

LEARNING FOR RESILIENCE

INSIGHTS FROM CAMBODIA'S RURAL COMMUNITIES

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Chapter 1 - Learning for social-ecological resilience: conceptual overview and key findings

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CHAPTER 1

LEARNING FOR SOCIAL-ECOLOGICAL RESILIENCE: CONCEPTUAL OVERVIEW AND KEY FINDINGS

Jean-Christophe DIEPART

The land and aquatic systems that form the basis for food security and economic development in Cambodia have changed dramatically over past decades. Under the influence of different social and ecological drivers, these changes comprise a diversity of processes that have interacted across multiple scales, e.g. the gradual change in our climate, the more rapid modifications of land and natural resources tenure regimes, the immediate opportunities and persistent constraints offered by the social-economic transformations of the country, the slow but inexorable degradation of the natural resource base and so on. Usually, these processes are not aligned nor do they proceed in predictable linear fashion (Peluso and Lund 2011); they are often dynamic, surprising, contradictory and usually end in conflict. But they are profound because they affect relationships between people and their environment and result in a repositioning of the role and place of land, natural resources and rural communities in the development of the country.

The research program entitled 'Food Security, Climate Change and Natural Resource Management in Cambodia' has aimed to examine these transformations through a four-year scientific adventure conducted as a joint effort by six institutions. It was conceived as an action-research initiative endeavoring not just to analyze how social-ecological changes affect land use and aquatic systems but also to understand the processes and activities that allow vulnerable people at local level to adapt to these changes while trying to maintain or even improve their food security.

The overall conceptual approach of the research program will be presented below, along with a thematic discussion of the key environmental or governance processes addressed by the authors in this volume.

RESEARCH FRAMEWORK

The focus of our investigations is land use or water systems that we conceptualize as social-ecological systems (SES). Given that they are produced by the interactions between ecosystems and human social economic systems, SES are inevitably in a state of constant flux (Low et al. 1999). In Cambodia, the production and productivity of land- or water-based SES have undergone an important transformation in recent decades: high levels of deforestation have been reported (Hansen et al. 2013, Save Cambodia's Wildlife 2014), there has been a vast movement of agrarian colonization from lowland rice plains to uplands associated with lowland-upland migration (Diepart et al. 2014), as well as land degradation resulting from

poor soil conservation practices (Bai et al. 2008, Seng 2014), and a decline in aquatic habitat quality and thus yield per fisher (Baran 2005).

In common with other countries, Cambodia's SES are subject to change as a result of the inter-related action of different drivers which can be any natural or human-induced factor acting directly or indirectly on the system, i.e. the environment, economy, institutions, demography and culture. We assess these transformations in a multi-scale framework (Figure 1) to capture the high variability in biophysical environments, social-economic activities, and cultural contexts that have triggered them (Cash et al. 2006).

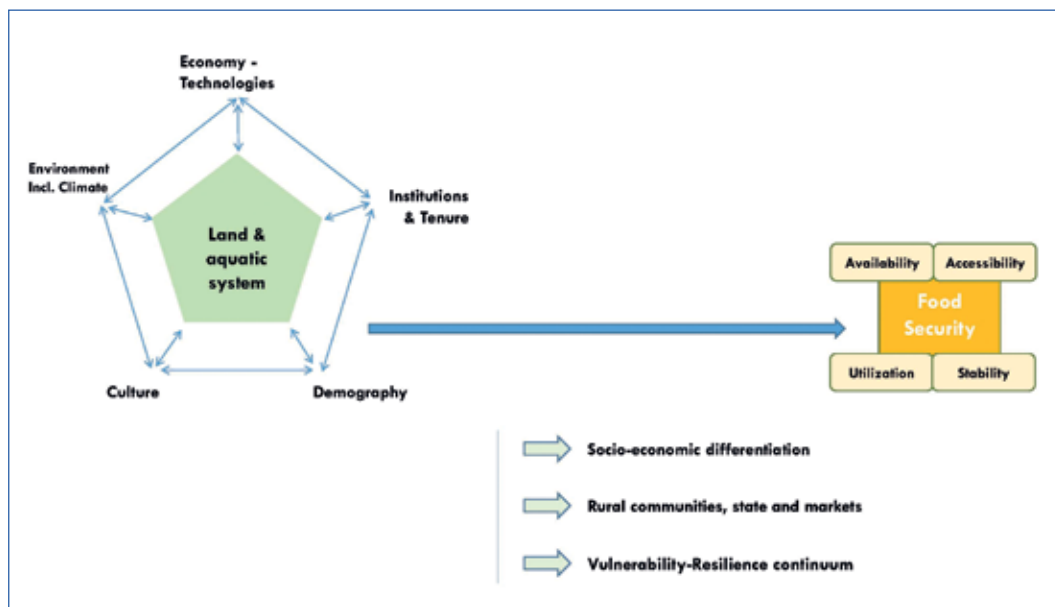


Figure 1: Conceptual research framework

Climate Change

For this study we view climate change as only one driver of environmental change. We therefore assess its effects on SES in conjunction with other drivers. The approach looks at the synergy or the divergence of these various drivers and leads us to recognize multi-scale pathways of change rather than focusing on single driver impacts.

In Cambodia, although there is a plethora of institutions and processes dealing with climate change, the knowledge base that is actually available to address its effects is relatively sparse. As an entry point into the climate change discussion, decision-makers rely on globally or regionally relevant reports from the Intergovernmental Panel on Climate Change (IPCC) (Royal Government of Cambodia 2006). A handy summary of potential impacts can be found in Nang (2013). It is now common knowledge that climate change occurs as a result of changes in the components of the water cycle and a related increase in the frequency of extreme climate events (rainfall causing flood and increases in river run-off, drought, storms, and so on). The IPCC suggests that extreme precipitation events over the wet tropics will very

likely become more intense and more frequent by the end of this century as global mean surface temperature increases (Stocker et al. 2013). At the Mekong basin scale, climate projections suggest that, as early as 2030, total annual run-off from the basin is likely to increase by 21 percent, with increased flooding affecting all parts of the basin and even greater impact in the downstream catchments, i.e. the Tonle Sap catchment of Cambodia (Eastham et al. 2008).

A recurrent theme in the literature is the high vulnerability of Cambodia to climate change due to its relatively low adaptive capacity mostly resulting from the high incidence of poverty and low endowment in physical infrastructure (Yusuf and Francisco 2009). Despite major uncertainties in future climate projection, it is already clear that natural disaster recovery efforts put intense pressure on government budgets; for example, the Royal Government of Cambodia had to request financial intervention from the Asian Development Bank and World Bank to recover from the floods in 2011 (Morton 2014).

Food security

The changes in land and aquatic resource systems primarily influence the lives of local people through their food consumption habits. But households pursue objectives other than the supply of food; they balance short-term nutrition requirements with long-term aspirations such as education, the safeguard of assets, and so on. In most cases, livelihood diversification is their means of reaching these short-term and long-term objectives. We suggest that livelihood security is a necessary and sufficient condition for food security.

With this livelihood perspective in mind (Frankenberger and McCaston 1998), we unpack the elements of food security and address its four components: the availability of food from people's own production or from remote markets; the accessibility to food, which depends on income, knowledge and prices; the utilization of food, which relates to the ability of the human body to convert food into energy or to store it; and the stability of the food supply, which encompasses the capacity to sustain food availability, access and use over short and long periods particularly in the event of stress or shocks (Maxwell and Frankenberger 1992).

In Cambodia, despite the reduction in poverty that has resulted from the economic growth of the past 20 years, food insecurity remains widespread. From 1990/1992 to 2011/2013, the prevalence of undernourishment in the total population dropped from 39.4 percent to 15.4 percent (FAO 2014). However, in the context of demographic growth, the number of people undernourished remains high: in 2013, for instance, 2.2 million people were still poorly nourished (FAO 2014). In a recent poverty assessment, the World Bank shows that, despite a huge drop in the poverty rate between 2004 and 2011 (from 52.3 percent to 20.5 percent), there has been a lack of progress in combating malnutrition. Between 2005 and 2010, the percentage of children classified as 'wasted' actually increased from 8 to 11 (World Bank 2013). Food insecurity remains a central concern in Cambodia, and the paradox persists: food insecurity is a rural problem mostly affecting a farming population whose primary occupation is to produce food for self-consumption.

Research approach

In order to analyze the effects that changes in the land use and aquatic systems have on food security, we refer to three main conceptual points:

Social-economic differentiation

Households are not equally equipped to address, cope with, and adapt to, significant changes occurring in their resource base. An important characteristic of current transformations is the growing inequalities in household wealth and assets. These inequalities are reflected in different income levels and structures, revealing a process of differentiation in the social relations of production (Akram-Lodhi 2007). The rise of agricultural wage labor (World Bank 2013) is, for instance, the direct consequence of a process of land and capital concentration working through market forces or by (violent) dispossession.

To better highlight these processes of social-economic differentiation we asked a number of political economy questions following the classic typology presented by Bernstein (2010): How are the means of production distributed - *who owns what?* What are the social divisions of labor - *who does what?* How does the distribution of the fruits of labor work (in-cash and in-kind income) - *who gets what?* What are the modes of reproduction and re-investment associated with this income - *what do they do with it?*

Rural communities, state and markets

Another dimension of the current transformation is the repositioning of relations between rural households, the state and the markets, particularly as they relate to questions of land and resource tenure. The institutions governing access, use and control of resources are being retooled in ways that pre-empt or follow the commodification of resources or create an institutional pluralism of old and new forms of resource co-management between the state and the users.

To describe these processes we asked a number of questions about resource governance: What is the bundle of rights vested in the different modes of resources access and use - *what can the users do?* Who controls the design and implementation of these rights - *who tells the users what they can do?* What are the contradictions and conflicts between actors and between institutions who grant resource tenure security - *what gives rise to disputes between users and the people who ultimately control the resources on which those users depend?* To answer these questions, we contextualized rural households within networks of actors including business corporations, state representatives, community-based leaders, development agencies and the military.

A vulnerability-resilience continuum

We used the integrative concept of vulnerability to understand the ways in which rural communities and households may be affected by changes in land and aquatic systems. Vulnerability analysis includes three dimensions, namely exposure (the degree to which a system is at risk, and the nature of that risk), sensitivity (the degree to which a system is affected by change) and adaptive capacity (the capacity of the system to adjust to the changes: i.e. the extent of its ability to moderate potential damages and take advantage of opportunities). We opted here for analysis of vulnerability that is place-based and socially differentiated insofar as access to social, political and economic capital affecting the vulnerability is not equally distributed within a social group (Moench 2011, Ribot 2011).

We envisaged the degrees of vulnerability and resilience along a multidimensional continuum of different states (O'Brien et al. 2004). Any change in exposure, sensitivity or adaptive capacity could move SES towards either the vulnerable or the resilient end of the continuum. We viewed resilience of a social-ecological system as its capacity to absorb disturbance and to re-organize while undergoing change (Folke 2006, Walker et al. 2004). Viewed in a continuum, it can be seen that resilience builds on adaptive capacity to facilitate continuous development, like a dynamic adaptive interplay that allows for development prompted by change (Smit and Wandel 2006).

Two elements are central in our approach. First, the position on the continuum is tied to the scale of analysis (Cash et al. 2006, Gibson et al. 2000, O'Brien et al. 2004). For example, national-level assessments may place a country at the resilient end of the continuum, but regional- or local-level analyses might shift some areas towards the vulnerable end. Second, an important factor that can move the system to the resilient end of the continuum is the ability of the actors (with their resource base and institutions) to learn from change and uncertainty and transform their system in a constant state of flux (Berkes and Folke 1998, Gunderson and Holling 2002). The learning processes will provide important clues for policy recommendations bridging multiple scales (Stagl 2007).

SYNTHESIS OF KEY FINDINGS

A rich collection of key findings emerged from the projects in this program. These can be linked within the following overarching themes that form the four sections of this volume.

Water management and agriculture

Significant change in rainfall patterns

Computation of long time-series rainfall data (monthly rainfall from 1920 to 2012) available for Kampong Chhnang and Battambang reveals similar place-based rainfall trends (Chapters 2 and 3). Despite the absence of significant alteration in the total annual rainfall in both sites, statistically significant trends in the rainfall have been observed. First, the dry spell

(months with less than 20 mm of rainfall) has increased from 1 to 3 months over the period 1920-2012. Second, the rainfall distribution has significantly changed from a bi-modal distribution (with two peaks in May/June and September/October) to a mono-modal distribution (one peak in October, but more intense). In Battambang (Chapter 2) the computation of extreme rainfall indices based on daily rainfall records for the period 1980-2012 confirms these changes. Most notably, the annual count of wet days (with precipitation >1mm) has increased. In addition, the annual maximum consecutive five-day precipitation and the annual count of days when rainfall >20-30-50mm are similarly increasing with mode of occurrence in October. This intensification is taking place slowly but steadily and is likely to put these provinces at higher risks of flood in the future.

Multi-level flood vulnerabilities

The flood vulnerability assessment conducted in the Steung Sankgae watershed (Chapter 2) shows to what extent the level and nature of vulnerability depend on the analytical scales used to assess it. At the watershed level, in addition to the normal seasonal flooding on floodplain areas, the survey shows the increasing significance of river-overflow and surface run-off flood. Our results show that upland floods (surface run-off and river-overflow) are also significant and potentially destructive even though they go totally unrecorded in official statistics and plans. At the watershed level, there is no shortage of government bodies and institutions dealing with flood management but there is a clear lack of coordinating mechanisms to deal with flooding. The institutional resilience is low and the capacity of provincial institutions to learn from flood hazards is limited which greatly hinders the reduction of flood vulnerability. At the commune level, the research reveals a diversity of vulnerability profiles which depend on the agro-ecological context in which the communes are situated and the proximity of the commune to the provincial center (which has a clear, positive effect on commune levels of adaptive capacity). At the household level, vulnerability is highly variable within each commune as a result of inequalities in access to land and in people's capacity to maintain food security with non-farming activities. Non-agricultural responses to floods are predominant and are usually short-term responses to cope right after the flood. These responses include access to credit, sale of household assets and change in labor. In most cases these reactions to flood do not reduce vulnerability but actually reinforce it over the long term as household assets are surrendered.

This assessment methodology provides nested pictures of vulnerability at different levels and scales and we argue that a dialogue between these levels and scales is necessary to understand the cause and nature of the vulnerability and to act to reduce it. Based on these different typologies of vulnerability this approach permits recommendations to be formulated that would help to reduce vulnerability through better horizontal and vertical integration of institutions, agencies, and effective collective action.

Convergence between climate change and the agricultural modernization agenda

Because flood occurrence is highly correlated with rainfall, cropping activities (specifically those related to rice) have been at increasing risk in the period September/October (primarily through crop destruction by flood). The farmers are aware of these changes in rainfall distribution even if they do not relate them directly to 'climate change' of which their technical knowledge might be limited (Chapters 2 and 3). An effective adaptation has taken the form of new cropping calendars to avoid the September/October peak, which farmers report is now too risky for rice cultivation. In areas where the agro-ecology makes it possible, the adoption of early season rice varieties and the intensification of the rice cropping system from March to June has provided a solution. The cultivation of non-photoperiod sensitive early season rice has been trialed by farmers for years. This has particularly been the case where cultivation can be conducted close to villages and in areas where access to water is easier through communal or private ponds, and soil fertility can be more easily maintained through manure (Pillot 2007).

More recently, in an effort to boost rice production and exports, the government has strongly supported the dissemination of non-photoperiod sensitive high-yielding rice varieties. These are well suited to early season or dry season cultivation (Royal Government of Cambodia 2005, Royal Government of Cambodia 2010). The convergence between environmental and agricultural development policy drivers is noteworthy and can partly explain why early season agriculture has developed at such a fast rate in Cambodia. But one should keep in mind the agenda behind what is presented as 'climate friendly' rice varieties. These 'new' rice cropping practices are actually the vehicle for a 'green-revolution' in the form of agricultural development. This modernization path has, however, important social-economic consequences. Farmers are not equally equipped to adopt high-yielding rice varieties: they need appropriate access to water and the necessary upfront capital to invest in all the chemical inputs required, and many do not enjoy these advantages. The social-economic changes that were so well-documented at the start of the green-revolution in the 1980s (Dufumier 2006, Pingali et al. 1997) are crystalized in Cambodia in that the process of innovation has excluded a significant section of the poor peasantry and has reinforced an on-going social-economic differentiation process between an emerging class of successful farmers and the 'proletarianization' of peasants who are forced out of the agricultural sector. This process is documented in both Chapters 2 and 3.

Inadequate water governance in Steung Chrey Bak catchment

In previous years, water management in Cambodia was relatively unproblematic because water resources were adequate relative to the needs of farmers. But the progression of rice intensification, coupled with demographic increase and lowland-upland migration, has increased the need for water to be better managed and allocated. To tackle new challenges, particularly the increased competition for water resulting from agricultural intensification and from a reshuffling of the cropping calendar, the government has promoted the establishment of Farmer Water User Communities (FWUCs). But as the Kampong Chhnang

investigation showed (Chapter 3), most of the FWUCs in Steung Chrey Bak catchment are dysfunctional, and are failing to address the multiple issues of water governance - and the attendant conflicts - or to support adaptive water management in the face of social-ecological change. This limited performance is largely due to the incomplete devolution of rights and responsibilities which has meant that these new institutions have insufficient accountability to the communities they are established to serve. Effective use of devolved water management institutions will require more diverse and effective participation of local resource users and NGOs (horizontal integration) coupled with better vertical integration and cooperation between levels of government involved in Cambodian water management.

Agricultural innovation and food security

The multi-purpose farming system (MPF) is an alternative to the rice intensification model inspired by the green-revolution. MPF is formulated according to agro-ecological principles and is being promoted by various actors across the country. Yet this farming system has never really been analyzed in agro-economic terms, and the positive and negative elements of adoption have never been properly aired. The fourth chapter of this volume aims to fill this knowledge gap.

Comparing agro-economic results for MPF and a conventional farming system, the authors show that MPF is not only sound from an environmental point of view, but also makes sense from an economic standpoint. In a wider perspective, it can also promote rural development. When implemented according to agro-ecological principles, MPF demonstrates significant gains in productivity (higher yield), efficiency (lower costs) and profitability (higher value-added) compared with conventional mono-cropping rice-based farming. Furthermore, MPF offers more regular use of labor throughout the year and also, by reducing the need for migration, supports a more cohesive social network. These advantages translate into a significant improvement in total family income.

Multi-purpose farming is sometimes presented as a climate-smart solution for agriculture because it reduces the risks associated with climate variations and extreme conditions. It is, however, not a panacea, and financial and knowledge barriers remain. For it to be fully successful, a co-learning approach between innovative farmers, and field practitioners and supporters is required. The model needs to undergo place-specific trials and experimentation and to evolve within specific social-ecological contexts. Experience shows that the system works if there is adequate support and if farmers are able to experiment and innovate through their own logic. The benefits offered by MPF go beyond agricultural production, food security and climate resilience. Unlike the green-revolution intensification model, the rules of which are determined by global agro-business actors and their technologies, MPF allows for innovation whereby decisions relating to production and consumption are made by the farmers themselves.

Land use change and food security in territories populated by indigenous people

Agrarian expansion onto the uplands

Over the past 15 years, Cambodia has seen dramatic changes in land use in the peripheral upland areas of the country. Various contributions in this volume have identified and documented three main pathways of land use change.

First is farmer-driven agricultural expansion from the lowlands of the central rice plain towards the peripheral uplands. This movement has led to massive deforestation associated with the creation of a new agrarian system based on subsistence and commercial crop production. Land pioneering into peripheral uplands has been associated with voluntary in-migration of a very large population from across the country. This migrant population comes particularly from the rice plain provinces where an increasing population density has outstripped the capacity of farmers to secure livelihoods based solely on rice production. This is significant in communities studied in Chapter 5.

Second, the colonization of upland forest can also be the result of agro-industrial economic land concessions granted to companies with agro-industrial (rubber, cashew) or mining (iron, bauxite, molybdenum, and so on) interests. These agrarian transformations reflect the integration of the Cambodian state and rural economy into supra-national agricultural markets dominated by agro-industrial groups. In a wider economic context, the setting for this transformation is the inclusion of this area within the Greater Mekong Subregion development corridors along with Thailand, Vietnam, Lao PDR, Myanmar, and the Yunnan province and Guangxi Zhuang autonomous region of China. Economic and mineral mining concessions are hotly debated and contested, generating conflict with local communities who have historically-rooted land and natural resource tenure arrangements. The communities studied in Chapter 5 have evolved in this context.

Third, the establishment of Protected Areas for the conservation of natural resources is another driver of land use change. By fixing a forest protection enclosure, the establishment of Protected Areas has forced the relocation of indigenous people in some instances. Very often it has resulted in a sharp decrease in the land available for swidden agriculture and has forced the people affected to convert from rotational to permanent agricultural systems. The communities studied in Chapter 6 have evolved in this context. Forced migrations have historic antecedents as ethnic minority groups were forced out of their swidden land during US bombing raids and Khmer Rouge rule some decades ago. Indeed, migration has been a way of life for some groups for the past 40 years. However, the analyses show the growing tensions between the state-sponsored projects and these groups who have always wanted a swift return to their swidden land. Community resilience is a key dimension of these land use change pathways.

Livelihood transitions emerging from land and natural resource commodification

Against the backdrop of agricultural growth promoted by land expansions, booming cash-crop cultivation and massive in-migration, the authors of Chapter 5 show that cash income has become a much more important element in the total income of the people involved. People are increasingly affected by the market economy, which exposes them to price fluctuations and rapid social mobility, upward and downward, that works to a large extent through land markets.

The authors show that the decline in resource availability has resulted in a sharp increase in wage labor. This actually reflects the social-economic differentiation between households and in particular the polarization of land/capital and labor, and suggests the deepening of income disparity within communities. On the one hand, a group of efficient and productive households is emerging, and they now have large land holdings, machinery and a high degree of access to agricultural markets. On the other hand, we found dispossessed households who have now become heavily reliant on wage labor and common pool resources to meet their basic food security threshold. However, there are important differences in this development pathway from one village to another. In areas where community mobilization to protect land rights is stronger, the process of differentiation is less pronounced. This suggests that social mobilization and struggle have an impact in acting as a buffer against the income disparities that emerge from the commoditization of resources.

Livelihood and land tenure transitions emerging from Protected Area management

In Chapter 6, the authors show another picture of livelihood transitions. In this, people have been dispossessed of swidden land as a result of the formation of state-sponsored Protected Areas. The transition in livelihoods here is exemplified by a change from the swidden-based household production system into several composite swidden systems. Prompted by choice or by constraints, and exhibiting different degrees of transformation, these may, for example, take the form of permanent small-scale cashew plantations on uplands and/or rice production on lowlands.

Against this backdrop, the authors show that households who have tried to (partly) maintain swidden agriculture in their livelihood diversification portfolio are better positioned to maintain or improve their food security status. The research also reveals that the imposition of the national parks and the fixing of the population on the lowland paddies have resulted in the fragmentation of collective tenure arrangements prevailing under a swidden system. The fragmentation occurs with increased state control through Protected Area management and the individualization of property rights on privately owned land for permanent agriculture. Efforts currently conducted as part of Protected Area co-management are not addressing the core issues of these transformations or the resulting social fragmentation.

Environmental change in fishing communities

Degradation of aquatic resource systems

In the context of post-war, loosely-regulated natural resources management, fisheries-dependent social-ecological systems have been under great pressures. Fish habitats have been severely degraded due to illegal and destructive fishing practices (which can be defined as a proximate cause) and to conflicting economic activities (sand mining, tourism, deforestation) or inadequate coordination and implementation of sustainable fisheries management efforts (which constitute underlying causes).

Climate change is manifest and its effects for fisher folk have been significant. Saltwater intrusion from higher tidal surge has reduced the rice and fish yields from coastal ponds and paddies. Heavy rains allow for fresh water run-off reducing salinity and forcing fish into deeper waters or increasing mortality of sessile organisms such as snails and shellfish. Floods and drought affect the agricultural productivity of land, which is such an important production asset to inland and coastal fishing communities. The different case studies have shown, however, that climate is not the most critical driver of change (Chapters 7, 8 and 9). It actually adds more risks and uncertainty to livelihoods that are already being affected by a decline in fisheries resources, which we see as a mostly institutional problem.

Pathways of change at household level

Changes in fisheries resources systems - i.e. degradation - affect households in different ways according to their assets, their capacity to cope and adapt, and the degree to which they are reliant on fisheries resources. A common theme running through Chapters 7, 8 and 9 is that households, rather than community-based organizations, are the most important actors in addressing the degradation of fisheries resources. They do this through diversifying their production and income generating activities.

But the diversification pathways followed by households are multiple and engage them in different types of relations with natural resources. This multiplicity depends on the wealth, resources endowment, and the demographic structure of the household, as well as the skills and the networked opportunities to which they have access. In coping with declining fish stocks, people have tended to turn to non-fishing livelihood activities to maintain their income. This change is, however, more often the result of the ineffectiveness of national-local fisheries resources management rather than a deliberate move out of fishing.

Associated with the decline of fisheries resources in inland and coastal fisheries systems is an increasing reliance on wage labor, especially in the extent to which it is associated with indebtedness (going into debt usually forces households into wage labor). The increase in wage labor is an important rural transformation in contemporary Cambodia (World Bank 2013), echoing a trend throughout Asia (Wiggins and Keats 2014). However, despite the widespread enthusiasm for increasing wage revenue our results show that going into wage

labor is very often a desperate, last resort to make ends meet and not a sustainable path to upward social mobility. Wage labor is often associated with the surrendering of personal or family assets, and an associated loss in the means of production, which exacerbates a process of social differentiation within the community. In contrast, adaptation mechanisms that are more likely to position households on a path of upwards social mobility in the context of fisheries resources degradation are those that allow for self-employment in non-farm activities (e.g. transport, trade, handicrafts, and petty commodity shops).

Institutional and community responses to environmental change

Over the past 10-15 years, the degradation of fisheries resources has encouraged the devolution of rights and responsibilities to communities for the management of inland and coastal fisheries resources across the country (Community Fisheries and Community Protected Areas in coastal regions). Co-management principles between communities and the state govern the management of these schemes.

Community Fisheries operate under the jurisdiction of the Fisheries Administration, but the legislation and institutions put in place actually give little scope for a real community-based approach to resources management. The contributions to this volume have identified several limitations. First a one-size-fits-all mainstream approach, which was promoted to develop co-management institutions (regulation, management plans and so on) has tended to leave the communities involved with little flexibility in terms of crafting new institutions to respond to their specific, local social-ecological systems. This has limited their resilience to environmental changes (Chapter 9). Second, through a mainstream approach, devolution to local level has been incomplete in that it has not been followed by a transfer of power that would allow communities to be the real owners and stewards of their resources (Chapters 7 and 9). Third, under these co-management schemes, resource extraction is restricted to traditional and non-commercial activities, thus depriving the state Community Fisheries of revenue. The imbalance is clear in that all the costs of organization and protection are incurred by communities while they have no opportunity to generate financial benefits (Chapters 7 and 9). Fourth, social-ecological systems managed by communities are essentially multi-functional areas in that farming activities are combined with access to, and use of, common pool resources. But the co-management schemes promoted by the government do not address this, and have only a narrow focus on fisheries management, conservation and aquaculture (Chapter 9).

In this context, Community Fisheries are poorly equipped to address the growing tensions and contradictions that exist between decentralized resource conservation policies and the resource development policies of the government that directly promote the commoditization of resources. Communities have come to depend on all kinds of external interventions and support from donors and NGOs. For example, donors have been beneficial to communities in terms of promoting good governance and in the provision of financial resources: they have helped to increase productivity. But where they have withdrawn, fundamental weaknesses have been revealed in the co-management institutions that were put in place.

Our study shows that community-based conservation initiatives that are sustainable are those that have evolved over time and are nurtured within some form of endogenous community initiative. These leave an institutional space for flexibility and for generating options: by promoting a learning-by-doing (passive adaptive) style of management they allow for some experimentation which enables initiatives to emerge that best suit specific needs. The case documented in Chapter 8 records the interest shown by residents of a Coastal Protected Area in establishing a community-managed eco-tourism resort to take advantage of the tourist influx into coastal Cambodia. This initiative further demonstrates a desire to move away from a strict reliance on fisheries resources as a means of income generation, and the benefits this approach can offer.

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