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Council for Agricultural and Rural Development (CARD)



International Food Policy Research Institute (IFPRI)

Cambodia Food Security and Agricultural Policy - ROUNDTABLE PROCEEDINGS



Joint publication by

**Cambodia Development Resource Institute (CDRI)
Council for Agricultural and Rural Development (CARD)
International Food Policy Research Institute (IFPRI)**

With Support of

United States Agency for International Development (USAID)



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July 2011

**Cambodia Food Security and Agricultural Policy
- ROUNDTABLE PROCEEDINGS**

This workshop funded by USAID/Cambodia, is also a partnership initiative between the Council for Agricultural and Rural Development (CARD), CDRI, and IFPRI on 04 November, 2010 in Phnom Penh, Cambodia

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LIST OF CONTRIBUTORS

Brief Welcome Remarks

- Mr Larry Strange, Executive Director, CDRI
- H.E. Dr Hang ChuonNaron, Permanent Vice Chairman, Supreme National Economic Council (SNEC), Secretary of State, Ministry of Economy and Finance, Royal Government of Cambodia
- Dr Blake D Ratner, Visiting Senior Research Fellow, IFPRI

Theme 1: Agricultural Policy and Strategy

- Mr Chan Sophal, President, Cambodian Economic Association (CEA), Cambodia
- Dr Theng Vuthy, Programme Coordinator, Poverty, Agricultural and Rural Development, CDRI
- Dr Bingxin Yu, Post-Doctoral Fellow, IFPRI
- H.E. San Vanty, Undersecretary of State, Ministry of Agriculture, Forestry & Fisheries, Royal Government of Cambodia

Theme 2: Food Security, Nutrition and Social Protection

- H.E. NgyChanphal, Second Vice Chairman of Council for Agricultural and Rural Development (CARD) and Secretary of State, Ministry of Interior, Royal Government of Cambodia
- Dr Olivier Ecker, Postdoctoral Fellow, IFPRI
- Mr Kem Sothorn, Research Associate, CDRI
- H.E. Dr San Vathana, Deputy Secretary General, CARD

Theme 3: Natural Resource and Climate Change

- Ms ChamroeunMudita, Senior Rural Development Specialist, The World Bank
- Dr Timothy S. Thomas, Research Fellow, IFPRI
- Dr Blake D. Ratner, Visiting Senior Research Fellow, IFPRI
- Dr Tin Ponlok, Secretariat for National Climate Change Committee and Director of Climate Change, Ministry of Environment

Concluding Remarks: Policy Gaps and Ways Forward

- Dr XinshenDiao, Sr. Research Fellow, IFPRI
- H.E. Tao Seng Hour, Senior Minister and First ViceChairman of Council for Agricultural and Rural Development (CARD)



Cambodia Food Security and Agricultural Policy Stocktaking Roundtable Meeting

04 November 2010

Phnom Penh Hotel, Phnom Penh, Cambodia

A Partnership of Council for Agricultural and Rural Development (CARD)-CDRI-
Cambodia's leading independent development policy research institute – International
Food Policy Research Institute (IFPRI)

With the support of USAID

Objectives

- (1) Characterise the current state of knowledge in key policy areas related to food security, including gaps in current knowledge.
- (2) Identify priorities for future collaboration on policy-oriented research and capacity building.

Intended Outcomes

- (1) Partners have an improved sense of strategic priorities for an emerging collaborative initiative on policy-oriented research and capacity building to address the challenge of food security in Cambodia.
- (2) Partners have an improved sense of the interests and needs of different stakeholders as a basis for exploring next steps in the collaboration.

AGENDA

08:00-08:30 Registration and Seating

08:30-09:00 Brief Welcome Remarks

Mr Larry Strange, Executive Director, CDRI

H.E. Dr Hang Chuon Naron, Permanent Vice Chairman, Supreme National Economic Council (SNEC), Secretary of State, Ministry of Economy and Finance, Royal Government of Cambodia

Context, objectives, and intended outcomes of the Roundtable

Dr Blake D Ratner, Visiting Senior Research Fellow, IFPRI

09:00-12:00 Paper Presentations

09:00-09:50 **Theme 1: Agricultural Policy and Strategy**

Moderator: **Mr Chan Sophal**, President, Cambodian Economic Association (CEA), Cambodia

1. Agricultural policy and policy research (15 minutes)

Speaker: **Dr Theng Vuthy**, Programme Coordinator, Poverty, Agricultural and Rural Development, CDRI

2. Agricultural strategy: Future development options for the rice sector (15 minutes)

Speaker: **Dr Bingxin Yu**, Post-Doctoral Fellow, IFPRI

Trigger speaker: **H.E. San Vanty**, Undersecretary of State, Ministry of Agriculture, Forestry & Fisheries, Royal Government of Cambodia (5 minutes)

Questions for clarifications (15 minutes)

09:50-10:05 Refreshments

10:10-11:00 **Theme 2: Food Security, Nutrition and Social Protection**

Moderator: **H.E. Ngy Chanphal**, Second Vice Chairman of Council for Agricultural and Rural Development (CARD) and Secretary of State, Ministry of Interior, Royal Government of Cambodia

1. Food security and nutrition in Cambodia: Patterns and pathways (15 minutes)

Speaker: **Dr Olivier Ecker**, Postdoctoral Fellow, IFPRI

2. Policy options for vulnerable group: Income growth and social protection (15 minutes)

Speaker: **Mr Kem Sothorn**, Research Associate, CDRI

Trigger Speaker: **H.E. Dr San Vathana**, Deputy Secretary General, CARD(5 minutes)

Questions for clarification (15 minutes)

11:00-11:50 **Theme 3: Natural Resource and Climate Change**

Moderator: **Ms ChamroeunMudita**, Senior Rural Development Specialist, The World Bank

1. Food security and climate change to 2050: Cambodia (15 minutes)

Speaker: **Dr Timothy S. Thomas**, Research Fellow, IFPRI

2. Natural resource governance and food security in Cambodia (15 minutes)

Speaker: **Dr Blake D. Ratner**, Visiting Senior Research Fellow, IFPRI

Trigger Speaker: **Dr Tin Ponlok**, Secretariat for National Climate Change Committee and Director of Climate Change, Ministry of Environment (5 minutes)

Questions for clarification (15 minutes)

12:00-13:00 Lunch

13:00-15:00 Structured Group Discussion with Facilitators.
Participants will join one working group, and each group selects a Rapporteur who will later report back to the plenary. The task of each working group is to identify up to 5 most important knowledge gaps and up to 5 future priorities for policy-oriented research and capacity building.

Group 1: Agricultural Policy and Strategy

Moderator: **H.E. San Vanty**, Undersecretary of State, Ministry of Agriculture, Forestry & Fisheries, Royal Government of Cambodia

Group 2: Food Security, Nutrition and Social Protection

Moderator: **H.E. Dr San Vathana**, Deputy Secretary General, CARD

Group 3: Natural Resources and Climate Change

Moderator: **Dr Tin Ponlok**, Secretariat for National Climate Change Committee and Director of Climate Change, Ministry of Environment

15:00-15:15 Refreshments

15:15-17:00 Reporting back from working groups on Knowledge Gaps and Research/Capacity Building Priorities (5 minutes for each group).
Discussion of gaps and priorities in plenary.

Moderator: **Dr Blake D. Ratner**, Visiting Sr. Research Fellow, IFPRI

17:00-17:30 Concluding Remarks: Policy Gaps and Ways Forward

Speaker: **Dr Xinshen Diao**, Senior Research Fellow, IFPRI

Speaker: **H.E. Dr Tao Seng Hour**, Senior Minister and first vice chairman of CARD



EXECUTIVE SUMMARY

These proceedings summarise conclusions of a stocktaking exercise conducted by the International Food Policy Research Institute (IFPRI) and the Cambodia Development Resource Institute (CDRI), and recommendations of group discussions at the Cambodia Food Security and Agricultural Policy Stocktaking Roundtable Meeting held in Phnom Penh in November 2010. The following priorities are recommended as focal areas for policy research and capacity building in the near future:

1. **Rethinking Cambodia's comparative advantages in rice production.** This should identify alternative paths to increase the competitiveness in the international rice market, and considering the synergies and trade-offs between different rice development goals. It is also necessary to assess the effect of different government support policies on the agricultural sector and on specific crops, including evaluating the cost and returns of public investment in different rice development plans. In addition, research on alternative paths of rice development needs to take into consideration the impact of different rice development strategies on poverty, food security, and nutrition at the household, regional, and national level.
2. **Understanding rice market demand by identifying current and future rice export markets.** In-depth research is needed to differentiate markets, including enhancing the traditional markets and exploring new and niche markets. Study is also needed on the major constraints in market expansion and penetration, and policies to address these constraints. Research must emphasize the possible trade-offs between rice exports and national food supply, and the required policies to balance domestic demand and exports.
3. **Assessing options for agricultural diversification, paying more attention to the experiences and lessons of other Southeast Asian countries.** Such research should focus not only on production, but also on consumption diversification, as experiences from other Southeast Asian countries suggest that diversified food production can lead to consumption diversification, which has helped to improve rural households' nutrition status. The relationship between production diversification, consumption diversification, and nutrition improvement deserves more detailed study in the future.
4. **Analyzing the causes of food insecurity and nutritional deficiencies.** This should devote particular attention to people's food consumption patterns, food use and utilization customs, and the relationship between agricultural production systems and food security and nutrition. The food security and nutrition impacts of national development policies and interventions, such as damming of rivers, as well as of external shocks should be considered in the research.
5. **Establishing a data and information collection platform for evaluating social protection programs.** This also requires practical tools suitable for monitoring and evaluating the efficiency of existing social protection programs in order to scale up successful existing programs, to design improved programs, and to make interventions more targeted in the future.
6. **Analyzing the synergies and trade-offs between long-term climate change risks and current challenges of natural resources management and governance.** While climate change trends pose risks to the food security of poor Cambodians over the long-term, many of the current challenges of natural resources management and governance are more immediate, and potentially more disruptive. Cambodia's food

security interventions need to respond to the full range of risks and opportunities. The very high attention that international aid agencies are placing now on financing for climate change mitigation and adaptation should not distract from these other challenges of natural resources management and governance. Instead, an integrated approach focused on risks and opportunities for local-level livelihood resilience and food security is appropriate.

7. **Analyzing the advantages and risks of large-scale concessions versus smallholder production systems.** Large-scale economic land concessions (ELCs) designed to promote agro-industrial development frequently fail to deliver their promised benefits in Cambodia. A range of foreign governments has been actively negotiating long-term agreements to secure agricultural land in Cambodia, and it is not clear how such agreements can be met without further displacing local farmers and forest residents. Some studies also point to the economic efficiency of smallholder production, and other benefits in terms of equity and food security. Focused analysis is needed on the relative performance of large-scale concessions versus smallholder production systems, the advantages and risks of each, their appropriateness in different contexts, and the sorts of policy interventions that are required.
8. **Research on a strategic options for management of common pool resources, emphasizing their critical role in local livelihoods.** Common pool resources—forests, fisheries, wetlands and coastal waters—are vital to the livelihoods of large numbers of rural Cambodians. Major reforms have been introduced over the past decade, and it is timely to assess what difference these reforms have made in local livelihoods and food security, and what additional measures are required to improve policy implementation, address shortfalls, and extend the benefits.
9. **Research on alternative strategies for helping farmers cope with climate change.** This should include recommendations for policy changes and recommendations for new crops, cultivars, and technologies. This also requires identifying the gaps in agricultural extension services against the climate change background, and the alternative interventions to strengthen the capacity of extension agents. Research on climate change should not be done only by international organizations—it is urgent to invest in the local institutional capacity to do such research. This should involve better linkages of government climate agencies to international research centers as well as increased support to national institutions.

INTRODUCTION

The International Food Policy Research Institute (IFPRI), in collaboration with the Cambodia Development Resource Institute (CDRI), conducted a stocktaking exercise recently as the first step in an anticipated long-term program to support the development and implementation of effective policies to strengthen food security in Cambodia and the nation's ability to adapt to climate change. The purpose of the stocktaking exercise is to identify knowledge gaps and pinpoint priority areas for future policy research on food security and climate change in Cambodia based on an assessment of previous studies and available data, and in consultation with a wide range of stakeholders and local experts in and around the national agriculture and food security policy debate. The exercise aims to provide a reference point for government, international organizations, civil society/think-tanks, universities, and research organizations in planning research and capacity building services to address the knowledge gaps.

In support of this broad purpose, the stocktaking exercise also aims to fulfill several more specific objectives. First, it will support the USAID country mission to target future investments in the food security arena, particularly in policy-oriented research and capacity building. Second, it will provide a platform for dialogue among multilateral and bilateral development agencies seeking to harmonize their support in this area. Third, it will provide a means to pilot collaboration between IFPRI, the Cambodian government, and non-government policy and research institutions.

Six papers have been jointly written by IFPRI and CDRI research staff as the research outputs of the stocktaking exercise. Based on the research results, a full day workshop, the Cambodia Food Security and Agricultural Policy Stocktaking Roundtable Meeting, was held on November 4, 2010 in Phnom Penh, Cambodia. The objectives of the workshop were to characterize the current state of knowledge in key policy areas related to food security, including gaps in current knowledge, and to identify priorities for future collaboration on policy-oriented research and capacity building. This workshop, funded by USAID/Cambodia, is also a partnership initiative between the Council for Agricultural and Rural Development (CARD), CDRI, and IFPRI. Through this workshop, it is intended that the partners have an improved understanding of strategic priorities for an emerging collaborative initiative on policy-oriented research and capacity building to address the challenge of food security in Cambodia, and an improved understanding of the interests and needs of different stakeholders as a basis for exploring next steps in the collaboration.

More than 60 representatives from governmental and non-governmental organizations, domestic research institutes, and international development partners participated in the Roundtable meeting of November 4. The workshop was divided into two sessions. In the morning session, seven staff members from CARD, CDRI, and IFPRI made presentations around three themes: a) agricultural policy and strategy, b) food security, nutrition, and social protection, and c) natural resources and climate change. The afternoon session was devoted to three parallel structured group discussions and a plenary discussion. In the three group discussions, participants were organized around the three themes of the morning session and around two topics: a) key knowledge gaps and b) priority for future policy research and capacity building. At the beginning of the plenary discussion session, a representative from each of the three groups first presented their group discussion result around these two topics. Then, all participants of the workshop further provided their comments, suggestions, and questions.

This document synthesizes the findings of the stocktaking and suggests priorities for future policy research and capacity. The synthesis draws from the six papers, seven presentations, and three group discussion presentations. These papers and presentations are included in the Appendixes of this document. We organize the main findings and suggestions around the three themes of the workshop.

AGRICULTURAL POLICY AND STRATEGY

Cambodia has undergone dramatic political, economic, and social change since 1993. In recent years until 2008, the country has witnessed rapid economic growth, with a 9.8 percent annual growth rate in GDP, exceeding both the growth rates of its neighbor countries and the regional average of the East Asian and Pacific region (World Bank 2009). This rapid overall economic growth has been accompanied by remarkable performance in the agricultural sector, which grew at 5.6 percent between 2000 and 2008—one of the highest growth rates in the region in this period. Nonetheless, Cambodia’s economy is still highly dependent on agriculture, which contributed to more than one-third of the national economy in recent years.

Existing Agricultural Policies and Strategies

To further improve agricultural productivity and diversification, thereby enabling the agriculture sector to continue as the dynamic driving force for economic growth and poverty reduction, a series of important development strategic documents have been published and implemented by the government. The most important strategic documents include the Rectangular Strategy, the Cambodian Millennium Development Goals (CMDG) 2003, the Socio-Economic Development Plan (SEDP-II) 2001-2005, the National Poverty Reduction Strategy (NPRS) 2003-2005, and Cambodia’s National Strategic Development Plan 2006-2010, which has been recently updated to 2009-2013 (NSDP). Most recent agriculture strategy documents include the National Forest Program 2010-2029 developed by Forestry Department, the Strategic Planning Framework for Fisheries 2010-2019 developed by Fisheries Department, and the National Action Program to Combat Land Degradation 2011-2020 developed by MAFF.

While the overall aim of NSDP is to reduce poverty and implement the government’s Rectangular Strategy for the enhancement of the agricultural sector, the NSDP further stipulates the primary need for developing a national Strategy for Agriculture and Water (SAW). The primary goal of the SAW 2006-2010, which was completed in 2007, is “enhancing agricultural productivity and diversification and improving water resources development and management.” The third component of SAW, the Cambodia Agriculture and Agribusiness Support Program (CAASP) focuses on food security and self-sufficiency (MAFF and MOWRAM 2008). The SAW lays out five programs: institutional capacity building, food security, agriculture and agri-business, water resources management, and agricultural research and development. With the guidance of SAW, the Ministry of Agriculture, Fishery, and Forestry (MAFF) and the Ministry of Water Resources and Meteorology (MWRAM) have jointly formulated the Agricultural Sector Strategic Development Plan 2006-2010, which outlines the following priority areas: food security and agricultural productivity and diversification; improving and strengthening agricultural research and extension systems; market access for agricultural products; institutional and legislative development framework; land reform, land tenure, and pro-poor land access; fishery reform; and forestry reform.

Rice and Other Sectoral Development Strategies

Rice is the dominant crop in Cambodian agriculture and rice-based farming systems have been the backbone of the country's agriculture. As the staple of the traditional diet, rice provides more than three quarters of daily energy intake for the average Cambodian (MAFF and MOWRAM 2008). The rice sector is also one of the main drivers in agricultural growth, contributing nearly half of total crop growth in the period of 1994-2006. In recent years, rice surpassed the country's traditional agricultural export commodities such as rubber and forestry products and became the most important agricultural export commodity.

Recognising the strategic role of the rice sector in economic growth, poverty reduction, and food security, the Cambodian government has paid special attention to this sector, and rice appears in government strategy and planning documents wherever agriculture is mentioned. For example, the NSDP 2006-2010 sets a production target for the rice sector through rice yield improvement and expanding irrigated land. In the 2008 Mid-Term Review of NSDP the rice targets were further revised, and, to support these more ambitious rice development goals, the government increased the budget allocation to rice-related activities, including agricultural and land management, and rural development. Such spending represents about 14 percent of the total budgeted resources of 2006-2010.

Other directives for agricultural development, food security, and poverty alleviation include the National Water Resource Policy, the Strategic Development Plan on Water Resources and Meteorology 2009-2013; Circular No. 3 on Food Security and Nutrition in the Kingdom of Cambodia; the Statement of the Government of Cambodia on the National Fishery Sector Policy; the National Fisheries Sector Policy and Law on Fisheries (2006); the National Program for Household Food Security and Poverty Reduction 2007-2011; the Strategic Framework for Food Security and Nutrition in Cambodia 2008-2012; the National Adaptation Program of Action for Climate Change (NAPA); the Law on Investment and its amendment (1994 and 2003), the Sub-Decree on Mortgage and Transfer of the Right over an Economic Land Concession (2007); and Royal Decree NS/RK/0609/009 (2009) to provide incentives for agricultural development in Cambodia.

Existing Policy Research and Knowledge Gaps

There are several institutes in Cambodia engaged in policy-relevant research, including CDRI and the Supreme National Economic Council (SNEC), Economic Institute of Cambodia (EIC), Cambodia Institute of Development Study (CIDS), Royal University of Agriculture (RUA), Community-Based Natural Resource Management Learning Institute (CBNRM LI), and Non-Governmental Organization (NGO) Forum on Cambodia. Access to policy research reports available in the public domain, however, is very limited, especially for public research institutes and think tanks. This review focuses primarily on the irrigation, agricultural crops, and fisheries and livestock subsectors, though other related areas may also be discussed.

Water-related policy research has covered governance issues, infrastructure, economic returns, and some pilot studies of irrigation schemes. These studies found that low capacity in management and weak institutions are the major constraints in most irrigation schemes. Many irrigation schemes were inappropriately designed, resulting in water scarcity. This leads to imbalanced water distribution and conflict among water users. Some conflicts can be solved within the community, but others need intervention from

provincial and national authorities. The participation of Farmer Water User Community (FWUC) members in irrigation fee payment, maintenance and ownership, and water distribution was found to be critical to successful irrigation management. Comprehensive research on groundwater in Cambodia is not yet available, despite rapid growth in small-scale groundwater extraction. Research is required to better understand the potential for groundwater as a source of water for irrigation, and its capacity to mitigate the impact of drought and climate change on agriculture and food security.

Some research has been conducted on agricultural trade between Cambodia and the Association of Southeast Asian Nations (ASEAN), and between ASEAN and China. Many agricultural commodities such as livestock (pigs, cattle, and buffaloes) and crops (rubber, cassava, maize, soybeans, and rice) are traded. This cross-border trade could help to stabilize market prices and expand markets for Cambodian agricultural produce. However, Cambodia benefits least and is less competitive than the other ASEAN countries in agricultural trade; almost all its commodities are exported as raw products, often through informal trade routes. Thailand and Vietnam have an advantage over Cambodia as they process many of the commodities imported from Cambodia and then sell them on the world market. Thus, value addition through price and other agricultural commodity processing has often gone to Cambodia's neighboring countries.

There are few studies on food security in Cambodia. Less diversification is found in food consumption patterns, as rice accounts for more than two thirds of total calorie intake for an average Cambodian, while fish and meat, respectively, each makes up only 6 percent of total calorie intake. Some studies using food security mapping found that nine provinces have experienced severe food insecurity, and five provinces were observed to have high rates of mortality, underweight, stunting, and wasting. However, these studies were done before 2007, and there is no recent or updated research finding available, making it difficult to target a social safety net program to mitigate vulnerability.

Many policy research studies address inland fisheries in response to the government policy on fisheries sector reform. The performance and sustainability of fisheries co-management is constrained due to overlaps in management authority, inadequate demarcation of resource boundaries, and limited capacity of agencies charged with providing support and enforcement. Resource conflicts are common between fishing communities, and between fisheries and farming communities due to competition over water resource use.

Government policy on the livestock subsector does not provide a strategic plan to guide research and development. While livestock-raising plays an important role in food security and draft power for agricultural production, there is no recent policy research available for it, signifying an urgent need for research to improve the development of this subsector. The socioeconomic study of the livestock subsector should be prioritized.

The impact of climate change on the agricultural sector is a new research area in Cambodia, which explains the very low number of studies on this issue. Climate change has been found to have negative impacts on livelihoods. Household income has been negatively affected by forest clearance for agricultural farming, crop failure due to longer dry season and uneven rainfall, and denied access to forest. Rural and urban people have some knowledge of the effects of climate change on human health and agriculture: people are more susceptible to illness, the weather has become hotter, and floods and rain storms are more frequent, negatively affecting agricultural production. Accordingly, CARDI is screening early head rice variety (short duration variety) which can produce yield in a short time, thereby reducing water requirement.

Future Research Areas

1. Agricultural Development

- 1.1. How should resources be allocated to improve agricultural development and growth? How can agricultural research be expanded to promote agricultural growth? How can research agencies and technology users be more effectively linked? What is the best way to promote and encourage farmers to adopt new production practices to increase productivity and food security?
- 1.2. What appropriate technology and inputs use can increase productivity for small landholders to produce enough and nutritious food for the household? What alternative job opportunities are there to diversify rural income besides farming income to improve livelihoods? How can rice-based farming with limited irrigation capacity be diversified to promote rural livelihood and poverty reduction?
- 1.3. How can the role of the commune council be promoted as the effective means of technology transfer in the community? What are effective training programs to build the capacity of commune councils for their role in technology transfer? How can private sector involvement in technology transfer for producers be promoted? How can institutional and capacity building for extension agencies be strengthened to help farmers increase productivity more effectively? How can more resources be allocated to extension agencies?
- 1.4. What policies would be effective in reducing risk and food insecurity for landless households? What are the risks and challenges of households in the provinces that face severe food insecurity? How can social land concessions for landless and near landless households be made more effective? What are the risks and challenges to food security faced by landless households?
- 1.5. What agricultural technology shift may happen in Cambodia in the future? What is the role of the agricultural sector in future economic growth, employment, rural and urban food security, and poverty reduction?
- 1.6. How can the risks to agricultural production and food security be reduced under the threat of climate change? How can effective groundwater use be designed and promoted to reduce the threat to agricultural land?

2. Rethinking Cambodia's Comparative Advantage in the Rice Sector

Alternative paths for Cambodia to increase its competitiveness in international rice market are needed as an important component of the country's agricultural strategy. It is important to examine the trade-offs between different rice development goals, such as yield increase versus diversified and high quality rice development. This study, including examining local agronomy conditions, potential impacts of climate change on rice area and yield in different agro-ecological zones, enables us to identify the comparative advantages of Cambodia in rice production and exports. Against this background, the following questions can become part of a future study.

- 2.1. What is the most effective way to make rice more profitable for farmers? Is high-input yield production profitable for most small farmers? Are there trade-offs between different rice development goals and cost and returns of public investment to realize them? What are these tradeoffs?

- 2.2. What is the more practical comparative advantage of Cambodia's rice sector? Are there different strategic options in promoting the rice sector, e.g., to promote rice varieties emphasizing superior taste and good quality that can enjoy high price premiums or to promote mass production with high yield but often at low prices? Are there other market niches for Cambodia's rice production potential (e.g. organic production)?
- 2.3. What is the realistic market opportunity for Cambodia's rice exports in the next 5 to 10 years? To understand this question, we must identify the current and future rice export markets, both in enhancing traditional destinations in E.U. and U.S. markets and exploring new and niche markets in emerging Asian economies. In-depth research is also needed to differentiate markets by quality, taste, and consumer preferences. Possible markets with great potential include niche markets of specialty rice and organic rice. Major constraints in market expansion and penetration, such as the lack of a grading system to meet international standards, the lack of market information, and limited transportation capability, need to be addressed. In addition, policies may be needed to improve rural income and promote rice exports. Also, the trade-off between rice exports and national food supply needs to be studied in detail to balance the demands for domestic consumption and exports.
- 2.4. Comprehensive research needs to pay attention to how Cambodia can benefit from rice exports with higher value addition. A value chain approach is necessary. Improving the quality of local rice could reduce the need to import high quality rice and fetch high prices in the international market. Previous value chain analysis has identified several constraints in retaining value within the country, including post-harvest loss, limited and obsolete processing facilities, high transportation cost, lack of storage, and limited rice storage facilities at community level. The new value chain approach should link the rice sector with broad development goals such as rural employment, income growth, food security, nutrition improvement and poverty reduction.
- 2.5. What are the impacts of different rice strategies on poverty, food security, and nutrition? More research is needed to examine the effect of different government support policies on the agricultural sector and on specific crops. To improve rice productivity, it is worthwhile to study Thailand's experience in promoting agricultural research and development (R&D) to improve the quality and taste of rice varieties. Research is also required on evaluating the cost and returns of public investment in different rice development focuses. For example, what's the impact of irrigation construction and maintenance in increasing crop yield and mitigating the negative impact of extreme climate events? In addition, research on the alternative path of Cambodia's rice development needs to take into consideration the impact of different rice development strategies on poverty, food security, and nutrition at the household, regional, and national level.
- 2.6. Crop diversification is an important research area. More attention should be paid to the experiences and lessons of other Southeast Asian countries, for example, upland crops in Thailand and cash crops in Vietnam. Such research should focus not only on production, but also consumption diversification, as experiences from other Southeast Asian countries suggest that diversified food production can lead to consumption diversification, which has helped to improve rural households' nutrition status. The relationship between production diversification, consumption diversification, and nutrition improvement deserves more detailed study in the future. There is a scarcity

of comprehensive analysis on fruits, vegetables, maize, cassava, and other cash crops. Post-harvest loss of crops is also a big issue in Cambodia.

3. Fisheries Development

- 3.1. What are the negative impacts of hydrological changes on fisheries ecology, habitats, and productivity in Cambodia's inland fisheries sector? How can changes in river hydrology and flood regimes be managed to sustain fisheries ecology, habitats, and productivity?
- 3.2. What measures are most needed to improve the benefits of community fishery development in terms of income generation, food security, equity, and poverty alleviation?
- 3.3. How can the roles of relevant agencies (including MAFF, MoE, MoWRAM and MoI) be harmonized and coordinated for more effective management of the fishery sector?
- 3.4. How can aquaculture production be improved to reduce the pressure on inland capture fisheries? How can aquaculture be promoted in rural areas far from inland fisheries to improve animal protein consumption and income?

4. Livestock Development

- 4.1. How can the livestock subsector be promoted to improve rural income and food security? How can crop and livestock production be integrated at the household level? What is the integral relationship between livestock and agricultural production, rural household incomes, and food security? What is the economic return from small-scale livestock producers? What are the major risks and constraints of livestock production faced by rural communities? How can these risks and constraints be mitigated?
- 4.2. How can a livestock market for small scale producers be developed? How can formal trade to expand the livestock market (e.g., cattle, buffaloes) be fostered? What regulations are needed to improve the livestock market?
- 4.3. How can local swine production be improved to supply local market demand? What are the appropriate swine production practices? What risks and constraints do swine producers face? What regulations and policies are in place to minimize the import of pigs and to promote local producers?

5. Water Resources Management

- 5.1. What potential does groundwater hold for irrigation? What are the economic, social, and ecological advantages and disadvantages of using groundwater for agricultural development? What is the economic balance of groundwater between benefits and impact on soil property and fertility in the long run?
- 5.2. How can surface water use efficiency of the existing irrigation scheme be improved? How can surface water users' participation in ownership and effective maintenance of irrigation schemes be strengthened? What is the economic return of investment in irrigation scheme maintenance?
- 5.3. What kinds of conflict exist around water scarcity and water resources allocation, and in what way can these be resolved effectively? In what ways can the share of public investment for irrigation infrastructure rehabilitation and construction be improved and made more effective?

FOOD SECURITY, NUTRITION AND SOCIAL PROTECTION

Exploring effective strategies and policy instruments to achieve food security that is multi-dimensional in nature requires a comprehensive and integrated approach that considers the cross-sector and multi-level nature of the food insecurity problem. Under this approach, food security is defined both at the national and subnational levels (i.e. the macro level) and at the household and individual levels (i.e. the micro level). Macro-level food security refers to the balance of food supply and demand for a particular country or region in which food needs in terms of both quantity and quality can be met through domestic/local production and by available and affordable imports. Micro-level food security is determined by the access to sufficient and nutritious food by the household and all individual members of the household, in addition to other factors affecting individual health and nutrition such as quality of shelter, access to clean drinking water, sanitation, and access to basic health care.

Historical evidence shows that economic growth generally leads to improvement in human nutrition. However, this trickle-down effect can be interrupted at different levels and at different points. The vast differences in the nutrition situation and improvement over time among developing countries with similar average per capita income level show that some countries' growth trickles down more than others', and that some governments have been more successful in leveraging economic growth for better nutrition outcomes, while others were less successful, and a few even failed. Successful countries are those that have developed an effective policy package fostering stable and broad-based income growth benefiting the poor, combined with interventions targeting the most vulnerable population groups. Although policy options are often country-specific, successful countries that share similar initial conditions tend to have common patterns and follow similar pathways.

Recent Achievements in Food Security and Nutrition Improvement

With rapid economic growth, Cambodia has managed to improve food security and reduce poverty during its recent growth period. The speed of poverty reduction in Cambodia is comparable with other successful Asian countries in the past at a similar development stage (e.g., China, Vietnam). The prevalence of undernourishment, an indicator to measure the situation of hunger at the national level, declined from 38 percent in 1992 to 25 percent in 2006, which is similar to the decline in the poverty rate. However, cross-country comparison shows that the prevalence of undernourishment in Cambodia is almost the same as that in Bangladesh and higher than that in India and Lao PDR, although Lao PDR has a lower level of per capita income than Cambodia does.

Cambodia also achieved notable success in reducing child malnutrition over the past two decades. Children under five years of age who are stunted and underweight were 59 percent and 43 percent, respectively, of all children in 1996, and declined to 40 percent and 29 percent in 2008. However, the mortality rate in Cambodia among children under five is high compared with other South and Southeast Asian countries. Although progress in reducing child mortality has gained pace since 2000, still 90 out of 1,000 Cambodian children died from malnutrition, poor health, or other preventable causes in 2008, compared with 117 out of 1,000 in 1990. Obviously, Cambodia is unlikely to meet the fourth Millennium Development Goal, which requires the 1990 mortality rate of children under five to be cut by two-thirds to 40 out of 1,000 by 2015.

The comparison of Cambodia with selected South and Southeast Asian countries including Bangladesh, India, Lao PDR, Thailand, and Vietnam shows that Cambodia's stage of development and food security is similar to that of Lao PDR and Bangladesh today, Vietnam in the early 2000s, and Thailand in the late 1970s. The historical trends show that Cambodia largely followed the pathways of Vietnam and China, where high economic growth has trickled down to contribute to a substantial reduction in hunger and child malnutrition, in contrast to India, where development bypassed the malnourished population. However, the progress of household food security and nutrition improvement has slowed recently in the country. In addition, income inequality has increased along with growth, and the population growth rate is still high. These factors challenge Cambodia's progress toward food security and improved nutrition, especially when economic growth slows down as a consequence of the recent global recession.

Therefore, effective policies, investments, and programs are needed to bring Cambodia back to the successful growth-nutrition pathway. China and Vietnam might serve as examples for how to better leverage growth for food security at the national, regional, and household level, while Bangladesh can be an example for successful interventions to reduce malnutrition effectively, even with moderate growth.

Knowledge gaps and Future Research Areas

The key knowledge, information, and data gaps that we identified are fivefold: (1) lack of monitoring and evaluation systems for performance analysis of existing food security, nutrition, and social protection strategies and policies as well as for their harmonization and coordination at the national and commune level; related to that, (2) lack of information on the return to investments in social protection measures, (3) inadequate evaluation of existing social protection programs, (4) lack of data and evidence to specify the coverage of social protection programs in terms of minimum assistance levels and priority in targeting the most needed geographical areas and economic sectors, and (5) lack of knowledge on the effects of changing agricultural production systems (intensification and diversification in farming, livestock raising, and fishery) on food security and nutrition.

Through the group discussion of the workshop, the following priorities for future research and capacity building were identified to address the above knowledge gaps: (1) analyzing the efficiency of existing social protection programs (including rates-of-return to investments) for evidence-based advocacy in order to evaluate past investments and, based on the lessons learned, to design improved programs and to scale up successful existing programs in the future; (2) establishing a data and information collection platform for social protection program monitoring, evaluation, and more targeted intervention; (3) analyzing the key factors contributing to food insecurity and nutritional deficiencies, devoting particular attention to people's food consumption patterns and food use and utilization customs; (4) analyzing the effects of improved agricultural production systems on food security and nutrition; and (5) analyzing the food security and nutrition impacts of national development policies and interventions such as damming of rivers as well as of external shocks.

Acknowledging the cross-cutting nature of the food security and nutrition problem and the relevance of social protection for its elimination, issues going beyond policies and interventions directly targeting food insecurity were raised in the group discussion. These include the role of education and information; the role of gender; the potential of food fortification, supplementation, and biofortification; the need for detailed, individual

nutrition data; the challenges of agricultural development and related investments including irrigation; the role of local retail food prices and market pricing; and good governance and willingness to streamline policies of ministries and government agencies at different levels.

Some of the knowledge, information, and data gaps and the priorities for future research refer to primary data collection and others to monitoring and evaluation of program implementation. Analytical work in this direction might be best performed by local research institutes and governmental agencies with support from IFPRI. In the areas of food security and nutrition and the link to social protection, research on the following issues should be the focus in the short- and medium-term: (1) region-specific analysis of food consumption patterns, food utilization and feeding practices, and the poverty, hunger, and malnutrition situation in the present, past, and change over time; (2) analysis of the primary and underlying causes of food insecurity and malnutrition at the national, commune, household, and individual level; their interactions; and the synergies to strengthen for improving nutrition outcomes (including aspects such as education, gender, health, migration, economic growth and transformation, and market prices); (3) analysis of the relationships between existing agricultural production systems and food security and people's nutrition and health; (4) determination of the characteristics of the most vulnerable people and evaluation of existing social protection programs in terms of targeting them; (5) analysis of the food security and nutrition impacts of policies, investments, and other interventions as well as of external shocks such as climate change related events and global economic crises; and (6) identification of effective policies, investments, and programs to foster balanced economic development and to improve food security and nutrition outcomes.

The research issues will be addressed using various advanced analytical methods and by combining existing data sources, complemented with evidence from the literature of different professions. Available data sources include the Cambodia Socio-Economic Surveys (CSES), Cambodia Demographic and Health Surveys (DHS), Cambodia Population Censuses, Statistical Yearbooks, National Accounts Statistics, and other sources from national and international agencies.

NATURAL RESOURCES AND CLIMATE CHANGE

Why Natural Resource Governance Matters

Cambodia experienced a decade of rapid economic growth until 2008. Looking forward, it is clear that sustaining growth and extending its benefits to vulnerable segments of the population will require confronting a range of serious risks. Inequality has increased sharply, and lack of assets is a major source of vulnerability for rural households and an important reason why chronic poverty and malnutrition persist. While investments in health, education, rural infrastructure, and microcredit are essential to improving the asset portfolio of vulnerable households, one of the most pressing and immediate needs is to improve security of access to the natural resources that underpin rural livelihoods.

For a rural population still primarily dependent on agriculture, the rapid pace of consolidation in landholding, the widespread nature of land conflicts, and the systemic failure to resolve these conflicts is particularly concerning. Equitable access to natural resources is an important element of the social safety net for poor rural households, especially in a country such as Cambodia where formal social protection programs remain incomplete and state resources to fund them are quite limited. Over the long term, equity in landholding has been demonstrated to contribute significantly to sustained economic growth in the transition from agricultural to advanced industrial economies, as exemplified by cases such as Japan, Taiwan, and South Korea.

Sustaining growth, reducing poverty and strengthening food security in the coming years will require diversifying Cambodia's rural economy and transforming institutional and governance arrangements, building on the country's comparative advantages of abundant land, a still-relatively high quality of natural assets, and inexpensive labor. To date, most of the natural resource sector's contribution to growth is due to exploitation, drawing down on the asset base, rather than sustainable management. The central importance of natural resource governance is its contribution to food security and rural economic development.

Strategic Choices in Natural Resource Governance

There have been important advances in natural resource policies in recent years, notably the suspension or withdrawal of virtually all commercial forestry concessions, and the adoption of regulation to support community fisheries and community forestry, as well as a range of initiatives to increase rural land titling and build capacity to resolve land disputes. But the benefits of these measures have so far paled in comparison to the new risks facing rural communities.

Conflicts over land rights, which include both agricultural and forest land, typically pit poor farmers and forest-dependent communities against politically connected private actors, the military, and/or state agencies. Overlaps in the areas designated for economic land concessions, mining concessions, community managed forest areas, and smallholder agricultural land are fueling renewed local resistance, protest, and conflict. Community organizers and civil society groups that have mobilized to defend resource rights for local users have consistently failed to achieve resolution through the courts and describe an atmosphere of impunity and systematic bias against poor resource users, indigenous groups, and other local communities.

Likewise, in the fisheries sector, despite a dramatic policy shift that reduced the area of commercial concessions in favor of community access in 2000/2001, conflicts

between commercial and subsistence fishers persist, along with a new set of challenges that include competing uses of water and land in the floodplain zone, and the potential impact of new infrastructure, particularly dams. No systematic framework is in place to assess the cumulative environmental and social impacts of new projects, including hydroelectric power projects, irrigation schemes, and mining operations, nor to weigh these objectively against the expected benefits.

The Royal Government's Rectangular Strategy places good governance at its core, and highlights the agricultural sector (including forestry and fisheries) as the first among four "strategic growth rectangles" requiring priority support. Yet, even with such overall policy direction in place, the competition and conflict arising from current and planned natural resource use signals the need for a clearer hierarchy of goals for natural resource governance in relation to economic growth, poverty reduction, food security, livelihood diversification, equity, social stability, and community well-being. Policy dialogue in this domain can be supported by evidence-based research that aims to clarify alternative development scenarios and their implications, drawing on analyses of development trends and experience in Cambodia as well as other developing countries and regions.

Impact of Climate Change

The impacts of climate change on Cambodia do not exclusively come from changes in domestic production. Cambodia is a net rice exporter, so increased world prices could increase the total value of domestic rice produced. On the other hand, however, many farmers do not produce enough rice for their own consumption and they need to purchase food seasonally. For poor agrarian households, negative productivity shocks can simultaneously decrease farm profits and increase food prices, leading to severe decreases in real income that can threaten the livelihood of current and future generations. This was evidenced by research showing that half of Cambodian households reduced food consumption during the 2008 food price crisis. Because of international linkages through trade and prices, any complete analysis of the potential domestic effects of climate change must consider impacts on a global scale.

The food security projections of the International Model for Policy Analysis of Agriculture and Commodities Trade (IMPACT) predict that world rice and maize prices will both be higher under various climate change scenarios. Whereas the world price of maize is more sensitive to different scenarios of global population and income growth, the world rice price is less sensitive in the simulation. Rice and maize yields in the Lower Mekong Region (LMR) are both projected to increase substantially from 2010 to 2050. Rice yield projections are more sensitive to climate change than projections for maize yields. Moreover, the model simulation results show that neither rice nor maize yields are sensitive to different scenarios of population and income growth, indicating inelastic supply response to higher world prices. Cultivated rice area in Southeast Asia is projected to decline from 2010 to 2050, and cultivated maize area is projected to remain mostly unchanged. Neither rice nor maize area appears to be sensitive to different climate change scenarios or to different demographic and economic growth scenarios.

The combined result of yield and area effects is increased maize production by 2050 in Mainland Southeast Asia, a result that is not highly sensitive to climate change or differences in demographic and economic growth. Rice production does not unambiguously increase or decrease in the simulations, and is sensitive to climate change as well as differences in demographic and economic growth. Mainland Southeast Asia as a whole is currently a net rice and maize exporter. The projections indicate the region will

continue to be a net rice exporter under all climate, demographic, and economic scenarios in the model. However, the region will be possibly become a net maize importer by 2050 under all similar scenarios.

The model projections show that food availability in Mainland Southeast Asia will increase under more optimistic scenarios of population and economic growth, but decrease under pessimistic scenarios. Likewise, the number of malnourished children in the region will decrease under more optimistic scenarios of demographic and economic growth, but increase under pessimistic scenarios. In all cases examined, climate change will negatively impact food security outcomes in the region.

As part of future research, there are several possible ways to apply the IMPACT model to better assess the potential impacts of climate change on Cambodian agriculture, trade, and food security. First, IMPACT can be used to generate projections of how the world food economy would react to certain exogenous shocks. For example, the model has been used to test the impacts of improvements in commercial maize productivity, improvements in developing country wheat productivity, a regional drought in South Asia, global improvement in water basin efficiency, and changes to trade policy. Such simulations may be useful for examining policies relevant to Cambodia, for example improvements to rice productivity, or policies banning rice exports when world food prices spike.

Another possibility for future research is to generate projections for agricultural productivity changes using a Regional Climate Model, such as the PRECIS model developed by the Hadley Center for Climate Prediction and Research. For a small country with a small area to coastline ratio, climate projections using a Regional Climate Model (RCM) rather than a Global Climate Model (GCM) offers much better resolution, and more accurate projections of crop productivity. While IMPACT currently uses a GCM to form projections, it could be adapted to use an RCM for certain countries of interest.

A difficult topic throughout the realm of climate modeling is how to deal with changing variability in climate. Currently, the IMPACT model's changes in crop productivity come from long-term changes in mean rainfall and precipitation. Many of Cambodia's concerns over vulnerability of the agricultural sector due to climate change, however, come from the possibility of increasing extreme events such as droughts and floods. Incorporating extreme events and changes in weather variability is currently being discussed by IMPACT developers, and such an improvement may prove very useful in generating projections for countries like Cambodia that are particularly susceptible to both drought and floods.

More research is also required to further identify various impact channels through which both existing climate variability and longer-term climate change may affect food security and future economic development, including economic growth, poverty reduction, and vulnerability at national and subnational levels, and to assess which impact channels are more important in the case of Cambodian agriculture. To accomplish this, an economy-wide computable general equilibrium (CGE) model may be necessary. Such models can assess how the impacts of climate change on energy (including hydropower), rural and coastal infrastructure (including roads), and other sectors that are highly sensitive to the climate change and important to agriculture affect agriculture (including fisheries, livestock and agro-forestry). By incorporating price and yield projections from the IMPACT model, a CGE model can better assess the impact of climate change on the local economy through both domestic and international market channels. This type of research will not only be necessary for understanding the magnitude of climate change impact, but

also helpful for planning future infrastructural investments including development of new irrigation systems. While climate change is a long-term and gradual process, attention will also need to be given to the observed impacts of past extreme weather events (i.e., floods, droughts and windstorms), given that the frequency of such extreme events may increase with climate change. Learning from past experiences of coping with extreme events at community, subnational and national levels will be helpful for designing practical plans and policy interventions addressing adaptation and mitigation measures.

Knowledge Gaps

Three top priority knowledge gaps were identified in the group discussion of the workshop.

1. Linkages between natural resource management, food security, and climate change policy

Policy officials and other policy stakeholders need to better understand the links between natural resources management, food security, and climate change policy. This should be grounded in a perspective that appreciates the existing sources of resilience in agricultural and natural resources management practices in rural Cambodia, and how these can be supported.

2. Options for cross-sectoral coordination in natural resources management

Implementing appropriate natural resources management policies that support rural livelihoods and national food security requires a cross-sectoral approach, integrating water, forests, land, and fisheries management. It also requires taking advantage of the opportunities to strengthen the capacity and effectiveness of local institutions made possible under the decentralization and deconcentration (D&D) reforms. This entails more effective coordination across line ministries, linking to sectors such as energy, education, women's affairs, and rural development. Policy officials and other policy stakeholders need to better understand what is working now to enable such cross-sectoral coordination, and how such efforts can be made more effective and widespread in the future.

3. Evaluation of climate change impact and capacity to conduct such research

A number of well-tested climate models (GCMs) are widely available for use, courtesy of the Intergovernmental Panel on Climate Change (IPCC). While these models are geographically specific, they disagree among themselves as to the degree of change in temperature, and even the direction of change in precipitation, for locations within Cambodia (and elsewhere). While this generates uncertainty as to what outcome we might observe in the future, it at least highlights the importance of flexibility and resiliency.

While the models are available, and the Climate Change Department of the Ministry of the Environment has done extensive crop modeling to evaluate the impact of climate change on rice, gaps in knowledge still exist, such as: 1) the impact of climate change on different crops, fisheries and forests, as well as on other natural resources; 2) research capacity to develop new varieties and to develop or apply agricultural technologies in appropriate manner; and 3) farmer awareness of successful strategies in the use of different technologies in agricultural practices required to adapt to climate change.

While Cambodia does have agricultural extension workers, there appears to be a gap between the number of workers available and the number of workers required.

Priorities for Future Research and Capacity Building

1. What are the advantages and risks of large-scale concessions versus smallholder production systems? Large-scale economic land concessions (ELCs) designed to promote agro-industrial development frequently fail to deliver their promised benefits in Cambodia. They often provoke conflicts with local residents over land ownership and use rights. A range of foreign governments has been actively negotiating long-term agreements to secure agricultural land in Cambodia, and it is not clear how such agreements can be met without further displacing local farmers and forest residents. Other countries have found success with contract farming and related models that allow smallholder producers to retain their land rights while benefiting from the technical advice, inputs, credit, and marketing services of private sector players. Some studies also point to the economic efficiency of smallholder production, and other benefits in terms of equity and food security. Focused analysis is needed on the relative performance of large-scale concessions versus smallholder production systems, the advantages and risks of each, their appropriateness in different contexts, and the sorts of policy interventions that are required.
2. What are the strategic options for management of common pool resources, emphasizing their critical role in local livelihoods? Common pool resources—forests, fisheries, wetlands and coastal waters—are vital to the livelihoods of large numbers of rural Cambodians. But retaining and sustaining these public assets for livelihoods and food security frequently does not get the attention it deserves in policy implementation. Major reforms have been introduced over the past decade, notably the community forestry and community fishery reforms, designed to enable community-based resource management. It is timely to assess what difference these reforms have made in local livelihoods and food security, and what additional measures are required to improve policy implementation, address shortfalls, and extend the benefits.
3. What are the most important ways in which infrastructure development (particularly dams, roads, and irrigation systems) may jeopardize environmental services? What does this imply for local-level resilience and capacity to adapt to climate change and other trends likely to affect food security? How do these cumulative impacts measure against the anticipated economic and social benefits? In what ways can these competing demands be effectively reconciled?
4. What are the likely benefits and risks of future investment in extractive industries, particularly oil and mining? How are these benefits and risks likely to be distributed among different social groups? How will they affect livelihood opportunities and development trends in agriculture, forestry, and fisheries? What international best practices are most appropriate to guide decision-making regarding these investments and the management of resource rents and revenue derived from them?
5. What mechanisms have proven most effective in enabling equitable representation of poor and vulnerable groups in decision making over policy and institutional reform in the natural resource sectors? What lessons from international experience can help advance social inclusion in natural resource governance in Cambodia given its current socio-economic and political conditions?

6. What mechanisms, both formal and informal, are most promising in efforts to improve public accountability of decision makers at commune, district, provincial and national levels regarding decisions over natural resource allocation and management? What roles do grassroots community organizations and networks, NGOs, and the media play in this regard, and how can these be strengthened?
7. What strategies are most effective in building institutions for conflict resolution and justice that are accessible to poor natural resource users? How can linkages between the courts, administrative structures, and informal, alternative dispute resolution processes be improved? What are the lessons of international experience regarding the relative emphasis and sequencing of investments in these different dimensions of conflict resolution?
8. What investments in institutional capacity development are most critical in improving the effectiveness of community based natural resource management initiatives? How can these be better integrated within the newly-empowered decentralized structures for rural development planning? What obstacles need to be addressed to enable a stronger flow of benefits to poor and vulnerable households?
9. How can decision-making over private sector investment be improved? What processes are effective in linking individual project assessments to a broader, strategic assessment of benefits and risks? What strategies are most promising to promote the adoption and implementation of international sector-specific standards and best practices to guide agro-industry, minerals, infrastructure, and energy investments?
10. Can long-term climate change risks and the current challenges of natural resources management and governance be better balanced? Climate change trends pose risks to the food security of poor Cambodians over the long term, while many of the current challenges of natural resources management and governance are more immediate, and potentially more disruptive. Cambodia's food security interventions need to respond to the full range of risks and opportunities. The very high attention that international aid agencies are placing now on financing for climate change mitigation and adaptation should not distract from these other challenges of natural resources management and governance. Instead, an integrated approach focused on risks and opportunities for local-level livelihood resilience and food security is appropriate.
11. Investing in the institutional capacity to conduct climate change research through better linkages to international research centers, such as IRRI, as well as increased support to national institutions, such as CARDI.
12. Identifying the gaps in agricultural extension services, and strengthening the capacity of extension agents. This will likely involve increasing their numbers, increasing their training, and improving linkages with research institutions. It is also worthwhile to explore the efficiency gains that may be available through public-private partnerships in agricultural technology development and extension.

CONCLUSION

Cambodia has achieved significant poverty reduction and food security and nutrition improvement during a period of rapid economic growth. Agriculture has been one of the most important drivers of such growth and will continue to play the important role in the future development process. However, challenges exist in both agricultural growth and nutrition improvement. Policy research and capacity building should focus on addressing these challenges through providing evidence-based analysis that can be conducted jointly between domestic and international policy and research institutions. The summaries provided above cover a wide range of potential areas for future research and capacity building. Based on the stocktaking exercise, and primarily drawing from the recommendations of group discussions of the Roundtable meeting, the following priorities are recommended as focal areas for policy research and capital building in the near future:

1. Rethinking Cambodia's comparative advantages in rice production, identifying alternative paths to increase the competitiveness in the international rice market, and considering the synergies and trade-offs between different rice development goals. It is also necessary to assess the effect of different government support policies on the agricultural sector and on specific crops, including evaluating the cost and returns of public investment in different rice development plans. In addition, research on the alternative paths of rice development needs to take into consideration the impact of different rice development strategies on poverty, food security, and nutrition at the household, regional, and national level.
2. Understanding rice market demand by identifying current and future rice export markets. In-depth research is needed to differentiate markets, including enhancing the traditional markets and exploring new and niche markets. Study is also needed on the major constraints in market expansion and penetration and policies to address these constraints. Research must emphasize the possible trade-offs between rice exports and national food supply, and the required policies to balance domestic demand and exports.
3. Assessing options for agricultural diversification, paying more attention to the experiences and lessons of other Southeast Asian countries. Such research should focus not only on production, but also on consumption diversification, as experiences from other Southeast Asian countries suggest that diversified food production can lead to consumption diversification, which has helped to improve rural households' nutrition status. The relationship between production diversification, consumption diversification, and nutrition improvement deserves more detailed study in the future.
4. Analyzing the causes of food insecurity and nutritional deficiencies, devoting particular attention to people's food consumption patterns, food use and utilization customs, and the relationship between agricultural production systems and food security and nutrition. The food security and nutrition impacts of national development policies and interventions such as damming of rivers, as well as of external shocks should be considered in the research.
5. Establishment of a data and information collection platform for evaluating social protection programs. This also requires practical tools suitable for monitoring and evaluating the efficiency of existing social protection programs in order to scale up successful existing programs, to design improved programs, and to make interventions more targeted in the future.

6. Analyzing the synergies and trade-offs between long-term climate change risks and current challenges of natural resources management and governance. While climate change trends pose risks to the food security of poor Cambodians over the long term, many of the current challenges of natural resources management and governance are more immediate, and potentially more disruptive. Cambodia's food security interventions need to respond to the full range of risks and opportunities. The very high attention that international aid agencies are placing now on financing for climate change mitigation and adaptation should not distract from these other challenges of natural resources management and governance. Instead, an integrated approach focused on risks and opportunities for local-level livelihood resilience and food security is appropriate.
7. Analyzing the advantages and risks of large-scale concessions versus smallholder production systems. Large-scale economic land concessions (ELCs) designed to promote agro-industrial development frequently fail to deliver their promised benefits in Cambodia. A range of foreign governments has been actively negotiating long-term agreements to secure agricultural land in Cambodia, and it is not clear how such agreements can be met without further displacing local farmers and forest residents. Some studies also point to the economic efficiency of smallholder production, and other benefits in terms of equity and food security. Focused analysis is needed on the relative performance of large-scale concessions versus smallholder production systems, the advantages and risks of each, their appropriateness in different contexts, and the sorts of policy interventions that are required.
8. Research on a possible national strategy for management of common pool resources, emphasizing their critical role in local livelihoods. Common pool resources—forests, fisheries, wetlands and coastal waters—are vital to the livelihoods of large numbers of rural Cambodians. Major reforms have been introduced over the past decade, and it is timely to assess what difference these reforms have made in local livelihoods and food security, and what additional measures are required to improve policy implementation, address shortfalls, and extend the benefits.
9. Research on alternative strategies for helping farmers cope with climate change, including recommendations for policy changes and recommendations for new crops, cultivars, and technologies. This also requires identifying the gaps in agricultural extension services against the climate change background, and the alternative interventions to strengthen the capacity of extension agents. Research on climate change should not be done only by international organizations—it is urgent to invest in the local institutional capacity to do such research. This should involve better linkages of government climate agencies to international research centers as well as increased support to national institutions.
10. Research on Regulatory Impact Assessment (RIA) to assess the impacts and effectiveness of policy implementation. This is applicable at all policy levels.

APPENDIX

Appendix 1: Policy Discussion Papers Prepared for the Roundtable Stocktaking Meeting

Vuthy, Theng and Koy Ra (CDRI): Review of Agricultural Policy and Policy Research

Yu, Bingxin and Xinshen Diao (IFPRI): Cambodia's Agricultural Strategy: Future Development Options for the Rice Sector

Ecker, Olivier and Xinshen Diao (IFPRI): Food Security and Nutrition in Cambodia: Patterns and Pathways

Sothorn, Kem (CDRI): Options for Vulnerable Groups: Income Growth and Social Protection

Ratner, Blake D. (IFPRI): Natural Resource Governance and Food Security in Cambodia

Thomas, Timothy S. and Nicholas Magnan (IFPRI): Food Security and Climate Change to 2050: Cambodia

Appendix 2: Presentation at the Roundtable Stocktaking Meeting

Appendix 3: List of Participants