrigation and crop intensification/diversification in selected areas for maximum synergic results.

333. While they face many difficulties, the key constraints include (grouped in terms of four dimensions of food security):

- a) <u>Production/availability</u>
  - increasing landlessness and small size of farms (fragmentation), exacerbated by "land grabbing", land sales and access to land restricted by landmines (in some areas)
  - damages from recurrent droughts and floods (no infrastructure to manage water/land problems) as well as from pests and diseases (inadequate protection/prevention measures)
  - low productivity (crops, livestock) due to minimal access/use of technologies and inputs (absence of supply market, high cost, weak quality control of agro-inputs, and inadequate knowledge)
  - inadequate diversification in production (primarily rice focused mono-culture)
  - decline in agriculture-related natural resources (land/soil, fishery and forestry resources) due to over-exploitation and poor conservation awareness
  - high and rising costs of production inputs (oils, fertilizers, agro-chemicals, etc)
  - limited availability of credits for production
  - inadequate opportunities for marketing and processing;
- b) Access to food
  - $\circ$  inadequate consumption of food (34.7 percent of households live below the international standards 2100 kcal), with wide-spread malnutrition
  - insufficient purchasing power of the poor accelerated by rising food prices
  - lack of income earning opportunities (especially off-farm and non-agricultural sectors)
  - inadequate marketing/distribution system for food (including infrastructure);
- c) <u>Utilization of food</u>
  - $\circ\,$  limited opportunities available for women on food and nutrition education and training
  - limited availability of range and quality food
  - o inadequate composition of diets and inappropriate child feeding/caring practices
  - o limited access to potable water
  - inadequate sanitation and hygienic practices
  - inadequate facilities and tools, including energy, for food preparation;
- d) <u>Stability in production/availability and access to food</u>
  - indebtedness and depletion of productive assets due to natural disasters and individual crises (illness) as well as high interest rates
  - $\circ\;$  imbalances in food production among provinces and districts, exacerbated by poor marketing system
  - o seasonal and annual fluctuations in rice production due to variations in rain fall;
  - o lack of systematic information on rice production and consumption; and
  - $\circ\;$  inadequate provisions (food stocks) at national level and rural area to meet food shortages.

# 3.2.3 Priority Needs of the Target Groups in Improving their Food Security

334. As indicated above, the target groups face so many constraints that it is not easy to select a limited number of actions for priority intervention. Within the overall purpose and scope of this programme, i.e. rapid increase in food production and/or income generation by poor and food insecure smallholders, following aspects represent the priority areas that require urgent attention:

a) <u>Production and availability</u> – the main priority is rapid increase or maximization of food production by the poor smallholders for higher self-reliance in local food supply, especially in areas where producers are not well linked with markets or outside economy, including:

- improved access to land for the target groups, including through social land concession programme, land titling, clearing landmines
- expansion and improvement of infrastructure at village level, especially irrigation facilities, including rehabilitation of existing schemes especially to provide improved water control and management (to reduce effects of drought and flooding)
- intensification for production increase, through (i) access to improved production technologies (low-input) and related inputs, including credits, (ii) provision of production inputs and related services for agricultural production for landless people who have gained access to land through social land concession programme, and (iii) support services in pest and diseases control
- diversification in food and agricultural production systems, including promotion of mixed farming (e.g. crops plus livestock or fisheries or agro-forestry) as well as vegetable gardens
- o improved land management, including promotion of organic fertilizers
- strengthening of group-based cooperation among farmers and villagers through institutional framework for more efficient production and better community solidarity, especially rice banks and group saving schemes among women
- productivity expansion (and diversification) for more market-linked development of small-holders in the longer run, especially for building stronger financial asset of farmers;

b) <u>Access to food</u> – while key causes of inadequate access are insufficient production or availability or lack of income, or combination of these, there is also considerable scope for improving storage, marketing and other on-farm post-harvest practices:

- increase of the purchasing power of the farmers and villagers through:
- generation of income-earning opportunities for the poor, especially those without access to land and other production asset
- improving the marketing and distribution systems for food to bring food to these people
- provision of safety net mechanisms (including food aid, rice banks and other community based mutual help schemes);

c) <u>Utilization of food</u> – women play key role in food use, and thus improving their knowledge on nutrition would be a priority:

- nutrition awareness creation on dietary and child care/feeding practices for the poor and food insecure households through training
- o provision of potable water, improved hygienic and sanitary practices
- stronger awareness on food quality and safety
- o capacity building of women and children on food use and nutrition education;

d) <u>Stability in production, availability and access</u> – this would require policy-related action at national and local levels:

- $\circ$  local level storage for rice and other food items, together with improved including marketing practices to secure better benefits for the producers
- improved marketing and distribution of food to respond to supply and demand, including efficient movement of rice and other food items from surplus areas to deficit areas

- policy measures for ensuring stable supply of key food at the national level, including possible provision for a national food reserve system
- improved coordination among the main actors at various levels on food security and nutrition issues
- enhancing the quality and cope of analysis for policy as well as improved availability and reliability of information and data on main food security issues;
- e) <u>Food aid</u> this can be used as a useful safety net mechanism to address shortfalls in any of the four areas mentioned above. In particular, food for work can serve as valuable input to increasing food availability, access and use. However, in the context of the FSSP, food aid is not addressed as a central theme.

# 3.2.4 Main Gaps in the Existing Approach to Food Security

335. Some progress has been made in recent times in addressing food security issues at national policy level by the publication of the SFFSN 2008-2012, and its application for mainstreaming the objectives and concerns of food security and nutrition throughout sectoral development strategies, including among the SAW programmes. However, two broad points may be made: (a) addressing food security is a complex and challenging task requiring coordinated and concerted efforts across the government structure; and (b) the initiative began recently, with only limited progress made so that much remains to be done in integrating such policies and strategies as priority objectives in planning and implementation of concrete programmes and projects. In this respect, a summary review of the situation has shown several points as areas for further strengthening and improvement.

#### 336. These include the following:

- a) As shown above, a large number of national organizations and international partners, both governmental and non-governmental, are active in addressing food insecurity and poverty as part of agriculture and rural development efforts. However, much of these efforts, including externally supported projects, have been planned and implemented in rather fragmented way without sufficient horizontal or vertical links, neither over time or space. As a result, even projects being implemented in the same locality often missed opportunities for exploiting synergic links among them to amplify combined multiplier effects on food security. Such a tendency for fragmentation has been especially marked in the large number of relatively small-scale projects in support of FS and/or community development, often implemented by NGOs with donor funding,
- b) One basic factor for the inadequate coordination noted above has been the absence of clear policy/strategy framework for coordinated approach among various organizations in addressing different dimensions of food security. While the recently issued Strategic Framework on FSN should provides an important step in filling this gap, its systematic implementation across ministries and organizations involved and their counterparts at provincial and local levels of administration remains a challenge, including the mainstreaming of FSN in the SAW strategy,
- c) In addition to the absence of an effective policy framework for food security, limited capacity for systematic planning and programming for FS as integral part of agriculture and rural development has been an important constraint,
- d) Mainstreaming of food security has been hindered particularly by the limited capacity at the local levels for planning and managing agriculture and rural development programmes and projects. Similarly at the local level, farmers' reluctance to organize themselves into forms of cooperative or similar associations has been an impediment to effective organization of farmers and rural communities. These factors have not been conducive to active participation of farmers and local agencies in articulating their priority needs on food security,

- e) One important manifestation of inadequate policy level coordination on food security has been the insufficient capacity to balance deficits and surpluses in rice supply among provinces, and
- f) Inadequacies in information and data on FS, especially at household and village/commune levels, has been an important constraint in analyzing FS situations, with focus on various poor and food insecure and vulnerable groups, including identification of food insecure and poor groups and targeting effectively programmes like FSSP. Recent efforts for strengthening coordinated development of information and data on poverty profiles (e.g. the MOP/GTZ project for identification of poor households), including use of nationally standardized methods for such surveys, deserve strong support.

337. These gaps and weaknesses imply that the FSSP should address the need for action at two levels, i.e. (i) further efforts for systematic implementation of the substance of the Strategic Framework on FSN as the national operative framework for coordinated planning and implementation of programmes and projects, related capacity building and for enhancement of information and data, and (ii) promoting approaches in direct field interventions that clearly target food insecure and poor groups providing them with integrated packages of support to enable them to achieve rapid and sustainable progress for food security and poverty reduction. Within the SAW strategy, it is imperative to adopt a coordinated approach with focus on meeting the priority needs of target groups, including the need to identify special needs of any particular target groups reflecting their limitations and potentials.

# 3.2.5 Proposed Approach to FSSP

338. Food security is a broad and multi-dimensional concept (covering production/supply, access, utilization and stability at national/sub-national/household and individual levels), requiring multisectoral and multi-disciplinary approaches focused on the needs of target groups. While MAFF and MOWRAM have an essential role for production and availability, access as well as stability dimensions, their overall role and functions should be seen in the context of the Strategic Framework on Food Security and Nutrition, with their inputs being complemented with those from other sectoral agencies as well as local partners. In the context of SAW strategy, it is imperative that this Programme (FSSP) is integrated and coordinated with the other program pillars, both in design and implementation, so that the programmes deliver in combination effective support to the target groups in improving their food security situation. Further, as noted above, food aid and other safety net mechanisms, which are largely outside the mandate of MAFF and MOWRAM, need to be taken into account in mobilizing most suitable support to meet the needs of target groups, including the food insecure people in urban areas.

339. The great majority of the poor and food insecure people in Cambodia live in rural areas, and they should be the main target groups for the FSSP. In particular, those with some potential capacity for food and agricultural production as well as those with capacity for income-earning should form the primary target groups of the Programme: such capacity based on agricultural production and income generation is an area where a programme based in MAFF and MOWRAM can make significant contribution. Such support needs to address the key aspects of food security's four dimensions, including on-farm production, storage/marketing and other post-harvest processes, agricultural/rural infrastructure, income earning, and food use.

340. The socio-economic characteristics of these target groups are such that working with them requires an approach with focus on the target groups and their livelihood, covering not only production and income earning aspects but also aspects necessary to empower their overall capacity, including social, financial and behavioral aspects. Technical inputs for production and income

generation must be complemented by a broader approach for participatory community development to strengthen their commitment and ownership.

341. Thus, the FSSP will address food security needs at two levels - (i) at field level to provide direct support to the food insecure and poor target groups and (ii) at policy and institutional level to mainstream the objectives and concerns of FSN as well as to address food security issues at national level, especially to ensure stability and sustainability of food security arrangements:

- a) Direct interventions targeted at the target groups for:
  - i. Improving rapidly their food and agricultural productivity through appropriate techniques for intensification and diversification, adapted to their needs, capacity and potentials, including access to necessary inputs and technical support;
  - ii. Maximizing their income generation possibilities through promoting on-and off-farm opportunities and training support, especially for those without adequate on-farm production capacity;
  - iii. Capacity building and empowerment of the target groups for strengthening their collective self-reliance and group solidarity/mutual help, both for food production, income generation and livelihood improvement;
  - iv. Improved management of water and land resources for productivity improvement and protection from natural disasters, like drought and flood;
  - v. Creating a financial resource base for expanding their assets and their villages for joint cooperative initiatives at community level, especially for small scale village infrastructure works and for capitals (micro-credits) to support production activities;
  - vi. Promotion of different intervention packages of production, within the overall approach outlined above, adapted to address major constraints and needs unique to different physical and socio-economic environments of the target groups (modular approach); and
- b) <u>Mainstreaming of food security and nutrition objectives/concerns and related capacity</u> <u>building</u>, by further strengthening the coordinated mainstreaming of FS concerns and objectives in policy, implementation and management process, including related information, in the context of decentralization and de-concentration.

### 4 ANNEX 3: WATER RESOURCE AND AGRICULTURAL LAND MANAGEMENT REVIEW AND CONTEXT

# 4.1 Water data management

#### 4.1.1 Hydrology

342. The agency in charge of hydrologic data is the department of hydrology and river works (DHRW) of the Ministry of water resources and meteorology (MOWRAM). The DHRW is supported by several projects whose main aim is not data management. In their area of activities, these projects can provide funds for devices maintenance, operating, training or studies but they never have a global approach of the national hydrological system and their support is irregular. The DHRW is also supported by the Mekong river commission (MRC) on a more regular and comprehensive basis. The global financial means of the DHRW (projects + MRC + State funds) are insufficient to maintain the data system.

#### 4.1.1.1 General information about hydrology

343. As far as hydrology is concerned, 2 parameters are followed: the water level and the discharge. The water level is the easiest parameter to follow with a range of equipment going from a mere scale read by man once a day to an automatic recorder which enables to follow the water level continuously. Water level alone is useless for water resources assessment but is important information for flood management. The data collected can be transmitted in real time (if the station is equipped with a transmission system), in nearly real time (every 24 hours) or in differed time (1 week to several months). Precise and quickly transmitted information is very interesting for flood management but require a high maintenance budget.

344. The discharge is the most important parameter for water resources assessment. It would be too time and money consuming to measure the discharge as often as the water level. The process employed is to measure the discharge a few times every year and to build from the collected data a rating curve which gives the discharge as a function of the water level. As the section of the river may change over time, the rating curves are to be updated regularly. Thanks to the rating curves, it is then easy to deduce the discharge from the water level. From the data collection (water levels and discharges), the hydrologist tries to forecast future events. The accuracy of his forecasts, based on statistical calculations, depends upon the size of the data series. It is then important to remind that good hydrology outputs needs years of data collection.

# 4.1.1.2 Observing system

345. Cambodia hydrologic network is comprised of water level only stations and water level and discharge stations. The number of monitored stations has dramatically varied trough the time as shown in the following figure:



346. Data are available for 83 stations but only 32 stations have data series longer than 10 years (which is a very minimum to make statistics) and only 40 have discharges data. The location of these stations is presented on the following map:



347. From this map, we can notice that:

1. The density of stations operational at least one year during the 20<sup>th</sup> century is very low (83 that is to say 1 for 2 181 km<sup>2</sup>) and lower if we consider only stations with discharge measurement with at least 10 years series (26 that is to say 1 for 6 961 km<sup>2</sup>). A rough estimate of the ideal number of stations for Cambodia should range between 300 (1 for 600 km<sup>2</sup>) and 600 (1 for 300 km<sup>2</sup>).

2. The distribution of the stations over the country is uneven with some provinces with low or no hydrology activities (especially the coastal area, the north and the east). The density of available data is the higher in the Tonle Sap basin but, even in this area, is far from the optimum.

348. Currently, the number of operational station is around 50 (33 with discharge and water level and 17 with water level only) but this figure is very variable from one year to another depending on the budget allocation and the number of projects which support the DHRW. It is also important to notice that the DHRW lacks of financial means to update regularly the rating curves (see 2.1.1 for technical explanations). So, the accuracy of the discharges data is likely to be very low in some areas. For the main stations, discharge measurements are carried out under the MRC activities and are consequently more regular. The following map presents the current situation:



349. From this map, we can notice that:

- 1. The comments for data availability trough the 20th century apply also to the current situation of the hydrologic stations: low density and uneven distribution.
- 2. 14 automatic stations exist in Cambodia. For the other stations, data are collected either by staff of province department or villagers by direct gauge reading twice a day.
- 350. As far as transmission is concerned, the following map sum up the situation:



351. The MRC support the DHRW to manage a real and near real time transmission network for flood forecasting. Near real time network (daily human reading transmitted by cell phone) is far easier and cheaper to implement than a real time network and gives very useful information for flood management. For the moment, only 8 water levels are at least daily reported. The regional flood center of the MRC has the objective to set up 14 new daily reported water level stations (out of which 8 would be upgraded to automatic stations).

# 4.1.1.3 Data base

352. The available data are stored by the DHRW. The MRC also store data but they are all extracted from the DHRW data base which is the unique reference. A nationwide hydrological study carried out in 1994 (HALCROW) includes some data not available in the DHRW base. The DHRW uses the HYMOS software which is recommended by the World Meteorological Organization (WMO).

# 4.1.2 Water quality

# 4.1.2.1 Observing system

353. Currently, the DHRW operates 21 quality stations (8 main stations and 13 secondary stations) with the support of the MRC. Nearly half of the stations were set up during the period 1993-1995. The other half was set up in 2004. The 8 main stations monthly operate, and the other 13 secondary stations seasonally operate. The followed parameters are pH, total suspended solids, conductivity, calcium, magnesium, sodium, potassium, alkalinity, chloride, sulphate, nitrate, nitrite, ammonium, total nitrogen, phosphate, total phosphorous, silica, dissolved oxygen, chemical oxygen demand and aluminum. The geographical distribution of the stations is represented on the following map:



354. In addition to that, the Department of Pollution Control of the Ministry of Environment (MoE) implements analyses of factories waste waters. The process of control is based on the subdecree on water pollution approved in 1999.

# 4.1.2.2 Data base

355. Water quality data are stored with HYMOS software.

# 4.1.2.3 Water quality

356. The MRC began a water quality monitoring program in Laos, Vietnam and Thailand in 1985. Cambodia joined the program in 1993. From the beginning, the MRC has focused only on traditional water chemistry. The MRC published in 2007 a diagnostic study of the water quality in the Lower Mekong Basin. The first phase of this study was a comprehensive analysis of the water quality data held from the routine monitoring network (It was the first time that such a work was done). It appeared that, in general, the water quality, during the period 1985 to 2000, was good or very good. Nevertheless, this appraisal is based on a limited number of data. Especially, biological parameters are not measured, there is very little data on pesticide and industrial pollutants and sediments are little monitored. The study also carried out a field survey during 2 years (2003 and 2004) which enables to confirm the reliability of the MRC monitoring network and to extend the knowledge on toxic micropollutants. Globally, concentrations found were low but some toxicity was recorded on few locations. As for other high level technical subjects as flood forecasting, the priority for the DHRW is to collaborate efficiently in MRC programs before developing its own programs.

# 4.1.3 Meteorology

357. The agency in charge of meteorological data is the department of meteorology (DoM). As for the DHRW and hydrological data, the DoM benefit from occasional supports from various agricultural projects. It is also supported on a more regular and comprehensive basis by the MRC. The global budget of the DoM is insufficient to maintain the data system.

# 4.1.3.1 Observing system

358. The observing system is comprised of 2 networks:

- 1. A basic network of synoptic stations with a large range of parameters measured : rainfall, temperature, humidity, wind speed, wind direction, evaporation, sunshine duration and pressure.
- 2. A complementary network of rainfall stations.

359. The DoM monitors 19 manual synoptic stations and has 10 automatic synoptic stations (6 of them out of order). The rainfall network is comprised of around 175 stations out of which 125 were operational in 2006. 23 stations (19 synoptic and only 4 rainfall stations) are daily reported and the information is transferred through the global transmission system (GTS) of the world meteorological organization (WMO). The data coming from the synoptic stations indicates the wind direction and its speed, rainfall and temperature. 2 other synoptic stations, located in the Airports of Phnom Penh and Siem Reap, are managed by the Secretary of state for civil aviation (SSCA). The Ministry for agriculture, forestry and fisheries also monitors 8 rainfall stations in provinces. For the moment, the DoM does not collect the data from the MAFF and the SSCA but intends to do so. As for hydrology, the main comprehensive support of the DoM is the regional flood center (RFC) of the MRC. In order to improve its medium term forecasts (10 days), the RFC needs mainly to strengthen the near real time rainfall stations network. To achieve this aim, the RFC is going to support the DHRW and the DoM in setting up around 28 new real time rainfall stations.

360. A sum up of the situation is presented on the following map:



361. This map shows that some areas of Cambodia are not covered by the meteorological network. As far as flood management is concerned, the new stations planned by the MRC will enable to improve the coverage. For other meteorological purposes, the density recommended by the WMO (1 synoptic station every 100 to 150 km with GTS transmission) is not respected. Moreover, the WMO request only one national responsible agency and it is not the case in Cambodia (MOWRAM and SSCA). After rainfall, one other parameter very important for agriculture is evaporation. Currently, evaporation is only available through the synoptic stations. The density of data is thus very low.

# 4.1.3.2 Data base

362. Currently, meteorological data are not stored with adequate software by the DoM. The Department is now equipped with HYMOS software but the staff need training in order to use it. Data are available in:

- 1. DoM data base (Excel sheets)
- 2. MRC database
- 3. The report "Rainfall monitoring stations, Tonle Sap" carried out by the Tonle sap lowland
- 4. stabilization project
- 5. The irrigation rehabilitation study in Cambodia (Halcrow, 1994)

363. The whole data cover the 20<sup>th</sup> century with many lacks: very few data are available before the sixties. Around 2000, Rainfall is available for 168 stations.

# 4.1.4 Ground water

364. No national data base exists for ground water. Data are widely scattered among several agencies and projects, not archived in a standard format, limited in geographical coverage. As a consequence, it is not possible to make simply an inventory even with few details of the existing data.

365. Among the most interesting documents, we can quote the studies named "Groundwater development in central and southern parts of Cambodia" achieved in 1999 and 2001 with the support of JICA. These studies cover 7 provinces (Kampong Cham, Kampong Chhnang, Kandal, Kampong Speu, Takeo, Prey Veng and Svay Rieng) and 3 peri-urban areas of Phnom Penh (Dangkor, Mean Chey and Russey Keo).

# 4.1.5 Water resources assessment

366. For the moment, the MOWRAM develops no activities of water assessment and has never adopted an official delineation and classification for the river basins. Still, much information on the subject is available:

- 1. At a large scale, the MRC elaborated comprehensive maps with sub-basins boundaries. Some water resources assessments have also been implemented in the framework of the MRC programs.
- 2. At a more precise scale, the irrigation rehabilitation study in Cambodia (Halcrow, 1994) proposed a demarcation of river basins boundaries which is the more comprehensive and precise work at national scale for the moment.
- 3. Many projects in recent years adopted a river basin approach and made local water resources assessment and sometimes develop a model to compare the needs and the resources. These

different works are unfortunately not compiled and coordinated. The map below represents the areas of work of the different projects (Water resources management sector project is planned for 2009-2014):



367. One of the important requests of the strategy is to have an overview of the water resources available in Cambodia for agriculture planning purpose. It is not possible to fulfill this request in this sector review.

# 4.1.6 Flood and drought forecasting

368. Currently, flood and drought forecasting in Cambodia exists through the DHRW activities and the flood and management and mitigation program developed by the MRC from 2000.

369. The DHRW makes short time (3 days) flood forecast from the near real time data available (7 water level stations). The DHRW benefits from the technical and financial support of the regional flood center of the MRC.

370. The MRC program is comprised of 5 components :

- 1. Establishment of a regional flood center
- 2. Structural measures and flood-proofing
- 3. Mediation of trans-boundary flood issues
- 4. Flood emergency management strengthening
- 5. Land management

371. The objective of the program is "to prevent, minimize or mitigate people's suffering and economic losses due to floods, while preserving the environmental benefits of floods". The regional flood center has been effective from 2005 and it is based in Phnom Penh. It currently produces short term (1 to 5 days) forecasts for 23 locations along the Lower Mekong River. Its medium terms aims are to improve the forecasts, especially to produce medium term (10 days) forecasts, and its hydrological models. In order to reach these aims, one of its priority issues is to gather an increased amount of data and especially near real time rainfall data. As we saw earlier in the hydrology and meteorology sections, the MRC support the 2 national departments to develop their stations network and their capacities.

# 4.2 Integrated Water Resources Management

372. Integrated water resources management (IWRM) has been defined by the Global water partnership as a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. IWRM principles can be used at every scales but it is better to adopt an up to down process beginning with the largest river basins and finishing with small tributaries catchments. Though there is no general recipe to implement IWRM, the following chronological process can be proposed and used as an appraisal grid to analyze the Cambodian situation:

- 1. Creation of a legal (water law at national level and water agreements at international level) and institutional (national agencies and international organizations) framework. The legal framework shall include a water allocation, license and protection system (for diversion, extraction, polluting discharges), a water bodies monitoring system, an organization of the water administration based on water basins boundaries, an environmental and social impact assessment obligation for each project and participatory water resources management organizations. The legal framework can also include a water fees system very interesting to take into account the external environment and social costs.
- 2. Creation of an environmental observatory system : This system should optimally include a wide range of information (about water but also social, economic, environmental, sanitary, etc...). Nevertheless, if there is a lack of financial and human means, the observatory can be limited at the beginning to the most important information and especially the water quantity and quality data.
- 3. For the main international and national basins, carrying out and implementation of water management framework plans in a participatory way. The participation is usually achieved through the creation of water basin committees gathering representatives of the government, the stakeholders and the beneficiaries.
- 4. In the priority sub-basins identified by the framework plans, carrying out and implementation of local water management plans focused on the main problems. Local water committees are usually created for this purpose.
- 5. For main basins or sub-basins, creation of water basin organizations to address specific issues (Implementation of water management plans, building and/or maintenance of water utilities, management of wetlands, implementation of water fees, etc...). These organizations can be independent of or supervised by the matching basin committees.

# 4.2.1 International level

373. 87 % of the Cambodian territory is inside the river Mekong basin. The 13 % left correspond mainly to the coastal basins and also to small catchments in the south-east of the country. It is then a priority for Cambodia and more especially for its government to adopt an approach at the Mekong

basin level. Cambodia can and should do it through the Mekong river commission (MRC). The MRC was created in 1995 and has implemented since many activities related to IWRM. In 2007, the MRC is managing 11 programs for a total budget of 170 M\$ :

- 1. The environment program
- 2. The basin development plan
- 3. The water utilization program
- 4. The flood management program
- 5. The fisheries program
- 6. The Agriculture, irrigation and forestry program
- 7. The navigation program
- 8. The hydropower program
- 9. The information and knowledge management program
- 10. The integrated capacity program
- 11. The drought management program

374. Through the MRC, Cambodia has a strong international legal and institutional framework. The MRC is now in progress to develop a basin development plan. For this purpose, the Mekong basin has been subdivided into sub-areas of which 5 lie partly in Cambodia. Sub-areas strategies should be a good basis for the development of sub-basins management plans. The MRC is a great opportunity for Cambodia to define its water strategy, to defend its interests and to benefit from financial and technical support. Moreover, the MRC implements priority activities in which it is logical for the Cambodian line agencies to be involved.

375. In this regard, the cooperation between the national and international levels is not optimal in several aspects:

- 1. The Cambodian law on water resources management of 2007 refers to the Mekong agreement in one of its last articles (Art 34) only to say that MOWRAM shall follow it. Neither the Mekong agreement, neither the Mekong Commission are considered as a framework for water resources management in Cambodia.
- 2. The draft strategic development plan 2006-2010 of the MOWRAM never refers to the MRC.
- 3. The collaboration and the relationship between the MOWRAM and the Cambodia national Mekong committee (CNMC) are little developed.

376. Actually, it is, in a great extend, like if the tributaries basin level policy does not take into account the main river basin level policy. This situation is exactly at the opposite of the definition of integrated water resources management. Globally, at the international level (Mekong level), the IWRM tools are very well developed but the link between the international level and the national level is to be improved.

# 4.2.2 National level

377. At the national level, the Cambodian Government has recently progressed steadily in establishing a legal and policy framework for the water sector:

- 1. The National Water Resources Policy was approved in early 2004.
- 2. The Law on Water Resources Management was approved by the Council of Ministers in 2005 and was approved by National Assembly and signed by the King in June 2007.

3. 4 sub-decrees are planned. 3 of them are already drafted (Basin management, water allocation and licensing, farmer water users communities) and one is still to be prepared (water quality).

# 4.2.2.1 National water resources policy

378. The national water resources policy is comprised of 4 sections: After a short introduction (section 1), is presented a vision for water in Cambodia (section 2) and the fundamental principles related to water (section 3). Section 4 presents the water resources policy. The vision and the principles are classical and rather similar to those of other countries. They do not need to be detailed in the present sector review.

379. In the agricultural scope, the policy can be sum up as follow:

- 1. To improve the monitoring of the water resources.
- 2. To promote river basin management and development.
- 3. To provide enough water for agricultural production.
- 4. To improve the legal and institutional framework.
- 5. To increase public information and participation.
- 6. To mitigate flood hazards.
- 7. To protect aquatic system.
- 8. To increase financial means through private management, fees collection and requests to the donors.
- 9. To collaborate with neighboring countries in order to achieve the aims of the Mekong agreement.

380. The national water resources policy is at the same time ambitious, rather exhaustive and well adapted to the national context. It is a good road map for the long term and an interesting source of inspiration to define objectives and activities for the agriculture and water strategy 2006-2010.

# 4.2.2.2 Law on water resources management

381. The law on water resources management is comprised of 11 chapters and 41 articles. Here under is presented a sum up of the text :

- 1. Water resources are the property of the State.
- 2. Water resources shall be managed following an integrated approach.
- 3. The MOWRAM is responsible for leading the implementation of this law.
- 4. The MOWRAM is responsible for managing an inventory of the water resources.
- 5. Everyone has the right to use water resources for basic needs without license.
- 6. The uses of water for other purpose than basic needs are subject to a license.
- 7. The MOWRAM is responsible of the preparation of establishment of FWUC.
- 8. Farmers using water from the same irrigation system have a right to establish a FWUC.
- 9. The disposal of polluting substances shall be subject to a license.
- 10. The MOWRAM can establish a protected zone when a water body is seriously threatened by human activities.
- 11. The MOWRAM can establish flood protection areas in which a flood protection plan is to be prepared and implemented and in which some activities can be prohibited.

# 12. The MOWRAM shall take into account the Mekong river agreement.

382. This law (with the 6 sub-decrees planned in it) gives to Cambodia the framework it needs to implement its water resources policy in an integrated manner. The text presents some imperfections which do not prevent its implementation and which could be corrected when an upgrading will be studied in a 5-10 years time. Among these imperfections, we can quote:

- 1. A general lack of preciseness which may lead to varied or even opposite interpretations. The text is not dense enough.
- 2. A real weakness as far as water quality is concerned.
- 3. The international framework of the Mekong river commission is not sufficiently recognized.

383. Globally, the water law and its 6 sub-decrees, when achieved, could enable to respect the first part of the condition 1 of the appraisal grid for IWRM: the legal framework.

# 4.2.2.3 Sub-decree on basin management

384. This sub-decree answers to the request of the article 6 of the law (The distribution of water management, conservation and development zones will be defined by sub-decree) and of the article 10 (The procedures for preparing and implementing plans for management, conservation and development of river basins, sub-river basins, watersheds, ground waters and aquifers shall be provided by way of a sub-decree). As explained above, this sub-decree is already drafted. It has to be finalized through a rather long process of endorsement (6-12 months).

385. One problem is that another regulation exist already on the subject: a royal decree on watershed management was approved in 1998 before the creation of the MOWRAM. This royal decree focuses mainly on the management and protection of the forest and gives the responsibility of implementation of this policy to the MAFF. Currently, the MAFF (Forestry administration) is developing a sub-decree on watershed management which goes further than forestry.

386. This draft sub-decree appears to be a good basis to begin the implementation of water management plans and the creation of basin organizations because it matches the IWRM principles and it is realistic (possible to begin an implementation with limited financial and human means). In the details, this draft sub-decree is confused and presents several imperfections which can still be corrected:

- 1. It quotes uselessly many sentences of the law.
- 2. It deals with topics not planned to be the subject of a sub-decree (flood management).
- 3. It deals with topics subjects of other sub-decrees (water allocation, water pollution, controls).
- 4. Its organization is not logical (Management plans and basin organizations are quoted at the beginning but presented at the end of the text).
- 5. It does not deal with the national water resources plan (article 9 of the Law).
- 6. It does not define water management zones as requested by article 6 of the Law. In this regard, it is not clear if a management zone is equivalent to a management area. It is also important to fix a working scale (5, 20, 50 or 100 basins in Cambodia? The more the scale is precise, the more the financial needs will be important).

387. It is also important to clarify the responsibilities. The MOWRAM should be the responsible agency to write the draft regulation about basin management and to implement it.

### 4.2.2.4 Sub-decree on water allocation and licensing

388. This sub-decree answers to the request of the article 12 (The procedures for the granting of water use licenses shall be determined by sub-decree) and the article 13 of the Law (Condition, procedure, modification of providing, transfer, canceling, determine of specified duration delay of water use licenses shall be determined by sub-decree. The determination of water use fee that are the objective of license shall be determined by sub-decree). As explained above, this sub-decree is already drafted. It has to be finalized through a rather long process of endorsement (6-12 months).

389. This draft sub-decree can enable the MOWRAM to begin an activity of water licensing. Nevertheless, this document contents several important weaknesses:

- 1. We can wonder if the general principles should not be at the level of the Law.
- 2. No link is proposed between the water allocation committees and the basin organizations of the previous sub-decree (2 organizations in parallel?).
- 3. The activities levels are not defined.
- 4. The content of the application file for licensing is the same for all activities levels.
- 5. Conditions to discharge wastewaters are not defined neither a reference to another sub-decree on water quality.
- 6. The environmental impact assessment is not systematic and its contents are not defined.
- 7. The aim, the amount and the conditions of recovery of the water fees are not clear.

390. Globally, at this stage, the draft sub-decree need, more than the other texts, a review of its contents. It seems difficult to implement it in this state. As far as water fees are concerned, the destination of the money should be clearly established in order that it serves only to water policy implementation.

#### 4.2.2.5 Sub-decree on water quality

391. This sub-decree is not draft yet and shall answer to the request of the article 22 of the Law (The polluting substances provided for in this article and the technical standard shall be determined by sub-decree). One important problem for the coherence of the whole legal framework is that a sub-decree on water pollution control exists already (04/1999) in order to apply the law on the environmental protection and natural resources management. Adoption of a new sub-decree cannot go without modification or abrogation of the existing sub-decree. Modifications at the law level may also be necessary.

#### 4.2.2.6 Sub-decree on farmer water users communities

392. This sub-decree is dealt with in section 4.5

#### 4.2.2.7 Organization of the administration in the water sector

393. Several national administrations are involved in the water sector. They are presented below:

#### **Inter-ministerial level**

1. The Cambodia national Mekong committee (CNMC) which has the responsibility of the link with the MRC and of the secretariat of the Tonle Sap Biosphere reserve.

- 2. The Council for agriculture and rural development (CARD) with a water resources department.
- 3. The vice chairman of the CARD is the Chairman of the Tonle Sap authority.
- 4. The Tonle Sap Basin Authority whose role is to coordinate the management, the conservation and the development of the Tonle Sap basin.

### **Ministerial level**

- 1. The Ministry of water resources and meteorology (MOWRAM)
- 2. The Ministry of industry, mines and energy (MIME) : Responsibility of water supply to provincial towns (Phnom Penh independent).
- 3. The Ministry of Environment (MoE) : Responsibility of water pollution.
- 4. The Ministry of rural development (MRD) : Responsibility of rural water supply
- 5. The Ministry of agriculture, fisheries and forestry (MAFF).
- 6. The Ministry of public works and transport (MPWT) : Responsibility of sanitation for provincial towns (Phnom Penh independent).
- 7. The national committee for disaster management (NCDM)

394. If it is desirable, to reach a better integration, that many agencies get involved in the water policy, a great division of the responsibilities is harmful and the negative consequences of the current organization are numerous:

- 1. The organization is unclear.
- 2. No agency has an overview of the water sector.
- 3. The MOWRAM does not have the possibility to really coordinate the other agencies and focus mainly on irrigation.
- 4. Links between levels (international, national and local) and sectors (agriculture uses, domestic uses, industrial uses, environmental issues) are very little developed.
- 5. As in many countries, and especially when financial means are lacking, the relationships between agencies are sometimes competitive.
- 6. Each agency may implement its own water policy and it is already the case with the MoE which adopted a sub-decree on water quality and with the MAFF on basin management.

395. The administrative organization of the water sector and its running are certainly among the main handicaps which can prevent Cambodia from achieving the integration of its water resources management especially at the national level.

396. That said, the modification of the administrative organization of the water sector at the national level is not in the scope of the present strategy and no proposals of modification are presented in the following sections. Nevertheless, at their level, the MAFF and the MOWRAM should try to improve their relationship by working developing projects with a co-management as for this strategy.

# 4.2.3 Catchment level

397. At the catchment level, many IWRM approaches (river basins studies, environmental impact assessment, creation of a water basin organization, fish pass) have been undertook since a few years mostly through sector projects. As we will see below on some examples, these experiences have enabled to progress in the implementation of IWRM principles but they have not been as profitable as

they could have been and there are still many questions among stakeholders (national and EDP) about the interest of and the way to apply IWRM principles.

# 4.2.3.1 River basin studies

398. As seen in section 1.4, nearly all the projects started in the last 5 years contained river basins studies. Before drawing conclusions from these experiments, it is interesting to analyze one project in detail: The Northwest irrigation sector project. In this project, the basin approach was used as a selection criterion: is there enough water to implement the project? Water uses and resources were inventoried and input in computing models in order to calculate the water balance for 4 sub-basins (ranging from 1 500 to 4 500 km<sup>2</sup>) of the Tonle Sap basin. The main lessons are as follows:

- 1. The establishment of the model is very difficult as there is a lack of data and as the boundaries of sub-basins are not clear in the Tonle Sap area. It requires highly skilled experts.
- 2. The basin model is useful for real irrigation (real means irrigation during the dry season. During the wet season, the schemes are more water control schemes than irrigation) : the impact of the irrigation schemes planned on water resources is important. It is then clearly a necessity to check this impact systematically.
- 3. 2 different modeling software were tested (Mike Basin and SWAT). In order to capitalize the work done and to harmonize the activities of the different projects, the MOWRAM should choose one of these 2 pieces of software, equip its departments and train its staff.
- 4. The cost of the model is around 150 000 \$ / basin. It is not so expensive and the expense could be far more profitable if the model was maintained by PDOWRAM in order to be used for assessments before water licensing, new projects and design of water management plans.
- 5. The model is only a technical approach and do not answer to all IWRM requirements. At the local level, the basin study could be completed by the creation of a committee which could design a water management plan and help the PDOWRAM to solve water uses conflicts and to grant water licenses.
- 6. There are few collaborations between projects and the technical involvement of the MOWRAM is insufficient (no technical appropriation of the model).
- 399. Nearly everything is said in this example. The conclusions to draw can be sum up as follow:
  - 1. Models are to be developed in basins where dry season irrigation is important.
  - 2. The MOWRAM shall involve itself in the modeling process and coordinate the projects.
  - 3. The modeling phase shall be completed by the creation of a water committee and the design of a water management plan.

400. We can add that a model at the Tonle Sap level is a necessity to control that the increasing water uses are not going to compromise the sustainability for the most important wetland of Cambodia.

# 4.2.3.2 Basin organizations

401. In 2003, the Royal government of Cambodia requested the Asian Development Bank (ADB) to provide technical assistance to study how to implement an effective integrated water resource management in the Tonle Sap basin. The technical assistance proposed the creation of a Tonle Sap basin management organization comprised of a Tonle Sap council and an office of basin management. The office of the basin management should have been actually common to all basin organization to be created in Cambodia and to the Cambodian national Mekong committee. This structure should have

enabled to strengthen the coherence of the administrative organization of the water sector by gathering the financial and human means for basin management in one agency.

402. The choice of the RGC was finally different from this proposal: A royal decree of September 2007 establishes the Tonle Sap Authority for coordination of the management, conservation and development of the Tonle Sap basin area. Its scope shall be defined by another decree but it seems to be broader than water. The Tonle Sap Authority is interministerial and has a general secretariat. This choice is certainly logical to drive properly the Tonle Sap basin policy but as far as water is concerned, it means the creation of a new agency and a new division of the responsibilities which could have a negative impact.

403. Nevertheless, a basin organization for the Tonle Sap was a priority as this basin is, in many aspects, the most important sub-basin in Cambodia. This new organization is an opportunity to develop smoothly one of the most important natural resources of Cambodia.

404. Apart from the Tonle Sap, a basin committee was created for the watershed around Siem Reap in 2007 in the framework of the MRC/GTZ watershed management project. This project aims to develop a water management plan in the next years. The MOWRAM is involved but the leading agency is the Forest administration. As far as basin organizations are concerned, it is also important to note the 3 following points:

- 1. The draft sub-decree on basin management plans gives the secretariat of all basin organizations in Cambodia to the MOWRAM.
- 2. Thanks to the sub-decree and the presence of numerous sector projects on the field, a real opportunity exists to create basin committees at local level.
- 3. Cambodia should focus its effort on basin committees first because a basin committee is far easier to create and maintain than a basin organization which can come next for a specific task defined by the basin committee.

# 4.2.3.3 Water management plans

405. As said above, the Mekong river commission is currently developing a basin development plan with a sub-basin approach. Cambodia is concerned by 5 sub- basins but the MOWRAM staff is little informed about and involved in this project. This is another example of the problems of collaboration between agencies.

406. As for the basin organizations and for the same reasons, a real opportunity exists to develop water management plans. It is especially important to develop a water management framework plan for the Tonle Sap basin. Actually, this basin concentrates the most important stakes and activities related to water in Cambodia. Activities such as irrigated agriculture, tourism, water supply and fisheries are beginning to become competitive. Only a framework plan can help the Government to make the good choices.

# 4.3 Soils resources

# 4.3.1 Objectives of ASDP 2006-2010 in Relation to Land Resources

407. The main sectoral goal of MAFF is "To ensure food security, increase incomes, create employment, and improve nutrition status for all people by improving the productivity, and diversification and commercialization of agriculture with environmentally sound protection and food

safety". Some of the defined Objectives related to land resources which shall contribute to achieving this main Goal are:

- 1. Ensure the access of land resources for the rural poor farmers by improving land tenure security and land market, and eliminate land disputes;
- 2. Ensure productive use of land for socio-economic development and protection, and sustainable use of land resources through promoting land reform.
- 3. Develop land capability and land suitability classification for contributing to land use plan and crop zoning.
- 4. Improve soil fertility management and conservation in all agro-ecosystems.

# 4.3.2 Objectives of SAW 2006-2010 in Relation to Land Resources

408. The main goal of MAFF and MOWRAM in the Strategic Development Plan for Agriculture and Water is "To contribute to poverty reduction, food security and economic growth through (a) enhancing agricultural productivity and diversification, and (b) improving water resources development and management". The Water resources, Irrigation and Land management Program of TWGAW has the goal "To achieve sustainable and pro-poor management of water resources, water management facilities, water-related hazards, and land resources that is integrated, efficient, and carried out in a river basin context" with 7 defined objectives. The objectives related to land resources which contribute to achieving the Program's goal are defined as follows:

- a) Land resources have been inventoried and appraised for their agricultural potential, and procedures have been developed to integrate the development and management of land, water and related resources to achieve the optimum use of all of them.
- b) Cultivable and pastoral lands with the greatest agricultural potential have been brought into production, and are being used in a sustainable way to produce farm products that provide the best return on investment.
- c) Farmers have secured tenure to their land.
- d) Agro-ecosystems analysis in irrigation systems, social land concession and economic land concession has been developed.

# 4.3.3 A Review of Land Resources

# 4.3.3.1 Physiography of Cambodia

409. Cambodia can be visualized as a large relatively flat basin, draining gently to the Southeast into the Mekong River delta in Vietnam. The elevation drop is only 40-50 m along a 400-km axis from Banteay Meanchey (Sisophon), in the Northwest on the Thai border, to Southern Kandal, in the Southeast on the Vietnamese border. Most of the rainfed lowlands have an elevation of < 50 m above sea level even in the Northwest at Battambang (SCW, 2006).

410. From the rice soil map of Cambodia, it is clear that rice production is focused around the Tonle Sap Lake in the centre of the country, and in the Southeast along the Mekong River and its delta. Interspersed with the rice-growing lowlands are areas of low hills and uplands, especially in Takeo, Svay Rieng, Kampong Chhnang, Kampong Speu, and Kampong provinces. Fringing the central rice growing region are low hills and terraces in the provinces of Kampong Speu, Battambang, Pursat, Siem Reap, Kampong Thom, and Kampong Cham with lower population density and lower levels of agricultural production.

411. Towards the Southwestern, Eastern, and Northern margins of the country are the mountainous areas, predominantly forest covered, significant portions of which are protected as nature conservation and wildlife habitat areas. Elevations of these areas range up to more than 1000 m above sea level. However, even in these provinces such as Koh Kong in the Southwest, and Kratie in the Northeast, there are significant areas of lowland basins suited to rice and fringing uplands with potential for non-rice crops.

# 4.3.3.2 Soil genesis

412. The soils of Cambodia have developed in a humid to sub humid tropical climatic conditions with pronounced alternate wet-dry seasons of six-month duration. The soils were formed from (Crocker, 1962):

- 1. Decomposition of acid or basic rocks,
- 2. Colluvial outwash from either or both of acid and basic rocks,
- 3. Recent or ancient alluvial materials, and
- 4. Coastal accretion which is the accumulation of water-born sediments.

413. The major rock types which form the soils of Cambodia are shown in Figure 14.

414. The acid rocks range from coarse conglomerates and sandstones to fine clay shale. They also include granites and other igneous or volcanic rocks. Soils developed from these materials and colluvial-alluvial outwash from them vary in acidity, color, texture, structure, fertility, capability, permeability and drainage characteristics, and development potential for agriculture.

415. The basic rocks of Cambodia are volcanic basalts, limestone and apatite. Soil developed from these materials and colluvial-alluvial outwash from them are generally of medium to high development potential for agriculture.

416. Ancient alluvial deposits along the Mekong River consisting of sandy clay to silty clay materials have developed into shallow- profile soils with low capability. In other parts of the country, the ancient alluvial deposits of sandy loams to clays have formed soils with similar capability. Areas adjacent to the Mekong River, tributary rivers and streams, and Tonle Sap lake have received recent alluvial deposits of generally fine texture of mixed materials which have formed soils with relatively high capability for agriculture. However, some areas received ancient alluvial deposits as marine sediments from which soils were formed by chemical reduction under anaerobic conditions, had developed soils which are harmful to plant growth and development.

417. Soils of the coastal complex in Cambodia comprise of saline and/or acidic clay or sandy tidal lowlands, tidal mangrove swamps, and beach ridge of white to yellow dune sands. Some of the salt-affected soils in the lowlands have been used from agriculture, especially for rice with relatively modest yields.



Figure 14. Generalized geology map of Cambodia. The legend identifies major rock types from which the soils have formed. Extracted from Seng et al. (2005).

#### 4.3.4 Exploratory soil survey

418. In 1961, under the Cambodia-United States Cooperation Agreement, Charles Crocker and the Cambodian Team carried out the first comprehensive national soil survey to provide soil information support for agriculture and economic development in the country (Crocker, 1962). An exploratory soil map at a scale of 1:1,000,000 was subsequently produced (Figure 15). The survey report gives an inventory of the major great soil groups and elaborates on the geological and physiographic relationships and spatial distribution of the soils of Cambodia. The survey identified 16 Great Soil Groups as described in Annex 1. The work established a basis for country-wide assessment of Cambodia's soil resources. Even Crocker's classification is rarely used by agronomists or is used inappropriately its usefulness being limited by the small scale of the map (1:1,000,000) and the unfamiliar nomenclature make it difficult for non-experts to recognize soils in the field. This general concept is very useful in any further attempt to assess soil resources of Cambodia. For nearly 5 decades, the survey has gained general acceptance in Cambodia.



Figure 15 Generalized soil map of Cambodia (Crocker, 1962).

# 4.3.5 Cambodian agronomic soil classification

419. Given the lack of practical guides for improving management and use of the country's soil resources, and the difficulties for researchers, agronomists and non-experts to communicate about soils in Cambodia, the Cambodian Agronomic Soil Classification (CASC) was developed to complement the first comprehensive soil taxonomy classification of Crocker 1962 (White et al., 1997a). The usefulness of CASC was restricted to the soils used for rice production which are mainly concentrated in the central lowland plain of the country. CASC identified 11 soil groups and 20 soil phases which mainly occur in the main rice growing areas of Cambodia (Annex 2). Soil groups were mapped at a scale of 1:900,000 (Figure 15). The soil groups and phase have been widely know throughout Cambodia by researchers, agronomists, extension workers and even some farmers. Also, CASC allows correlation of these soil groups with other international classifications for comparison purposes (Table 10).



Figure 16 Soil map of the main rice-growing areas in Cambodia (White et al., 1997a).

Table 10 Correlation between Soil Groups of CASC and soil classes of various soil classification systems in Cambodia.
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Group <sup>#</sup>	CASC <sup>#</sup>	Soil Taxonomy	FAO classification	Crocker classification
No.	(1997)	(1994)	(1974)	(1962)
0	Prey Khmer Soil	Ultisol, Entisol (Psamments)*	Dystric Fluvisols, occasionally Arenosols	Red-Yellow Podzols, occasionally
				Planosols
1	Prateah Lang Soil	Alfisol (Plinthustalfs, Haplusalfs),	Luvisols, Acrisols, Planosols	Red-Yellow Podzols, Plinthite Podzols,
		Ultisol (Hapludults, Plinthustults,		Cultural Hydromorphs
		Plinthaquults, Kanhaplustlt)		
2	Labansiek Soil	Ultisol, possibly Oxisol	Nitisols, Ferrasols, Plinthosols	Latosols
3	Orung Soil	Inceptisol, Entisol (Fluvent)	Fluvisol	-
4	Krakor Soil	Entisol, Inceptisol	Fluvisol, Gleysol	Lacustrine Alluvials, Alluvials
5	Bakan Soil	Alfisol, sometimes Ultisol	Luvisols, sometimes Planosols or	Cultural Hydromorphs, Grey Hydromorphs
			Acrisols	
6	Kbal Po Soil	Inceptisol, Entisol	Fluvisols, Gleysols	Alluvials
7	Kein Svay Soil	Inceptisol (Humaquept), Entisol	Fluvisol, Cambisol	Alluvials
8	Toul Samroung Soil	Vertisol, Alfisol (Endoaqualf)	Luvisol, Vertisol	Brown Hydromorphics, Grey
				Hydromorphics, Cultural Hydromorphics
9	Koktrap Soil	Ultisols, Alfisols	Acrisols (Plinthic Acrisols, Gleyic	Alumisols
			Acrisols)	
10	Kompong Siem Soil	Vertisol (Aquert, Ustert)	Vertisols	Regurs, sometimes Basic Lithosols

# Based on White et al. (1997a).
\* Only for Entisol where the sandy topsoil extends deeper than 1 m. Words in italic refer to Soil Suborder.

# 4.3.6 Survey of soils of the Lower Mekong Basin

420. In mid 1970's, the Mekong Committee, now the Mekong River Commission (MRC), initiated a survey of the pedogeomorphological resources of the Lower Mekong Basin including Cambodia, Lao PDR, and Vietnam. A pedogeomorphological map at a scale of 1:1,000,000 was produced using satellite imagery augmented with data from available soil maps (Ceruse, 1977). Soils were classified using the 1974 FAO-UNESCO soil classification guidelines and 17 soil units were delineated for Cambodia. The province of Svay Rieng, and most of the Kampot and Prey Veng provinces were not studied and mapped since these areas are outside the Lower Mekong Basin region. The new nomenclature for the legend and the description of the soils remained difficult to interpret for non-experts, and it was hard for agronomists to relate the assigned unit names with site-specific fertility characteristics. Consequently, the map has never gained wide acceptance in Cambodia.

421. In early 2000s, MRC reproduced a soil map of 1: 250,000 for the lower Mekong Basin based on the 1988 FAO World Soils Map (MRC, 2002). In Cambodia, the most prevalent soils are Acrisols, Leptosols, Cambisols and Gleysols (Table 11). Acrisols extend up to about 49% of the total land resources of the country.

Table 11 Relative abundance of the common Soil units in Cambodia based on FAO World Soil Resources (MRC, 2002). Extracted from Bell and Seng (2001).

Soil units	Percentage of total land area
Acrisols	48.8
Leptosols	12.5
Cambisols	11.2
Gleysols	9.5
Ferralsols	3.7
Planosols	2.8
Luvisols	2.5
Plinthosols	1.8
Vertisols	1.6
Arenosols	1.6
Fluvisols	0.8

# 4.3.7 Soil surveys by Vietnamese experts

422. In mid 1980s, several soil surveys were conducted to re-assess existing Cambodian soil classification at national and provincial levels by Vietnamese scientists in cooperation with the Cambodian Ministry of Agriculture, Forestry and Fisheries (MAFF). At a national level, the work comprised of a series of hand-drawn, hand-colored maps produced at a scale of 1:500,000. Soil, agro-ecological and hydrological maps as well as land use and land suitability maps were also produced (Tran Kim Thach, 1985). The map delineated the same soil units as that of Crocker (1962), and the resolution remains the same despite a larger scale. At the provincial level, the Vietnamese Soil Classification System was used to classify soils in three provinces of Cambodia, namely Prey Veng, Svay Rieng and Takeo. The provincial soil maps were produced at a scale of 1:50,000. Eight principal soil groups were defined and subdivided to a maximum of 37 mapping units depending on the province in the maps. The Gray, Gray Elluvial, Leached Gray, Alluvial and Acid Sulfate soils were described as being important for rice production in Cambodia.

# 4.3.8 Soil surveys by Thai experts

423. In 2004-2005, a team of experts from the Thai Ministry of Agriculture and Cooperatives and Cambodian Ministry of Agriculture, Forestry and Fisheries conducted soil surveys and land use planning for improving economic-crop production systems in the northwestern provinces of Cambodia including Banteay Meanchey (Malai district), Battambang (Kamrieng district), Siem Reap (Sot Nikum district) and Oddar Meanchey (Anlung Veng and Trapiang Prasat districts). Specific objectives of the project were to prepare soil maps and soil information as the baseline data for agricultural development, evaluate the land for crop zoning especially for soybean, corn, castor bean and paddy rice, identify the constraints and recommend the appropriated technologies in soil and water conservation and management for sustainable production, and to increase the knowledge and field experience of Cambodian staffs in soil survey and land use planning. The project provided very details, but practical description of each soil series found in the studied areas including the main soil characteristics which constraint on crop production, and land suitability assessment for the selected field crops and paddy rice. The outputs of this project are very useful for supporting agricultural development plan of the selected districts.

# 4.3.9 Soil surveys by CARDI

424. In 2004, Cambodian experts from CARDI (Cambodian Agricultural Research and Development Institute) and Australian experts from Department of Agriculture and Foods Western Australia carried out soil surveys in Kampong Cham, Takeo and Battambang provinces to assess land capability and suitability to facilitate diversification of field crops in Cambodia under various soil-landscape conditions. The project completed soil surveys in 5 districts: Ou Reang Ov and Ponhe Krek (Kampong Cham), Tramkak and Kong Pisey (Takeo and Kampong Speu), and Banan (Battambang). The study by Thai-lead experts in the northwestern provinces mentioned above has similar level of details, but different methods and approaches used for soil classification and land suitability.

425. Detailed description of soils was completed and soils were mapped for each of the selected studied districts. Soil classification was completed by detailed profile descriptions using the 1990 FAO-ISRIC descriptors (Seng et al., 2007). CASC was used to correlate FAO-ISRIC classification with local soil classification. For example, soil-landscape units and soil map of Ou Reang Ov district, Kampong Cham province are shown in Table 12 and Figure 17. The most relevant soil qualities for field crops were identified and land capability classes were then determined for the main soils occurred in each district (See next section on land capability). The outputs of this project provide very useful baseline soil-landscape information for field crop production and future attempt to introduce sustainable land management approaches for increasing productivity of upland farming systems in Cambodia.

2011	% Of district	Summary description of son-randscape unit
Unit	covered	
KC1	13.5	Very gently undulating to undulating uplands on basalt with red clay soils
		(Labansiek, non-petroferric phase). Rubber plantations and upland crops
KC2	13.1	Gentle to moderately sloping fringes of basalt uplands and low basaltic rises
		with rocky or gravelly red or brown soils (Ou Reang Ov). Upland crops.
KC3	20.5	Very gently sloping areas surrounding basalt uplands. Dark clayey soils with
		basalt boulders at depth. (Kompong Siem, gravelly and non-gravelly). Paddy
		field rice and upland crops
KC4	14.9	Flat area surrounding basalt uplands and often at lower elevation than map
		unit KC3. Dark clayey soils with basalt boulders at depth. (Kompong Siem,
		non-gravelly). Paddy field rice
KC5	24.3	Alluvial plains, flooded 2-4 months per year. Dark, clayey soils, not rocky
		(Kompong Siem). Flooded rice
KC6	4.4	Swamps with vegetation
KC7	2.8	Permanent water
KC8	4.8	Alluvial plains, flooded 2-4 months per year. Yellow to brown sandy to

 Table 12 Descriptions of soil-landscape units of Ou Reang Ov district, Kampong Cham province.
## STRATGEY FOR AGRICULTURE AND WATER – HARMONIZED PROGRAM DESIGN DOCUMENT – FINAL ANNEXES

		clayey soils (Bakan, Prateah Lang). Flooded rice
KC9	0.3	Groundwater seeps out of basalt hills/rises. Opportunistic irrigation and
		cropping. Tree crops, reservoirs and native vegetation.
KC10	1.5s	Low and often linear rises emanating from basalt uplands. Kompong Siem,
		gravelly and non-gravelly and Ou Reang Ov. Paddy field rice and upland
		crops.

Source: ACIAR Project (LWR/2001/051) of CARDI.

Figure 17 Soil map of Ou Reang Ov district indicating the location of each soil- landscape unit.



Source: ACIAR Project (LWR/2001/051) of CARDI

## 4.3.10 Specific-purpose surveys

426. A number of specific purpose soil surveys were conducted to serve locally restricted projects in the 1960s, 1970s, 1980s, 1990s, and 2000s. The works were mostly undertaken by consultancies or technical cooperation agencies, and they were generally a compilation of the existing soil information (Seng and White, 2006).

427. In mid 2000s, the Ministry of Land Management, Urban Planning and Construction with funding and technical supports from GTZ and ISRIC implemented a project to assist the national land resources assessment team of Cambodia to compile and assess national land resources in terms of their suitability for settlement of small-holders in so-called social land concessions project (ISRIC, 2007). The assistance project included the creation of a national Soil and Terrain database (<u>SOTER</u>) at a scale of 1:500,000.

## 4.3.11 Soil database of Cambodia

428. The CARDI Soil Profile Database was established by with funding support from ACIAR and technical support from Department of Agriculture and Food Western Australia through a project entitled "Assessing land suitability for crop diversification in Cambodia and Australia (LWR/2001/051)". It is the first national land resources database of Cambodia. The database was developed to collect, store and manage all information about soil resources of Cambodia from various soil studies in the past, present and future so that such information kept safe, convenient, and available for users. The database system uses the international standards and codes of the World Reference Base for Soil Resources (FAO-ISRIC) which are transferable to other users internationally. Presently, it contains about 1,700 soil profile data country-wise.

## 4.3.12 Land use for Agriculture

429. Agriculture comprises of about 24% of the country's total land areas whereas about 56% is forest cover land (Figure 18). Agricultural production is mainly concentrated in the northwestern districts bordered with Thailand; in the central plain around Tonle Sap lake and its river systems, and Mekong and Basac rivers towards the Mekong delta; and in the northern and northeastern provinces of the country. Based on GIS model of Figure 5, the total land-use area for agriculture is about 4.37 million hectares. Paddy rice is the dominant crop in agriculture which comprises of nearly 80% of agricultural land which is equal to about 3.57 million hectares including areas of receding and floating rice and paddy rice intersperse with village (Table 13). Field crops comprises of 6%, rubber 2%, garden crops 7%, orchard < 1%, and others as being slash and burn 8% (Figure 18).

430. Rice crop is mainly grown in the main wet season under rain fed lowland conditions. The current total cultivated areas for rice is about 2.44 million hectares (MAFF, 2005) suggesting that about 1.13 million hectares of rice land may have the potential for utilization. Wet season rain fed lowland rice crop occupies about 84% of the total cultivated areas whereas the dry season rice crops with full and/or supplementary irrigation occupy about 11%, and the remainders are deepwater and upland rice crops (Bell and Seng, 2001). Cultivated rice areas have increased by about 14% from 2000 to 2005. Total irrigated rice areas including supplementary irrigated area increased by about 67% from 284,172 ha in 2001 (FAO, 2001) to 475,000 ha in 2005 (RGC, 2005). By 2010, the Royal Government of Cambodia has planned to increase irrigated rice areas to 594,000 ha, and at the same time increase the total rice production to 5.0 million metric tons with an average yield of 2.4 t/ha (RGC, 2005).

431. Upland agriculture in Cambodia comprises mainly of rubber, field crops (maize, soybean, mungbean, peanut, sesame), cassava, fruit trees (orange, mango, longan), sweet potato, and banana. Some of these crops, however, are also grown in high fields in the lowland areas. The total land-use area for these crops is about 0.66 million hectares including garden crops (Table 13). At present, the productions of soybean, cassava, and sesame have increased by 4-10 folds while that of maize, mungbean, and peanut have increased by 24-83% when comparing with the 1967 productions. By contrast, productions of sugarcane, vegetables, jute, and tobacco have decreased by 30-95%. Current cultivated land areas for non-rice crops (Secondary and Industrial crops) is about 0.46 million hectares (MAFF, 2005) suggesting that there are still some potentials for expansion of upland crop production.



Figure 18 Land use categories for agriculture in Cambodia. Source: SCW (2006).

No.	Land-use categories	Mapped area (ha)	Percentage of agricultural land
1	Paddy field	2,788,069	64
2	Paddy field (Receding & Floating)	194,864	4
3	Paddy field with villages	373,345	9
4	Field crops	260,145	6
5	Rubber	84,758	2
6	Garden crops	311,031	7
7	Orchard	8,179	< 1
8	Others (Slash & burn)	349,636	8

Table 13 Agricultural land use categories and their estimated areas based on GIS model of the map<br/>shown in Figure 18.

## 4.3.13 Land capability and land suitability classification

432. Land capability classification is a systematic process for organizing land resource information for the purpose of assessing land use potential. It aims to evaluate options for land use, and rank them according to their potential for profitable and sustainable production. Land suitability assessment is the process of determining the best land use options for particular parcels of land which involves assessment of soil constraints, crop requirements, and socio-economics of the different options (Bell et al., 2005). Very little has been done to assess land capability classes and land suitability for Cambodia. For example, land capability classification was done for Ou Reang Ov district (Kampong Cham), Banan district (Battambang), and Tramkak district (Takeo) (See Section I.4.8); and for several districts of the northwestern provinces bordered with Thailand (See Section I.4.7). Land capability

can be classified by assessing land qualities which is determined by measuring land characteristics. In Cambodia, land capability for field crops can be classified into 5 classes as shown in Table 14 (Bell et al., 2006). For example, in Tramkak district of Takeo province three classes of land capability for field crops were determined using the criteria in Table 14 (Figure 19).

Table 14 Land qualities and their rating for land capability classification for field crops in Cambodia. For specific crops these ratings will vary. Extracted from: Bell et al. (2006).

	Land capability class					
Land qualities	1	2	3	4	5	
	Very high	High	Fair	Low	Very low	
pH (CaCl <sub>2</sub> ) (0-10 cm)	5-7.5	4.6-5	4.3-4.5	<4.3, >8.5		
pH (CaCl <sub>2</sub> ) (50-80 cm)	5-7.5	4.6-5	4.3-4.5	<4.3, >8.5		
Nutrient availability	Low leaching risk	Moderate leaching	High leaching			
Surface condition	Loose, soft firm, self-mulching	Few stones	Crusting, common stones	Cracking, hard setting, many stones	Abundant stones, boulders	
Surface soil structure decline susceptibility	Low	Moderate	High			
Rooting depth (cm)	>80	50-80	30-50	15-30	<15	
Water logging	Nil, very low	Low	Moderate		High, very high	
Inundation	Nil, low		Moderate		High	
Soil water storage (mm/m)	>70	35-70	<35			
Soil workability	Good, fair		Poor		Very poor	
Water erosion risk	Low	Mod	High	Very high	Extreme	
P export	Low	Mod	High			

Figure 19 Map of land capability classes in Tramkak district, Takeo province



(Source: ACIAR Project LWR/2001/051).

## 4.3.14 Soil Fertility and its Capability for Crop Production

433. In Cambodia, sandy materials cover a large proportion of the landscape of the country, on account of the siliceous sedimentary formations that underlie much of the Kingdom (See Section I.4.2). Sandy soils are, therefore, the most prevalent in agricultural lands of Cambodia (Seng et al., 2005).

In rain fed lowland rice ecosystems, more than half of the rice-growing soils were categorized 434. as being low productivity potential whereas about 20% medium potential, and 23% high potential (White et al., 1997b). The low potential soils, Prateah Lang and Prey Khmer together represent about 40% of the lowland rice-growing area. These soils are strongly to moderately acidic in reaction, very low in organic carbon (C) and total N, very low to moderate in extractable P, very low to low in exchangeable K, and very low in effective cation exchange capacity (ECEC) (Table 15). The Bakan, another low potential soil is extremely acidic in reaction, and very low in all of these properties. The medium potential soil, Toul Samroung strongly acidic in reaction, very low in organic C and extractable P, and low in total N, exchangeable K and ECEC (Table 6). The Labansiek soil was also a medium potential soil, but it has recently been beyond the use for rice cultivation (even upland rice) because of its undulated landform and a demand for growing valued-added crops other than rice. This soil is extremely acidic in reaction, low in total N and extractable P, and very low in organic C, exchangeable K and ECEC. The high potential soils, Kein Svay and Kampong Siem are moderately acidic to slightly alkaline in reaction, but very low in organic C content. Their total N content is low to very low, P is moderate to low, K is low, and ECEC is moderate to low except that of the Kompong Siem (Calcareous phase) which is very high due to the presence of calcareous nodules in the profile (Table 15). Thus the main soil limiting factors for lowland rice, especially where there is prevalence of sandy soils are: very low organic C, total N, extractable P, exchangeable K, and ECEC.

435. In upland ecosystems of Cambodia, there are also prevalence of sandy soils which occur in southern to southwestern areas, northern areas, and in areas fringing lowlands of the provinces surrounding the Tonle Sap Great Lake (Seng et al., 2005; Noble and Seng, 2007). Most of the soils in these areas are not well understood about their biophysical constraints for agricultural crops. There are, however, presences of soils which are similar with soils found in the lowlands such as Prateah Lang and Prey Khmer soil groups. Such sandy soils were assessed for their capability for field crop production (ACIAR Project LWR/2001/051). Apart from their assessment for chemical properties others land characteristics were also assessed since they influence soil management for field crops. The capability of Prateah Lang soil group was classified as being low due to its hard setting, surface crusting, waterlogging and inundation characteristics whereas the capability of Prey Khmer soil group was low to fair depending on its high leaching, low soil water storage and subsoil acidity. By contrast, the capability of Bakan soil is very low due to its waterlogging and inundation characteristics.

436. The Labansiek soil group appears to be a well-known soil in the upland farming systems of Cambodia because of its reputation to produce a good rubber production. This soil has favorable physical properties for tillage and crop establishment. The soil surface remains soft to firm, is easy to till and does not impede seed emergence. While the soil becomes sticky when wet, the porosity allows soil water to rapidly drain after rain to a range of water contents suitable for tillage. The soil structure is stable and not susceptible to decline. Labansiek soils are almost always well drained and free of inundation risk. However, its characteristics of extremely acidic in reaction would commonly restrict root growth and development especially in subsoil. The capability of Labansiek soil for field crops was fair because it is extremely acidic (ACIAR Project LWR/2001/051).

437. The Ou Reang Ov soil group has recently been distinguished from Labansiek soil, and classified as a new soil group (Seng et al., 2007). The soil occurs on sloping land of undulating topography extending from Labansiek soil to Kompong Siem soil, hence it is well-drained and is not

subject to inundation. The soil has naturally very high extractable P level, moderate exchangeable K level, low in Total N and ECEC, but very low in organic C (Table 6). It is moderately acidic in reaction. The Ou Reang Ov soils are generally more difficult to plow than Labansiek soil due to stoniness, and it is generally have limited soil water storage capacity. Overall land capability of the Ou Reang Ov soil group was rated as fair depending mostly on low soil water storage capacity, poor soil workability, and crusting (ACIAR Project LWR/2001/051).

438. The Kompong Siem soil group has high water holding capacity on account of its clay content and depth. Nutrient availability is not limiting as levels of most nutrients are satisfactory and pH is only moderately acid. Waterlogging risk is perhaps the most severe limiting factor, but despite the high clay content, the Kompong Siem soil appears to drain well so long as there is no shallow perched water table. Waterlogging risk increases once soil wets up, swelling of clays occurs, and perched water tables develop within the profile. Drainage is restricted by the perched water table that develops in the subsoil clayey horizon at below 45 cm. The overall land capability of Kompong Siem soil for field crops was rated as being fair based on water logging and workability characteristics (ACIAR Project LWR/2001/051).

 Table 15 Some selected topsoil properties of the major Cambodian agricultural soils. Depths of investigation range from 0-8 to 0-45 cm depending on soil types

Soil Types <sup>#</sup>	pH	Organic C	Total N	Colwell P	Exch K	ECEC	Site
	(CaCl <sub>2</sub> )	(%)	(%)	(mg/kg)	(cmol/kg)	(cmol/kg)	code*
Prateah Lang, loamy phase	5.1	0.38	0.02	8	0.15	1.9	111
Prateah Lang, clay phase	5.8	0.54	0.05	22	0.13	6.0	115
Prey Khmer	4.8	0.22	0.02	2	0.04	1.6	52
Bakan	4.3	0.40	0.02	4	0.03	0.9	59
Toul Samroung	4.5	1.17	0.10	7	0.34	12.7	34
Kein Svay	5.6	1.10	0.10	22	0.4	18.5	42
Kompong Siem	5.6	1.03	0.09	16	0.19	13.3	13
Kompong Siem, calcareous phase	7.2	1.30	0.12	18	0.35	45.7	31
Labansiek	4.0	1.75	0.17	11	0.05	2.4	99
Ov Reang Ov	6.1	1.54	0.12	132	1.74	12.4	11

<sup>#</sup>Soil types by CASC (White et al. 1997a). The Labansiek and Ou Reang Ov soil groups occur in upland areas which are now beyond the use for rice. \*Referring to the Cambodian Soil Database (ACIAR Project LWR/2001/051). (Source: ACIAR Project LWR/2001/051).

## 4.3.15 Conclusions

## 4.3.15.1 Legal framework

439. The Cambodia's 2001 Land Law built the foundation for governing the uses and management of land resources and strengthening land tenure security to facilitate the country's fast growing economy with heavily demand for land uses and development. In addition to this Law, the Royal Government of Cambodia has legislated and enacted a number of legal documents to support and strengthen the development of agricultural sector which included the sub-decrees on social and economic land concessions, strategy of land policy framework and state land management, and the

rectangular strategies (Phase 1, 2). The enforcement and implementation of these legislations in most cases requires a strong coordination among related RGC's institutions, but such coordination has been reported to be weak. The governance of the use and management of agricultural lands has been poorly taken into account because much of the research has been in favor of technology development and adoption to increase crop production. Under such situation, the agricultural lands have been facing the challenge of "Conversion of land to other uses, and the unused farmlands being kept for speculative purposes". In this case, the lands are poorly protected, conserved, and enhanced for productivity. Thus, there is an urgent need to develop policy framework for protection, conservation and productivity-enhancement of agricultural lands.

## 4.3.15.2 Technical framework

## 4.3.15.2.1 Land resource assessment

440. There has been a number of land resource assessment works conducted for Cambodia to serve different purposes. They are different from each other in terms of methodology used, scales, volume and details of survey, and usefulness. The exploratory survey of Crocker (1962) and the geological survey of MRC have been used as baseline information for the later soil survey works in the country. Recent works of CARDI and Thailand-Cambodia Project are good example of land resource assessment work for Cambodia. The Cambodian Agronomic Soil Classification system is a good example for immediate identification of soils in the field, but it is being restricted to use for lowland rice soils. Land capability classification should be done country-wise using the methodology recently developed by CARDI. In addition, all information about soil resource assessment should be stored in the National Soil Database recently developed by CARDI, and made such information available for users.

## 4.3.15.2.2 Lowland rice soils

441. There is increasing tendency of land-use changes in the lowland rice ecosystems together with improved rural infrastructure, improving the current soil classification system in terms of extra groups, phases, scale, volume and significance of use will significantly improve our understanding of the soil resources in the country. There is still much to be learnt about the constraints of the rice soils of Cambodia for higher productivity. There is also need for a better understanding of how rice soils can be managed and used for crop intensification and diversification in the lowland cropping systems.

## 4.3.15.2.3 Upland soils

442. In Cambodia there are a large proportion of soils in the upland farming systems, but very little is known about soils in such farming systems. It is important to develop a comprehensive database of the soil resources of the country as well as developing simple guidelines for the recognition and use of these upland soils. It is suggested that the guidelines be developed based on the framework of CASC so that upland soils are simply well identified, recognized, and hence better management for sustainable utilization. In addition, vast areas of sandy upland soils occur in Cambodia but are only poorly described, and at present not extensively used for agriculture. A major hindrance to the sustainable management and utilization of upland sandy soils in Cambodia is the dearth of knowledge about the distribution and properties of such soils. While political situation of the country is stable, infrastructures supporting agricultural sector development including roads and markets have significantly improved: population pressure, improved living standards, and demands for improved nutrition in diet are likely to be key drivers for expansion of upland cropping in Cambodia. There is a need to hasten the pace of research and resource assessment of these sandy uplands so that land suitability assessment and sustainable farming systems are available to guide the expansion of

agriculture in upland farming systems where there is likely to be increasing agricultural development over the next 20 years.

## 4.4 Land use and land tenure in Cambodia

## 4.4.1 Introduction: Background and Objective

443. Cambodia has achieved an impressive record of macro-economic growth, averaging about 8.2 percent per annum during the last decade. This growth has been accompanied by modest reductions in poverty, averaging about 1 percent per annum over the past ten years. In order to sustain macro-economic growth and accelerate poverty reduction, the agriculture sector, where about 90 percent of the poor reside, needs to be developed as a third engine of growth after garments and tourism. A key component for promoting increased agricultural production and growth is land tenure security for Cambodia's smallholder farmers.

444. Demographic and market forces, along with poorly functioning governance institutions, however, are eroding land tenure security in the rural sector. The land tenure situation in the near to medium term for many of Cambodia's rural households, especially the poor and more vulnerable households such as those headed by single women, may worsen in terms of the number of landless and near landless households as well as the scope and scale of land-related conflicts. If left unchecked, insecure land tenure in the rural sector will undermine efforts to promote agricultural growth and reduce poverty, as well as pose a threat to social harmony and economic development.

445. The National Strategic Development Plan for 2006 – 2010 of the Royal Government of Cambodia (RGC) identifies land reform as a key component for achieving sustainable and equitable growth as well as poverty reduction in the agricultural sector. The NSDP aims "to ensure an equitable, proper and efficient system of land management, distribution and tenure security, proper eradication of illegal settlements and land grabbing, and the control of ownership concentration for speculative purposes." The challenges are "to control and curb further land concentration in few hands, including review of already granted large concessions exceeding limits under the 2001 land law" and NSDP, 2006:48.

446. The objective of this policy review is to identify priority actions for charting a more equitable and sustainable course of strengthening land tenure security for rural households and communities. One set of policy questions concerns the most effective agricultural development strategy for achieving equitable growth, poverty reduction, and sustainable land use. Can smallholder farming approaches generate sufficient growth, and can plantation-type approaches help reduce poverty? A second set of questions concerns the rapid conversion of Cambodia's forested lands to agricultural uses. This can be achieved through planned policy interventions, which will eradicate the current anarchy of smallholder migration, commercial encroachments, and corporate and elite land grabbing. Both sets of questions raise issues about the process of expanding agricultural frontiers by assigning state land to agricultural uses. Transparent and equitable mechanisms are required whether the state should retain land or allow it to be transferred for agricultural development.

## 4.4.2 Land Tenure Defined

447. The rationale for promoting secure land tenure is based on property rights theories that predict people are more likely to invest resources in productive activities when they are confident that they, or their heirs, will enjoy the benefits of such investments in the future (Feder and Feeny, 1991). There is also considerable empirical evidence from around the world suggesting that over time land tenure security encourages investment in agricultural production and diversification and promotes the development of sustainable land use practices (Deininger, 2003; Feder, 2004). In Cambodia, for example, recent analysis of CSES 2004 survey data suggests that secure land tenure in the form of

certificates and application receipts has had a significant impact on raising crop yields, value of land, and household consumption (World Bank, 2006 and 2007).

448. Land tenure arrangements concern access to and control over land resources. More specifically, land tenure determines "(a) who has access to land and who can be excluded from it; (b) the terms and conditions of that access; (3) the rights and obligations that such access gives rise to; (4) how land can be used and controlled; and (5) the means and circumstances by which the rights and obligations can be transferred to others" (FAO, 2002). Land tenure systems are essentially social phenomena comprised of rules to regulate different and often competing interests in land, including the management of conflicts that arise from such competition. As a result, land tenure systems tend to reflect the social structures and distribution of power within society. Land tenure systems, therefore, may vary not only in terms of the distribution of access to and control over land rights, but also in terms of "the means by which they are defined, recorded, and enforced" (Grover et al., 2006: 7-8).

449. In transforming economies such as Cambodia, formal and informal governance institutions often operate parallel to one another, resulting in ambiguity and tension in the formation and enforcement of land tenure rights between various actors and across different jurisdictions (Williamson and Wallace, 2007). Such ambiguities and tensions tend to increase during periods of rapid social and economic transitions characterized by changes in the technology of production and/or local prices that affect the expected value of wealth producing assets, such as land (Libecap, 1986). Increasing competition over land resources among community members and outside claimants attracted by the creation of new assets can result in widespread conflict and the exploitation of land resources for short-term gain. This is particularly the case in post-conflict societies where rapid transitions in land use and land tenure take place within a context of weak governance and poorly functioning enabling institutions (FAO, 2005).

## 4.4.3 Land Tenure in Rural Cambodia: Factors and Circumstances

450. The land tenure reform process outlined in the NSDP is taking place in a context of increasing population growth, rapidly expanding land markets, increasing landlessness and near-landlessness, and significant rural-rural migration. The development focus on irrigation infrastructure and water resource management will also have significant impact on land use and land tenure arrangements.

## 4.4.3.1 Population Growth and Employment

451. As of 2005, Cambodia's population was 13.8 million, which grew at an annual rate of 2.5 percent in the late 1990s and 1.8 percent in 2000-05 (NSDP, 2005). At current growth rates of 2.1 percent population was projected to increase by approximately 16.6 million in 2011 to 20.3 million 2021 (NIS,1998. Most of this growth will take place in the main rice growing regions of the Mekong and Tonle Sap basins, where land resources are already under considerable pressure. Cambodia's labour force has increased by 221,000 or 3.6 percent annually between 1998 and 2004 and is projected to continue growing until 2010. Agriculture accounted for 57.4 percent of total employment in 2006, but has not been able to absorb many new labour market entrants since 2000 (Lundstrom and Ronnas, 2006). Population growth and the lack of job creation in the rural sector is fueling urban and cross-border migration, as well as migration to frontier regions on the periphery of the main rice growing areas and beyond (CDRI 2007a; Chan, 2008).

## 4.4.3.2 Expanding Land Markets

452. Rising incomes are enabling urban elites along and a growing middle class to purchase periurban and rural land at an increasing rate (CDRI, 2007b). Such purchases are often for speculation and result in agricultural land being withdrawn from productive use. Those who sell land enter the labour force, invest in business, or purchase land in rural areas beyond the peri-urban realm, thus contributing to the increased demand for land in rural areas. As a result, land markets throughout Cambodia are pushing outward in a kind of rippling pattern from multiple urban bases.

453. Peri-urban and rural land sales are motivated by a variety of factors. Some households sell land in order to finance capital investments in a business or migration in search of employment. Others have been forced to sell land as a result of poor production over time caused by poor soils and/or a succession of flood and droughts. Many others are forced to sell land in order to pay off debt and the high costs associated with health care. It is therefore important to view soil conditions. weather-related disasters and health care costs as two of most important factors affecting land tenure security in rural areas. Any policy designed to promote land tenure security must take these factors into account (ADI/NGO Forum, 2007; CDRI, 2007a and 2007b).

454. Recent research suggests that not all land transactions are voluntarily (ADI/NGO Forum, 2007; GRET/CEDAC, 2007). This observation has implications for land tenure security throughout Cambodia, and is of particular concern regarding poor and vulnerable households. More research is required to understand the scope and scale of coerced sales and what steps can be taken to reduce their occurrence.

## 4.4.3.3 Increasing Landlessness and Near-landlessness

455. The number of landless and near landless (i.e., less than 0.5 ha) households is growing in rural areas, thus contributing to increasing inequality in landholding size. The proportion of landless households has risen from 13 percent in 1997 to 20 percent in 2004 and is widely perceived to be steadily increasing. The growing number of landless and near landless households is one of the main drivers of increasing inequality in the rural sector, which is measured by an increase in the Gini coefficient for per capita annual consumption from 0.27 to 0.33 percent in the rural areas of Cambodia. The Gini coefficient for landholdings is 0.69, among the highest in the region. The inequality in land ownership implies the likelihood of a trend to growing inequality of production, income and consumption in the future" (World Bank, 2006 & 2007).

## 4.4.3.4 Increasing Rural-Rural Migration

456. In some cases, rural household members migrate to cities, border areas, or other countries (e.g., Thailand, Malaysia) in search of employment. In other cases, households migrate to other rural areas in search of land. The process of rural-rural migration appears to be accelerating as more land in the central rice growing areas is occupied, thus pushing more people moving into the frontier areas where they clear land either for themselves for farming or for others on a wage labour basis. In these areas, rural migrants may come into conflict with state agents who are enforcing rules and regulations concerning the acquisition of state land, or others claiming land through illegal occupation or forced acquisitions (CDRI, 2007a; GRET/CEDAC, 2007). Rural-rural migration will have a significant impact on land use management and land tenure and must be taken into account in designing a comprehensive agricultural development strategy. More research is required to understand the scope and scale of rural-rural migration and its impact on land use and land tenure.

## 4.4.3.5 Land mines and Unexploded Ordnance

457. The NSDP observes that "large tracts of arable land are infested by dangerous land mines planted, and unexploded ordnance (UXO) dropped, during past conflicts, which routinely claim lives and limps of both humans and animals. As a results, land mines and UXO are an important factors

concerning land tenure security as thery hinder access to land and forest resources by small hold farmers and others. Land mines and UXO clearance therefore is very important for making arable land safe for cultivation (NSDP, 2006:15). Although the RGC with support from various donors has made considerable progress over the past year in land mine clearance and reducing the number of fatalities and injuries associated with this legacy of past conflict, much work remains to be done.

## 4.4.3.6 Water Resource Management and Land Tenure

458. The relationship between water resource management and land tenure security is of increasing importance as the RGC increases its efforts to expand rural infrastructure and strengthen natural resource governance. There is certainly plenty of scope for developing irrigation infrastructure. As of 2006, the total cultivated area included 2,548,388 ha for rice production, 508,427 ha for subsidiary industrial crops making a total of 3, 056, 815 ha of cultivated land (MAFF, 2007). The total irrigated area is about 1,046,263 ha (MOWRAM, 2006), about 34 percent of total cultivated land. In the plains area alone, about 44 percent of all plots do not have irrigation in either the wet or dry season (World Bank, 2006: 90).

459. At the micro level, the development of irrigation schemes is likely to increase the value of land as a productive resource and could stimulate conflicts where land tenure is not secure. With regard to larger schemes, there is some evidence to suggest that the need to consolidate land in medium and large-scale systems can be efficiently managed by traditional local mechanisms of transacting and transferring land use rights (Le Meur, 2005). In such cases, it will be important to consider ways to officially recognize the transfer of customary rights where land titles have not yet been issued.

460. At the mesa level, water resource management will involve governing upstream and downstream relationships among various stakeholders, with important impacts for both water resource supply and land tenure arrangements. This is also important with regard to the introduction of privately owned and operated reservoirs and irrigation systems where powerful outside entrepreneurs acting with the authorization of sub-national authorities may usurp local land rights. There are also some cases where ELCs have blocked or otherwise diverted water resources away from local communities, thus disrupting local agricultural production (CDRI, 2007a).

461. At the macro level, land tenure arrangements regarding access to and control over forest resources will have significant impacts on water basin management, especially in areas where forested land is cleared by subsistence migrants, commercial encroachers, and ELCs. The anarchic conversion of state forested land to agricultural uses is likely to disrupt overall water supply and flows in the medium- to long-term.

462. More research is required to understand the complex relationships between water resource management and land use and tenure, especially in a context of increasing demand for both land and water resources.

## 4.4.4 The Legal and Policy Framework

463. Much of Cambodia's land tenure policy is embodied in the Land Law of 2001. The Forestry Law of 2002 is also relevant as it governs access to and control over forest resources. This aspect of land tenure policy is important for many rural households, especially the poor, whose livelihoods depend on their access to forest products. Together both laws and their associated sub-decrees provide a comprehensive legal framework for reform. The implementation and enforcement of many legal provisions, including better coordination among state institutions with overlapping roles , however, need to be strengthened in order to be more effective.

464. The NSDP states the need for a comprehensive Strategy for the Agriculture and Water Sector (SAW) that addresses issues pertaining to agricultural land management in support of increasing production, productivity and diversification, and for ensuring equity and social justice with respect to smallholder farms, farmer cooperatives, contract farming, and large scale land concessions. The SAW's reference to "establishing arrangements for land tenure and access to water that creates confidence for investment", however, lacks specificity in terms of actual measures that can be implemented and enforced. The reference to "identifying, determining the potential utility of, and opening up for settlement of cultivable land that is presently unused" as well as "determining the potential utility of presently under-utilized cultivable land, and encouraging more productive use" is a useful starting point, but also requires concrete measures for action. These objectives have important implications for land use and land tenure arrangements, and must be considered in the context of a specific agricultural development strategy.

465. In practice, Cambodia is currently pursuing a dual track approach that employs land-titling approaches to secure tenure for smallholder farmers while employing ELC provisions to support plantation style approaches to agricultural development. These approaches are spatially oriented with land-titling efforts focused in rice-growing areas in the Mekong and Tonle Sap basin areas while ELCs are often granted in areas that are largely forested and sometimes overlap with existing communities (CDRI, forthcoming). A crucial policy question concerns the degree to which these two approaches can be reconciled under a comprehensive agricultural development strategy in ways that provide land tenure security for smallholder farming households and commercial investors, as well as promote sustainable land use patterns as called for in the SAW. How this question is addressed has important implications for land use management and the allocation of limited development resources.

## 4.4.4.1 The 2001 Land Law

466. The major provisions of the Land Law of 2001 include the removal of temporary possession as a means for land acquisition, the establishment of a nationwide land titling process, the creation of a national and provincial cadastral authority, authorization of economic and social land concessions, and recognition of communal land rights. Taken together, these provisions suggest that tenure security is largely perceived in terms of ownership in the form of land titles and that land markets are defined largely in terms of land transactions (i.e., the buying and selling of land parcels). Such "proprieterist approaches" to land tenure tend to over-write local customary rights governing land tenure and neglect to consider other forms of access to land, such as rental markets (GRET/CEDAC, 2007).

## 4.4.4.2 Land Titles and Land Tenure Security

467. The NSDP states that one priority is to issue clear, incontestable, legal land ownership titles to provide security of tenure for those who use the land they occupy. The Ministry of Land Management, Urban Planning, and Construction's (MLMUPC) systematic land-tilting project has recently completed its initial 5-year phase and successfully reached its target of one million land titles issued. Land titles have been primarily issued in the lowland rice growing areas in the central plains and Mekong-Tonle Sap basin areas, while Chamcar land, newly cleared land and foothills in the peripheral, or frontier, areas remain outside the domain of the official registry. There are approximately six million plots remaining to be titled, which will require considerable time and resource to complete. As land occupation and use in rural areas is usually not documented in any way (CDRI, 2007b), tenure therefore remains insecure for most rural households. One way to address such legal gaps would be to consider ways to officially recognize land occupation and use at the local level until land titles can be issued.

468. Recent studies observe that people generally perceive that land tenure is more secure with land titles (Deutsch, 2006; ADI/NGO Forum, 2007, Markussen, 2007). The capacity of land titles to actually protect land tenure security, however, has not yet been tested with regard to how they may stand up in court or are otherwise enforced at the local level in cases of conflict. A special concern in this regard is the degree to which women's tenure rights are protected and upheld by the titles, such as in cases involving separation, divorce, or the death of a spouse (CDRI 2007a, CDRI, 2007b).

469. There are additional sources of potential tenure insecurity despite the issuance of land titles. One concerns titled land sales that are recognized by local officials, but not officially registered with cadastral authorities at the provincial or national level (ADI/NGO Forum, 2007; CDRI 2007b and 2007c). As the primary means of land acquisition is increasingly through purchase and more land sales will over time involve titled land, expanding land markets may in fact undermine tenure security once promised by land titles (Ballard, 2008). One possible solution is to eventually locate the cadastral authority at the commune or district level. This would require considerable time and effort in light of current local capacity constraints.

470. Second, there is some indication that the mis-application and mis-interpretation of land titling procedures in at least some areas at the local level may inadvertently undermine women's rights in certain instances, especially in cases involving the death of a husband, divorce, separation, and abandonment, as well as in cases involving polygamy (Meyrav, forthcoming). More systematic research is required in this regard.

471. Third, the systematic land-titling process is highly dependent on external support for financial and technical matters. Any disruption in external support could have serious consequences for the process of strengthening land tenure in the long run. The RGC will need to consider alternative sources of funding for MLMUPC's land-titling programme over the long run. One possible source of funding is oil and gas revenues.

## 4.4.4.3 Social Land Concessions

472. The Land Law of 2001 provides for land concessions as the right to use state private land (i.e., private property of the state) for specific purposes. Social land concessions (SLCs) provide a mechanism to enable landless farmers to gain access to land for residential and subsistence farming now that temporary possession has been ruled out as a means for legally acquiring land. After five years of occupation, the land recipient would then be eligible to apply for land ownership title.

473. There are currently three pilot sites in two sites that include 2 communes in Kratie province and one in Kampong Thom province under the World Bank supported Land Allocation for Social and Economic Development (LASED) programme, which is expected to formally become effective. It is expected that there will be about 20 commune-based SLCS in Kratie, Kompong Cham and Kompong Thom provinces by the end of 2009. Kratie is currently selecting land recipients, while in Kompong Cham there are problems associated with UXO clearance. If sufficient funding is secured there could be as many as an additional five more commune-based SLC supported by NGOs in Kompong Chhnang and Kompong Speu province by the end of 2009. The government has also indicated plans to undertake SLCs in Kampot and perhaps Stung Treng. In 2010, LASED will be assessed, and if the land identification and allocation as well as recipient identification processes are working well, the World Bank and the RGC could scale up their support for additional SLCs.

474. In addition to providing landless households with access to land, the SLC mechanism provides an opportunity to guide the settlement and clearing of state land in a transparent and orderly fashion in support of the government's development objectives and policies. Migrant farmers are increasingly clearing state lands for cultivation, either for their own use or for wage labour on behalf of others who clear land to establish possession rights. Such extra-legal land acquisitions often

involve converting forested state land to private agricultural uses, and do not conform to the RGC's land management policies. The SLC mechanism could be a useful means of targeting specific areas for conversion to private agricultural uses while at the same time providing landless households with an opportunity to legally acquire land. The SLC mechanism will also help planners target complementary development resources, such as extension services, infrastructure (e.g., transport, irrigation), and social services in support of smallholder farming.

475. The SLC mechanism is similar to the systematic land-titling programme in the sense that it too is highly dependent on external support for financial and technical matters. As with the land-titling programme, any disruption in external support could have serious consequences for implementing the SLC mechanism. The RGC will eventually need to consider alternative sources of funding for SLC programme. One possible source of funding could be state revenues that are supposed to be generated by the economic land concessions.

## 4.4.4.4 Economic Land Concessions

476. The Land Law of 2001 establishes land concessions for economic purposes as a form of land allocation from the private domain of the State to private users for specific purposes (Chapter 5, Article 48-62). According to this Law, the economic land concessions (ELCs) provide investors with exclusive rights to manage and harvest land up to 99 years, but cannot be converted into land ownership. Genreally speaking, the ELCs that have been granted have been for periods of time less than the maximum allowed. The rationale for economic land concessions is to make unused land work in order to promote investment in agricultural production and generate rural off-farm employment leading to poverty reduction in the rural sector, as well as generate state revenue. As of August 2007, 53 companies with total land area of 845,920 ha were operational based on validation of contract. By then, MAFF requested to cancel 37 contracted companies with total land area of 332,240 ha in 11 provinces. As of November 2008, the concessions increased to 65 companies covering a total land area of 912,275 ha in 13 provinces (MAFF, 2008). Currently, MAFF is undertaking a review of validated contracts, and the total land area will be reduced after this review. In 2007, nine ELC companies with land areas more than 10,000 ha were reviewed and negotiated for reducing land area to 10,000 ha. As a result, four companies agreed to reduce, and one company contract was cancelled. Thirty two companies in 7 provinces were granted less than 1,000 ha by provincial authority. In June 2008, MAFF reviewed 35 companies in 13 provinces in which 3 companies were requested to cancel, 2 had been warned, and 30 were pushed to implement.

477. The implementation and enforcement of the provisons governing ELC has been inconsistent. In some cases, affected communities have not been properly engaged in public consultations. In other cases, ELCs have not been activated within the first 12 months as required by law. A number of concession granted have exceeded the stipulated maximum size, while in some cases companies have encroached beyond the concession boundaries onto other land. Some companies exclude local people, including indigenous communities, from land to which they have had traditional access, thus generating considerable conflict. It is imperative to delineate land boundaries in areas where ELCs have been granted in other to minimize conflict with custromory land tenure arrangements by rural poor people.

478. With regard to the enforcement of the laws covering ELC, a comprehensive and objective review of the existing ELCs is also needed, including those granted at the provincial level. One possible institution that could oversee such a process is the Technical Secretariat on Economic Land Concessions, which was appointed by the Prime Minister in June 2006. MAFF has established 5 working groups to help the Technical Secretariat carry out its role. The Technical Secretariat has since been collecting information on concessions and will establish an ELC logbook. MAFF has created an ELC homepage on its website that include profiles of concessions granted and basic company information. This represents an important step in making the ELC process more open to the public.

## 4.4.4.5 Communal Land Rights

479. The Land Law of 2001 also provides for communal land rights for indigenous communities (IC) in the form of collective titles. Collective rights include all of the rights and protections of ownership as are enjoyed by private owners. The law also provides measures for identifying IC land, the role of traditional authorities in regulating land rights, the prohibition of any authority outside the community to acquire IC lands, and the need for indigenous communities to consolidate themselves as legal entities in order to have these rights vested in them as legal persons (Andersen, 2007).

480. The NSDP (2007:48) refers to the need to "continue to discuss and develop the required legal framework for effective implementation of the Land Law, including registration if indigenous people's land rights". The implementation of the IC, however, has proved to be problematic for several reasons. For example, "IC lands are also the State's land that has not yet been classified and mapped. State Public and State private landa have to be distiguished within the title for indigenous communities (Andersen, 2007:36). Also, the classification of shifting cultivation areas as within either State Private or State Public remains outstanding. State Public land is under the Forest Administration and requires a Community Forestry Agreement for the use of the land and a sub-decree by FA. IC claims to land must be forwarded during the State's land mapping and land classification exercise, but only ICs that are registered as legal entities can participate. As a result, two important steps need to take place before the incorporation of IC communities as legal entities with the Ministry of Interior (MOI) and the demarcation of IC land (Andersen, 2007).

## 4.4.4.6 The 2002 Forestry Law

481. The Forestry Law of 2002 is the major legal instrument for the forestry sector managing the Permanent Forest Reserves (PFRs). Forests are classified as State Public property held by the State in public trust. Forests make up the largest volume of State land holdings. The Forest Administration (FA) is responsible for the PFRs and the Ministry of Environment (MoE) for Protected Areas, which are not included within the PFR. The PFR is comprised of Production Forest, Protection Forest, and Conversion Forest. The Forestry Law also provides provisions for establishing Community Forestries.

## 4.4.4.7 Forest Coverage

482. The total forested area of Cambodia is 10,864,186 ha about 60 percent of the land area (FA, 2007). Access to forest resources (e.g., non-timber forest products) represents a critical aspect of land tenure in rural areas, especially for rural poor households. One of the most significant challenges confronting the Forest Administration (FA) concerns the lack of clearly demarcated boundaries concerning the jurisdictions of various government bodies. Many cases are now before the courts in which the FA is suing encroachers to regain forested land. Such cases officially account for approximately 200,000 hectares (FA, 2004), although unofficial estimates suggest that the amount of land involved could be as much as one million hectares. A permanent Forest Estate Demarcation process has recently been initiated and 380 km have been completed so far. This is an ambitious exercise and will require substantial institutional commitment and sustained financial support in order to be successfully completed.

## 4.4.4.8 Community Forests

483. The Community Forestry (CF) law represents an important dimension of securing community members' access to forest resources and products. According to the prakas on Community Forestry, CF must be initiated by the community, proposed to the FA, and approved by MAFF. There have been approximately 264 CFs initiated to date, covering a total area of 179, 020 ha in 19 peovinces (FA, 2007). Although guidelines concerning the CF application and approval process were published in late 2006, there is a lack of human resource capacity available at the local level to manage such complicated procedures. It remains to be seen how community forestry arrangements will stand up against possible smallholder and commercial encroachments as well as corporate and elite land grabbing.

## 4.4.5 The Institutional Context: Key Governance Challenges

484. There are a number of complex institutional challenges covering the governance of land use and land tenure arrangements. These challenges include fragmented state authority, competing private interests, weak law enforcement and dispute resolution mechanisms, uneven financial and human resource capacities, multiple development partners, and a lack of information for monitoring policy implementation and impact.

## 4.4.5.1 Fragmented State Authority

485. The institutional authority of the State to govern land use and land tenure arrangements resides with several ministries, including the Ministry of Land Management, Urban Planning and Construction (MLMUPC), the Ministry of Agricultural, Forestry, and Fisheries (MAFF), the Ministry of Environment (MoE), the Ministry of National Defense (MoND). In some cases, there are overlapping jurisdictions of authority and area boudaries are unclear. At the sub-national level, coordination between the national and provincial level as well as among different departments of the provincial governments is limited. Such challenges are complicated by the assignment of multiple and conflicting functions to different levels of government. There is a real need to decentralize certain aspects of land management to the local level by providing the commune councils with appropriate roles and authority regarding law enforcement and dispute resolution. Such processes will require considerable time and resourses given financial and human capacity constraints.

## 4.4.5.2 Competing Private Sector Interests

486. The private sector is comprised of a wide range of actors with competing interests and varying degrees of power and influence. Landless households and smallholder subsistence farmers are the most numerous, but also the weakest in terms of tenure security. Commercial farmers who operate on a larger scale have more resources with which to secure their tenure interests than do subsistence farmers. There are also a growing number of foreign and domestic companies seeking investment opportunities to develop large-scale corporate plantations as well as agri-business ventures. The business sector also includes banks and other lending institutions that require land in the form of titles as collateral for loans. Urban elites and an emerging middle class are also increasingly important stakeholders given their role in the emerging rural land markets.

487. Each of these actors has a stake in land tenure security. The uneven distribution of wealth and power, however, enables certain actors to exploit institutional and legal gaps in the policy environment for their own interests, often at the expense of smallholder subsistence producers and others. The design, implementation, and enforcement of land tenure policy must consider how each of these actors is affected by a particular policy. The equitable enforcement of land laws that protect the tenure security of small hold farmers may require new incentive structures that change the current

institutional arrangements. The demand for and implementation of such changes must be expressed through the appropriate political processes and mechanisms.

## 4.4.5.3 Law Enforcement and Conflict Resolution Mechanisms

488. The enforcement of laws and regulations pertaining to land use and land tenure needs to be strengthened. Local authorities have no formal mandated role to enforce laws as such, and as result generally refer cases on to higher authorities. Although they are widely perceived to play a prominent enforcement role with regard to natural resource management, the roles and responsibilities of the military and police need to be clearly identified (CDRI, 2007a). Sometimes, the power and authority of the courts is weak, and they are insufficiently resourced and human capacity is uneven.

489. The scope and scale of land-related conflicts is increasing and involves a wide range of actors at all levels of society. In areas where customary practices have governed land tenure, "low-intensity conflicts" involving disputes among neighbours over plot boundaries or within families over inheritance can be resolved locally either through mediation by neighbours or others familiar with the disputants. "High-intensity conflicts" that involve powerful actors from outside the village, however, often cannot be resolved easily. As with law enforcement, local authorities do not have sufficient capacity, knowledge, or authority to formally resolve land disputes (So et al, 2001).

490. Along with the courts, the cadastral authority is also mandated to resolve disputes, but the increasing volume of land disputes has generated a growing backlog of cases in both institutions. For example, the Cadastral Commision was able to resolve only 889 out of 3,257 (27.3 percent) cases between 2003 and 2005 (NSDP, 2006). Various line ministries as well as the Council of Ministers are also involved in resolving land disputes, often in cases involving state institutions and/or powerful private sector entities. A National Authority for Land Dispute Resolution (NALDR) was created in 2006, partly to help ease the burden of the growing number of cases involving powerful state and private sector actors. These various dispute resolution mechanisms, however, are insufficiently integrated, and disbutants routinely take their cases where they have a better chance of securing a favourable outcome (So et al, 2006). The lack of a comprehensive and coordinated dispute resolution process generally favours the better off over the poor. More systematic research is required in order to inform the development of an integrated and objective land dispute resolution process to which the poor have equitable access for fair hearings.

## 4.4.5.4 Uneven Assignment of Budget Allocations

491. As noted above, state institutions involved with land use and land tenure at all levels of government are inadequately resourced. Some ministries and departments, however, are better endowed with financial and human resources than others. In addition to uneven budget allocations by sector, there is also a geographic variation in budget allocations. Budget allocations depend on state revenues as well as donor support, and the assignment of budget allocations based on need with regard to land use and land tenure issues would be extremely complex to formulate. Over time, improved state revenue generation will enable the government to achieve a more balanced budget allocation that will support better governance of land use and tenure matters. One area of special importance concerns salaries and the overall incentive structure available to government personnel. Low salaries do not provide sufficient incentives for government staff to consistently perform well.

## 4.4.5.5 Multiple Development Partners

492. Bi-lateral and multi-lateral donors, civil society organizations and research institutions are also concerned with land tenure arrangements. Donor organizations play an important role in terms of

providing important financial and technical capacity on a wide range of issues pertaining to land management and administration. Their overall effectiveness, however, has been undermined by poor co-ordination among themselves and with the government, resulting in fragmented inputs and thus contributing in some measure to the uneven budget allocations. Some progress has been achieved recently, such as donor support for LMAP, but much more work remains to be done.

493. Civil society organizations are also involved in a variety of ways, including human rights organizations and other advocacy groups that seek to protect land rights for the poor and disadvantaged as well as implementing organizations concerned with a variety of development projects. Research institutions that focus on land policy also play an important role in making policy relevant to information available to a wide audience for stakeholders. The use of research findings, however, has yet to be integrated into the policy making process. One way to promote "evidenced-based" policy making would be for state agencies, development partners and research institutions to develop a comprehensive and long-term research and capacity building agenda regarding land management and administration.

494. The Technical Working Group mechanism provides a useful opportunity for improving communication and coordination among the various State authorities and development partners. With respect to land use and land tenure, several TWGs are focusing on land use and land tenure related issues. For example, there is a TWG for land as well as a TWG for agriculture and water. It is important that these various TWGs coordinate among themselves regarding their various activities. A sectoral mapping exercise to identify the activities of various development partners and the allocation of financial and technical support would be a useful step in this regard.

## 4.4.5.6 Monitoring Mechanisms

495. Another important component of effective and relevant public policy concerns the need for ongoing objective monitoring of key indicators to assess the effectiveness of certain policy interventions. In this sense, information about the pace and direction of changes in land use and land tenure needs to be regularly and carefully collected. The capacity of the government until recently, however, to mobilize sufficient human and financial resources for such activities has been limited. As a result, other institutions, including state agencies, civil society organizations, and research institutes have tried to fill such information gaps by undertaking research that is usually specific to their own needs. Overtime, inconsistent and sometimes misleading data collection has resulted in conflicting and confusing analysis. This undermines the design and implementation of relevant and effective public policy. Moreover, poorly organized land use and land tenure data systems can undermine effective land administration and management. The implementation, enforcement, and monitoring of land management policies and practices in accordance with the relevant laws requires a well-organized and reliable land use and land tenure database system (Ballard, 2006).

496. Research is also an important aspect of policy design, implementation and monitoring. In addition to providing statistical data on a regular basis and conducting an agricultural census every ten years, specific research is required in support of policies designed to strengthen land tenure security for all Cambodians.

## 4.4.6 Land Use and Land Tenure Policy Summary

497. Cambodia's agricultural sector needs to be developed as a third engine of growth in order sustain macro-economic growth and reduce poverty. Secure land tenure for smallholder farmers and commercial enterprises is an important component of the agricultural development strategy envisioned in the National Strategy Development Plan. Cambodia is currently pursing a dual track approach regarding land use and land tenure that employs a systematic land-titling programme for

smallholder farmers while granting economic land concessions to private investors to support plantation styles approach to agribusiness development. These approaches are spatially oriented with land titling efforts focused in rice-growing areas in the Mekong and Tonle Sap river basins, while ELCs tend to be granted in frontier and forested areas. A crucial policy question concerns the process of expanding agricultural frontiers by assigning state land to agricultural uses under a comprehensive development strategy that promotes sustainable land use and secure tenure for agricultural producers. The most transparent and equitable mechanisms for transferring state lands to stakeholders for agricultural development is required.

498. Although Cambodia's land laws provide a comprehensive framework for governing land use and land tenure, there are problems associated with timely implementation and enforcement. Reforms aimed at achieving better governance of land use and tenure are being introduced within a complex social and economic environment. Cambodia is experiencing rapid economic growth, population growth, expanding land markets, increasing landlessness and near-landlessness, increasing rural-rural migration, the presence of land mines and UXO, and increasingly complex relationships between water resource management and land tenure, and widespread conflicts over land resources between numbers of actors. Cambodia must overcome several important institutional challenges in order to achieve its reform objectives. There is a need to define and clarify the authority of various state institutions, strengthen law enforcement and land dispute resolution mechanisms, secure financial resources and build human capacity, regulate competing private sector interests, coordinate closely with development partners, and collect and disseminate accurate information for monitoring land policy process, implementation, and impact on social and economic development of the country.

## 4.5 Participatory irrigation management and development

## 4.5.1 Irrigation development objectives of the strategy for agriculture and water 2006-2010

499. Drawing from the target set by the National Strategic Development Plan (NSDP) 2006 - 2010 to increase the irrigated area to 25% of the total cropland by 2010, the development of irrigation in Cambodia is recognized in the Strategy for Agriculture and Water as a cornerstone for the improvement of agricultural productivity and the eradication of poverty. The target set by MOWRAM under the SAW is to increase area under irrigation from 1,120,246 hectares (2008) to 1,245,246 hectares by 2013; equivalent to an annual increase of 25,000 hectares.

500. The proposed PIMD program and objectives accords with MOWRAM's institutional objectives and development strategy and also with the NSDP by addressing:

- i) good governance
- ii) enabling environment for implementation of the rectangular strategy
- iii) enhancing the agricultural sector
- iv) rehabilitation and construction of physical infrastructures
- v) private sector development and employment
- vi) capacity building and human resource development

501. The formation of Farmer Water User Communities through implementation of Participatory Irrigation Management and Development is seen as a key component for the program on Land, Irrigation and Water Resources Management.

## 4.5.2 Agricultural Land and Irrigation Resources

502. Existing cultivated areas total approximately 3 million hectares, representing some 16% of total land area, and of this some 2.58 million hectares (NIS 2008) are paddy rice, with diversified food crops using a further 0.26 million hectares, industrial crops 0.16 million hectares.

503. The Atlas of Cambodia (Danida, 2006) proposed the following classification of the major rice agro-ecosystems:

- **Rain fed Lowland Rice**: characterized by flat bunded rice fields which depend almost entirely on rainfall or surface runoff (except in irrigated areas). Localized essentially around the Tonle Sap and Mekong River (See map 1), this represent approximately 86% of the total rice cultivated area. Average yields is comprised between 2-3 T/ha.
- **Recession Rice**: typically located in areas close to the major rivers and their floodplains, this rice is cultivated as flood recedes on residual moisture, with increasing use of individual pumps for additional irrigation. Average yields is approximately 4 T/ha.
- **Deep Water/floating Rice**: localized in flood prone areas (50cm to 3m high during at least one month), they represented 4.5% of the total rice cultivated area in 2006.
- **Rain fed Upland Rice**: integral part of shifting cultivation, it is localized mainly in the Northeastern provinces (2% of total rice cultivated area)



Map 1- Localization of main rice agro-eco-systems

Deep Water / Floating rice
 Rainfed Lowland rice
 Recession rice
 Rainfed Upland rice

Source: The atlas of Cambodia, Danida Modified by S. Balmisse

504. Accurate irrigation inventory figures are difficult to obtain and figures quoted require confirmation best achieved through the conducting of a comprehensive irrigation and FWUC inventory.

505. In 2003, the design team for the North West Irrigation Sector Project reported that there more than 3000 irrigation schemes in Cambodia and that of these only some 10% were fully operational and that up to 70% of the agricultural area was not readily irrigable. According to MOWRAMs Strategic Development Plan (2009), in the period 2004-2008 MOWRAM increased the area under irrigation from 560,149 hectares in 2003 to 827,373 hectares in 2008 (representing 31.63% of the total cultivated area under paddy rice). This comprises 582,085 hectares of wet season irrigation and 245,288 hectares of dry season irrigation. According to MOWRAM inventory statistics, the total wet season irrigated capacity is 773 188 hectares, and total dry season is 347,058 hectares; for a total capacity of 1,120,246 hectares.

506. In 2006 (but based on 1994 data) the World Bank reported that some 473,000 hectares (20% of total rice growing area) was under irrigation but of that, only 53% (250,000 ha) actually receives sufficient water for irrigation. Most irrigation developed serves as **supplementary irrigation for the wet season**, and only a much reduced area can be used for dry season rice growing of which a significant portion is actually recession rice (1% of the total cultivated area of fully irrigated area during the Dry Season according to NSDP). Map 2 shows a repartition of family having access to any kind of irrigation (in 2004). They are mostly concentrated on in the lower part of the Mekong basin and, to a lesser extend around the Tonle Sap.



### Map 2- Repartition of families having access to irrigation in Cambodia

Source: The Atlas of Cambodia Danida, 2006

507. A report prepared by JICA in 2006 reported that about 54% of irrigable areas have poor soils. These soil conditions will therefore account for the comparatively low rice yields realized by Cambodian farmers compared with those in neighboring Vietnam and Laos. A separate report on Soils will shed more light on this issue.

# 4.5.3 Participatory Irrigation Management and Development and its institutional and legal context

508. Cambodia has a long history of irrigation. According to available information, collective management started after the Khmer Rouge regime, when farmers were loosely formed into "krom samaki" (solidarity group) to operate, maintain and manage irrigation schemes (1980-1985). Land was owned collectively by these groups. Management and maintenance were ineffective due to many different factors.

509. After 1985 projects were developed by the government with community participation in both labor and materials. The Ministry of Agriculture Forestry and Fisheries provided farmers with construction materials and technical expertise to develop schemes which, once completed, were handed over to provincial level agencies (Provincial Office of the Department of Hydrology). Responsibility for O&M and repairs of small and medium schemes was handed over to the water users, with supposed assistance and support from the District Agriculture Office. Due to lack of staff numbers, staff capacity and skills, lack of budget and periods of insecurity, little development was initiated and in the majority of cases no maintenance was carried out. Schemes depreciated rapidly and became more dilapidated. In the 1990's and with improving social conditions, international NGOs and bilateral assistance programs began to provide support to the sector in drafting a Water law and also undertaking O&M and rehabilitation of smaller schemes or parts of schemes. In 1994 the Government began transferring responsibility for irrigation scheme O&M to Farmer Water User Communities (FWUCs). This was still under the auspices of the ministry of Agriculture, Forestry and Fisheries.

510. The Ministry of Water Resources and Meteorology (MOWRAM) was established in 1999. External development partners (EDPs) began to provide technical assistance and institutional capacity building as well as strategic development. The Department of Irrigated Agriculture was formed with ADB assistance in 2001 with a primary role in developing irrigation sector policy and with a particular focus on developing water user organizations (it was then named Department of Irrigation and Drainage). This Department retains responsibility for the implementation of PIMD and the FWUC Development Office is also located within the department.

511. In 1999, the Government issued Circular No. 1 on Implementation Policy for Sustainable Irrigation Systems, which was signed by the Prime Minister. The Circular promulgates the following six principles of reform:

- 1. That the Farmer Water Users Community (FWUC) will be a formal legal entity recognized by government and civil society. (This means that the FWUC will have the right to make rules, enforce sanctions, have a bank account, loan money, enter into legal contracts, etc.)
- 2. That irrigation system development will be done only at the request of the FWUC and that the FWUC will participate in all aspects of scheme development. (This is meant to include decision-making and investment in every stage of scheme repair, rehabilitation, modernization and extension.)
- 3. That water users will be obligated to pay for the cost of routine operation and maintenance and develop a fund to pay for emergency repairs.
- 4. That irrigation systems will be maintained and improved over time, in partnership between the FWUC and government.
- 5. That water delivery will be arranged by the FWUC in an equitable and reliable manner.
- 6. That MOWRAM will be responsible to provide technical and managerial support, monitoring and evaluation and other support as needed.

512. In July 2000 MOWRAM issued Prakas 306, who promoted the Policy for Sustainability of Operation and Maintenance of Irrigation Systems, elaborating the new PIMD policy to be implemented by MOWRAM. The policy describes the structure and functions of the FWUC and

lower-level water users groups (WUG), basis for calculating the Irrigation Service Fee and the responsibilities of government to provide training and extension, monitoring and evaluation, environmental assessment and agency human resource development. The MOWRAM also issued a brief document that explains eight steps for organizing and establishing an FWUC, entitled "Steps in the Formation of a Farmer Water Users Community".

513. This was complimented further in October 2003 with the publication of seven training modules authorized by MOWRAM under Appendix Seven, Prakas No. 151, aimed at facilitating the implementation of PIMD.

514. MOWRAM has finalized a sub decree on establishing FWUC. This FWUC sub decree draws heavily on Prakas 306 and Circular No. 1 particularly in regards to the organization and structure, FWUC Statute, establishment procedures and also roles and responsibilities, and financial support from RGC. The main objective of the sub decree is to provide the FWUC with legal status; it is then a legal entity that may partner into agreements with RGC (and others). The FWUC sub decree is receiving first priority from MOWRAM.

## 4.5.4 Current status of PIMD implementation

515. According to MOWRAM as of the end of 2008 there are some 350 FWUCs established nationally of which a total of 114 have been registered by MOWRAM. Depending upon the source of project support, some water user organizations have been registered at provincial level only. Map 3 is presenting the localization of FWUC in Cambodia. These FWUCs are comprised of 305,550 households covering 245,122.5 hectares of wet season and 105,157.5 hectares of dry season paddy.



Map 3- Localization of FWUC in Cambodia

516. With assistance from the Asian Development Bank (ADB Loan No. 1445-CAM, SF), MOWRAM has implemented the PIMD strategy from 2001 to 2005 in 11 provinces in the areas around Tonle Sap Lake and along the Mekong River. In each province one irrigation system has been selected for assistance. This includes establishing the FWUC, provision of training to FWUC leaders and staff, participatory repair and improvement of irrigation infrastructure, provision of irrigation and agricultural extension and on-the-job support to FWUC to ensure that they can implement water delivery and drainage and maintenance properly..

517. In 2005 the North West Irrigation Sector Project (NWISP) commenced implementation and this project will rehabilitate at least 12 subprojects identified in 4 target provinces. Planning for each subproject is done on a river basin basis. The first batch of subprojects have been identified and scheme construction has commenced. NWISP is committed to working within MOWRAM's PIMD policy and also within the framework established under Circular No.1 and also Prakas 306 to establish and strengthen FWUCs in each subproject. The NWISP collaborates with the Dept. of Irrigated Agriculture FWUC Unit for FWUC establishment and strengthening training.

518. In 2006 started the Eastern Rural Irrigation Development Project (funded through IMF debt remittance) in 7 provinces, where a total of around 80 schemes will be rehabilitated and FWUC will be established and strengthened.

519. A number of projects funded by various donors have established Farmer Water User Communities using PIMD methodological steps. These projects include Prey Nup Polder Rehabilitation Project funded by AFD, Stung Chinit Irrigation and Rural Infrastructure Project co-funded by ADB and AFD, rehabilitation of Kamping Pouy Irrigation Scheme through BAPEP project supported by JICA, rehabilitation of Boeung Nimoul Irrigation Scheme through CBRDP project funded by IFAD/GTZ, and AFD and a number of other projects.

520. The FAO is also assisting MOWRAM through the Dept. of Irrigated Agriculture with the Technical Cooperation Project CMB/3101. The project has 4 components, two of which are of immediate relevance to the formulation of the SAW: i) Component 1 – review of current PIMD experiences and identification of further needs. ii) Component 4 – Formulation of a National Action Plan (NAP) on the implementation of PIMD strategy. The NAP is a critical input to the national implementation of PIMD and formulation of appropriate delivery strategies.

521. There are new projects in the pipeline; the AusAID Cambodia Agriculture Value Added Chain (CAVAC) project which contains an irrigation component with funding support for FWUC maintenance and repairs, and the ADB's Water Resources Project. CAVAC should commence implementation mid 2010 and ADB Water Resources Project end 2010. CAVAC proposes to establish provincial irrigation O&M funds to help meet government obligations to FWUCs (i.e.: 50% RGC and 50% CAVAC).

## 4.5.5 Sector performance

522. The TWGAW with the support of AfD, AusAID, and IFAD, conducted a comprehensive national study of PIMD by a task force on Agriculture and Water in 2006. The study was entitled: "Review of experiences: Modes of intervention, results and lessons learned" and was conducted over some 22 irrigation schemes, with a broad range of management (FWUC, local authorities, private), physical infrastructures (preks, pumping, reservoir, flood recession dams), size, etc. in 13 provinces.

523. Other surveys, such as the research conducted in Cambodia in December 2007 by IWMI ("Towards establishing a system of Monitoring and Evaluation for the PIMD", Perera 2007) and the review of Raju under ADB 1445 project led to similar conclusions described below.

524. The conditions of irrigated agricultural production is resulting from the interactions between the resources available (soil quality, water availability, access to land and water), the type and shape of irrigation infrastructures, and the collective organization for the management of irrigation activities (as presented in Figure 20).



Figure 20 Main factors affecting irrigated agriculture production

## 4.5.5.1 Organization

525. Their level of performance of FWUC very heavily is correlated to the external support that they have received since their creation (from MOWRAM or other service providers). Most of visited FWUC showed weak level of internal organization and could not be considered as stand-alone organization. In the organization that received high level of support (for the most efficient of them, this implies constant grassroots support for several years on organizational aspects), it is however recognized that FWUC represents a real opportunity for improving water management. The farmers themselves recognize that "many issues and problems could be resolved by the water user group – if it had the collective will, motivation and management capacity".

526. The links between FWUC and the local authorities were determined as important factor for the success of FWUC. Local leaders, especially commune and village chiefs, are often involved in calling meetings, resolving conflicts among users, collecting water fees. Their involvement from the beginning of the projects is thus very important.

527. The issue of Operation and Maintenance is very crucial. Even though, formal maintenance plan exist in all registered FWUCs, the maintenance, if any, is mostly done on ad-hoc basis. The level of maintenance carried out is often insufficient, which leads to frequent rehabilitations needed.

528. In practice, the level of ISF collected in schemes rehabilitated under ADB 1445 is fixed at 10 US\$/ha and there is a phasing out budgetary support provided by MOWRAM following statement of Policy In other schemes rehabilitated under different projects, the amount of ISF is fixed by FWUC, based on resources required for Operation and Maintenance.

529. In several cases, FWUC are too weak to collect all ISFs from their members (for various reasons, as shown in the sector review conducted by TWGAW in 2006). This low rate of collection was also reported by the FAO consultant Z. Gao in the first input report for the FAO TCP, as was the general observation that the collected amount of ISF was also insufficient for sustainable O&M.

530. Besides, there is also a general lack of common understanding of what is maintenance, and a lack of clearly defined share of responsibility between FWUC and other stakeholders (State, commune, etc.) for carrying out maintenance activities. In most of schemes managed by FWUC, there is no formal agreement between the FWUC and the State on the sharing of infrastructure Operation and Maintenance.

531. The AFD supported irrigation and drainage project at Prey Nup in Sihanoukville is a pilot experience in this regard. Owing to the length and extent of the French funded technical assistance, it is one of the best documented projects in the irrigation sector. The Prey Nup PUC (polder user committee in this case) is arguably the best organized and most sustainable FWUC in Cambodia. The project has not executed full IMT to the PUC but rather, has entered into a shared management arrangement with local authorities and MOWRAM.

## 4.5.5.2 Infrastructure

532. The performance of FWUC actually relies very much on the efficiency and adequacy of infrastructures that are developed and handed over to farmers for management.

533. In several cases, incomplete and/or inefficient infrastructures undermined the development of FWUC. FWUC especially encountered difficulty in collecting ISF whenever the level of irrigation service was not satisfactory to farmers (in other words when farmers did not have timely access to sufficient quantity of water). Reciprocally, the development of infrastructure with very little attention paid on the development of managerial capacity led to inefficient management of the schemes in a number of visited schemes.

534. In some of the schemes, inappropriate design was considered by the farmers as the main factor leading to inefficient water use. In these cases, farmers underlined that they were not consulted during the process of irrigation design.

535. Last but not least, it should be noted that infrastructures are often developed regardless both the cost of their maintenance in the future, and the financial capacity of farmers to bear these costs. Initial design of the schemes is often determining the design of rehabilitated infrastructures. For "Pol Pot schemes", the initial inappropriateness of design may be a drawback for further rehabilitation (insufficient water source for command area, complex and costly to maintain distribution systems...). In areas that may be temporally flooded, maintenance of tertiary and quaternary canals may result very expensive for farmers who often turn to direct pumping in bigger canals (primary or secondary).

## 4.5.5.3 Water Resources

536. Availability and reliability of water source is a key factor to the development of irrigation activities. Unfortunately, the lack of reliable meteorological and hydrological data is hampering the evaluation of water resources.

537. Whenever water is not available in sufficient quantities for farmers (low irrigation service quality), it is impossible for the FWUC to collect ISF. Obviously, this creates difficulties to scheme managers to ensure proper maintenance of the scheme over the year.

538. Beyond availability of water is the question of water allocation. This is particularly true for systems based on the storage of water in a reservoir that may be cultivated during the wet season. In these cases, FWUC encounter difficulty to solve conflicts on water allocation between upstream and downstream part of the systems, and lack of support from MOWRAM (PDOWRAM) to solve these issues.

## 4.5.5.4 Land Resources

539. There is a diversity of issues related to land tenure in irrigated areas in Cambodia. Recent studies focus mainly on two problems: access to land and soil quality.

540. Access to land was determined as top priority issues by poor farmers and women single households. The price of land is highly variable in the schemes (from 300 US\$ to 5000 US\$, with extreme values of 70 000 US\$ in the surrounding of cities), the major determining factors being distance of plot from road, cities/tourist site, soil quality, water availability.

541. The quality of soil is also as very important in valorizing irrigated agriculture. Recent research made by TWGAW showed that assessment of soil quality issues are probably not sufficiently taken into account in retrieved feasibility studies, leading to insufficient assessment of land potentialities for irrigated agriculture.

## 4.6 Summary of the Problems in the Water Resource Sector and Agricultural Lands Resource Sector

542. The main problems as they emerge from the sector review can be summed up as follow:

## 4.6.1 Water data management

- The collections of water data are very limited and not always stored in good conditions (scattered data and inappropriate software).
- The observatory systems do not cover the whole country, are not dense enough and are not sustainable.
- The MOWRAM staff is lacking of skill on data management.
- The lack of data is a strong constrains for water resources assessment.
- The MOWRAM has not developed a systematic activity of water assessment.
- The water resources assessments produced by different projects are not capitalized.
- A document on water resources assessment is not available at the moment for agricultural planning purpose.
- The flood and drought forecasting system exists but needs improvements.

## 4.6.2 Integrated water resources management

- The Mekong level legal and institutional framework is strong and efficient but the link with the national level and especially the MOWRAM is too weak.
- The national legal framework is still to be finalized with 4 sub-decrees on basin management, farmer water user communities, water licenses and fees and water quality.
- For the moment, the financial and human means of the MOWRAM are insufficient to enforce the legal framework.

- The responsibilities in the water sector are divided among too many agencies and the MOWRAM faces difficulties to coordinate all of them.
- Several basin studies have been achieved by different projects but the results are not capitalized by the MOWRAM.
- No basin committees exist and no basin management plans have been developed so far.

## 4.6.3 Agricultural Land Legal Status

• There has been a poor legal framework to protect, conserve, and enhance the use of agricultural lands for productivity and sustainability.

## 4.6.4 Land resource assessment

- The surveys used different principles, and hence there were differences in methodology, scales, volume and details: data are of variable quality, unreliable or irrelevant.
- Most of the surveys were conducted at small scale: lack of comprehension for people who make policy and land use decisions.
- Some of the surveys were incomplete and out of date: lack of continuation to update land resource information for the whole country, or it is done by projects with specific area.
- The Cambodian Agronomic Soil Classification system is a good example for immediate identification of soils in the field, but it is being restricted to use for lowland rice soils.
- Land capability classification was done, but did not carry out country-wise: lack of data for other agricultural areas.
- Data of land resource information are not well managed: they are generally managed by individual projects or personnel making difficulties for access.

## 4.6.5 Lowland rice soils

- Need to update the current soil classification system in terms of extra groups, phases, scale, volume and significance of use for crop production.
- Low fertility: most soils in the lowlands are low fertility in nature, and they are subject to use under rainfed conditions with significant fluctuations in nutrient and water availability. Rice yield remains relatively low.
- Low productivity: provided that water available for full and/or supplementary irrigation, the intensification and diversification in the lowland cropping systems help increase productivity of lowland rice soils and generate more incomes to farmers. Also, the potential yield level for rice has not been achieved.

## 4.6.6 Upland soils

- Soil classification: there are no simple guidelines to classify, identify and manage upland soils. This is a major hindrance to the land utilization, and sustainable management of upland soils.
- Land suitability: very little is known about soil suitability in upland farming systems. This is a major hindrance to increasing productivity of upland soils.
- Crop zoning: there has been no information on crop zoning for upland cropping in Cambodia. This information is useful for agricultural land-use planning.

• Lack of comprehensive database of upland soil resources of the country: very little research has been carried out to understand the soils and overcome their constraints in order to allow for sustainable production.

## 4.6.7 Small holder land tenure security

- More and more agricultural lands are purchased for speculation.
- Poorest land owners are often forced to sell to pay off debts or health care.
- The number of landless or near landless households is growing in rural areas.
- Some research suggest that land transactions are sometimes coerced.
- The process of land titling is efficient but not quick enough.
- The social land concession mechanism is little applied.
- The communal land rights of indigenous communities are recognized by the law but not effective on the field.

## 4.6.8 State land resources

- The implementation and enforcement of economic land concessions has been questioned by a wide range of observers for not following the spirit and letter of the law and sub-decree.
- There is a lack of clear definition of forests.
- There is a lack of clearly demarcated boundaries concerning the jurisdictions of various government bodies.

## 4.6.9 Monitoring of land tenure policies

- The implementation, enforcement, and monitoring of land management policies and practices in accordance with the relevant laws requires a well-organized and reliable land use and land tenure database system.
- An agricultural census every 10 years is required.
- Specific research (rural-rural migration and its impact on land use and land change, gender aspects of rural land tenure, water resource management and land tenure and land disputes and resolution mechanisms) is required in support of policies.

## 4.6.10 Sustainable operation and maintenance of water management infrastructures

- The creation of FWUC requires a strong support to build local capacity on technical, financial and organizational matters. This support is deficient currently.
- At national level, there is a need to improve institutional and financial framework of PIMD policy implementation, in order to decentralize and improve the support to the FWUC.
- There is a need to improve monitoring of FWUC performance.
- The sharing of responsibilities for maintenance and operation of water management infrastructures between the MOWRAM and the FWUCs is rarely clarified.
- The MOWRAM maintenance budget for irrigation infrastructures is insufficient.

## 5 ANNEX 4: AGRICULTURE AND AGRIBUSINESS SUPPORT REVIEW AND CONTEXT

## 5.1 National sector review

543. The National Sector Review describes and assesses the efficiency of the agricultural marketing system in Cambodia. The chapter is divided between the four main sub-systems of macroenvironment/basic conditions, production, consumption and marketing. The assessment follows a value-chain approach and focuses upon the internal technical and operational efficiency of enterprise activities, the degree of competition between functionally similar firms i.e. horizontal relations, the nature of relationships between different categories of firms within the marketing system i.e. vertical market relations, and the relationship between the marketing, production and consumption systems.

## 5.1.1 The Macro Environment

544. The macro environment includes the given basic conditions the agricultural marketing system operates within and inherently affects the structure, conduct and performance of it. Important aspects are Government policies, laws and market interventions that can promote or inhibit efficiency and competitiveness.

545. Similarly, the provision of public infrastructure such as roads, telecommunication networks and market places is an important Government role for supporting agricultural marketing development that would otherwise not be provided by the private sector.

## 5.1.1.1 Government Policies and Strategies

546. The National Sector Development Plan (2006-11) describes several priorities for enhancing the agriculture sector. These include expanding support services for research, extension, market development and the provision of micro credit; increasing agricultural productivity and the cultivation of high-value crops; developing high-value products through agro-processing; and improving agricultural products to conform to international standards.

547. The MAFF and MOWRAM developed a joint Agriculture and Water Strategy, including eight key components. One component is tasked with extending commercial agriculture for rural households and communities to generate cash income, as well as providing a basis for agribusinesses. The development goal of this component is:

# 548. Agriculture and agri-business that make effective use of inputs and market opportunities, are steadily intensifying and diversifying production, and deliver full benefits to farmers, rural communities, and other stakeholders.

549. It is envisaged the strategy will assist farmers to engage in commercial production by providing information and forecasts regarding market demand; promoting new product opportunities; establishing value-added processing facilities; administering arrangements for product quality assurance and food safety; facilitating entry into profitable markets via improved transport and storage facilities, marketing infrastructure and bulking/wholesaling arrangements, etc.

## 5.1.1.2 Policy Reforms - Land reform

550. Secure land tenure for smallholder farmers and commercial enterprises is an important component of the agricultural development strategy, envisioned in the NSDP. Cambodia is currently pursuing a dual track approach regarding land use and land tenure that employs a systematic landtitling program for smallholder farmers, while granting economic land concessions to private investors to support plantation style approaches to agribusiness development.

Approximately 20% of land owners in Cambodia hold secure title to their land<sup>41</sup>. In 2002, the 551. Land Management and Administration Project (LAMP) initiated a pilot project on systematic land registration in ten provinces and the municipality of Phnom Penh. The project aims to register one million land parcels by 2007, issuing titles that are legally enforceable and providing security of tenure.

552. The 2001 Land Law establishes land concessions for economic and social purposes. Economic land concessions are allocated to private users for specific purposes with the rationale of promoting investment in agricultural production and generating rural off-farm employment, leading to poverty reduction in rural areas. Conversely, social land concessions provide a mechanism for enabling landless farmers to gain access to land for residential and subsistence farming purposes<sup>42</sup>.

## 5.1.1.3 Policy Reforms - Forestry reform

553. The Forestry Law of 2002 is the major legal instrument for the forestry sector managing the Permanent Forest Reserves (PFRs). Forests are classified as State public property, held in public trust, and make up the largest volume of state land holdings. The Forest Administration is responsible for the PFRs and the Ministry of Environment is responsible for the Protected Areas, which are not included in the PFRs. The Forestry Law also provides provisions for establishing Community Forests. It represents an important dimension of securing community members' access to forest resources and products<sup>43</sup>.

#### 5.1.1.4 **Policy Reforms - Fisheries reform**

554. Since 2000, the Government has introduced a series of policy reforms regarding the use of, and access to, fishing lots in the country. The reforms were initiated through the issuance of Government decrees and sub-decrees, i.e. a sub-decree issued in February 2001 removed license fees from medium-scale fishing gears in inland fisheries, a sub-decree issued in June 2005 on Community Fisheries laid out roles and responsibilities of different actors in the overall process of managing community fisheries. In March 2006, the National Assembly endorsed the Fisheries Law providing a comprehensive legal framework for the establishment and management of Community Fisheries<sup>44</sup>.

#### 5.1.1.5 **Policy Reform - Legal reform**

555. As a member of World Trade Organization (WTO), Cambodia has agreed to bring its Intellectual Property Rights regime in compliance with the Trade Related Aspects of Intellectual Property Rights Agreement.

<sup>&</sup>lt;sup>41</sup> NGO Statement to the 2006 Consultative Group Meeting in Cambodia, Phnom Penh, March 2006

<sup>&</sup>lt;sup>42</sup> Programme Four Design Team, MAFF & MOWRAM, 2008: Draft Sector Review and Proposal of Programme <sup>43</sup> Programme Four Design Team, MAFF & MOWRAM, 2008: Draft Sector Review and Proposal of Programme

<sup>&</sup>lt;sup>44</sup> Department of Fisheries, 2006

556. To date, the Government has passed or introduced a number of legislations or draft legislations: i) Laws on Patents and Industrial Designs (2003) and followed by Regulation on Patents and Industrial Designs (2006), ii) Law on Trade Marks, Trade Names, and Acts of Unfair Competition (2002) and followed by sub-decree 46 on implementation of the law (2006), iii) Law on Copyright and Related Rights (2003), iv) Legislation on Geographical Identifications (draft), v) Legislation on Layout Design of Integrated Circuits (draft), vi) Legislation on Protection of Undisclosed Information and Trade Secrets (draft), and vii) Legislation on Plant Variety Protection (draft)<sup>45</sup>.

## 5.1.1.6 Government Ministries and Departments: Roles and Responsibilities

557. MAFF has several departments providing services for farmers and agribusinesses:

558. **Department of Agricultural Extension:** Agricultural extension services are provided in all 24 provinces targeting smallholder farmers with the purpose of increasing rice productivity, diversifying crop production and improving upland agriculture and livestock production systems. Another focal area is the nationwide expansion of Agro-Ecosystem Analysis (AEA) and integration of AEA in the commune planning process.

559. **Department of Agro-Industry:** The Department of Agro-Industry (DAI) is responsible for carrying out research and facilitating agro-industrial and agribusiness development, including the licensing of agro-processors and certification of agri-food products. A laboratory has been established for analyzing the quality and safety of semi-processed and processed agro-industrial and agri-food products, but is not yet fully equipped or operational.

560. **Department of Agronomy and Agriculture Land Improvement:** The Department of Agronomy and Agriculture Land Improvement (DAALI) is responsible formulating policies and planning programs, projects and measures to develop agriculture production. One of its main roles is to inspect the quality of inputs used in agricultural production and formulate measures and instructions for proper use.

561. **Department of Agriculture Legislation:** The Department of Agriculture Legislation (DAL) is responsible for reviewing and enacting agriculture draft laws and regulations, disseminating and monitoring the implementation of judicial terms, conditions, regulations and overall legislation of agricultural sector. It also assists the ministry on the registration and standardization of agricultural materials and quality control of agricultural inputs.

562. **Agricultural Marketing Office**: The Agricultural Marketing Office (AMO) is positioned under the Department of Planning, Statistics, and International Cooperation of MAFF. Its mandate includes:

- i. Formulating policies and strategies for market development and strengthening the agricultural marketing system.
- ii. Formulating the technical norms and standardizations of agricultural products, rice and paddy standards, commodity coding, standardization of cereal crops and selected vegetables, etc.
- iii. Collecting information on wholesale and retail sales of agricultural products in local markets. Providing agricultural marketing information to farmers, traders, consumers as well as government agencies, non-governmental organizations and international organizations.

<sup>&</sup>lt;sup>45</sup> DTIS, 2007

- iv. Analyzing and interpreting price movement and variables of agricultural products in international markets; arranging programs for daily broadcasting by radio and by television; compiling agricultural product price bulletins.
- v. Conducting economic/marketing research and studies in order to find out the marketing constraints and solutions in marketing agricultural products; analyzing the marketing costs and margins by various participants in the marketing chains.
- vi. Providing advisory services to farmers and traders on post-harvest technologies, such as storage, packaging, processing distribution, and group marketing, i.e. Farmer Marketing Schools
- vii. Producing marketing extension materials for extension workers, including marketing information leaflets and brochures, price charts, crop trends and patterns, etc.

563. However, the AMO is under-resourced and little has been done on aspects such as analyzing and interpreting price movement and variables of agricultural products in international markets or conducting economic/marketing research and studies for marketing agricultural products. Very little on-farm post-harvest handling to prepare crops for market is carried out and with only one Agricultural Marketing Officer is present at Provincial level, therefore advisory services are largely limited to generic mass media campaigns.

564. Other relevant Ministries and departments include:

565. **Ministry of Industry, Mines and Energy (MIME)**: The MIME supports Small and Medium Enterprise (SME) development for the agro-industrial sector. The Department of Small Industry and Handicrafts is responsible for issuing operating licenses for producers, processors and traders of food, beverages and tobacco. The Department of Standards issues certificates of product quality, health and safety for producers, processors and traders of food, beverages and tobacco and also certificates of Scale and Counter Inspection for weighing scales in public markets.

566. **Ministry of Commerce (MoC)**: The MoC is responsible for issuing Certificates of Commercial Registration, essential for exporters. The Trade Promotion Department promotes and extends export capacity and issues import and export licenses. CamControl inspects, analyses and certifies compliance of goods with national standards for export and import and also issues Certificates of Origin.

## 5.1.2 Government Interventions in Agricultural Markets

567. Government interventions are typically imposed to compensate for market failures. Examples are the reduction of transaction costs through the public provision of information, spatial planning for markets and storage facilities, protection for infant industries, promoting competitiveness and preventing the emergence of monopolies.

568. There is minimal Government intervention in Cambodian agriculture. Markets are liberalized and unprotected. Borders are open to neighboring countries; informal trade is tolerated and therefore any interventions are only likely to affect 'formal' trade.

569. Cambodia has four tariff rates for imports. Imported food products are charged at 7% and spare parts and machinery at 15%. All imports are also liable to 10% Value-Added Tax. In addition to low tariff rates, Cambodia does not impose many non-tariff barriers on imports. According to the Association of South East Asian Nations (ASEAN) Secretariat, only 29 non-tariff measures (NTM) have been identified on imports into Cambodia. This is the second lowest among ASEAN member countries. Vietnam and Thailand impose 293 and 138 NTM on imports respectively. It can be concluded Cambodia does not offer much protection to its farmers.

570. There are no official export tariffs from Cambodia. Whilst this encourages exports, the absence of standards and internationally recognized authorities for SPS certification, effectively prevents the official export of agricultural products.

## 5.1.3 Public marketing institutions

571. The MoC is responsible for 'Green Trade', a merger of three State Owned Enterprises (Cambodian Food Company, Material and Equipment Company and Agricultural Product Company). It owns and operates warehouses and rice mills for the purpose of: (i) Providing a food security reserve, buying and selling commodities to maintain market prices; (ii) Supplying Government contracts, and (iii) Exporting and importing.

572. Commercial rubber production was previously carried out by several large State Owned Enterprises (SOE) currently undergoing privatization.

573. Whilst the remnants of some public marketing institutions continue to exist, they are of little significance as producers and traders are not obliged to trade through them and they also do not appear to prevent the private sector from trading.

## 5.1.4 Legal and Regulatory Environment

574. Since the late 1990s, the Government has made significant improvements to the legal framework for commerce. New financial and commercial sector laws, including the Law on Commercial Enterprises (2005), Law on Negotiable Instruments and Payment Transactions (2005), Law on Commercial Arbitration (2006), and others have helped initiate progress in strengthening the financial sector. The Land Law (2001) has created the framework for ownership of immovable property, the use of land for mortgages, and the issuance of land titles. The Law on Accounts, their Audit, and the Accounting Profession (2002) is the first step toward implementing improved accounting standards.

575. The Department of Agricultural Legislation under MAFF is responsible for preparing policy and drafting laws for MAFF and importantly assisting the Ministry on registration, standardization and quality control of agricultural materials and inputs. Relevant departments of MAFF also issue Operating Business Licenses for the production, processing, transport and trade of agricultural inputs, livestock, fish, and forestry products.

576. Several laws have been promulgated concerning the agricultural sector. The purpose of most laws is to ensure the sustainable exploitation of resources and consumer safety.

- *Forestry Law 2002 (Forestry Administration, MAFF).* Includes provisions for several types of forest management arrangements and the exploitation of timber and non-timber forest products, permits for harvesting and establishing of sawmills and export licensing.
- *Fisheries Law (Fisheries Administration, MAFF).* Includes provisions for the development of fish markets and processing industry, a closed season for the transport of fish, allowable types of fishing gear, licensing for commercial fishing rights and commercial-scale trading, processing and transport of fish, export licenses, CITES related certification and issuing of health certificates.
- Seed Management and Plant Breeder's Right Law (DAALI, MAFF)
- Minimum Residual Limited in Agricultural Products Originated from Plants and Food Safety - Prakas (DAALI, MAFF)
- Sanitary and Phyto-Sanitary Control Anukret (DAALI, MAFF)

- Law on Management of Quality and Safety of Products and Services (2000). Includes the labeling requirements of produce i.e. ingredients, user guidelines, manufacture and expiry date in Khmer language and also quality labeling. The labeling requirements refer to imports as well as domestic products.
- Land law (2001). The law clarifies various types of rights relating to land, including ownership, easement, usufruct, security interest, concessions of State land, and leases.
- *Contract Law (1988).* Regulates the formation, performance, interpretation and enforcement of all types of contracts. It also deals in greater detail with certain types of contracts e.g. sales contracts, leases, loan contracts and personal property mortgages. Chapters of the law are gradually being supplemented and superseded by more specific laws, such as the Land Law with respect to leases
- *Law on Commercial Enterprises (2005).* The registration system established at the MoC is functioning well, with an increasing number of companies moving from the informal to the formal economy, though the majority remain in the informal sector.
- *Law on Customs.* Although passed by the National Assembly in 2007, the law has not yet been promulgated. The law will provide a clearer mechanism for the assessment and collection of duties, taxes and fees on imported and exported goods.
- Unfair Trade Practices (2002). Unfair competition includes acts which cause consumer confusion regarding competitors' products, false allegations which discredit a competitor and dissemination of information which misleads the public regarding a competitor.

577. Although several laws have been enacted, in general the existing legal framework for commercial activities is very weak, with many necessary laws still in the drafting process or awaiting approval by the Council of Ministers or National Assembly. As part of the Government's requirements for accession to the WTO in 2004, the Government has committed to reform the commercial legal framework to improve the business environment for SMEs and the private sector. The Government's work plan for WTO accession involved enacting several major commercial laws, including laws on contracts, insolvency, secured transactions, commercial courts, and various others. The passage and implementation of these laws will provide building blocks for the establishment of an enabling business environment for SMEs. In the majority of cases, these laws will require implementing *anukret* (sub-decrees) and *prakas* (regulations) to be formulated and issued in a timely manner.

578. The judicial system to enforce contracts, foreclosure, and resolve commercial disputes remains unclear and creates a lack of investor confidence. However, a positive step is the introduction of commercial arbitration<sup>46</sup>.

## 5.1.5 The Institutionalization of Standardized Weights, Measures and Quality Grade

579. The Institute of Standards of Cambodia, under MIME, is tasked with developing standards, certifying conformity and issuing product licenses. Capacity building and technical support has been provided by United Nations Industrial Development Organization (UNIDO). Guidance and control of export standards and certification devolves directly to three Departments within MAFF: i) the Department of Animal Health and Production for livestock products, ii) the Department of Agronomy and Agricultural Land Improvement - Plant Protection and Phyto-Sanitary Inspection Office for plant products, and iii) the Fisheries Administration for fish products. To date, industrial standards for agrifood products only exist for vinegar, chili sauce, fish sauce and bottled water.

580. The lack of standardized weights, measures and quality grades increases uncertainty and transaction costs and also undermines efforts to increase quality.

<sup>&</sup>lt;sup>46</sup> IFC, 2007: Business Issue Bulletin No. 14

## 5.1.6 Technical Barriers to Trade and Sanitary and Phyto-sanitary Measures

581. As stated above, the absence of export tariffs provides Cambodia with a significant competitive advantage. At present, much of Cambodia's agri-food trade is directed to regional trading partners, such as Vietnam and Thailand. SPS and environmental standards are less demanding within the sub-region and have less of an impact on Cambodian agri-food trade. However, if Cambodia is to increase its exports and diversify towards new and higher value markets, Technical Barriers to Trade (TBT) and SPS issues must be addressed.

582. The current draft Law on Standards does not comply with many of the provisions of the WTO Agreement on Technical Barriers to Trade and furthermore, the portion of the draft law relating to accreditation seems to be incompatible with internationally recognized and accepted best practices<sup>47</sup>.

583. Cambodia's inability to deal with non-tariff barriers, complicated and costly export procedures and a lack of supply capacity have all contributed to the poor performance of Cambodian agricultural exports. Cambodian agricultural exports generally face the problem of not clearing standard requirements demanded by importing countries.

584. Lack of supporting measures in issuing required certificates, such as the Sanitary Certificate, has resulted in Cambodian products being rejected landing permits in importing countries. Dourng and Sok (2005) reported cases where the lack of supporting measures have resulted in the ban of rice exports from Cambodia to China and a fish product export ban to the European Union (EU).

585. Even if SPS standards were being met, there are few independent or semi-independent accredited certification organizations operating in Cambodia at present. A notable exception is The Rubber Research Institute of Cambodia which is recognized by the International Rubber Association's regional test laboratory and is in the process of becoming a laboratory certified in compliance to the ISO/IEC 17025-1999 standard with assistance from UNIDO.

## 5.1.7 Preferential Trade Agreements

586. Cambodia is not taking advantage of several preferential trade agreements for exporting to high-value markets as standards and sanitary certification requirements cannot be met.

587. **World Trade Organization**: As a member of the WTO, the world market is already open for Cambodia. Cambodia also receives preferential treatment from three large markets: ASEAN, China, and the European Union.

588. **ASEAN:** As a member of the ASEAN Free Trade Agreement (AFTA), Cambodia enjoys preferential market access to other ASEAN member states under the Common Effective Preferential Tariff. Importantly, AFTA does not only apply to tariffs, but also to non-tariff measures and trade facilitation. However, as part of the agreement, Cambodia is obliged to reduce import tariffs on other ASEAN member country products each year until 2015, when they will cease to exist altogether.

589. **The ASEAN-China framework agreement** will open up the world's largest market to ASEAN states, including Cambodia, in the next few years. Currently, the Early Harvest Program between China and ASEAN is offering export opportunities for 297 agricultural products, tariff free.

<sup>&</sup>lt;sup>47</sup> DTIS, 2007
590. **General System of Preferences (GSP):** Cambodia enjoys GSP status from the European Community and the United States. GSP status allows duty-free export to both of these markets if the products being exported are made in Cambodia. Cambodian made products are those in which at least 35% of the total value comes from sources within the country. At a time when the more developed neighboring countries are about to lose their GSP status, Cambodia's newly gained GSP status is a major advantage.

### 5.1.8 Barriers to Entry for Emerging Agribusinesses

591. According to the World Bank 'Doing Business in Cambodia 2008', Cambodia ranks 148 out of 178 countries. Employing workers, accessing credit, trading across borders and enforcing contracts were considered to be the biggest problems in doing business.

592. When firms themselves were interviewed, corruption was cited as the most common constraint to enterprise operation and growth, followed by anti-competitive behavior, regulatory policy uncertainty and an unsure legal system<sup>48</sup>.

593. The report also indicated the formal private sector faces a myriad of transaction costs and barriers to establishment and operation. It takes 94 days to start a business in Cambodia, 30 days longer than in Vietnam and 52 days longer than in Thailand. Staying in the informal sector appears to be a rational response to the investment climate, as informal firms face lower taxes, bribes and predatory attention of State officials.

594. Cambodia also has one of the longest time requirements for export. It takes up to 43 days from final packing to departure from the port of exit in Cambodia, as compared to the Asia Pacific regional average of 34 days<sup>49</sup>. Since many agricultural products are perishable, delays in export procedure are a deterrent.

#### **5.1.9** Access to finance

As of the end of 2007, only about 29% of the nation's population had access to finance. Total 595. credit including Bank and microfinance loans to the private sector represented only 21% of GDP, one of the lowest rates of banking intermediation in the world. Various obstacles stand in the way of expanding credit in the economy. A developing but still weak legal framework for commercial and banking activities narrows the forms of finance available and causes a generally high credit risk in the economy. The underdevelopment of basic informational institutions, like accounting and auditing systems, and efficient credit information sharing, brings up transaction costs in creditors' due diligence and restricts the possibilities for borrowers' reputational collateral to replace dependence on physical collateral. Of all these obstacles, three concrete barriers are perceived to block SMEs' immediate access to finance. The first is the lack of a credit information system, which heightens commercial banks' risk-averse behavior. Secondly, the underdeveloped accounting and taxation systems do not allow SMEs to provide sufficient financial information to commercial banks. Finally, Cambodia has no legal framework for alternative forms of finance and of finance providers, for example leasing arrangements. Leasing arrangements are particularly suitable financing mechanisms for agricultural contract services e.g. land preparation, and acquiring processing, storage and transport equipment.

<sup>&</sup>lt;sup>48</sup> World Bank, Investment Climate Assessment and Reform Strategy, 2004

<sup>&</sup>lt;sup>49</sup> World Bank, 2005

596. Cambodia remains a cash economy. As of 31st December 2007, it is estimated only 197,337 borrowers have formal bank loans and Micro Finance Institutions (MFIs) service a further 624,000 borrowers<sup>50</sup>. For both working and investment capital, firms source 65% of financing from their own internal funds and equity and approximately 25% from family and friends<sup>51</sup>.

597. The banking sector in Cambodia is made up of the National Bank of Cambodia (Central Bank) and its provincial branches, 17 commercial banks servicing corporate clients, seven specialized banks including the State-owned Rural Development Bank servicing some SMEs in the agro-industrial sector and 17 licensed MFIs servicing small agricultural borrowers.

598. Most credit is short-term with approximately 70% of loans for periods of less than one year. Formal long-term financing for investment in capital goods is virtually non-existent<sup>52</sup>. All loans require hard collateral, although some MFIs provide group loans based on social collateral for revolving funds. MFIs are the main lenders to farmers and sometimes allow grace periods in consideration of production cycles.

599. Money lenders remain an important source of short-term financing for farmers to overcome cash flow problems. No collateral is required, grace periods can be negotiated and repayments can be in kind. However, effective interest rates are high, up to 120% per annum.

600. The lack of long-term loans results in little investment in the agricultural sector for capital items such as irrigation, storage and processing infrastructure, as pay-back periods are long compared to other industries. Limited access to formal finance prevents agro-industrial enterprises and small holder farmers from expanding their businesses and capturing new business opportunities. Within the international agricultural sector, land as the main asset, is most often used as collateral for long-term financing. Increased land titling in commercial agricultural areas would allow this form of financing in Cambodia. The provision of competitive matching grants to fund business proposals is also commonly used to encourage farmers to invest in diversification. Grants are leveraged in projects with equity and loan finance, which through financial modeling, is seen to produce stakeholder risk-reward relationships, ensuring efficient deployment of the grant.

601. The high cost of short-term cash flow financing from informal money lenders puts pressure on small holder farmers to sell their produce at harvest, when prices are low. This prevents farmers from amassing enough savings to overcome cash flow deficits in the long-term and escaping the subsistence trap. Internationally, overdraft facilities are commonly provided for business accounts to overcome short-term cash flow problems. The banks feel confident providing overdrafts as they have records of the business performance through bank statements.

# 5.1.10 Infrastructure

# 5.1.10.1 Roads

602. Roads are the only transport mode with nation-wide coverage, carrying approximately 65% of passengers and 70% of freight within the country<sup>53</sup>. There are 4,695km of national roads, 6,615km of provincial roads and 18,948km of rural roads. The Cambodian road network is well linked to neighboring countries with five national roads entering both Thailand and Vietnam, as shown on Map 4. Whilst 40% of roads in Cambodia are classified as being in 'good' condition, only 6.3% are paved compared to 98.5% in Thailand and an Asian average of 13.3%<sup>54</sup>.

<sup>&</sup>lt;sup>50</sup> NBC, Supervision Report, 2007

<sup>&</sup>lt;sup>51</sup> World Bank, Cambodia PICS, 2003

<sup>&</sup>lt;sup>52</sup> IFC, Financial Sector Diagnostic, 2007

 <sup>&</sup>lt;sup>53</sup> MPWT, Trade Conference 2007
 <sup>54</sup> World Development Indicators, 2006



Map 4 Cambodian Road Network and International Border Crossings

<sup>(</sup>Source: MPWT, Trade Conference 2007)



<sup>(</sup>Source: MPWT, Trade Conference 2007)

603. Rural roads are in the poorest condition, occasionally impassable during the rainy season, hampering the collection of farm produce into marketable quantities and increasing transaction costs.

604. The number of vehicles in Cambodia is shown in Table 16. Total vehicle ownership has doubled since 2000.

Year	Light Vehicles	Heavy Vehicles	Motorcycles		
1990	4,181	1,536	43,733		
1995	32,201	7,231	152,050		
2000	70,007	13,886	247,965		
2006	144,808	22,260	511,439		

Table 16 Number of Vehicles on Cambodian Roads

(Source: MPWT, Trade Conference 2007)

605. The increasing number of vehicles and reliance on roads for freight transport has lead to mounting congestion.

#### 5.1.10.2 Railroads

606. Table 17 shows there are some 602km of existing railway lines linking Sisophoan in the north-west to Sihanoukville in the south, via Phnom Penh. Trains carry passengers and freight, once a week taking 16 hours to travel between Phnom Penh and Sisophoan, compared to 6 hours by road. Although train travel was once popular, travel by road is now preferred as it is quicker and more convenient.

Table 1 / Cambodian Railroads						
Description	Length (km)	From	То	Remarks		
Existing line 1	338	Phnom Penh	Sisophoan	BMC (Khmer – Thai border)		
Existing line 2	264	Phnom Penh	Sihanoukville	Port		
Reconstruction	48	Sisophoan	Poipet	Khmer – Thai border		
Planned	255	Phnom Penh	Loc Ninh			

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(Source: MPWT, Trade Conference 2007)

607. Cambodia's railway network is in poor condition due to war damage and decades of neglect. The ADB will assist in the rehabilitation of the railway network and reconstruction of destroyed lines to boost regional transport links through a US\$42 million loan under the Greater Mekong Sub-Region Program. As shown in Table 17, it is planned to extend the rail links into Thailand and Vietnam. Efficient railway links to Vietnam and Thailand will reduce export and import costs.

#### 5.1.10.3 Inland waterways and river ports

608. There are approximately 1,700km of navigable routes along the Mekong, Bassac and Tonle Sap Rivers, including the Great Lake, during the wet season. This reduces to 870km in the dry season. There are seven main river ports located in six provinces as shown on Map 5. River freight transport to Vietnam via the Mekong is considered more convenient and cheaper than road transport for non-perishable goods, depending on proximity to river ports.



Map 5 Cambodian Inland Waterways

(Source: MPWT, Trade Conference 2007)

#### 5.1.10.4 Marine port

609. A deep water port is located at Sihanoukville, 230km from Phnom Penh. The port caters for bulk, cargo, container, livestock and refrigerated carriers. Shipping charges were estimated at US\$141 for a 20 foot container<sup>55</sup>, the highest in the region and four times the cost for shipments of comparable size in Thailand.

#### 5.1.10.5 Airports

610. As shown on Map 3, Annex A, there are 17 airports across Cambodia, of which six have paved runways. The two international airports are located in Phnom Penh and Siem Reap serving Singapore, Bangkok (Thailand), Hanoi and Saigon (Vietnam), Luang Prabang and Vientiane (Laos), Hong Kong, Guangzhou, Beijing, Shanghai (China) and Taipei (Taiwan). There is currently little demand for air freight as current export products and destinations are better serviced overland or by sea.

<sup>&</sup>lt;sup>55</sup> World Bank, Benchmarking Selected Variables from the 2003 Value Chain Report, 2007



(Source: MPWT, Trade Conference 2007)

#### 5.1.10.6 Utilities

611. Cambodia has one of the lowest electrification rates in Asia, with only 17% of the population connected to a power supply<sup>56</sup>. Electricity charges in Cambodia are also much higher than in neighboring countries, as shown in Table 18.

Country	Residential	Commercial	Industrial	Average
Cambodia	10.86	16.24	16.24	14.44
Vietnam	4.57	6.19	2.44	4.4
Thailand	3.55	2.4	2.38	2.78
Philippines	9.12	9.33	8.09	8.84
Japan	13.05	13.05	13.05	13.05

Table 18 Electricity Cost Comparison (US\$Cents/kwhr)

(Source: CAASP Preparation Report, 2008)

612. Cambodia imports 40% of its electricity. The remainder is largely produced from conventional oil-based technologies such as diesel generators. Although Cambodia has discovered off-shore oil and gas deposits, 3,700 bbl of imported oil is consumed every day. Cambodia has yet to develop alternative and cheaper sources of energy. Thailand and Vietnam derive only 16% and 33% of there energy requirements respectively from conventional energy sources.

613. Telephone coverage is widespread through the use of mobile phones. It is estimated there are 1.14 million mobiles or 8 mobiles per 100 persons.

<sup>&</sup>lt;sup>56</sup> World Bank, ESMAP Technical Paper 076, 2005

#### 5.1.11 Production and Consumption Sub-Systems

614. The production and consumption sub-systems are linked by the marketing sub-system reviewed in the next main section. In efficient marketing systems production adapts to consumption demands. As Adam Smith stated in *The Wealth of Nations* (1776), 'Consumption is the sole end purpose of all production, and the interest of the producer ought to be attended to only so far as it may be necessary for promoting that of the consumer.'

#### 5.1.11.1 Population and Consumption Data

615. According to the latest statistics, Cambodia's population is growing at a rate of 1.54%, as shown in Table 19. There is also increasing urbanization, with 19.5% of the population living in urban areas in 2006, compared to 16% in 2000. Per capita GDP has nearly doubled since 2000, to US\$526 in 2006.

Indicator	2000	2008
Population (persons)	12.6 million	13.4 million
Population growth (annual change %)	1.8	1.54
Population density (persons/km <sup>2</sup> )	70	75
Urban population (% of total)	16	19.5
Per capita GDP (US\$)	287	589
Share of consumption (%):		
Poorest 10% of population		3
Wealthiest 10% of population		35
% population below poverty line		35

Table 19	Population	Growth	GDP	and	Urbanization
rable r	1 opulation	orowin,	UDI	ana	Orbanization

(Source: ADB and National Institute of Statistics, General Population Census of Cambodia 2008)

616. Cambodia has achieved self-sufficiency in most essential agricultural commodities. Although the total population is comparatively small, agricultural production for domestic consumption will have to increase in line with population growth to maintain self-sufficiency and food security. Table 20 shows projected rice self-sufficiency until 2020.

	Table 20 Rice Balance Projection					
Description	2007	2010	2015	2020		
Cultivated areas (ha)	2,541,432	2,500,000	2,510,000	2,600,000		
Harvested areas (ha)	2,516,415	2,430,000	2,450,000	2,500,000		
Yield (t/ha)	2.48	2.49	2.50	3.00		
Production (t)	6,240,709	6,050,700	6,125,000	7,500,000		
Seed reserve & post-harvest losses						
(t) - 13%	811,292	786,591	796,250	975,000		
Available rice (t)	5,429,417	5,264,109	5,328,750	6,525,000		
Milled rice (t)	3,474,827	3,369,030	3,410,400	4,176,000		
Food requirement	1,914,614	2,003,069	2,112,047	2,274,675		
Consumption/person (kg)	143	143	140	140		
Population (annual growth 1.54%)	13,388,910	14,007,478	15,086,053	16,247,680		

Rice surplus (paddy)	2,437,832	2,134,313	2,028,676	2,970,820
Rice surplus (milled rice)	1,560,213	1,365,960	1,298,353	1,901,325

Key assumptions:

Milling rate: 64%

Seed reserve and post-harvest losses of total production: 13%

Population growth: 1.5%

Per capita consumption is reduced from 2015 due to upgrading consumption.

(Source: NSDP 2006-2010 and CAASP Design Team Projection based on Agricultural Statistics Book 2006-2007)

617. Table 20 shows that the projected demand for rice in 2020, allowing for an increased population, is still below actual rice production levels in 2007. Cambodia currently produces over 50% more rice than it needs for self-sufficiency. With reducing poverty levels, rising disposable income and increasing urbanization, consumption patterns, consumer behavior and demand will change over the next decade, necessitating a change in cropping patterns.

#### 5.1.11.2 Main consumption centers

618. Table 21 shows population and population density by province. The four most populated provinces are: i) Kampong Cham (1,680,694 persons), ii) Kandal (1,265,085 persons), iii) Phnom Penh municipality (1,325,681 persons) and iv) Prey Veng (947,357 persons).

619. If ranked according to population density, Phnom Penh is by far the most concentrated consumption centre: i) Phnom Penh (4,571 persons/km<sup>2</sup>), ii) Kandal (355 persons/km<sup>2</sup>), iii) Takeo (237 persons/km<sup>2</sup>), and iv) Prey Veng (194 persons/km<sup>2</sup>)<sup>57</sup>.

Province	Population	Area (km²)	Population density (persons/km <sup>2</sup> )
Banteay Meanchey	678,033	6,679	102
Battambang	1,024,663	11,702	88
Kampong Cham	1,680,694	9,799	172
Kampong Chhnang	471,616	5,521	85
Kampong Speu	716,517	7,017	102
Kampong Thom	630,803	13,814	46
Kampot	585,110	4,873	120
Kandal	1,265,085	3,568	355
Koh Kong	139,722	11,160	13
Kratie	318,523	11,094	29
Mondol Kiri	60,811	14,288	4
Phnom Penh	1,325,681	290	3,571
Preah Vihear	170,852	13,788	12
Prey Veng	947,357	4,883	194
Pursat	397,107	12,692	31
Rattanakiri	149,997	10,782	14
Siem Reap	896,309	10,299	87
Sihanoukville	199,902	868	230
Stung Treng	111,734	11,092	10

Table 21 Population Density by Province

<sup>&</sup>lt;sup>57</sup> NIS, Cambodia Census, 2008

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Svay Rieng	482,785	2,966	163
Takeo	843,931	3,563	237
Oddar Meanchey	185,443	6,158	30
Krong Keb	35,753	336	106
Krong Pailin	70,482	803	88

(Source: Cambodia General Population Census Provisional Report 2008, NIS, Ministry of Planning)

#### 5.1.11.3 Average daily calorific consumption

The average Cambodian citizen gains their daily calorific intake from the following basket of 620. goods shown in Table 22.

Food Source	Per capita daily calorie intake
Rice	1,419
Maize	107
Pig meat	80
Sugar	79
Palm oil	48
Cassava	26
Bovine meat	20
Wheat	18
Animal fats	16
Soybean oil	11
Milk	10
Poultry meat	9
Eggs	4

(Source: FAO Country Profile, 2004)

621. The above table indicates the majority of the daily calorific intake is derived from rice. Less animal products, oils and fats are consumed in the average Cambodian diet when compared to developed countries, as shown in Figure 21 below.

As witnessed in other Asian countries, increasing incomes have led to a higher consumption 622. of animal products and processed foods. Consumer behavior also changes with an increased demand for quality and convenience foods. If production does not follow consumer demand, the demand will be satisfied by imports.



#### Figure 21 Source of Dietary Energy Consumption (%)

#### 5.1.11.4 Retailing

623. Developed countries have seen a revolution in retailing through the growth of supermarkets. In Asia, packaged grocery sales through supermarkets grew at 3% per year between 1999 and 2002<sup>58</sup>. Table 23 shows the percentage of food sales through supermarkets in several Asian countries.

Country	All foods (%)	Fruit (%)	Vegetables (%)
Manila area,	n/a	n/a	15
Philippines			
Bangkok area, Thailand	n/a	40	30
Malaysia	n/a	60	35
Vietnam	20	n/a	n/a
Hong Kong	80	n/a	n/a
Singapore	80	n/a	n/a

 Table 23 Percentage of Food Sales through Supermarkets

(Source: FAO, Changes in Food Retailing in Asia, 2005)

624. In Thailand, the 'Tops' chain now have 21 supermarkets and 48 mini-markets. TescoLotus, a joint venture between Tesco UK and CP Group Thailand, have 50 super and hyper markets and 31 smaller Express Stores in partnership with ESSO petrol stations<sup>59</sup>. The key drivers of changing food distribution systems in Asia are:

*i)* Income growth with increasing urbanization causing an increased demand for processed foods. Increased ownership of refrigerators induce a shift from daily

<sup>&</sup>lt;sup>58</sup> FAO, Changes in Food Retailing in Asia, 2005

<sup>&</sup>lt;sup>59</sup> FAO, Changes in Food Retailing in Asia, 2005

shopping to weekly buying and increased car ownership prompts larger volume grocery shopping at more distant locations.

- *ii)* Changing consumer preferences. The entry of women into the workforce has increased their incentive to seek one-stop, fast, convenient and value for money shopping. Quality and safety standards are perceived as being better in modern stores.
- *iii)* Changing consumer eating habits. With more women working there is an increased demand for processed and easy to prepare meals found in supermarkets.
- *iv)* Increased infrastructure development such as highways, retail technology and logistics spurred the rise of supermarket chains that developed their own distribution centers to accommodate high volumes of direct shipments from producers under a central inventory control.
- v) Low margins and high competition. Modern technologies and know-how regarding supply chain management, procurement arrangements, stock optimization, quality control, cold storage, product handling and consumer services provide unprecedented services and quality for consumers. Supermarkets constantly seek savings through efficiency gains, economies of scale and cost reductions.
- *vi) Demographic, social and cultural changes.* The proportion of young people and westernized lifestyles is increasing in Asia. Family structures are becoming more nuclear, rather than extended. The increased use of bank cards, rarely accepted in traditional markets, contribute to the attractiveness of supermarkets.
- *vii*) *Increased travel.* More travel has exposed people to modern retailing techniques, to a wider range of products and the possibility of being able to consume many out of season products.

625. The procurement practices of supermarkets are likely to have a significant impact upon producers. A greater concentration in food distribution and dominant role of agro-industrial firms and retailers, the growing importance of food safety and quality could result in power imbalances and unfavorable terms of trade between small-scale chain actors and larger supermarkets.

626. Supermarkets use a wide variety of procurement practices as follows:

- i. Purchases from farmers by individual supermarkets;
- ii. Purchases from farmers by distribution centers;
- iii. Purchases from wholesalers, who work either directly with farmers or through wholesale markets;
- iv. Purchases through independent procurement companies (dedicated suppliers) who often work directly with farmers;
- v. Purchases through farmers' groups, associations or co-operatives;
- vi. Purchases through individual large-scale farmers, who often sub-contract to small-scale farmers;
- vii. Leasing space in supermarkets to traders, farmers and co-operatives on a commission basis.
- 627. Problems faced by farmers and traders supplying supermarkets include:
  - i. Difficulty in meeting quality standards and health and safety regulations,
  - ii. Provisions for rejected produce,
  - iii. Cleaning, grading and packaging requirements,
  - iv. Access to production and post-harvest technology,

- v. Fulfilling volume requirements and delivery schedules, and
- vi. Coping with cash flow problems due to few arrangements for advance payments during production and delayed payments subsequent to delivery.

#### 5.1.12 Agriculture And Food Production

628. The agricultural sector contributes nearly a third towards total GDP, second only to services. However, as shown in Table 24, growth patterns have changed since 2000. The agricultural sector recovered from negative growth in 2000, to 6% growth in 2006. Growth in the agricultural sector compares favorably with both the industry and services sectors.

Sector	2000	2006
Structure of Output (% of GDP)		
Agriculture	36	30
Industry	22	26
Services	37	39
Other	5	5
GDP Growth (annual change %)	8	11
Agriculture	-1	6
Industry	31	18
Services	9	10
Trade (US\$ million)		
Exports (fob)	1,397.1	3,690.3
Imports (cif)	1,935.7	4,737.1
Balance	-538.6	-1,046.8
Employment (%)		
Agriculture	74	69
Manufacturing	7	9
Mining	<1	1
Others	18	30

Table 24 M	facro Eco	nomy and	Employ	ment

(Source: ADB)

629. Cambodia remains a net importer, although the increase in imports has been less than the increase in exports since 2000, resulting in an improved balance of payments.

630. The agricultural sector remains the main source of employment for 69% of the population. This has decreased slightly from 2000 as more jobs have become available in other sectors and increasing urbanization. It could therefore be assumed that approximately 30%, or just over 4,000,000 of the population, are net food consumers.

631. Figure 22 shows the share of agricultural GDP by sub-sector. Crops are the dominant subsector accounting for 51% of GDP. Whilst fisheries are also significant with a 24% share, livestock and forestry only account for 15% and 10% respectively.





(Source: MAFF Statistical Year Book, 2006)

#### 5.1.13 Land-Use

632. Up to 62% of land in Cambodia is classified as forest. Table 25 shows only 19% is classified as cultivatable for agricultural purposes.

Catagana Catagana								
Category	Area (million nectares)	% snare						
Forests not under concessions	4.8	27						
Protected areas/forests	3.1	17						
Cultivated areas	2.7	15						
Forest concessions	*3.3	18						
Scrub land, non-wooded land, etc.	1.7	9						
Towns, infrastructure, etc.	1.1	6						
Fishing concession lots	0.5	3						
Agricultural concessions	0.8	4						
Land mine contaminated areas	0.1	1						
Total	18	100						

Table 25 Estimates of Land Use in Cambodia

(Source: IFSR 2004, MAFF 2007, \*Forestry Administration)

633. Of the land cultivated for agricultural purposes, 2,541,432ha or 83% is planted to rice. Figure 23 shows the area planted for main crops in Cambodia.





Cultivated Land by Crop Type

#### 5.1.14 Land tenure and farm size

634. Since 2002, approximately 1 million land title certificates have been issued covering 10 provinces and Phnom Penh municipality, as part of the LAMP project. Even without widespread certification, 95% of farmers claim to own and cultivate their land with 16% of farmers also renting some additional land<sup>60</sup>. Average farm size is 1.5ha split into 2.5 parcels<sup>61</sup>. It is evident agricultural production in Cambodia is based upon small fragmented farms, producing a diversity of crops, for subsistence needs.

635. Land titling will encourage the formal transfer of land and encourage consolidation of larger single farmsteads.

#### 5.1.15 Access to irrigation

636. Approximately 18% of arable land in Cambodia is irrigated, compared to 19% in Lao PDR, 31% in Thailand, and 44% in Vietnam. Irrigation is predominantly supplementary and the dependence on rain-fed agriculture is a major constraint to increasing output.

#### **5.1.16** Crop production

637. Crops planted and main production areas are shown in Table 26. Rice is the dominant crop, accounting for 83% of cultivated area.

<sup>(</sup>Source: MAFF, Annual Report, 2006/07)

<sup>&</sup>lt;sup>60</sup> ADB survey, 2002

<sup>&</sup>lt;sup>61</sup> Socio Economic Survey, 1999

Crop / Average Yield (t/ha)	Cultivated Area (ha)	Output (t)	Main producing provinces		
Rice	2,541,432	6,264,030	> 300,000t		
2.49 t/ha			Battambang, Prey Veng, Takeo, Banteay		
			Meanchey, Kampong Cham, Kampong		
			Thom, Kampot, Siem Reap		
Maize	109,220	376,662	>10,000t		
3.45 t/ha			Battambang, Banteay Meanchey,		
			Kandal, Pailin and Kampong Cham		
Cassava	99,207	2,182,043	>100,000t		
21.99 t/ha			Kampong Cham (1,041,167t),		
			Battambang and Pailin		
Mung bean	86,584	59,899	> 10,000t		
0.7 t/ha			Battambang, Banteay Meanchey		
Soybean	75,053	98,289	> 10,000t		
1.3 t/ha			Battambang, Kampong Cham		
Sesame	56,051	24,789	> 10,000t		
0.45 t/ha			Pailin		
Vegetables	44,507	222,893	> 10,000t		
5.08 t/ha			Kandal, Kampong Chhnang, Kampong		
			Cham, Kampot, Siem Reap, Takeo		
Rubber	20,583	21,389	Kampong Cham, Rattanakiri		
Ground nut	14,438	23,811	> 9,000t		
1.65 t/ha			Battambang, Kampong Cham		
Sweet potato	9,623	45,664	>5,000t		
4.74 t/ha			Battambang, Kampong Cham, Kampong		
			Chhnang, and Kampot		
Tobacco	8,768	14,231	Kampong Cham		
1.62 t/ha					
Sugar cane	8,358	141,704	> 10,000t		
16.95 t/ha			Battambang, Kampong Cham, Kampot,		
			Kandal, Takeo		
Jute	449	575	Banteay Meanchey, Battambang,		
1.28 t/ha			Kampong Cham, Pursat		

Table 26 Area Cultivated and Output of Main Crops

(Source: MAFF, Annual Report, 2006/07)

Table 27 shows the percentage of cultivated area by crops planted. It is evident very little land 638. is devoted to the production of high value crops, such as vegetables.

Сгор	% of cultivated area
Rice	83
Maize	4
Cassava	3
Mung bean	3
Soybean	2
Sesame	2
Vegetables	1
Rubber	1
Ground nut, sweet potato, tobacco, sugar	1
cane, jute	
(Source: MAFF, Annual Report, 2006/07)	

Table 27 De of Cultivated Area by Cu

While achieving self-sufficiency in many agricultural products, Cambodia imports fruits and 639. vegetables. According to Food and Agriculture Organization (FAO), Cambodia imports about US\$3

million worth of fruits and vegetables each year. However, given the importance of informal trade, the number is estimated to be much higher. A rough estimate shows the import of fruits through Okhna Mong Port alone amounts to between US\$50,000 and US\$100,000 per day.

640. Even though much of the imported fruits and vegetables can be grown in Cambodia, the main reason for imports is seasonality and supply consistency. Hotels tend to use imported fruits and vegetables to complement a shortage of local supply. Five tonnes of vegetables are needed each day in the high season to supply the 68 hotels in Siem Reap. Lack of consistent supply has sometimes brought about the worst scenario when hotels ignore local products and depend entirely on imported products to save the cost of coordination. So far, the local distribution network has not been successful in providing supply consistency. Supply chains normally associated with wholesale markets do not exist in Cambodia. Large buyers of agricultural commodities either have to produce the commodity themselves or engage in direct supply arrangements with producers.

#### 5.1.17 Livestock

641. Livestock accounts for only 15% of agricultural GDP but has been growing slightly year on year. Some specialized intensive production of broilers and pigs are undertaken. However, cattle are largely raised for draught purposes with meat as a by-product. Livestock numbers are shown in Table 28. If beef production were to be promoted appropriate breeds and rearing systems would need to be introduced.

Table 28 Livestock Numbers in 2000						
Livestock	Number					
Cattle	3,344,612					
Buffalo	724,378					
Pig	2,760,029					
Chicken and duck	15,693,626					

Table 28 Livestock Numbers in 2006

(Source: MAFF, 2007, Annual Report, 2006/07)

642. The recent informal import of cheap meat, especially pork, has undermined domestic production<sup>62</sup>, with a reduction in the number of pigs raised.

#### 5.1.18 Forestry

643. The forestry sector has contracted since the cessation of forest concessions and now contributes only 10% to agricultural GDP. Table 29 shows the annual production of forest products.

Table 29 Forestry Products							
Forest Product	Quantity						
Industrial round wood (m <sup>3</sup> )	125,000						
Wood fuel (m <sup>3</sup> )	9,386,000						
Wood charcoal (t)	33,000						
Sawn wood (m <sup>3</sup> )	4,000						
Wood based panels (m <sup>2</sup> )	5,000						

(Source: FAO Statistical Yearbook, 2004)

#### 5.1.19 Fisheries

<sup>&</sup>lt;sup>62</sup> CASSP Preparation Report, 2008

644. Cambodia has a short coastline of 435km. The marine fishery is small compared to the inland fishery. Offshore fishing is largely carried out by international fleets, of which there are no estimates of effort, catches or revenue, as their catches are landed in their home ports.

645. Cambodian freshwater fisheries are one of the most productive in the world, due to the presence of large floodplains around the Great Lake and along the Tonle Sap and the Mekong Rivers. Fisheries accounted for 24% of agricultural GDP in 2006. Large-scale commercial fisheries are operated by a system of lots, or concessions, auctioned off by the Government to private businesses. Estimates by the Mekong River Commission<sup>63</sup> suggest the inland fisheries of Cambodia produce between 289,000 and 431,000t of fish each year, 235,000t of which come from the Tonle Sap Great Lake. Value at landing is estimated at US\$300 million<sup>64</sup>.

646. There has been a gradual increase in aquaculture amongst emerging smallholders and the establishment of medium-sized fish farms. Aquaculture is an alternative solution to cope with declining wild fish catches and increasing demand<sup>65</sup>.

## 5.1.20 Agricultural Trade

647. Table 30 shows official exports of agricultural commodities. Rubber is by far the highest value export. It is noticeable the majority of other exports are raw commodities, such as maize and soybean, with little value-added. The table does not show unofficial exports to Thailand and Vietnam, which are estimated to be considerable, especially for unmilled paddy and cassava. The major destinations for exports are Vietnam, the USA and Thailand.

648. Table 31 shows the agri-food imports, ranked according to value. It is noticeable milled rice is a major import, even though Cambodia has been self-sufficient in rice production since 1995<sup>66</sup>. This is due to the export of paddy at harvest to satisfy cash demands and the import of milled rice later in the year when domestic stocks have been depleted. It is also noticeable that the majority of imports are processed goods, such as sugar, processed foods and flour, which could be produced in Cambodia. Main sources of imports are Indonesia, Singapore and Thailand.

Table 30 Agricultural Exports								
Commodity	Quantity (Mt)	Value (US\$'000)						
Rubber, natural dry	324436	36933						
Maize	64276	3713						
Soybean	14580	3442						
Tobacco leaves	1678	2652						
Milled paddy rice	5013	1889						
Cassava starch	7881	1502						
Cattle (head)	8857	1149						
*Fish	24,100	n/a						
Cigarettes	297	1143						
Palm oil	2841	797						
Garlic	1714	516						
Offal	283	226						
Maize flour	3000	185						
Wheat	1388	146						
Cashew nut, shelled	45	146						

<sup>&</sup>lt;sup>63</sup> Capture Fisheries Project at the Department of Fisheries

<sup>&</sup>lt;sup>64</sup> Hortle et al, 2004

<sup>&</sup>lt;sup>65</sup> CAASP Preparation Report, 2008

<sup>&</sup>lt;sup>66</sup> EIC, 2004: Special Report on Rice Industry in Cambodia

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Bread	360	138
Beer	276	135
Vegetables, preserved	32	113
Green beans	1	106

Source: FAOSTAT 2004, \*Department of Fisheries

Commodity	Quantity (Mt)	Value (US\$'000)
Cigarettes	17792	81371
Milled paddy rice	75458	12700
Palm oil	13967	6911
Cotton lint	5367	6610
Food waste	34207	6569
Sugar (centrifugal, raw)	22516	4352
Tobacco leaves	2808	3896
Malt of barley	9637	3862
Infant food	1686	3682
Prepared food	2614	3629
Wheat	25620	2736
Cows milk	3030	2681
Pastry	6160	2409
Sugar, confectionary	1373	1603
Sugar, refined	7246	1600
Beer	2497	1199
Wheat flour	2900	1100
Maize flour	1785	971
Vegetable oil	1820	850

Source: FAOSTAT 2004

#### 5.1.21 Agricultural Productivity

649. Cambodia's agricultural productivity remains low with annual value-added of US\$292 per worker from 2001-2003. Several factors account for the poor productivity such as low levels of technology, limited access to services, relatively poor soils, irregular rains, high-cost economy and poor rural infrastructure<sup>67</sup>. Yields of main crops grown in Cambodia are compared with neighboring countries in Table 32.

Crop / Yields (kg/ha)	s Cambodia Laos		Thailand	Vietnam
Rice	2,489	3,500	2,906	4,891
Cassava	22,653	7,583	21,091	16,247
Rubber	1,039	na	1,811	1,067
Maize	3,580	4,332	4,116	3,702
Soybean	1,527	1,164	1,561	1,390

Table 32 Yields of Main Crops Grown in Cambodia Compared with Neighboring Counties

(Source: CAASP Preparation Report, 2008)

650. Table 32 shows Cambodian cassava yields are the highest in the region. Yields for soybean are average and yields for rubber and maize are slightly below average. Rice yields are the lowest in the region and half that of Vietnam, mainly due to the lack of irrigation and low fertilizer usage.

<sup>&</sup>lt;sup>67</sup> IFAD, 2007 Country Strategic Opportunities Programme

#### 5.1.22 Use of inputs

651. Cambodia has a comparatively low fertilizer usage rate. For example, the amount of ammonia applied in paddy cultivation is one third that of Lao PDR and Thailand, and 15% that of Vietnam. Similar patterns can be seen in other crops, as shown in Table 33.

Crops		Rice			Maize		Ū	Cassava	ı	V	egetabl	es
Nutrient	Ν	Р	Κ	Ν	Р	K	Ν	Р	Κ	Ν	Р	K
Cambodia	17	15	5	25	15	0	35	10	0	45	30	20
Thailand	62	33	17	56	32	48	55	40	50	125	40	105
Vietnam	115	45	42	105	60	55	60	45	10	140	60	85
Laos	55	15	0	50	25	0	45	0	0	65	40	25

(Source: Compiled from FAO, 2002)

652. Reasons for low fertilizer usage include the higher cost of imported fertilizers compared to neighboring Vietnam and Thailand, from where they are imported. According to an EIC survey, 79% of farmers said they do not have enough money to buy fertilizers or pesticides, which are also under-used.

653. Farmers have also been deterred from using fertilizers due to their illegal dilution. Test results have shown that some fertilizers have been diluted by up to 48%, suggesting quality issues related to agricultural inputs continues to plague the market, and that packaging and labeling standards, particularly when fertilizers and other inputs are repackaged for retail sale, continue to go unchecked<sup>68</sup>.

654. There are five major importers of fertilizer in Cambodia. According to the Agricultural Input Company these have, in principle, localized distributional monopolies. MAFF-registered Cambodiabased agribusiness companies distribute their products through small distribution points to farmers and local agricultural producers. Approximately 88,032t of fertilizers, 54t of powder pesticides, 11,230 liters of liquid pesticides, and 9t of herbicides were officially imported into Cambodia. These data, however, may not reflect the real situation since there are smuggling and cross-border imports from Vietnam and Thailand which go unrecorded. The volume of pesticides available in markets is far more than this and the Bureau for Agricultural Materials and Standards (BAMS) of MAFF estimates at least 80% of pesticides are smuggled across the border from Thailand and Vietnam.

655. There is little documentation on the importation of seeds, particularly for vegetables. As new quality vegetable seeds are required for each planting a study is necessary to identify suitable varieties with appropriate environmental parameters for high potential vegetable production areas in Cambodia. Similarly, suitable quality rubber seedlings are required for the increase in new planting.

656. The sub-decree 'Standards and Management of Agricultural Materials' was promulgated in October 1998. However, it is not fully followed and enforced. Pesticides and other agricultural chemicals are available in all markets, and even at communal trading points. Inspections of licensed Agricultural Merchants are not carried out to ensure authenticity of products sold and create farmer confidence in 'licensed' suppliers.

657. The sub-decree requires that whoever deals with manufacture, formulation, import, storage, and sales or transactions of agricultural materials in Cambodia (including pesticides, and fertilizers)

<sup>&</sup>lt;sup>68</sup> World Bank, Benchmarking Selected Variables from the 2003 Value Chain Report, 2007

registers the products with the MAFF. As far as the law is concerned only six firms have registered. All are international companies from Thailand, Vietnam, Japan, Germany, and Israel.

### 5.1.23 Farm mechanization

658. Agricultural production is largely unmechanized, with farmers using cattle for plowing. According to MAFF estimates in 2005, there were 4,936 tractors in Cambodia, compared to 220,000 in Thailand and 163,000 in Vietnam. The small-size of land holdings is one reason for low levels of mechanization. The use of tractors is concentrated in Battambang and Banteay Meanchey, where extensive mono-cropping of maize is practiced.

### 5.1.24 Agricultural extension and training

659. There are approximately 500 MAFF extension officers to cover two million farm households in Cambodia, a ratio of 1:4,000. In Vietnam, the ratio is one extension officer for 1,340 farm households. Whilst the farmer/extension officer ratio is very high in Cambodia it is also debatable whether the provision of public extension services is appropriate for the development of commercially oriented agriculture. The content of public extension services has a general food security and poverty alleviation focus, whereas commercially-oriented farmers require specific technical and marketing related information to address specific problems.

660. As expected, 74% of farmers receive price information from collectors and wholesalers. Only 2% of farmers receive price information from extension workers.

#### 5.2 The Marketing Sub-System

661. The marketing sub-system deals with the structure and conduct of marketing enterprises, providing a descriptive model of market attributes and the relationships between them and performance.

#### 5.2.1 Innate and Market Related Commodity Characteristics

662. This section provides a brief description of the innate and market-related characteristics of the selected commodities. Rice, maize, cassava, rubber, vegetables and fish were selected as they represent the main crops grown and traded in Cambodia.

# 5.2.1.1 Rice

663. Over 80% of farmers cultivate rice, mainly in the Tonle Sap Lake and Mekong basin regions, covering approximately 2.5 million hectares<sup>69</sup>. Rice is the staple food for Cambodians and by far the dominant crop in Cambodia. The main production system is 'rain-fed terraced' during the wet season. There has been an increase in area cultivated for dry land rice and an increase in yields of wet season rice, due to improved seeds and fertilizers. Cambodia has been self-sufficient in rice since 1995, with current production estimated at 6.3 million tonnes. Although yields have increased, they remain lower than neighboring countries due to the low use of inputs, including irrigation.

<sup>&</sup>lt;sup>69</sup> MAFF, 2006

664. The rice supply chain is characterized by seasonal price fluctuations, a large number of players (small-scale producers, three scales of rice mills, traders, wholesalers and different consumers), intensive inter-provincial and informal cross-border trade, mixing of varieties and the absence of quality incentives. Many of these factors result in low quality and high post-harvest losses.

665. The rice milling ratio in Cambodia is lower than neighboring Vietnam and Thailand. The majority of mills use old and out of date equipment and technology. Table 34 shows milling conversion ratios for several countries in the region.

Table 34 Rice Willing Conversion Ratios			
Country	Conversion rate		
Lao PDR	0.60		
Myanmar	0.62		
Cambodia	0.63		
Vietnam	0.65		
Thailand	0.66		
China, PR	0.70		
Taiwan	0.73		
Japan	0.73		

Table 34 Rice	e Milling	Conversion	Ratios
1 4010 5 1 1400		Conversion	1 caci 0 b

(Source: MoC, TARP Project, Cambodia's Rice Export Promotion in Post-WTO Accession, 2007)

666. Surplus production is diverted from domestic mills to foreign mills through unofficial exports of paddy into Thailand and Vietnam. It is estimated approximately 10% of the rice marketed domestically is exported officially, and 33% of the paddy sold by farmers is exported unofficially. At harvest, farmers seek to sell their rice immediately for much needed cash. Local millers and traders do not have enough working capital to purchase the large volumes of rice being sold at harvest, so Thai and Vietnamese traders buy the unmilled paddy from the farm-gate for export.

667. Due to the lack of capacity of the Cambodian market system i.e. no available capital for storage and limited, poor quality processing facilities, large quantities of rice is channeled into Vietnamese and Thai supply chains with no value-added. According to the rice value-chain in Annex C, margins for milling are 8%, representing substantial lost revenue to Cambodia millers.

668. An exception is Angkor Kasekam, which exports high quality organic 'Neang Malis' aromatic rice from Battambang to niche markets in Europe and Hong Kong. Angkor Kasekam enters contract farming agreements with producers providing quality seed, extension and a guaranteed price. In 2002, 50,000 farmers had entered contract farming agreements covering 30,000ha. It is estimated 50,000t of rice was milled and sold in 2002, fetching a fob price of US\$460/t, US\$100/t more than the best Thai Jasmine varieties and more than twice the price of domestically marketed rice. The success of Angkor Kasekam is due to targeting specific high value markets with a quality product, for which there is a demand. A critical factor in the success has been the management of the supply chain through contract farming<sup>70</sup>.

669. To improve returns from rice, a coordinated effort needs to address the different problems at all levels starting with access to quality markets, establishment and implementation of a grading system, improvement of post-harvest handling and processing, improving on-farm handling and better quality seed varieties.

5.2.1.2 Maize

<sup>&</sup>lt;sup>70</sup> AusAID Diagnostic Study, 2006

670. The biggest production area for maize is Battambang province, followed by Banteay Meanchey, Kandal, Pailin and Kampong Cham. Output has increased mainly due to yield improvements from the introduction of quality seeds, with some additional planting. According to the MAFF, approximately 109,220ha of maize was planted in 2006, with production estimated at 376,662t.

671. Increased maize production was stimulated by an increase in demand for red maize from the animal feed industry. It is estimated up to 90% of the harvest is exported to Thailand and Vietnam<sup>71</sup>. Aflatoxin contamination is common in maize due to poor post-harvest practices. Wastage rates of up to 30% have been recorded<sup>72</sup>.

672. Similar to rice, maize is sold and exported at harvest with little value-added. The main demand for maize is as an ingredient in animal feeds in Thailand and Vietnam. Although opportunities for animal feed processing in Cambodia are limited, due to limited domestic demand and uncompetitiveness as an export, adding value through milling prior to export is viable. The majority of maize is exported unmilled, representing substantial lost revenue to Cambodia millers.

### 5.2.1.3 Cassava

673. Cassava is the second largest crop cultivated in Cambodia by volume, estimated at 2,182,043t in  $2006^{73}$ . Main production areas are Kampong Cham, Battambang, Banteay Meanchey and Pailin. Yields have increased in recent years to 22.65 t/ha, the highest in the region.

674. Cassava is mainly harvested in the dry season as drying is dependent upon the sun. This causes an over supply in the dry season and under supply in the rainy season, with follow on continuity implications for processors.

675. Domestic demand is estimated at 144,000t, whilst demand from Thailand and Vietnam is 285,000t and 1,001,000t respectively. Cassava is processed into starch for livestock feeds, processed human foods and bio-fuel. Forecasts predict a continuing increase in demand.

676. There are many small-scale cassava processors who buy both fresh tubers and dried chips from smallholder farmers and process them into starch pellets. The pellets are sold to local buyers who mix them with other ingredients to produce modified flour for agro-food products e.g. Sakou, Saray, or export them to Vietnam.

677. Four large and four medium-sized starch processing factories operate in Cambodia, located in Kampong Cham and Battambang provinces, on the border with Vietnam and Thailand respectively. Some of the factories grow their own cassava on concession land and others are seeking to do the same. The factories also buy fresh cassava roots from smallholders and process them into starch for sale to Vietnamese and Thai buyers. Sources of raw supplies are a concern for processors, hence their reason for growing their own.

678. Although some primary processing of cassava is carried out in Cambodia, most processing into final products is carried out in Thailand and Vietnam. In June 2008, a new agri-food company started producing 'Instant Noodles' from cassava starch, offering good prospects for future value-addition in-country and import substitution.

<sup>&</sup>lt;sup>71</sup> DTIS, 2007

<sup>&</sup>lt;sup>72</sup> JICA, Development Scenario for Agriculture Sector in Cambodia, 2007

<sup>&</sup>lt;sup>73</sup> MAFF, 2006

## 5.2.1.4 Fisheries

679. There are small, medium and large-scale inland fisheries with the latter regulated through auctioned concessions. Main fish caught include carp, barb, giant snakehead and catfish. The largest landing sites are located at Kandal (21,000 t), Kampong Chhnang (20,000t), Siem Reap (12,000 t) and Battambang  $(10,200t)^{74}$ .

680. Large quantities of fish are processed into fish paste, dry salted fish, smoked fish, fish sauce and dried trash fish for animal feeds and distributed all over Cambodia from the Tonle Sap region. As the main source of protein in the Cambodian diet, demand is high. Consumers' preference is shifting from traditional processed products to live and fresh fish requiring refrigerated supply chains. However, rural consumers without refrigeration will continue to require preserved fish, mainly 'prahoc', for daily consumption.

### 5.2.1.5 Vegetables

681. Main vegetable producing provinces are Kandal, Kampong Chhnang, Kampong Cham, Kampot, Siem Reap and Takeo. About 44,507ha of vegetables are grown, producing approximately 222,893t annually75. Common vegetables grown in Cambodia include cucumber, radish, tomato, lettuce, Chinese kale and morning glory. According to estimates, only 30% of vegetable consumption in Cambodia is produced in-country.

682. Approximately 20% of rural households engage in some vegetable production, which can generate higher returns than rice. For example, US\$400/ha for cauliflower, US\$1,400/ha for lettuce, and US\$3,000/ha for black pepper, compared to US\$100-300/ha for rice.

683. Though returns are high, vegetable production remains low due to unreliable seed, high input costs and limited knowledge of off-season production techniques or post-harvest handling. Production is limited to the dry season, between December and March, even though modern production techniques would allow year-round production.

684. High losses are incurred during post-harvest handling. Spoilages occur due to the lack of cold storage, water damage when ice is used in lieu of cold storage, and overloading during transport.

685. Very little on-farm cleaning, grading or packaging of vegetables is carried out. Vegetables are crudely transported on motorbikes or trucks to wholesale markets, during which a high percentage are spoiled. Minimal cleaning and grading is done by wholesalers and retailers. No cold storage is undertaken in the supply chain, with the exception of a few supermarkets. Whilst no national standards exist for grading, consumers are willing to pay small premiums for higher quality produce.

686. 'Triple F' is a domestic pack house operator who supplies quality, graded and packaged fresh produce (fruits, vegetables and meat) to local high value markets, such as hotels, restaurants and supermarkets in Siem Reap. Triple F's clients are willing to pay a premium for the assurance of supply/quantity, quality and convenience packaging. Similar to Angkor Kasekam, Triple F has contract farming arrangements and provides inputs and extension to ensure continuity of supply and product quality.

687. According to estimates, Cambodia imports up to 70% of vegetables consumed from Vietnam. The main vegetable varieties imported are onions, red garlic, carrots, potatoes, cabbage and Chinese

<sup>&</sup>lt;sup>74</sup> FAO, 2004

<sup>75</sup> MAFF, 2007

cabbage. Volumes imported vary from 40t/day between December and March to 160t/day between April and November. The vegetables originate from Ho Chi Minh City market or from producers in Dalat province. Approximately 60% of the vegetables cross the border at Trapeang Phlong in Kampong Cham and 20% at Bavet in Svay Rieng.

688. There are nine importers and approximately 70% of the imported vegetables are destined for Deum Kor market in Phnom Penh. Fifty wholesalers distribute the vegetables for retail in Phnom Penh or to secondary wholesalers in other provinces<sup>76</sup>.

689. If imports are to be substituted, contract farming arrangements and pack house facilities will be required as the vegetable sector suffers most from the lack of a wholesale market system. Assistance in facilitating such agreements will be required and therefore a suitable cadre of consultants trained.

### 5.2.1.6 Rubber

690. The majority of rubber plantations are in Kampong Cham province. The Government is in the process of privatizing the SOEs, which have dominated the industry in the past, and encouraging the emergence of small-scale out-growers. With technical assistance from the ADB, the Government plans to divest all the seven SOEs by the end of 2008. Rubber plantations are expanding through spontaneous private investment. If current growth rates continue rubber plantations will cover 200,000ha by 2025<sup>77</sup>. Table 35 shows current area planted and production by enterprise type.

Enterprise Type	Land area under production (ha)	Land area under immature trees (ha)	Total area (ha)	Production (t)
State-owned plantations	19,328	20,362	39,690	21,294
Government plantations under				
private management	4,234	912	5,146	3,081
Privately owned plantations	8,824	16,325	25,149	10,000
Total	32,386	37,599	69,985	34,375

Table 35 Area Planted and Production by Enterprise Type

(Source: AFD, 2007)

691. All rubber produced is destined for China via Vietnam. Although rubber is the biggest value official agricultural export, yields are low as the trees are old; therefore a program of replanting with improved clones is required.

692. The large SOE rubber plantations have their own processing facilities with a total estimated processing capacity of 80,000t/year. With current production at 45,000t, this signifies a large surplus and represents a high processing cost per unit. Although the small-scale out-growers were expected to use the ex-SOE processing facilities, 17 small private sector processors have been established to service the small-scale growers in the area<sup>78</sup>.

693. Cambodia is heavily reliant on Thailand and Vietnam for exporting its surplus production of rice, maize, cassava and rubber. This limited export base poses a risk and needs to be diversified. However, the lack of SPS facilities prevents supplying new and potentially higher-value markets.

<sup>&</sup>lt;sup>76</sup> CDRI, The Cross Border Economies of Cambodia, Laos, Vietnam and Thailand, 2005

<sup>&</sup>lt;sup>77</sup> AFD <sup>78</sup> SOFFECO 200

<sup>&</sup>lt;sup>78</sup> SOFRECO, 2006

#### 5.2.2 Spatial Commodity Flows

694. No conventional wholesale market system operates in Cambodia. Trade is based on direct negotiation and auctions are rarely seen. Deum Kor market in Phnom Penh is the biggest market in Cambodia and functions as a retail (consumption) centre for Phnom Penh and a distribution centre to other regional/provincial markets for some commodities, such as fruits and vegetables.

695. Prices in regional markets in Banteay Meanchey and Battambang are not closely integrated with prices in Deum Kor, indicating they are more integrated with Thailand. However, prices in markets in the south-east of the country are integrated, including imported produce from Vietnam, as Phnom Penh is the main distribution centre for Vietnamese imports<sup>79</sup>.

696. Regional markets attract produce from the surrounding area. Deficits are supplied from provinces with surpluses and vice versa. If produce is transported from one province to another it does not pass through a local wholesale market, but is transported directly. There is no central market or co-ordination and clearing house where large buyers can source single deliveries of large quantities of uniform produce. This provides the rationale for large cassava processors becoming directly involved in production and restaurants and hotels sourcing fruits and vegetables from large wholesalers in Thailand and Vietnam. Spatial flows for selected commodities are presented in Figure 24 to Figure 27.

697. It is evident from the spatial commodity flows that large production areas for rice, maize and cassava are concentrated adjacent to border areas to feed into the Thai and Vietnamese supply chains and explains the absence of a 'Cambodian' wholesale market structure. Table 36 summarizes the volumes of selected commodities exported.

Table 56 Troportion of Main Commodities Exported				
Commodity	Production (t)	Domestic	Export	Export
		consumption (t)	(t)	(%)
Rice	6,264,030	3,570,497	2,693,533	43
Maize (red)	223,656	22,366	201,290	90
Cassava	2,182,043	144,000	2,038,043	93

Table 36 Proportion of Main Commodities Exported

(Source: CAASP Design Team estimates)

#### Figure 24 Spatial Flows for Paddy in Cambodia



<sup>&</sup>lt;sup>79</sup> Em HUY (2007) Spatial Connection of Vegetable Markets in Cambodia, Kyusu University, Fukuoka, Japan



Figure 25 Spatial Flows for Maize in Cambodia

Figure 26 Spatial Flows for Cassava in Cambodia





Figure 27 Spatial Flows for Vegetables in Cambodia

#### 5.2.3 Institutional Commodity Flows and Marketing Chains

698. Marketing chains typically involve several middlemen with small margins and little valueadded. At harvest time, commodities move quickly to Thailand and Vietnam, normally via informal and petty trade (motorcycles and small trucks across the border). Rent capture by officials of all ranks is high, and smuggling in both directions is common. Up to 75% of produce is transported by bicycle or motorbike and passes through up to ten different middlemen, each with a very marginal profit, before arriving at the consumer.

699. Figure 28 shows the marketing chain for rice. Approximately 80%, or 7,838,400 farmers, grow rice on areas averaging less than 1ha. Up to 23,103 rice millers are registered with the MIME, of which only 948, or 4%, are classified as medium-scale and capable of processing up to 1,611t/year. The capacity of small mills is limited to approximately 67t/year. As seen in the rice value chain presented in Figure 29 and Figure 30, margins for millers and traders are thin due to the number of intermediaries and high competition. With a few exceptions, strategic marketing is not applied and competition is based on price, rather than quality.



(Source: CAASP Preparation Report, 2008)







Figure 31 Value Chain Analysis of Maize



700. Figure 32 shows the marketing chain for cassava. Although most production is small-scale, large processors are planting extensive areas as a means of ensuring supply. The number of larger processors is increasing but at present only four medium and four large-scale processors operate in Cambodia. Small-scale processing is common and the high number of intermediaries ensures competition, but low margins.



Figure 32 Cassava Marketing Chain

(Source: CAASP Preparation Report, 2008)

701. Figure 33 shows the marketing chain for imported vegetables. There are only five major vegetable importers from Vietnam who sell onto approximately 50 wholesalers in Phnom Penh, either directly or through agents<sup>80</sup>. The vegetable value chain in Table 37 shows margins for importers are less than the wholesalers and retailers in Cambodia, but the importer works on volume, so income is likely to be higher.



Figure 33 Vegetable Marketing Chain

(Source: Development Analysis Network, The Cross Border Economies of Cambodia, Laos, Thailand and Vietnam, March 2005)

<sup>&</sup>lt;sup>80</sup> Development Analysis Network, The Cross Border Economies of Cambodia, Laos, Thailand and Vietnam, March 2005

Trader	Purchase cost	Value added cost	Selling	Gross Margin	Profit Margin
VN importer	\$156.25	\$20.30	\$179.67	\$3.13	1.74%
Wholesaler	\$179.67	\$7.67	\$199.84	\$12.50	6.26%
Retailer	\$199.84	\$10.00	\$237.34	\$27.50	12%

702. The institutional marketing chains indicate that markets are competitive and monopolies do not exist, however there are barriers to expansion and enlargement. The agricultural production and marketing sectors have remained fragmented and small-scale as entrepreneurs cannot access affordable finance to pay for investment and growth. The large number of small-scale operators competing on price leadership, does not encourage quality improvement, value addition or diversification into higher-value markets.

#### **Market Functions** 5.2.4

703. Markets have three main functions: i) exchange (buying and selling), ii) physical (storage, transportation and processing) and iii) facilitating (standardization, financing, risk-bearing and market intelligence). Each of the functions adds value to the product and are described further below.

#### 5.2.4.1 **Buying and Selling – Marketplaces**

704. Market place conditions in Cambodia can be described as follows:

- produce is not cleaned before it is brought to the market; •
- different qualities of produce are not sold separately; •
- produce is not graded before being sold; •
- produce is not sold by standard weights or in standard packages; •
- produce is sold with a lack of price information, creating an atmosphere of uncertainty; and •
- limited storage facilities are available and immediate sales have to be made. •

705. All the above factors undermine the efficient exchange of goods along the marketing chain. As stated in Section 5.1.11, demands on food supply chains are changing. Due to the absence of a wholesale market system in Cambodia, buyers are relying more on imports.

Modern wholesale markets are built on the outskirts of cities to avoid traffic congestion and 706. have facilities for bulk handling, processing, grading and packaging, and storage and communication facilities. The whole complex is usually managed as a single unit. Because of the high investments involved most of these facilities have been built by a municipality, provincial or national government, or a combination of all three. Some of the largest new market complexes, such as the Thalad Market in Bangkok, have been built by private enterprise with government-backed finance or other support.

707. Well managed wholesale markets enforce the use of standardized grades and packaging and provide a venue for price information collection. Importantly, large buyers such as restaurants, supermarkets and hotels can be supplied and consumer demands more effectively communicated down the marketing chain to producers.

Due to the large number of intermediaries between consumers and producers in the 708. Cambodian marketing system, consumer preferences are not transmitted back to producers. Buyers and collectors in villages buy in bulk and do not pay a premium for quality produce. Some grading may be carried out by retailers, but this does not encourage farmers to improve quality standards.

709. It would appear that due to the open economy and porous borders, Cambodia feeds into the supply chains of Thailand and Vietnam and their respective wholesale market network, explaining the lack of such networks in Cambodia. Nonetheless, the hygienic condition of public markets is poor and would benefit from upgrading. Better management of public markets would improve product handling and storage, facilitate enforcement of standards and also provide a venue for price information collection.

710. Due to the absence of wholesale networks three main supply strategies have emerged: i) Large processors and traders diversify into plantation style production or initiate contract farming arrangements, ii) Supermarkets deal directly with farmer groups or pack house intermediaries through contract supply agreements, and iii) Large buyers such as supermarkets, hotels and restaurants rely on imports. Specific programs of support are required to develop and strengthen vertical relationships and value chain partnerships, such as contract farming, between farmers and medium to large buyers. This may include the establishment of commodity groups, though which commodity specific assistance can be channeled.

### 5.2.4.2 Storage

711. The majority of farmers do not store their produce as their main concern is a quick sale to receive cash. Rudimentary cleaning and drying is carried out, but very little sorting, grading or packaging. No premium is paid by collectors and traders for on-farm post-harvest processing; therefore farmers are not encouraged to improve post-harvest on-farm handling.

712. There are no major storage facilities in Cambodia for the long-term preservation of crops under environmentally controlled conditions. Most traders do not have either the capital or the interest to invest in speculative storage. There are a few large rice wholesalers and millers with 'warehouse' facilities, previously used by the Government or SOEs for storing rice in short-term transit. However, most are presently unused or used for storage of other goods such as cement, pesticides and fertilizer which are incompatible with food storage.

713. Similarly for processors, storage represents a large investment in both the infrastructure and the commodity concerned. Storage is usually an important function for processors to ensure a continuous supply of raw materials and Cambodian processors often cite a lack of supply of raw commodities as one of their biggest constraints. The lack of investment in storage is largely due to a limited access to investment capital.

714. In countries with developed wholesale markets, cold storage facilities are often provided on a user-fee basis. However, as stated above, wholesale markets in Cambodia remain undeveloped. Improved storage facilities would bring benefits of co-ordinating supply over the year for domestic consumption and processing and also allow sales during price peaks.

715. Seasonal price trends are presented below. Generally price troughs occur between January to March and peak in July and August, a six-month gap. Possible margins for storage are summarized in Table 38 below.

716. Although there are risks associated with storage, such as adverse price movements, losses and theft, the above table indicates storage as a function in itself can be profitable.

Commodity	Price Jan '05 (R/kg)	Price Jul '05 (R/kg)	Price difference (R/kg)	Storage cost for 6 months (R/kg) <sup>81</sup>	Storage margin (R/kg/6 months)
Paddy (Takeo)	550	650	100	24	76
Maize (Kg. Cham)	530	690	160	24	136

Table 38 Storage Margins for Rice Paddy and Maize

(Source: AMO)

#### Figure 1: Price Trend for Paddy and Rice (Mix) in Kompong Chhnang Babambang Takeo Siem Reap B.Meanchey and Kompong Cham Province in 2004-2005







<sup>&</sup>lt;sup>81</sup> Kampong Cham Investment Profile, 2008



Price Trends for Cabbage (Riel / KGS)





#### 5.2.4.3 Processing

717. According to the MIME, 81% or 25,455 SMEs, are classified as food, beverage and tobacco manufacturers, dominated by 23,103 rice millers. The vast majority of rice millers are small village mills (50-300kg/hour capacity) and only 948 medium-scale (0.5-2.5 t/hour capacity) rice mills are estimated to be operating. SMEs dominate Cambodia's economy, accounting for 99% of firms and 45% of employment<sup>82</sup>. SMEs operate almost entirely in the informal sector, are not registered with the MoC, but have operating licenses from the relevant ministries.

718. Unlicensed micro-enterprises are also numerous. They are usually involved in the final processing of foods, such as cakes and pickles, to supply the local informal market.

<sup>82</sup> ADB, 2006

719. A maximum of 100 medium-scale enterprises are estimated to operate at national level, competing with Vietnamese and Thai imports. Influential relationships are important, providing a significant barrier to entry, to access institutional supply contracts.

720. Few large enterprises operate in Cambodia to supply national and export markets. They are commonly vertically integrated, producing the raw commodity on a plantation scale, and carry out the processing and export marketing themselves. Influential relationships are critical to access land and foreign markets. Access to private sources of investment capital are also required; therefore barriers to entry are particularly high.

721. Processors are faced with several constraints that explain the lack of development in the sector. Firstly they lack the financial capacity to purchase and store large quantities of raw materials at harvest, when producers are selling and by default much of the raw commodities are exported. Subsequently, there is difficulty in sourcing supplies for the rest of the year of the desired quality. For example, a 2002 survey in 10 major rice-producing provinces in Cambodia showed that of the 12,716 rice mills, 96% are custom mills with a milling volume of 67t per year while only 4% are relatively modern commercial mills with a milling volume of 1,611t per year. With the total surplus paddy (rough, un-milled rice) production of the country estimated by public rice traders at around one million tonnes per year, the local mills cannot cope with the overwhelming supply. This could be overcome by storage and milling throughout the year, maximizing the capacity of mills.

722. Access to appropriate processing technology is also a constraint. For example, the majority of rice mills are outdated with milling ratios of 63%. Bottling or modern packaging facilities are also rare in Cambodia.

723. The costs of processing in Cambodia are high when compared to neighboring countries. For example, electricity costs in Cambodia are 0.18/kwh compared to 0.05/kwh in Vietnam and 0.06 in Laos<sup>83</sup>.

724. To be commercially viable, processing plants need to produce more than can be consumed locally, and distribution to the rest of the country, and even overseas, becomes important. Transportation costs in Cambodia are also high, when compared to neighboring countries. Average costs for transporting 1t of maize for 100km in Cambodia are US\$11, compared to US\$4.50/t in Vietnam and US\$2.50/t in Thailand<sup>84</sup>.

# 5.2.4.4 Animal feed processing

725. The C.P. Group (Cambodia) Ltd, a subsidiary of CP Group (Thailand), has a 50% market share of the 300,000 to 350,000 tonne animal feed market in Cambodia. The CP Group can successfully supply the limited Cambodian demand for animal feeds as they have access to other required feed ingredients from their parent company in Thailand. There has been a gradual decline in demand for animal feeds, mainly due to a reduction in large-scale swine/poultry production in Cambodia, as barriers have been lifted on imports of swine and poultry. The main markets for animal feeds are Thailand and Vietnam, where most of the maize and cassava exports are sold. Unless the constraints described above can be addressed, it is unlikely domestic production of animal feeds will be competitive with imports or as an export.

<sup>&</sup>lt;sup>83</sup> World Bank, 2007 Has Enabling Environment Improved in Cambodia to Strengthen the Competitiveness of Strategic Sectors?

<sup>&</sup>lt;sup>84</sup> CDRI/ANZ, Cambodia Outlook Conference, 22-23 February 2007

## 5.2.4.5 Rubber processing

726. Industrial processing units on State-owned plantations are equipped to process the latex from their own plantations and produce *off latex* quality (TSR 5 and 5L), for which a market bonus is paid but global demand is limited. These units also collect approximately 20% of the production from neighboring privately owned plantations, usually in the form of latex.

727. The private processing sector has been developing rapidly over the last few years. Rubber, in the form of remnants (cup oyster) or coagula (scump), is gathered through collection centers or by itinerant collectors and processed into TSR 10 and 20. This grade does not have as much value on the market but there is global demand from tire manufacturers. Processing by both private and public sectors is summarized in Table 39 below.

Sector	Capacity (t)	Activity (t)	Approx. source	Approx. mode	Processed product
Government-	80,000	21,000	80% Gov't plantations	Mainly latex	Off latex qualities
owned			20% private		(5 and 5L)
			plantations		
Private	79,000	10,000	Only private	Remnants and	TSR 10 and 20
			plantations	coagula	

Table 39 Rubber Processing (2006	)
----------------------------------	---

(Source: AFD)

728. At the present time, there is excessive processing capacity. The relatively high processing cost (US\$93 on average, or 30% more than the cost of processing in Vietnam), is due to this overcapacity and high cost of energy. Nonetheless, the producer receives over 70% of the fob price<sup>85</sup>.

#### 5.2.4.6 Meat

729. Backyard slaughtering, particularly for pigs, is tolerated and only five abattoirs are registered with the MIME. They are generally in poor condition with low hygiene and food safety standards. Few inspections are carried out, or controls enforced. Large-scale slaughtering and processing facilities do not exist. As cattle are mainly used for draught purposes, beef is a by-product and quality is low. Butchering techniques are not used to differentiate higher value cuts of meat. Although steadily increasing, current demand for quality meat is limited to high-end restaurants, hotels and supermarkets, which rely on imports from Argentina and Australia.

730. Processed food imports are subject to a 7% import levy. Considering the above constraints and higher operational costs it is unlikely domestically produced processed foods would be price competitive with regional imports and would certainly not be competitive when exporting to neighboring countries. However, opportunities do lie in exporting further afield to higher value markets, such as the EU, if SPS requirements can be fulfilled. Countries like Thailand have been successful in developing an agro-industrial sector almost exclusively through exports.

# 5.2.4.7 Transport

731. The transport function is carried out by collectors and inter-provincial traders. Up to 75% of produce is transported from the farm-gate by bicycle or motorbike. Up to 40% of fruits and vegetables

<sup>85</sup> AFD

are lost or destroyed during transport<sup>86</sup>. Specialized packaging during transport is not widely used apart from large, round woven baskets holding between 200kg and 300kg of produce. Losses during transport are high.

732. For longer distances, produce is transported in bulk by trucks. This has important implications for the value chain as traders/transporters do not differentiate quality. Farmers are paid based on volume. Sorting and grading is carried out prior to retail either by the trader or retailer, so the producer is not encouraged to improve quality, as he is not rewarded for it.

733. There is little demand for professional transport services as this function is carried out by wholesalers. In fact, as such little storage is carried out by wholesalers, they would be better described as transporters.

734. As described in Section 5.1.10, transportation costs in Cambodia are also considered high and regarded as a major barrier to domestic and international trade. Shipping charges in Cambodia are the highest in the region and four times the cost for shipments of comparable size in Thailand. Some exporters transport overland to Ho Chi Minh and ship from there as it is considerably cheaper.

735. The high transportation costs due to poor roads and local fuel costs are further aggravated by the unofficial costs in the form of bribes and informal taxes paid by rice traders and transporters from the point of source to the market destinations. Interviews conducted by the World Bank in 2002 revealed these unofficial fees contribute as much as 57% to the total transportation costs incurred in transporting rice.

### 5.2.5 Intra Firm Organization

736. The internal productive efficiency of marketing enterprises is usually judged from accounting data. As such data is not available, the following comments are based on observation.

# 5.2.5.1 Levels of specialization: products and functions

737. Agricultural production in Cambodia is characterized by small-scale diversified production to satisfy subsistence needs. Average farm size is 1.5ha split in to 2.5 parcels<sup>87</sup>. Almost all farms are planted with rice and dry-land field crops such as maize, cassava, mung bean, groundnut etc. with no specialization.

738. Larger farms (over 1.5ha) expand into perennial cash crops, such as fruit trees and a few commercial farms specialize in the production of single crops such as maize and cassava and plantations of rubber and cashew.

739. Farm assets are typically tied up as follows: land 70%, livestock 26% and machinery 4%<sup>88</sup>. As secured land tenure through certification is still rare, the potential for farmers to use their land as collateral for loans and further investment is not being exploited. Machinery can also be used as collateral but Cambodian agriculture is largely unmechanized due to the small size of farm holdings and lack of available capital for investment.

740. Whilst processors are specialized due to the machinery required, traders tend to deal in commodity groups with similar marketing requirements e.g. fruits and vegetables, grains and pulses,

<sup>&</sup>lt;sup>86</sup> AQIP vegetable study

<sup>&</sup>lt;sup>87</sup> ADB Survey, 2002

<sup>&</sup>lt;sup>88</sup> FAO, 2003
fish, and meat. Traders have few assets beyond basic premises and transport. Even established traders often have to bulk buy on credit and pay their suppliers once sales are completed.

741. Even the larger agribusiness companies lack specific expertise in market research, new product development and general marketing skills. Formal education for agricultural marketing and agribusiness is limited to a degree course at the Royal University of Agriculture. There is a lack of vocational diploma level education for those wanting to enter the commercial sector.

## 5.2.5.2 Technical and operational efficiency

742. Operating a business means dealing with exceptionally poor infrastructure, high energy and telecommunications prices, little if any non-predatory support from Government institutions, and few business development service firms able to cost-effectively supply even minimal services.

743. As stated in earlier sections, crop production yields are generally lower than neighboring countries. Transport, storage and processing losses are also higher, resulting in lower productivity ratios based on land and labor use.

# 5.2.5.3 Profitability

744. Net profit margins for most Cambodian businesses are far below international standards relative to the business risks, most times averaging less than 2 or 3% return on investment. Figure 29 to Figure 31 presents value chains for selected commodities, based upon gross margins. Slim trader profit margins are evident for all commodities. Another common feature is the majority of the 'profit share of retail price' falling to the producer, indicating a certain amount of equity along the value chain. However, as average land holdings are so small this does not equate to high levels of income. Table 40 compares the Cambodian value chain for rice to the Vietnamese.

Country	Producer	Assembler	Miller	Wholesaler	Retailer
<u>Cambodia</u>					
Profit margin (%).	40	2	8	2	4
Profit share of retail price					
(%).	33	2	9	2	4
Vietnam					
Profit margin (%).	41	3	2	3	2
Profit share of retail price					
(%).	15	1	2	3	2

Table 40 Comparative Rice Value Chain Efficiencies

745. Profit margins are similar for all value chain participants in both countries, with the exception of millers in Cambodia, who enjoy higher margins. Profit share of retail prices are generally higher in Cambodia than Vietnam. Overall this indicates Cambodia is competitive in the domestic production and marketing of rice.

746. The large number of participants at each level of the value chain and low profit margins is indicative of a market with constrained growth. The emergence of bigger players, or diversification into new markets, has not occurred in Cambodia largely due to the absence of available financing for capital investment.

## 5.2.6 Horizontal Relationships Between Firms

747. The horizontal relationship between functionally similar firms shows not only the degree of competition, but also mutually beneficial partnerships along value chains.

748. According to the Farmer Organization Survey<sup>89</sup> there are over 13,000 Farmer Organizations in Cambodia, with 70% having less than 30 members. Farmer groups are often established with the assistance of donors as a means of channeling extension and credit. Approximately 63% of the groups have been established since 2000. Although market access is commonly cited as a constraint by farmers, only 1% of farmer groups are involved in group marketing activities. A legal framework for Farmer Organizations is provided through a Royal Decree on Agricultural Co-operatives and Farmer Organizations can register with Provincial Agricultural Departments.

749. Associations of rice millers and pig raisers and Chambers of Commerce have been established in about 12 provinces. The principal mission of the Chambers is to seek foreign investment for the private sector and donor support for training programs for its members in occupational trades, international industry standards for export, and general business skills. Linking traders and producers to markets is not a major function.

750. It can be concluded there are few horizontal linkages between similar firms. As production is so fragmented, coordinated supply chains rarely exist, prompting large buyers to access imports and processors to engage in production themselves. If contract farming is to become more widespread as a supply chain strategy, co-ordination through the establishment of commodity groups will become critical.

# 5.2.7 Vertical Relationships Between Firms

751. In countries such as Cambodia, with liberalized markets and open economies, there is a danger small-scale farmers will find it difficult to fully participate in the market economy. Attempts by governments and development agencies to promote 'income generation' activities for rural people have rarely borne fruit as the necessary backward and forward market linkages are rarely in place, i.e. rural farmers and small-scale entrepreneurs lack both reliable and cost-efficient inputs such as extension advice, mechanization services, seeds, fertilizers and credit, and guaranteed and profitable markets for their output. Well-organized contract farming does, however, provide such linkages, and would appear to offer an important way in which smaller producers can farm in a commercial manner. Similarly, it also provides investors with the opportunity to guarantee a reliable source of supply, from the perspectives of both quantity and quality.

752. In recent years there have been a few notable examples of successful vertical integration and partnership along value chains through contract farming. British American Tobacco and Angkor Kasicam are large processors and exporters of tobacco and rice respectively; they provide quality inputs, technical advice and a guaranteed price based upon quality. The provision of services is calculated into the final price paid to producers. Lucky Supermarket sources some of its fresh produce through 'Triple F', a pack house company who itself enters into contract farming arrangements with producers.

753. Due to absence of wholesale market networks and the emergence of modern retailing methods, contract farming mechanisms will become vital if small-scale farmers are to become integrated into the economy. Otherwise, vertical integration will take place within large companies who diversify into large-scale production themselves to guarantee sources of supply, as already witnessed by some large cashew and cassava processors. Such a corporate path for agricultural

<sup>&</sup>lt;sup>89</sup> Couturier J. et al, Overview of the situation of farmer organisations in Cambodia, 2006

development would exclude Cambodia's small-scale farming communities and condemn them to continuing subsistence and poverty.

## 5.3 Summary Of The Major On-Going And Planned Projects In The Sector

754. A summary of on-going and planned projects that cover activities identified under CAASP is presented in Table 41. It can be seen that many of the activities are being covered to some extent by on-going or planned projects in some of the provinces. A short description of the major on-going and planned projects is presented below.

	AusAID's	USAID's MSME2	EC's SME Dev't in Agro Industry	AQIP (close to the	NZAID's CADF	ADB's ASDP	EC's ECOSORN	GTZ's Regional Eco Dav't	CIDA's CAMIS	DANIDA/DFID's	JICA's Fresh Weter Acusculture	UNDP's TRADE	ASEAN Food	AFD's PGI/PDO	GTZ's Private Sector Promotion	EC's Smallholder	WB'sMulti-Donor Trust Fund
Component 1: Inputs and farm production.																	
Sub-component 1.1: Improved quality of inputs. 1.1.1 Quality of farm inputs improved. 1.1.2 New efficiency improving inputs identified.				Х													
Sub-component 1.2: Agricultural diversification and extension services. 1.2.1 Quality and yields of farm produce increased.	x x					x x	x x				x x						
1.2.2 Farmers diversified into high value crops 1.2.3 Imported fruits and vegetables substituted with domestic production	X						X	х									
1.2.4 Cattle raising systems developed for quality beef production. 1.2.5 On-farm post-harvest handling improved.	Х					Х											
Component 2: Market development																	
Sub-component 2.1: Market research and information dissemination. 2.1.1 New products and markets developed. 2.1.2 Marketing information and intelligence available. 2.1.3 Private sector market research and new product development skills improved. 2.1.4 Agro-tourism strategy developed.	х	x					х		х	x							
Sub-component 2.2: Marketing and business development services. 2.2.1 Marketing and business skills for emerging and expanding agribusinesses available. 2.2.2 Educated agribusiness graduates entering job market	Х	Х				Х	Х			Х		Х			х		

Table 41 Project/Program Matrix - On-going and Planned Projects Relevant to CAASP

# STRATGEY FOR AGRICULTURE AND WATER – HARMONIZED PROGRAM DESIGN DOCUMENT – FINAL ANNEXES

	AusAID's CAVAC	USAID's MSME2	EC's SME Dev't in Acro. Industry	AQIP (close to the	NZAID's CADF	ADB's ASDP	EC's ECOSORN	GTZ's Regional	CIDA's CAMIS	DANIDA/DFID's Civil Society &	JICA's Fresh Water Achaerulture	UNDP's TRADE	ASEAN Food	AFD's PGI/PDO	GTZ's Private	EC's Smallholder Livestock	WB'sMulti-Donor Travet Errod
Sub-component 2.3: Market																	
matching	v		v			v											
contract farming or other	л		л			л											
supply chain agreements		••															
with high-value markets. 2.3.2 Traditional marketing	Х	Х	X*														
system strengthened.			X*											Х	Х		
2.3.3 Cambodian niche																	
export.																	
Sub-component 2.4: Rural																	
finance 2.4.1 Cost-effective	Х	Х	X*				Х			Х		Х					Х
financial products available																	
to the agriculture and																	
agribusiness sector available.																	
2.4.2 Other rural finance																	
products, such as crop																	
Component 3: Market																	
infrastructure.																	
sub-component 3.1: Market places.																	
3.1.1 Market facilities			X*														
upgraded.																	
responsive to, consumer																	
preferences.																	
<u>Sub-component 3.2:</u> Storage.			X*														
3.2.1 Raw materials for																	
supplying agro-processors			X*														
3.2.2 Crops sold during																	
price peaks.																	
Sub-component 3.3: Processing			X*			X*	X*										
3.3.1 Processed agri-food																	
products meet international			X*			X*	X*										
3.3.2 Processing losses			X*				X*										
decreased and quality																••	
increased.											х					Х	
agri-foods increased.																	
3.3.4 Abattoirs upgraded.																	
policy and regulations.																	
Sub-component 4.1:																	
<u>Marketing policy.</u> 4.1.1 Policies supportive of	x	x	x			x						x					x
agricultural development	~											21					
promulgated.																	
<u>Sub-component 4.2:</u> Marketing regulations.																	
4.2.1 Standardized weights,	Х		Х			Х						Х					Х
measures, varieties and quality grades for main																	
agricultural commodities																	
developed and applied.			Х									Х	Х				
4.2.2 Internationally recognized SPS facility																	
established																	

## 5.3.1 The Cambodia Agriculture Value Chain Program (AusAID)

755. The goal of CAVAC is accelerated growth in the value of agricultural production and smallholder income in the provinces of Kampong Thom, Kampot and Takeo, through improving the productivity of rice based farming systems. The program has three components covering agribusiness development, water management and research and extension. The implementation strategy is to develop mutually beneficial partnerships, market connections and competitive advantages between key actors along target value chains, thereby increasing total investment and generated value for stakeholders, particularly smallholder farmers. The total budget is A\$42 million over a five year duration (2009-13). CAVAC has very similar components and activities to CAASP.

## 5.3.2 TRADE SWAp

756. Trade SWAp is the trade integration strategy assisted by UNDP for the Government of Cambodia. Its function is to assist in the implementation of policies for the Government on a national basis with an emphasis on provincial requests for action. Trade SWAp covers all the areas of the MAFF and MOWRAM as the online Ministries working with the MoC, from inputs, business development services, regulatory environment, finance, and processing, to exports. It operationalizes policy by identification of export opportunities, overcoming obstacles to resource development and facilitating SMEs in meeting export needs. In doing so, it works closely with the International Trade Centre (UNCTAD/WTO). The program is renewable every three years and works through existing structures mobilizing policy implementation, stakeholders, institutions, and donors to target implementation of identified actions to meet needs. TRADE SWAp is thus not an additional institution; it is the strategic arm of the Government in trade policy implementation.

757. TRADE SWAp covers three priorities of CAASP: i) export of cashew, cassava, maize, fish, livestock, rice, rubber and soybean and import substitution of vegetables; ii) establishing SPS facilities; and iii) TRADE finance, a new initiative providing access to finance for commercial purposes, including the export of agricultural commodities. TRADE SWAp provides a co-ordination mechanism for the MAFF to work with other relevant ministries such as the MoC.

## 5.3.3 Development of SMEs in the Agro-Industry Sector in Cambodia (EC)

758. The project is managed by the Mekong Private Sector Development Facility (MPDF) and aims to develop SMEs in the agro-industry sector, especially in processing, and support SME policy development. The project takes a value chain approach to analyze constraints and develop appropriate interventions. It focuses on specific crops as well as business competitiveness and institutional strengthening, and provides training to banks designed to improve links with agribusiness and identify new investors. The total budget is  $\in 11.3$  million over a five year duration (2007 – 2012). The project will cover the processing and SME development aspects of CAASP.

## 5.3.4 Micro, Small and Medium Enterprises Project (USAID)

759. Phase I of the MSME project was implemented in Kratie, Kampong Cham, Svay Rieng and Prey Veng provinces between 2005-08 with a budget of US\$5.2 million. The project took a value chain approach with a primary focus on fisheries, pig raising and machinery and tile manufacturing enterprises. The MSME Project is addressing problems of limited business skills, weak links to markets, difficulties in accessing capital, and regulatory constraints to business, similar to the marketing support services component of CAASP. A main strategy is facilitating mutually beneficial

partnerships along value chains. A second phase extension of the project will be implemented in both existing and some new provinces with a budget of approximately US\$20 million.

## 5.3.5 Cambodian Agricultural Market Information Project (CIDA)

760. CAMIP provides support to the AMO in collecting and disseminating price information. The project is designed to integrate market information into agricultural extension services in Kampot, Takeo, Kampong Cham, Kandal, Prey Veng, Battambang, Banteay Meanchey, and Siem Reap provinces and will eventually expand to cover eleven provinces. The project has a budget of US\$4.2 million and a duration of five years (2006-10). CAMIP contributes towards the market research and information dissemination sub-component of CAASP.

## 5.3.6 The Asia Foundation

761. The Asia Foundation has established forums for Public-Private Dialogue in Kampot, Kampong Cham and Kampong Chhnang provinces and is also collaborating with AusAID and the MPDF to research and publish the Provincial Business Environment Scorecard in Cambodia, ranking provinces according to their business environment. The overall purpose of these activities is to promote good governance and an enabling business environment.

# 5.3.7 ECOSORN (EC)

762. The project is being implemented in Siem Reap, Battambang, and Banteay Meanchey provinces and covers 40 out of the 96 communes in those provinces. The project is a US\$25 million grant and covers farming systems interventions in agriculture, livestock and fisheries. Components of the project include: small-scale irrigation; landmine clearance; linking farmers to markets, especially through the improvement of tertiary roads; developing integrated farm models using a farming system approach to promote model farmers and diversify cropping and to encourage year-round agricultural production. One goal is to have three or four models based on three or four agricultural zones.

763. The project assists in the development of the private sector by contracting out project components to private sector firms and other interested parties, including one sub-component focused on improving farmer, intermediary, and other supply chain associations.

# 5.3.8 Cambodia Agriculture Development Facility (NZAID)

764. CADF promotes agribusiness development in Siem Reap and Banteay Meanchey provinces, providing business advice to carefully selected agribusiness clients. The Facility identifies opportunities to improve the performance of a client's business by addressing supply side issues and constraints and provides additional technical assistance, not only to the client, but also to other market participants in the client's supply chain. The duration of the project is from 2006 to 2011 with an estimated budget of US\$1.5 million.

## **5.3.9** Protected Geographical Indications (AFD)

765. The project focuses on promoting geographical indication as a means of adding value and provides commercial opportunities for accessing the international market, in particular Europe. The objectives of the project are: to set up the legal framework, undertake studies on market chains and

establish PGI and PDO for three to four products. The initial project target is Kampot focusing on pepper, silk and palm sugar in Kampong Speu with a budget of US\$1.2 million.

## 5.3.10 Smallholder Livestock Production Project (EC)

766. Project activities include institutional capacity building for the Department of Animal Production and Health, improved rural animal health services through training, certification, and expansion of Village Animal Health Workers, introduction and implementation of a national system of animal disease surveillance and monitoring, improved animal health through demonstration and extension services, improved livestock feed regimes, linking producers with local markets and improved meat processing, storage and marketing. The provinces covered are Pursat, Kampong Chhnang, Takeo and Kampong Speu for a five-year period between 2004 and 2009, with a budget of US\$6.5 million.

## 5.3.11 Natural Resource and Environment Management (DANIDA/DFID)

767. The project includes a component on 'Pro-poor rural business development' with an estimated budget of US\$9 million, running between 2006-10. This component does not seek to work directly with the poorest and is flexible about how it demonstrates the link to employment and income for the poor. Nevertheless, the component seeks to support a number of mostly existing initiatives in areas such as: investment climate and local market information dissemination; innovative access to finance, potentially including an equity component, as well as SME-relevant funds for on-lending and business plan assessment training for MFI staff; business advisory services provided through existing rural producer and other civil society groups, in support of local business development; and, assistance with the development of credit unions, associations of business cooperatives and an Advanced Rural Producers' network.

## 5.3.12 The Cambodia Trade Facilitation and Competitiveness Project (World Bank)

768. The project aims to promote economic growth by reducing transaction costs associated with trade and investment, introducing transparency in investment processes, and facilitating access of enterprises to export markets. The project has a budget of US\$10 million and covers three components:

- 1) The application of appropriate information technology to broaden management activities and significantly streamline operations, improve the level of transparency and accountability and facilitate the achievement of all border related government objectives.
- 2) Technical support to the MoC Department of Export Promotion in establishing an exporter technical assistance window, and a technical assistance matching grant facility that can cover 50% of the cost of achieving market standards, or evidence of compliance with those standards.
- 3) The Private Participation in Infrastructure and Investment component finances a program of capacity building to implement the Law on Concessions.

## 5.3.13 Private Sector Promotion Project (GTZ)

769. To objective of the project is to increase the competitiveness of private sector enterprises, contributing to the creation of new and sustainable jobs, especially for low income households and women. This is achieved through building capacities in small and medium enterprises, helping

entrepreneurs to form associations which deliver services to their members and enter into a dialogue with the public sector, assisting the market for business development services and the Trade Promotion Project. The estimated budget of US\$9.6 million covers Phnom Penh, Kampong Cham, Pursat, Banteay Meanchey, Kampong Thom, Battambang and Siem Reap for the period 2004-12.

## **5.3.14** Regional Economic Development (GTZ)

770. The objective of the project is to tap the potential of the tourism industry in Siem Reap for rural development and poverty alleviation, following an integrated approach of regional management, promoting co-operation between institutions from the public sector, private sector and civil society and other relevant stakeholders to foster the regional economy. Other components include 'Beneficial market participation of the poor' for selected value chains e.g. fruits, vegetables and handicrafts and 'Decentralized development management.' The project has a budget of US\$5.6 million and a duration from 2007 to 2012.

## 5.3.15 Rural Development Program (GTZ)

771. The project is expected to close at the end of 2008. It focused on creating income and employment for the local population in Kampong Thom and Kampot provinces through tourism related services and businesses i.e. organic rice and organic cashew nuts. The project budget was US\$0.2 million.

## 5.4 Cross-Cutting Issues

## 5.4.1 Decentralization and Deconcentration

772. The Royal Government of Cambodia established a Strategic Framework for Decentralization and Deconcentration (D&D) to guide the process of governance reform at provincial/municipal, district/khan and commune/sangkat levels.

773. The long-term development objective of D&D is to achieve broad-based and sustainable development and strengthen vibrant local economic foundations so that every citizen has equal opportunity to participate in local development, effective environment and natural resource management and delivery of quality public services to meet the needs of citizens and poverty reduction by focusing on vulnerable groups, indigenous minorities, women and children<sup>90</sup>.

774. The immediate outputs of the D&D Strategy are to achieve 3 main development dimensions as follows:

1. <u>Policy and regulations:</u> includes the establishment of an organic law and various regulations for implementation of the organic law. The regulations also include instruments for fiscal decentralization and deconcentration reforms and the assignment of revenue and expenditures for provincial/municipal, district/khan, and commune/sangkat administrations. Sectoral policies on division of responsibility for delivering public service that the national level should transfer or delegate to each level will be developed. A regulatory framework to enable commune/sangkat authority collecting their own sources of revenues will be finalized and various existing provisions will be revised in order to be consistent with the systems to be provided in the organic law.

<sup>&</sup>lt;sup>90</sup> RGC, 2005: Strategic Framework for Decentralisation and Deconcentration Reforms

- 2. <u>Institutional management strengthening:</u> includes provision of management systems at provincial/municipal, district/khan and commune/sangkat levels and the strengthening of commune/sangkat management systems, including the establishment of unified administrations at provincial/municipal, district/khan and commune/sangkat levels and revision of the roles and duties of ministries and institutions at national level. Legal instruments for institutional strengthening will be prepared to improve effective resource mobilization such as the assessment of sources of revenue, revenue collection, revenue sharing etc. and expenditure management such as preparation of annual and multi-year budget, implementation of plan, assets management, financial and accounting reporting, internal monitoring etc. The systems and procedures of transfer or delegation of public service delivery will be developed and cooperation and coordination between national institutions and provincial/municipal, district/khan, and commune/sangkat administrations will be promoted.
- 3. <u>Sectoral development management:</u> provincial/municipal, district/khan, commune/sangkat administrations deliver infrastructures and social and economic services as well as other public services, investment for natural resource management and local socio-economic development.

775. D&D has widespread implications for CAASP, for example in the provision of agricultural and marketing extension services and development of local policy and by-laws. Projects implemented with or through local Government partners will need to consider capacity levels and include institutional strengthening as a core activity to ensure successful outcomes. Management of public market places and abattoirs are already under the jurisdiction of local Government and will need to be considered accordingly for the proposed upgrading interventions.

# 5.4.2 Gender

776. Cambodia has among the lowest levels of gender equity in Asia as measured by the gender development index (0.427) and the gender empowerment index  $(0.283)^{91}$ . Rural women are responsible for 80% of food production and more than 65% of women are farmers. Among all female farmers, half are illiterate or have less than an elementary level of education. The prevalence of female headed households in Cambodia is higher than in other countries. They tend to have smaller landholdings and be more vulnerable to losing their land.

777. Men and women spend approximately the same amount of time on income generating labor in rural areas, but women spend more time than men on non-income generating work and household work. In terms of agricultural wages women are paid less than men; even after taking differences in age and education into account, women's wages are only 75% of men's wages.

778. Women tend to dominate trading activities, with some estimates that well over 80% of fruit and vegetable traders, for example, are women. Women also often play a central role in the management of small and medium sized business. For this reason any project involved with agribusiness must ensure the active participation of women

# 5.4.3 Poverty Alleviation

779. Cambodia is among the poorest countries in the world with 34% of its people living on less than US\$1 a day and 15% to 20% in extreme poverty - and inequality appears to be increasing.

<sup>&</sup>lt;sup>91</sup> Human Development Report 2003.

Poverty in Cambodia is overwhelmingly rural, from a low of 10-15% in Phnom Penh to 40-45% in the rural areas, reaching 60% in some provinces in the Tonle Sap Basin. Despite the economic growth, official figures indicate that the incidence of poverty has declined only modestly. According to DFID (November, 2005), this is due to a range of factors including the:

- Narrowness of the existing sources of growth, with few if any backward linkages to the domestic economy,
- Poor quality and lack of access to social services,
- Lack of access to credit,
- Landlessness,
- Environmental degradation,
- Lack of integration of the poor to the mainstream economy, and
- Lack of effective voice of the poor (particularly minority groups and women) in decisions that shape their lives.

780. Poverty profiles suggest that income inequality has increased, especially in rural areas. Slow agricultural growth has exacerbated income inequality. The industrial sector was the main engine of growth, with industry's share of GDP increasing from 13% in 1992 to 28% in 2002, and that of agriculture falling from 48% to 36% during this period.

781. The bulk of the poor are found among the rural landless who make up around 20% of the rural population. CAASP does not seek to directly address the situation of the chronically poor, who are generally operating at subsistence or sub-subsistence levels, as Program 2 (Food Security Support Program) of the Agriculture and Water Strategy has been designed for this. Many in this group do not have sufficient land resources to produce a marketable surplus but will benefit indirectly due to improved on-farm labor opportunities and increased employment in processing and marketing.

# 5.5 Summary of the Analysis and Findings

# 5.5.1 Inputs and Farm Production

# 5.5.1.1 Inputs

- Inadequate importation of sufficient quantities of quality farm inputs e.g. seeds, fertilizers and pesticides that comply to 'Law on Management of Quality and Safety of Products and Services (2000)' regarding quality standards and Khmer labeling.
- Inputs are imported overland unofficially and diluted.
- Low yields due to limited use of quality seeds, fertilizers and pesticides etc. owing to cost and unreliable quality e.g. diluted fertilizers.
- Licensed Agricultural Merchants are not inspected to verify the authenticity of products sold.
- Irrigation is focused upon rice production, with little consideration for cash crops.

# 5.5.1.2 Agricultural Extension Services

- Agricultural extension services have limited coverage and do not serve the needs of commercially oriented farmers.
- There is no private sector technical or business development services available to commercial farmers.

- 83% of the cultivated land is planted with rice, a comparatively low value crop, producing 50% more than is required for self-sufficiency.
- Farmers are not diversifying in to high-value crops e.g. off-season vegetable production.
- Agricultural production is based upon small fragmented farms, producing a diversity of crops, primarily for subsistence needs.
- Most vegetables consumed are imported from Vietnam, even though they could be produced in Cambodia.
- Cattle are used for draught purposes with meat as a by-product. Quality beef is imported.
- Farmers do not produce, or are rewarded for, quality produce.
- Farmers at present carry out very little post-harvest handling on farm and are unfamiliar with modern retailing requirements.
- On-farm storage is minimal and sometimes inappropriate e.g. Aflatoxin contamination in maize can result in 30% of the crop being discarded.
- Reliance on sun drying limits cassava harvest to the dry season, when it could be yearround to co-ordinate supplies to processors.
- Farmers are divorced from markets and unaware of consumer preferences due to the number of intermediaries.

# 5.5.2 Market Development

# 5.5.2.1 Market Research and Information Dissemination

- The MAFF lacks capacity to fulfill responsibilities for the provision of public services e.g. market research and information dissemination, certification and quality control.
- Market research and new product development skills within private sector companies is limited.

# 5.5.2.2 Marketing and Business Development Services

- Lack of skills and experience in facilitating and brokering contract farming arrangements.
- Support is required to develop and strengthen vertical value chain partnerships, such as contract farming, between farmers and medium to large buyers. This may include the establishment of commodity groups, though which commodity specific assistance can be channeled.
- Lack of formal education in agricultural marketing and agribusiness to provide graduates for the private agribusiness sector.

# 5.5.2.3 Market Matching

- Due to lack of coordinated supply normally associated with wholesale markets, large buyers rely on imports e.g. vegetables for hotels and restaurants.
- Exports of rice, maize, cassava and rubber are limited to Vietnam and Thailand, representing a risk. Export markets cannot be diversified if SPS requirements are not addressed.
- The agricultural production and marketing sectors have remained fragmented and smallscale as entrepreneurs cannot access affordable finance to fund investment and growth.

The large number of small-scale operators competing on price leadership does not encourage quality improvement, value addition and diversification into higher-value markets.

- If contract farming is to become more widespread as a supply chain strategy, coordination through the establishment of commodity groups will become critical.
- Cambodia has a poor international reputation for quality.
- Cambodia exports generic, undifferentiated low value raw commodities, rather than high quality niche products.

# 5.5.2.4 Rural Finance

- Very little long-term financing for investment capital available.
- Majority of loans from the formal sector require collateral.
- Money lenders charge high rates of interest that do not solve cash flow problems in the long-term.

# 5.5.3 Market Infrastructure

# 5.5.3.1 Market Places

- No primary wholesale system exists in Cambodia. Large buyers of agricultural commodities have to produce the commodity themselves and engage in direct supply arrangements with producers or rely on imports.
- Public markets are in poor condition and require upgrading to improve product handling and food hygiene and safety standards. Better management of markets will provide a mechanism for improving standards.
- Due to the large number of intermediaries, consumer preferences are not transmitted back down the marketing chain to producers.

# 5.5.3.2 Storage

- Due to lack of storage facilities and capital to purchase stock, commodities are sold at harvest for export with little value-added.
- No stocks are available later in the year for consistent supply to processors.
- No cold storage or transport facilities for perishable high-value commodities such as fruits, vegetables and fresh fish, resulting in high wastage.
- Packaging during transport and storage does not offer protection.

# 5.5.3.3 Processing

- No research into the processing of convenience foods.
- Low levels of processing technology and efficiency.
- Much of the rice and maize harvest is exported unmilled as millers do not have the financial capacity to purchase or mill the large volumes put on the market at harvest by farmers.

- Capacity of processing machinery cannot be maximized throughout the year due to the lack of storage of raw materials.
- Processing not competitive with imports or as export to neighboring countries due to high costs. Exporting to further markets such as Europe and USA may be viable if SPS requirements could satisfied.
- Abattoirs standards are particularly low and butchering techniques do not differentiate higher value cuts of meat

# 5.5.4 Marketing Policy and Regulations

# 5.5.4.1 Marketing Policy

- Government policies and regulations are promulgated but not enforced.
- Few Government interventions to protect or support agribusiness development e.g. storage facilities for processors, protection for infant industries, promoting the SME private sector, promoting exports and import substitution.

# 5.5.4.2 Marketing Regulations

- Licensing system is not used to enforce standards.
- The absence of standardized weights, measures and quality grades increases transaction costs.
- Lack of internationally recognized standards and accredited SPS testing facilities for certifying exports to high value markets e.g. Europe and USA.

## 6 ANNEX 5: RESEARCH, EDUCATION AND EXTENSION REVIEW AND CONTEXT

## 6.1 A& W Research Development

782. The National Agricultural Research System (NARS) has the mission to promote economic growth by increasing agricultural productivity through the development of new technologies and upgrading the research level for sustainable intensification of agricultural and water use. Accordingly, its objective is to increase the quantity, quality, and availability of technologies, methods and policy advice for the efficiency and profitability of agriculture and water while improving food security, safety, equity, and natural resources sustainability.

783. Headed by MAFF, the NARS addresses the challenges in agricultural development by organizing research along commodity lines. The main research organizations within MAFF are as follows:

- 1. Cambodian Agricultural Research and Development Institute (CARDI) into crops and integrated farming systems;
- 2. Cambodian Rubber Research Institute (CRRI) for research into rubber;
- 3. National Veterinary Research Institute (NaVRI) under Department of Animal Health and Production for veterinary research;
- 4. Forest and Wildlife Science Research Institute (FWSRI) under Forest Administration for forestry research;
- 5. Inland Fisheries Research and Development Institute (IFReDI) under Fisheries Administration for fisheries research; and
- 6. Department of Agro-industry for the improvement in the agro-industry sector.

784. Overall, there is a minimum core of qualified, and experienced staff in MAFF to manage adaptive research programs, but linkages among the various research entities are weak. Smaller research organizations should improve their linkages with those possessing more qualified staff that could assist them research design, analysis and reporting. In addition, as demonstrated with CARF program, projects are particularly productive when research institutes and educational organizations work together.

785. But, the extremely low funding of research by the Government is the most serious constraint, forcing most of the programs and activities to be donors-dependant. Further, there is serious mismatch in deployment of skilled staff and laboratory operations, and most laboratories within MAFF suffer (i) shortage in trained staff, (ii) lack of equipment, (iii) poor laboratory facilities to house the equipment, and (iv) lack of operational funds. For instance, CARDI laboratories are in a new building requiring the installation of fume extraction equipment and safety measures. The institute also does not have trained personnel capable of operating the new equipment on order, nor are there sufficient analytical reagents to conduct the intended analyses. On the other hand, laboratories in the General Directorate of Agriculture (GDA) have well trained staff, but possess old broken equipment.

786. Both GDA and CARDI constitute laboratory buildings for analysis of soil, plant tissues, seed, fertilizer and water. Similar facilities are also found at RUA on a smaller scale. Duplication can be avoided and large saving made if samples from all sectors are forwarded to one laboratory for analysis. This also applies for the analysis of pesticides and pesticide residues. GDA laboratories can service all MAFF requirements including CARDI, FiA, DAHP, RUA, and other regulatory, research, and educational organizations.

787. Large expenditure on buildings and equipment over the past decade has not resulted in an efficient laboratory system for research and development. The lack of operational funds constraints the activities of all laboratories in MAFF and most rely on special project funds to purchase necessary chemicals and other supplies. This causes delays and lack of continuity and facilities. The malady could partly be remedied if the laboratories are able to charge a fee for the service they provide and these fees to be re-invested back into the laboratories, as being practiced by CRRI.

788. The Master Plan for National Agricultural Research (2006) had laid down the following strategies for strengthening research-for development in Cambodia:

- 1. Improving the efficiency and effectiveness of technology development and transfer through the greater participation of producers in all stages of the research and dissemination process, better targeting of research resources and stronger linkages with all sources of knowledge;
- 2. Broadening the funding base and promoting participation of the private sector in the funding and provision of agricultural research and related service;
- 3. Incorporating social equity, gender and environmental concerns in all aspects of technology development and transfer;
- 4. Increasing and maintaining a knowledge base through applied and adaptive research and through interactions with international institutions for basic and strategic research data; and
- 5. Strengthening its capacity to implement these strategies in a sustainable manner especially with respect to its ability to attract, develop and retain quality staff, resource deployment and decentralization of activities in service of agricultural development efforts throughout the country.

789. The research programs must be designed through consulting with all stakeholders, at both provincial and district levels, in both formal and informal meetings and workshops, in order to determine the priority needs and real problems faced by farmers, and select various approaches and strategies to implement the program.

790. Often, due to resource constraints, not all departments were able to conduct researches even on priority programs. The focus of research carried out by GDA, CARDI is on rice. Research related to other crops, such as vegetables, fruits and other cash crops, is still limited. Research by DAHP is concentrated on Faciola infection in cattle, animal movement, the intervention on animal health and production, and on improved feeding systems. For FiA, research has focused on aquaculture of fresh and salt water, and natural resource management and conservation. For DAE, research programs emphasized the development and updating of agro-ecosystems analyses and extension program packages for farmers.

791. Achieving the vision of a productive and successful NARS to address a changing environment requires an adequate complement of skilled and motivated staff. The personnel policies, including recruitment procedure, salary level, operational facilities, enabling mechanisms and incentives and rewards have been out of time. An early correction with due emphasis on merit and performance is called for. The satisfactory status of research and low turnover of the qualified researchers at CARDI, CRRI, IFReDI and RUA was partially due to the provision of supplementary salaries.

792. The pool of qualified staff is small in most research institutes, except at CARDI. MAFF may ensure that each of the research institutes has significantly qualified personnel by targeting staff for training and that qualified staffs are retained. Expanding the number of trained staff in the research institutes may be achieved by sponsoring staff to study for Master and PhD degrees. Collaboration with well-reputed universities abroad through joint post graduate training programs offered by USAID, AusAID, JICA, EU, CGIAR centers and other should prove helpful.

793. As per the NSDP, a gender-positive recruitment policy is needed to target 30% women in the Government workforce within a ten year period. All supporting staffs including technical officers, laboratory staff, and other assistants require incentives to be productive members of research programs. Technical staffs are often overlooked and low morale at this level often leads to gross inefficiencies in the form of absenteeism and low productivity. Expanding training opportunities to include technical staff, combined with accelerated promotion of the best performers can lead to significant improvement in performance of research programs.

794. Non-governmental organizations (NGOs) have an important role in agricultural research and technology development. NGOs can facilitate access by farmer groups to government support services and, perhaps, promote change in these services so that they are more relevant to the needs of local communities. Moreover, NGOs play a more active role as partner of formal sector research systems and farmer groups to get issues of small farmers onto the research agenda, and in engaging researchers to help small farmers resolve them.

795. As regards the private sector, they generally implement their own research programs, and show little cooperation with public research institutes due to the limitation of the research capacity of public sector and the lack of appropriate mechanism for coordination, and outcome sharing. Some good beginning has been made, such as the CP Group Ltd. is working with RUA on pig genetics and poultry research and the Mong Rithy Group on the advantages of using oil palm waste and cassava as stock feed.

796. Supported by donors, nine research-related projects are on-going and 15 such projects were completed in the recent past. Twenty two of these were funded by Australia's AUsAID and ACIAR, one by ADB (preparation of the Master Plan for national Agricultural Research, costing US\$ 300,000) and one by the World Bank (a substantive multidisciplinary project entitled "Agricultural Productivity Improvement Project", costing US\$ 35.1 million 1997 – 2005). Impacts of these projects should be critically analyzed/assessed and lessons learned be shared by all concerned, using relevant/appropriate formats for future planning and programming. These and other donor-funded projects had yielded valuable technologies but their adoption is poor.

797. No formal linkages exist between the research institutes and the DAE. However, most of the research institutes interact with government extension services at the provincial level. Direct interactions between research institutes and the DAE are generally project based. Close collaboration through additional and stronger links between research institutes, farmer organizations, NGOs, commodity dealers, traders, seed producers, millers, manufacturers and other private enterprises are proving to be a productive method of extending technologies to farmers, such as the role of the Agricultural Quality Improvement Project (AQIP) regarding introduction and distribution of quality seeds.

798. RGC spends only around 3% of agricultural GDP on agriculture, against over 10% spent by China, Malaysia and Thailand. Despite the fact that rate of return on investment in agricultural research is rather high, allocation for agricultural research in Cambodia is almost negligible and nearly 70% of the investment is by donors. Private sector investment has also been meager, but has, lately been slowly growing primarily for developing or promoting company products. Overall priority of the public sector has been on rice and rice-based farming systems, livestock health and production and fisheries development. Following the Rectangular Strategy for Growth, Employment, Equity and Efficiency the development of pro-women technologies will be promoted by the NARS. Although, a well perceived body, the Cambodian Agricultural Research Council (CAREC) is not fully functional, which could ensure the much needed effective linkages among Research, Education and Extension.

799. In the globalized world with veritable divides threatening peace and harmony at various levels, research must not ignore the interest of the poor, the small, marginal and landless farmer, the women farmers, the rural youth, the tribal people and the remote such as mountain terrains and flood-prone areas and agro-ecologically non-congenial areas, socioeconomic research should be

strengthened towards formulation of appropriate policies, strategies, programs and resource development for ensuring congruence of enhanced productivity and income, sustainability and inclusiveness.

800. From the SWOT analysis, (Table 42) and the Problem Tree Analysis (Figure 34), it emerged that although the research and development system in the country is growing slowly, it operates in a difficult environment and does not meet the needs of the country. The main underlying causes are:

- 1. Absence of a policy framework-some and overlap of research activities amongst MAFF departments;
- 2. Lack of budget and infrastructure for research; most of the research is based on the availability of the budget support from international organizations and NGOs which often are not in tune with the priority needs and the level of development of the country;
- 3. Unplanned, uncontrolled and uncoordinated research and development work. All the departments and research institutes produce their own plans unmindful of the available resources and of plants and others;
- 4. Lack of skilled and experienced staff and lack of reliable updated information and databases;
- 5. Poor coordination between provincial and central departments. MAFF does not yet have a coordination body to connect the different departments at both central and provincial levels; and
- 6. Linkage between research and other stakeholders are limited and linkage to outside sources of knowledge, information and technology is sub-optimal.
- 801. In order to overcome the above weaknesses, the following actions are suggested:
  - 1. All concerned departments should promote research that reflects the needs of the country and its level of the development and should be in line with national policy and guidelines issued from time to time;
  - 2. The Master Plan for National Agricultural Research (2006-2010) should be implemented and CAREC should be entrenched as the key player. The RGC should provide the necessary financial and human resources support required;
  - 3. MAFF should work closely with NGOs and private sector in order to mainstream their activities into the national agenda. Coordination of activities should be on commodity, themes and be also at the provincial levels. Major partners should be the board of CAREC to ensure their effective participation in decision making and program implementation;
  - 4. Research needs on secondary and cash crops (fruits, vegetables, industrial crops etc.) should be strengthened;
  - 5. Research programs related to animal production and health should concentrate on fodder, feed and animal breeding programs and strengthening of the veterinary services;
  - 6. Research on markets, socio-economic aspects and ICT should be strengthened, and necessary reliable information and technology databases created;
  - 7. Strengthen the management information systems in all departments and institutions;
  - 8. Develop trained human resources for research, farmers for participatory research, technical departments and research institutions staff. NGOs and the private sector should also collaborate in this endeavor;
  - 9. International agencies and donors should help translate the research master plan into a national research agenda and continue to support MAFF and MOWRAM in the areas of prioritized agricultural and water research for development; and
  - 10. The Technical Service Centre of MOWRAM should be raised to be the National Water Research, Technology and Education Institute.

Strengths	Weaknesses
	1. Fragmented and uncoordinated NARS.
1. National expertise in applied and adaptive rice	2. Inadequate human, fiscal and physical resources.
research (CARDI).	3. Ad-hoc and non-inclusive research priorities and
2. Linkage with few bilateral and international	programs.
organizations.	4. Absence of new and emerging concerns in
<u> </u>	research agenda.
	5. Low salary and absence of incentives for staff.
	6. Absence of organized research on water.
	conservation and use.
	/. Lack of integrated animal breeding, feeding, and health research.
	8. Poor investment of private sector in research.
	9. Absence of organized research in agro-industries.
	value addition and post-harvest management.
	10 Lack of research recognition
	11 Lack of enabling policy environment and
	infrastructure (technology introduction
	development & disseminations)
	development ædissemmations).
Opportunities	Threats
1. Up-scaling of the role of agricultural and private	e 1. Loss of scientific staff due to market competition
sector interest research	2. Market vulnerability
2. Increasing donor support for agricultural and	3. Donor-driven and un-sustainability of projects.
water research	4. Disease and pest outbreaks.
3. Increased prospects of sharing national and	
international markets	
4. Increased access to new technologies, including	5
ICT	
5. Accent on the development and adoption of	
integrated farming systems and efficient	
conservation and utilization of water, land and	
soil resources.	

Table 42 SWOT Analysis for A & W Research System



#### Figure 34 Problem Tree Analysis of A&W Research System

## 6.2 A & W Education and Training

802. The NSDP and SAW have emphasized capacity building and human resources development and have in particular aimed to modernize and improve the quality of education through effective reform and linking education/training with the changes and needs of labor market and society.

803. The Royal University of Agriculture (RUA) is the flagship Public Administration Institute of agricultural higher education in Cambodia. Besides the RUA, there are two other post-secondary education and training institutions namely, Prek Leap National School of Agriculture (NSAPL) and Kampong Cham National School of Agriculture (NSAKC). Under the Ministry of Education, Youth and Sports there are also several other universities of relevance: University of Svay Rieng, University of Battambang and University of Banteay Meanchey.

804. Commensurate with the NSDP and SAW, the RUA is offering education in agriculture to respond to the needs of national and international systems. To achieve this, RUA has to undertake the following:

- 1. Offer quality education and training programs to students and staff in rural and agricultural fields with high academic standards, morality and creativity in line with national development needs;
- 2. Conduct rural and agricultural research in close cooperation with local and international research institutes and the industry; and
- 3. Create an information center for disseminating agricultural knowledge and technology to farm communities.

805. The Workshop on Strategic Plan Development 2009-2015 of RUA with the support of the French Technical Assistance Project, March 2009, reiterated that RUA shall progressively achieve an international level of quality in education, research and extension of agriculture, related sectors as well as the sustainable use of natural resources. Towards this goal, the University should aim that (i) quality and quantity of graduates produced by RUA to correspond to the job market, (ii) levels of programs are compatible with international standards, (iii) joint international-level research projects conducted by researchers or research teams, and (iv) more appropriate publications and better extension are carried out as a result of improved research by achieving increased quantity and quality of research projects.

806. The SWOT Analysis and Problem Tree Analysis of A & W Education and Training are given in Table 43 and Figure 35, respectively.

	Table 45 SWOT Analysis for A & W Edd					
	Strengths		Weaknesses			
1. 2. 3.	Clear, comprehensive and synergistic mandate. Inclusiveness through targeted strategies. Well-informed policy developed through participatory approach taking into consideration new and emerging issues and opportunities.	1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11.	Fragmented and uncoordinated education system. Inadequately resourced and ill-managed education system. Inadequate implementation of policy and strategy. Low salaries, biased and unfair promotional and reward system. Weak linkages with research, extension, farmers, outside sources of knowledge and markets. Static and non-inclusive curricula and teaching/training methodologies. Weak curricula coverage of water resource conservation, use and management. Available recourses underutilized for research and extension. Inadequate emphasis on research and extension education. Lack of education and training on soil and water use, conservation, management and harvesting. Non-inclusive curricula of new and emerging issues such as climate change, socio-economic, farming system, value-adding, food security, bio- security etc			
	Opportunities		Threats			
	~ PP ~ · · · · · · · · ·					
1.	Coordination of Agriculture and Water	1.	Reluctance of concerned ministries to relinquish			
	Education and Training.		their ownership of institutions required to be			
2.	Making Cambodian agriculture more productive		integrated.			
	and competitive.	2.	Financial resources may not match the will and			
3.	Elevating the Water Technical Service Center to		commitment.			
4	the level of a national water R & D institute.	3.	Conflict of motives of potential partners and			
4.	with research, extension, farmers and market		stakenoiders.			



Figure 35 Problem Tree Analysis of A&W Education and Training System

807. The A & W Education and Training (ET) System is large and complex, but should be seen in context of its following sub-systems with built-in flexibility to perform the following needed functions:

- 1. Higher Education in Agriculture is comprised three higher education institutions related to MAFF (NSAPL, NASKC and RUA); five higher education institutions related to MoEYS (Institut de Technologie du Cambodge,University of Chea Sim Kamchai Mear (formerly Maharishi Vedic University) University of Svay Rieng, University of Battambang and University of Banteay Meanchey).and private universities that provide, among others, agricultural education;
- 2. Vocational Education and Training in Agriculture covers the Vocational Training Center (VTC), which has institutional linkage with the Department of Vocational Training of MoEYS, Ministry of Public Affair, and Ministry of Rural Development (MRD); and
- 3. Short-term Training Providers, including the organizations concerned with providing continuing agricultural education. The organizations related to MAFF are DAE, SAPL, SAKC, CARDI and RUA; related to NGOs are AGRISUD Cambodge, Centre d'Etudes et de Développement Agricole du Cambodge (CEDAC).

808. Notwithstanding the commonality of the core mandate, being essentially autonomous, each university and college has its own specific flavor. RUA's mandate, which is most relevant for the present work is given below:

- 1. To provide training in all levels of higher agriculture techniques, internship and follow-up training for experts by improving quality and quantity to meet the needs within the Kingdom of Cambodia including training through the university system by instruction, learning and agricultural skills training and future training to provide qualitative skills, certificate and degree training, and organize and hold various seminars and conferences to meet the needs of society;
- 2. To promote activities, skills, methodology of teachers and professors for the Royal University of Agriculture, school general knowledge and agricultural school in the country;
- 3. To propose annual curricula for approval by the Ministry of Education , Youth and Sport;
- 4. The RUA, with other agricultural institutions, shall issue national degrees in agricultural education, including Associate, Bachelor, Master, and Doctoral degrees;
- 5. To organize and conduct scientific and agricultural production research, veterinarynursing, aquaculture, forestry, agricultural engineering, agricultural irrigation systems, agro-industry, agro-economic, environment and rural development etc;
- 6. To design curricula, course content, methodology, develop technical-scientific documents in Khmer and foreign languages which are appropriate to the geographical nature of the Kingdom of Cambodia for public use and dissemination;
- 7. To prepare and organize the transparent placement/completion examination, conduct self evaluation on the education in accordance with policies;
- 8. To develop material-base plan for the RUA;
- 9. To administer the civil servants, employees, workers, students, teachers, professors and properties of the RUA;
- 10. To establish relationships with national/international organizations, non-government organizations, and other institutions for improvement of study and scientific-technical research; and
- 11. To act as the mechanism of the government in the development of human resources in agricultural production at district, khum, and sangkat levels of the Kingdom of Cambodia.

809. In order to meet the mandate, the RGC had regularly received support from its major donors, notably the cooperation services of France, Germany, Japan and Australia. The French-funded FSP project has prepared a new strategic plan, through the earlier mentioned workshop in 2009, to contribute to both education and research activities and to take new steps to achieve international

standards in both education and research. Commensurate with its capacity and experience, the university should identify main issues and directions and accordingly determine curriculum updating and initiating new MSc and PhD programs and pursue research in a manageable number of new areas. Among other things, the Workshop has emphasized establishment of a performance-based recruitment and promotion of the teaching staff (who are also researchers and extensionists).

810. The demand-supply scenario of human resources has been debated and analyzed from time to time but, many of the recommendations were not implemented. It would be useful to know if the absorptive capacity of the labor market is considered as a real preoccupation by the decision-makers.

811. Although the universities and higher education colleges are supposed to be autonomous, the Cambodian system is governed in a multifaceted manner with limited voice of the university management in major decisions. For instance, the RUA board is comprised of members, of which seven are representatives of ministries and only two are academicians (including the Rector). Further, representatives of customers (students and employers) and donors are missing. RUA is under the technical supervision of MAFF; financial supervision of Ministry of Economy and Finance; and accreditation of curriculum by Ministry of Education, Youth and Sport. Therefore, the proposition, as mooted in 2000, to transform the temporary A &W ET Component into a permanent office of MAFF in charge of agricultural education and training is highly valid and deserves implementation.

812. The human resources at RUA are considered inadequate. Of the 135 faculty members, total number of PhD (14) and Master (63) degree holders, spread over in eight faculties and one Graduate School, is not able to adequately develop and deliver the required new courses and curricula. Further, the imbalance among subjects is also apparent, the number being extremely low in agro-industry and agricultural engineering and management – the areas of high potential for Cambodian agriculture and water, particularly from the point of view of value addition, employment, labor productivity and competitiveness. Similarly, the crop sub-sector, which accounts for 53% of the agricultural GDP and is the backbone of food security, has only 18% of the staff allotted for it. On the other hand, it is positive to note that the numbers in economics and rural development appears satisfactory. As general procedures for recruitment and appointment, the staff is appointed to RUA by the MAFF. At RUA, staffs are appointed to their posts by the rector according to their field of study, their experience and capacity as teachers (MAFF, April 1999).

813. The University draws its financial resources from two main streams – internal and external (donor-supported). The internal resource, including revenues generated from student's fees and testing services, accounts for about one-third of the budget and the remaining two-third is from donors' support. The need for significantly increasing RGC's allocation and, as education cycles are much longer than physical production cycles, committing the funds on a long-term basis, particularly by the donors, can hardly be overemphasized.

814. Additional requirements include an increasing support for overall strengthening of the university, which could be led by one particular donor which could help establish a consortium of donors to provide sustained support and assist the University to operate the funds through a committee chaired by the Rector and co-chaired by the lead donor. Among the priority dispensation, the following aspects merit high attention:

- 1. A global staff training plan should be funded and executed;
- 2. Specific resources should be planned and allocated for salary supplementation to avoid counterproductive turnover of qualified staff;
- 3. An institutional development plan should be set up as soon as possible and used as a management and fund resourcing tool. The staff-training plan would be included in the university's development plan; and
- 4. Strengthen the University ICT Center; and the Faculty of Land Management and Land Administration (LMLA).

815. RUA's 19 staff members are specialized in Forestry/Renewable Energy/Environment/GIS and five persons in Agro-industry/Biotechnology/Biosecurity/Post-harvest Technology. As regards upstream facilities, the University has a laboratory each for Microbiology, Small animal clinic, Animal feedstuff analysis, Dairy pilot, Food processing, E-Learning, GIS-Remote Sensing and Computer.

816. The Strategic Plan of RUA 2001-2010 has the following seven objectives:

- 1. Create a strong structure of management and clear working direction;
- 2. Have on-duty officers and lecturers with capacity and qualifications responding to training demand;
- 3. Improve the curriculum programs according to market requirements;
- 4. Equip with modern tools for study and research in order to respond to the demand of training and research;
- 5. Select and train students with professional quality for responding to demand of market;
- 6. Have enough capacity to carry out continued training and post-graduate training; and
- 7. Strengthen RUA toward international standards.

817. The University has been improving qualifications of its teaching staff through collaborations with foreign universities. Between 2000 and 2005, 31 and 6 staff was trained for Masters and PhD degrees, respectively. Among other needs, trainings were required in teaching methods, second language to enable accessing knowledge and new information from international publications, research methodology and adult education. For the administrative staff (including deans), training would include administrative and financial management, educational planning and management and budgeting for practical activities. On-the job training opportunities should be available for the entire staff and be a part of the long-term Development Plan.

818. The RUA is linked domestically with the Government centers, research institutes and industries with a large number of organizations, namely, AIT, the EU, JICA, DAAD, DED, KOSAN, AusAID, CIM, GTZ, CIRAD, AUF and Genetic Computer.

819. Most research activities are conducted on the campus or in collaboration with provincial agricultural offices. A research station at O'Sandas in Battambang province is available for exclusive use by students to conduct their field research. The RUA Research and Extension Center possesses two laboratories for training of post graduate students and university staff members.

820. The RUA had operated some 25 small research projects in 2004 – 2005 with support from CAE, JICA, MAFF, MOEF, ACIAR, ADRC, CRG and DED. Several such projects with collaboration from many other donors are on-going or have been completed. Outcomes of these projects should be assessed and experiences gained should be shared among the partners. RUA and farmers should be linked with defined responsibilities, as outlined below:

821. RUA's responsibilities: identify issues and situations, devise appropriate solutions, apply the solutions in the field, evaluate the results, improve these through lessons learned, and recommendations made based on real situations.

822. Government's responsibilities: support for extension and application of new technologies through policy and regulations.

823. Farmers' responsibilities: share issues and situations with the RUA, test the appropriate interventions jointly with RUA, share the procedure and results, and adopt improved methods/technologies.

824. RUA collaborates with the International Cooperation Center for Agricultural Education (ICCAE) in curricula development, introduction of Master's and Doctoral programs, research fellowships, promotion of agro-processing for rural development, and conducting joint field research in rural areas.

825. The on-going collaboration with the Asian Institute of Technology has been effective in establishing and strengthening research-education-extension linkages through initiating new academic programs, internalizing new researches and technologies in the curricula, assigning research topics to post-graduate students from the identified priority research areas and through sharing the research findings through publications and conferences.

826. RUA also has active collaboration with several universities and institutes in Australia, Canada, Indonesia, Japan, Korea, Laos, New Zealand, The Philippines, Singapore, Thailand, USA, and Vietnam. These have been helpful in updating the curricula, training Cambodian scientists for higher degrees and enhanced knowledge and in undertaking joint researches of mutual benefits.

827. RUA has pursued programs to promote inclusiveness and environmental health. As per the Strategy Plan 2001 - 2010, the University has strived to increase enrolment of female students, resulting in the increase of their proportion to 18% in 2007 - 2008 (out of total student strength of 2347, female students numbered 428), still short of the target of 30% by the year 2010. Several of the RUA collaborative and outreach programs have been pro-poor, pro-women and pro-environment.

828. The University has been following participatory approaches in its planning and programming tasks. For instance, its ten year strategy 2001 - 2010 is based on a three year participatory needs assessment and on consultation with various stakeholders. The 2009 strategy plan development meeting involved many researchers, extensionists, and educators of RUA and other REE institutions concerned in priority setting, planning, implementation, evaluation and impact assessment of REE programs.

829. In order to strengthen technology transfer, RUA has been offering short-term training courses and continuing education programs on agricultural technology and management, agricultural education for extension. Moreover, it has been providing vocational training on small scale animal production, farming system development, post-harvest handling systems of agricultural products, small scale aquaculture management, and management of small scale agricultural machinery and equipment. Further, it has been running courses on community development, development of project planning, fund raising and project proposal, project management, project monitoring and evaluation, training of trainers, human resources management, and organizational development.

830. CEDAC has been playing an important role in providing vocational training to farmers, including young farmers, unemployed youth, extension workers, rural entrepreneurs, etc, covering nearly 2000 villages and over 65,000 families. The training duration is 12 months and is designed on the concept of learning-by-doing, community development, environment and resources management, community business and leadership and management skills.

831. Short internship courses for students and apprenticeship courses for young graduates are also organized. The CEDAC farm families were reported to have increased their annual household average income by 700 to 900 US dollars as compared to the non CEDAC families. The CEDAC program is highly relevant and deserves commensurate support, particularly for training the above mentioned 14,000 extension workers.

832. Fortunately, some of the new donor-aided programs are emphasizing vocational trainings. For instance, the ACIAR managed US\$ 42 million Cambodian Agricultural Value Chain Program (CAVAC), co-funded by AusAID and ACIAR, for five years, launched in 2009, aims to accelerate growth in the value of agricultural production and smallholder incomes through improved productivity of rice-based farming systems, has a strong non-formal training component. It will

develop a cadre of professional extension workers and farmer assistants capable of implementing wide-ranging extension programs.

833. Likewise, the latest ADB US\$ 2 million grant from the Japan Fund for Poverty Reduction (JFPR) to the RGC for a pilot program will train agricultural producers in post-harvest food handling, storage and processing techniques. It will also fund skills training for jobless and out-of-school youth. The program will train specialists who will then train about 3,000 agricultural producers, including 1,500 women, in post-harvest food skills designed to boost their incomes and reduce poverty. The skill bridging component will target about 700 young people who have never enrolled in secondary school or who have little formal education, and give them access to training and employment opportunities through the Technical Vocational Education and Training (TVET) certificate-level program. Funds will be given to community-based groups, NGOs and public and private skills providers to draw up the training program. The grant will also be used to build up the skills and capacities of the staff managing and implementing the program.

834. Given the important role of agricultural education, and taking consideration the changes that might have taken place in recent times, there appears to be a need for the relevant authorities/parties to re-examine the following regarding agricultural education in Cambodia:

- 1. The policy framework relating to the mandates and roles of the agricultural education institutions to support the agricultural industry in relation to their roles in the REE system and its requirements;
- 2. Manpower needs of the sector and to orient their education and training offerings accordingly;
- 3. Differentiated responsibilities of the national level institutions, particularly the RUA, and the agriculture colleges in the provinces; and
- 4. Accreditation in line with national, regional and international system standards.

# 6.3 A & W Extension and Outreach

835. Extension is the bridge between research and farmers for a two-way sharing of technology, knowledge and information towards accelerated, cost-effective and sustained development of agriculture and water sectors leading to the alleviation of poverty and food insecurity. RGC policy is aimed to promote agricultural productivity and diversification by addressing the package issues of agricultural technology, rural infrastructures (such as irrigation systems, road and electricity), rural credit, market and processing.

836. However, agricultural and water productivity are still quite low due to the lack of farmers' skills, lack of access to agricultural knowledge, information and technology, low labor productivity, lack of quality inputs (e.g. seeds, fertilizers and credit), poor water management control and low level of support services available to farmers, and lack of empowerment of local communities. The extension services are further weakened due to the limited number and quality of extension workers, lack of facilities for extension services and extension materials and poor communication between research and extension agencies. The strengths, weaknesses, opportunities and threats are given in Table 44. The problem Tree (Figure 36) defines the development problem, its causes and underlying constraints and their impact.

837. MAFF's extension workers and field personnel are mandated to work with farmers, but are unable to effectively mobilize them because of lack of number and capacity of extension staff at subnational and community levels, and paucity of resources such as fuel for vehicles, and incentives. They lack the facilities (e.g. training centers and demonstration farms) and networks to disseminate technologies, and the linkages between research, development and extension remain weak. Hence, extension services are weak overall, and farmers have limited awareness of and access to agricultural and water management technologies, and poor skills in agricultural production and water management. District agricultural offices have a major role to play in field delivery, but are weak by low number and capacity of staff, remuneration, and the lack of operational budgets. NGOs play an effective role in agricultural extension, but are also dependent on sustained funding from donors.

838. The number and quality of public sector extension personnel and overall performance of the extension service has been sub-optimal. However, in addition to the RGC extension employees and a good number of extension experts/agents in private sectors and with NGOs, 14,000 extension workers are reported to be operational, although little is known about their qualifications, experience, development work and source of financial support. A status report on the effectiveness of this resource should soon be prepared for further planning and use. If trained appropriately, these extension workers, one for each village, should fill the manpower gap.

839. The RGC, as pronounced in the Rectangular Strategy (RS), aims to accelerate economic growth and poverty reduction through promoting agricultural productivity and diversification by addressing package issues of agricultural technology, credits and rural infrastructures (road, irrigation, and electricity), market and processing technology, and improving water and irrigation system management. This has already expanded the system of technology and agricultural extension services by rolling them out to district and community levels. The extension system must ensure that RGC officials, farmers, and other agri-business interests have access to and are equipped to use the best available knowledge, information and technology related to agriculture, agri-business and water management, and secondly to enable rural communities, commune councils and other community-based organizations to participate effectively in aspects of agriculture, agri-business and water management that require community level action.

840. The Department of Agricultural Extension (DAE) of MAFF, established in 1995, has the government mandate to develop a demand-driven, district-implemented, provincially-managed and centrally-overseen extension system appropriate to the needs of Cambodia, with the following objectives:

- 1. Develop extension/facility and strengthen/expand extension systems by making regular improvement on organization structure, role, responsibility and increasing cooperation and collaboration with relevant stakeholders to ensure sustainable extension operation;
- 2. Develop management system in response to development needs by improving planning, strategy, monitoring and evaluation systems and decision making;
- 3. Develop the capacity of staff, and through the partners (private sectors/NGOs) at all levels within extension systems, to manage extension programs/activities and provide support to farmers and farming community in agricultural production, agri-business and processing to respond to market needs and to increase rural farm income;
- 4. Develop and strengthen effectiveness and efficiency of mass media and agricultural technology broadcasting systems to support technology dissemination to farmers and farmers' communities;
- 5. Develop provincial and district [management] information systems to provide support and facilitate management and implementation of extension programs and activities; and
- 6. Support and encourage the development of farmer organizations and agricultural communities.

841. The organizational structure of agricultural extension, resources, approaches and activities of the DAE are elaborated in Annex xx.

842. As regards the water sector, there is no clear structure for extension activities. The MOWRAM's Department of Irrigated Agriculture and Department of Farmer Water Users Community have, however, some activities related to water extension such as on-farm water management, irrigation system operation and maintenance. However, MOWRAM lacks staff at provincial and district levels, although some irrigation schemes have structure guards to operate water gates. The Participatory Irrigation Management and Development (PIMD) policy has mandate to

establish, empower and transfer management, financing and development of irrigation systems to Farmer Water Users Communities (FWUC). MOWRAM plays an important role to provide capacity building and technical support to FWUC. However, FWUC's capacity on operation and maintenance of irrigation systems is weak.

843. There are 10 on-going projects directly or indirectly augmenting the Cambodian agricultural extension system. Three such projects have recently been completed and three are in the pipeline, all supported by donors. The gains made by the completed projects, unfortunately have not been consolidated and may even erode in due course of time. The outputs and outcomes of the on-going projects may meet the same fate. Therefore, the need for adding on to and integrating the outcomes of individual projects in the Master Plan or the continued consolidation and transformation of the system to effectively meet the evolving and emerging demands can hardly be overemphasized.

844. Keeping in mind the huge technology transfer gap, the various weaknesses and opportunities and almost the total absence of extension on water in agriculture on one hand, and the intention and commitment of the Government to establish a vibrant and responsive extension system on the other hand, a sub-program on Extension has been proposed.

	Strengths	Weaknesses					
<ol> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> <li>5.</li> </ol>	Strengths A framework of agricultural Extension system in place. Successful tools and techniques packages have been tested and applied; Relevant information and extension materials are being disseminated. Farmers and farmer communities involvement in extension is increasing; Policy support in agricultural and water	1. 2. 3. 4. 5.	Weaknesses Inadequate number and technical capacity and skill of extension staff. Limited fiscal, physical and logistic resources. Lack of relevant information and capacity packing for dissemination; Lack of appropriate technologies, particularly gender-sensitive ones Weak extension system for water resources and management, particularly at provincial, district and				
	extension (policy statement and PIMD)	6. 7. 8.	community levels Poor empowerment of farmers/community and other stakeholder for setting and benefiting from extension agenda, especially with regard to WRMD. Poor linkages between research, extension, farmers, and market and with other extension service providers (private sectors, NGOs). Technical Departments maintain their own extension services and program with little coordination with DAE.				
	Opportunities		Threats				
1.         2.         3.         4.         5.         6.         7.	Decentralization and de-concentration policy and process. Policy support and priority in agricultural and water extension (policy statement and PIMD) High demand for agricultural quality products at the local and international markets, especially rice. Availability of promising technologies within Cambodia and outside. Increased linkage among public, private sectors and NGOs in extension. Pronounced donor commitment for agriculture and water sector development in Cambodia. External membership of and linkages with peer institutions.	1. 2. 3. 4.	Erosion and high turnover of extension workers from public sector, especially from rural areas. Poor enforcement of rules, regulations and standard and bio-security measures (SPS, GAP, food and environmental safety); Climate, natural calamity/uncertainty (floods, drought, pest outbreak, etc.) and lack of early warning systems for disaster risk management; Market competition from neighboring countries for local products coupled with inflation, high cost of agricultural inputs, imported input without quality control and high fuel costs.				

Table 44 SWOT Analysis for A & W Extension System



#### Figure 36 Problem Tree Analysis of A&W Extension

#### 6.4 Programs and projects

845. During the past decade or so, a large number of programs and projects were formulated, funded and implemented jointly by the RGC and multilateral and bilateral donors on alleviation of poverty and food insecurity; agricultural (crops, livestock, fisheries, agro-forestry and natural resources) productivity and diversification; water resources conservation and management; and on post-harvest management, value addition, agribusiness and market linkage. Several of these were on or related to Research, Education and Extension (Table 45). These programs/projects would have presumably contributed, in varying measures, to the reduction in food insecurity and poverty levels, and to the enhancement of agricultural and water productivity, sustainability and overall livelihood security.

846. Despite the above efforts, levels of poverty, food insecurity and malnutrition are stubbornly high. Productivity and diversification have remained low, variable and vulnerable. The factor productivity growth is negligible, and the farmer-non-farmer and rural-urban socio-economic divides have magnified. Obviously, the programs have performed sub-optimally and/or their outcomes have not been up-scaled and out-scaled.

847. Often, there are duplications and fragmentations amongst the programs/projects. Moreover, after the completion of the projects, there was no or negligible follow up by the RGC, resulting in poor Impact and non-sustainability. Building on the initiative and furthering the outcomes were generally missing and often, there was erosion of the gains made through these programs/projects. Therefore, it would be highly strategic and prudent on part of the stakeholders to have the outcomes and impacts of the various programs/projects critically assessed to steer future planning, programming, investment and implementation. This exercise is equally relevant to the RGC as well as to the donors, development agencies and other partners.

No.	Project Title	Objectives	Funding Sources	Budget in (million)	Timeframe
		Concluded			
1	Improving feeds and feeding for small scale aquaculture in Vietnam and Cambodia	To develop diets based on locally-available ingredients for improved production of catfish and tilapia; demonstrate and evaluate the potential of new improved feeds in on-farm trials; and transfer technology and extend information.	AusAID	AUSD 761,460	2004 -2008
2	Farmer-based adaptive rodent management, extension and research system in Cambodia	To develop the methods for managing the rodent pests and the progressive institution of a community- based system of management	AusAID	AUSD 515,973	2004 - 2008
3	Development of a model for the control of fasciolosis in cattle and buffaloes in the Kingdom of Cambodia	To update, refine and validate the risk model using geographic information systems. Extension officers will be trained with the aim of developing an extension program to control Fasciolosis, leading to the development and promotion of a national strategy.	AusAID	AUSD 191,406	2004 -2007
4	Identifying research priorities for the development of the beef industry in Cambodia and Lao PDR with special reference to animal health interventions	To develop best practices for cattle and buffalo health and husbandry systems for Cambodia and Laos	AusAID	AUSD 60,000	2006 -2007
5	Assessing and controlling the risks of disease spread in Mekong countries	To identify the drivers that lead to the spread of animal disease both between and within countries, primarily	AusAID	AUSD 88,373	2006

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	with an initial focus	through livestock			
	on Cambodia	movement.			
6	Farming systems research for crop diversification in Cambodia and Australia	To help reduce poverty and contribute to food security at household and national levels through the development of techniques and opportunities for the production of non-rice upland crops in Cambodia	AusAID	AUSD 1,037,590	2003 - 2007
7	Improving the marketing system for maize and soybeans in Cambodia	To bring about positive socio-economic change in the Cambodian soybean and maize marketing systems through the use of community-based decision- making	AusAID	AUSD 499,901	2004 - 2008
8	Increased productivity of rice- based cropping systems in Lao PDR, Cambodia and Australia	To improve rice-breeding and agronomic techniques in order to increase productivity and improve stability, mainly in lowland rice-based cropping systems in Lao PDR and Cambodia.	AusAID	AUSD 1,452,140	2000 - 2006
9	Improving understanding and management of rice pathogens in Cambodia	To initiate and develop Cambodian training in general plant pathology and more specifically rice plant pathology, to build Cambodia's long-term agricultural research capacity		AUSD 424,725	2005 -2008
10	A system to reduce risk in the adoption of new rice production technologies in Cambodia	To develop systems that would increase the efficiency of crop and soil management in lowland rainfed rice cropping environments of Cambodia.	AusAID	AUSD 164,533	1999 - 2001
11	Cambodian Agricultural Research and Development Institute-Assistance Project (CARDI-AP)	To assist CARDI achieve sustainable management of its personnel, financial and physical resources and to deliver its mandate according to national priorities for food security, poverty reduction and national resource management	AusAID	AUSD 6 million	2002 -2006
12	Agricultural Productivity Improvement Project (APIP)	To carry out a coordinated program through MAFF to bring about sustainable improvements in agricultural productivity and rural incomes.	AusAID	USD 35.1 million	1977 - 2005
13	Control of fasciolosis in cattle and buffaloes in Indonesia, Philippines and Cambodia	To develop strategies for the control of the tropical liver fluke parasite, originally developed for Indonesia through ACIAR-funded research, and extend the work to large ruminants in the Philippines and	AusAID	AUSD 1,157,910	1998 - 2003

		Cambodia.			
14	Cambodia-Australia Agricultural Extension Project Phase II+IIb	Increase Household cash income by further developing a sustainable district-oriented agricultural systems with DAE of MAFF	AusAID	AUD 20.6	2001-2007
15	Battamabng Agricultural Productivity Enhancement Project	Improved Agricultural Productivity in Battambang	JICA	JPY 265.34	2003-2006
16	Open source for weed assessment in Lowland paddy fields	To build knowledge base for weed pecies in Cambodia and Laos	EU	USD 81,294	2004 - 2005
17	Intensification system for rice	To develop agronomic packages for rice intensification	CARF	USD 22,670	2004 -2005
18	Reduction of postharvest losses of fresh "Posat" orange fruit	To identify the causes and estimate the postharvest losses of oranges in Battambang	ЛСА	USD 9,159	2004-2005
19	Productivity of fresh sweet potato processing	To study the potential for processing sweet potato and extending technology to farmers	MAFF and MoEF	USD 5,375	2004 - 2005
20	Follow-up study of RUA graduates between 2000 - 2004	To evaluate the effectiveness of the RUA undergraduate program as perceived by alumni and employers	MAFF and MoEF	UDS 6,736	2004 - 2005
21	Feeding practices for small scale aquaculture	To identify ingredients and nutritional quality of fish feed	ACIAR	UDS 32,950	2004 - 2005
22	Seed production of snakeskin gouramay (Trichgaster Pectoralis)	To promote indigenous fish species in small scale aquaculture	CARF	UDS 5,000	2004 - 2005
23	Irrigation I the production cycle	To evaluate irrigation types, and farmer resources, output and income from water consumption	EU	USD 111,000	2004 - 2005
24	Biogas production using pig manure	To evaluate biogas production and gas retention in tanks	RUA	USD 4,000	2004 - 2005
25	Improving goat production for small households	To improve the performance of local goats through cross breeding	RUA	USD 10,000	2004 - 2005
26	Case study of community forestry	To build capacity on community forestry in support to policy development	IDRC	USD 9 million	2004 - 2005
27	Nursery management of commercial tree species	To build knowledge on tree seedling treatment	CRG	USD 4,500	2004 - 2005
28	Establishment of data base of indigenous tree species	To develop data base for 30 indigenous tree species in Cardamon mountains	DED	USD 4,200	2004 - 2005
		On-Going			
1	Improvement of Agricultural Extension in Kandal, Cambodia	To improve the efficiency and effectiveness of agricultural services at district level.	VVOB (Belgium)	EUR 1.2	2008-2013
2	Economic and Social Re-launch of Northwest Provinces (ECOSORN)	To contribute to poverty reduction through increased household income through increased agricultural	EU	EUR 25.00	2005-2010

		productivity, and increase local community empowerment.			
3	Agricultural Sector Development Project ADB Loan 2023-CAM (SF) (Partly extension activities)	Provide farmers, including poor and women farmers with effective agricultural support services to assist increased commercialization of agriculture and reduce rural poverty.	ADB	USD 4.7 million	2004-2009
4	Cambodia Agriculture Value Chain Program (CAVAC) (Partly extension activities)	Accelerated growth in the value of agricultural production and smallholder income in the rice based farming systems of target provinces	AusAID	AUD 42.0	2009-2014
5	Rural Livelihood Development Project (RULIP-IFAD) (Partly extension activities)	A sustainable impact of the rural poor in the targeted communes of the three provinces are improved	IFAD	USD11.51	2007-2014
6	Rural Poverty Reduction Project in Prey Veng and Svay Rieng (Partly extension activities)	Improve rural livelihood and income generation	IFAD	USD15.49	2004-2011
7	Agriculture Development in Mine- affected Areas of Cambodia (ADMAC)	Strengthen Cambodian institutions for improved implementation of sustainable integrated agriculture development and mine action in support of poverty reduction	CIDA	CAD 5.0	2005-2009
8	Cambodia Agricultural Marketing Improvement Program	Improved agricultural marketing and information	CIDA	CAD 5.0	2005-2010
9	CARE Integrated Rural Development and Disaster Mitigation Project	Improve food security and income generation	USAID	USD4.60	
10	Battambang Rural Area Nutrition and Development Project	Agricultural service delivery to farmers is enhanced in target communes	JICA	JPY 168.506	2006-2010
11	Strengthening the formal education of teaching and research staff and promoting the short course training programs of RUA	Strengthen overall RUA teaching capacity and improve market-oriented short-term training course	FSP	USD1,600,000	2005 - 2010
12	Improved feeding systems for more efficient beef cattle production in Cambodia	To improve profitability of cattle production and reduce labor demand for feeding cattle in smallholder farming communities	ACIAR	AUSD 621,652	2008 - 2011
13	Best practice health and husbandry of cattle, Cambodia	To improve the profitability of cattle production in Cambodia by evaluating the best practice health and management interventions.	ACIAR, Australia	AUSD 764,513	2007 – 2011
14	Understanding	To predict the risk of disease	ACIAR	AUSD	2007 -

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	livestock movement and the risk of spread of trans-boundary animal diseases	spread by understanding livestock movement patterns		1,257,361	2012
15	Cambodia Agricultural Value Chain Program (CAVAC)	To enhance research in agricultural value chain related areas, pest control, food processing, crop production, farming systems and agricultural machinery	AusAID and ACIAR	USD 2.5 million	2009 – 2014
16	Analyses of three databases of fisheries data from the Mekong River	To improve knowledge of the likely response of exploited fish stocks and their species assemblages to forecast changes in the flow regime of the basin	ACIAR	AUSD 149,867	2008 – 2009
17	Cambodian Agricultural Research Fund (CARF)	To assist Cambodian scientists in government, university and NGO organizations to compete for agricultural research funds in areas of animal and plant health, and food safety.	ACIAR	AUSD 1,279,630	2002 - 2011
18	Diversification and intensification of rain- fed lowland cropping systems in Cambodia	To increase the range of crops grown under rain-fed lowland conditions by promoting non-rice crop technologies that provide efficient water use and high financial return to the growers	ACIAR	AUSD 900,482	2007 - 2010
19	Enhancing production and marketing of maize and soybean in north-western Cambodia	To develop and disseminate a sustainable model for maize, and farmer-ready technological packages across the whole value chain.	ACIAR	AUSD 1,169,040	2008 - 2011
20	Improvement of vegetable production and postharvest management systems in Cambodia and Australia	To map supply chains and identify constraints to improvement of vegetable industry, develop and demonstrate improved production and post-harvest strategies to underpin quality improvement and improve R&D capacity in vegetable research.	ACIAR	AUSD 1,109,360	2005 - 2009
	-	Pipeline	1	1	T
1	Tonle Sap Poverty Reduction and Small holders Development	Enhanced agricultural productivity, diversification and commercialization	ADB	USD15.49	2010-2015
2	Household Food Security and Poverty Reduction	Improved household Food Security and income generation for rural poor	RGC/EDP	USD 51.00	2007-2011

#### 6.5 Summary of Analysis and Findings for Agricultural Research, Extension and Education

#### 6.5.1 Core Problems and their Root Causes

848. The institutions involved in and responsible for agricultural innovation system in Cambodia have largely failed to satisfy most of the essential requirements. Nonetheless, the resources development and institutional strengthening, resource mobilization and coordination and formulations of needed policies and strategies are ongoing processes, including the requirements of the national system for generation and transfer of appropriate knowledge, information and technologies for agricultural transformation and judicious harvesting of water resources.

849. Enhancing national capacities of agricultural innovation (synergistic research, education and extension) requires combined, integrated and sustained interaction of all elements involved in agricultural and water research planning, technology generation, adaptation and validation, transfer and utilization, including the active collaboration of policy-makers, educators, trainers, extensionists, and clients.

850. It is essential to have sustained political will, support and commitment, linked with appropriate policies and strategies, good institutional alignment and governance, together with defined priorities, coherent objectives, qualified and motivated scientific and technical staff, adequate facilities and equipment, sustained adequate funding, effective coordination and intensified on-farm involvement.

851. Even a fraction of the above requirements have hardly been met in Cambodia. Hence, the need for national capacities to plan, fund and implement long-term strategies for building effective knowledge systems and adequate human capital, and generation, adaptation and diffusion of relevant information and appropriate technologies can hardly be overemphasized. As given in Figure 37, the main root causes of the problem include:

- 1. Fragmented and underperforming research system as a result of inadequate policy environment, investment and coordination mechanisms; incomprehensive, poorly-responsive redundant and non-inclusive research agenda; and inadequate exposure to outside sources of knowledge;
- 2. Inadequate and recalcitrant education system as a result of insufficient enabling policies, capacities, including teaching staff, trainers and resources, outdated and non-responsive curricula and training programs; and poor linkages with policy-makers and among research, extension and farmers;
- 3. Extension is almost non-existent it is highly ineffective & poorly linked to farmers' priorities as a result of shortage of appropriate technologies and extension methodologies; lack of skilled extension workers, resources and infrastructure; little influence of farmers on setting extension and research agenda, and little consideration of market trends and market information;
- 4. Functional linkages within and among REE institutions are generally poor and unsustainable. A major constraint to closer co-operation is the prevailing policies which favour functional specialisation of the REE institutions and do not recognise the synergy of their functions. Even when the benefit of establishing or strengthening the linkages among R & D institutions is recognised, little or no resources and incentives are allocated to foster and sustain these linkages; and
- 5. Negligible competence and capacity in the areas of socio-economic analyses and research which are supposed to underpin national policies, priorities, strategies, and allocation and development of resources.

852. The above constraints result in persistence of stagnation of food and agriculture production and productivity, low water productivity and stubbornly high food insecurity and poverty; low
capacity for technology generation, adaptation, assessment, dissemination and adoption; low impact of graduate technical skills, technological interventions and extension approaches on the livelihood of resource-poor men and women farmers; duplication, overlapping and wasteful use of meager resources by stakeholders of agricultural innovation; and inability to exploit the country's comparative and competitive advantages and market opportunities.

## 6.5.2 Challenges and Opportunities

853. The challenge is to build and sustain a viable innovation system for agricultural and water resources development capable of generating relevant information, appropriate technologies and comprehensive knowledge system for enhanced and sustained food and agricultural production in Cambodia. In order to achieve the Program's goal and objectives, the agriculture and water resources sector must:

- 1. Build capacity and mobilize all available resources in a holistic, coordinated and inclusive manner, and establish linkages among all stakeholders of agricultural and water innovation to create knowledge societies and sustained funding mechanisms for the transformation of agriculture and water sectors, the enhancement of rural livelihood and conservation of environment; and
- 2. Develop appropriate policies, institutional arrangements and governance, and empower stakeholders, particularly the resource-poor men and women farmers and other marginalized rural groups to set the agriculture and water research, education and extension priorities and effectively participate in implementation and impact assessment of their agenda.



## Figure 37 A&W Innovation Problem and Impact Tree