Research article

Mechanism toward Resilience Building in the Face of Climate Change: A Review for Cambodian Rural Communities

NIMUL CHUN*
Faculty of Agriculture, Svay Rieng University, Svay Rieng Province, Cambodia
Email: chun_nimul@hotmail.com

Received 22 November 2015 Accepted 11 April 2016 (*Corresponding Author)

Abstract The article discusses the current climatic situations in Cambodia and existing mechanisms of the country to address climate change (CC) and the level of rural communities being able to adapt to CC. Reviews of various CC related documents indicate that structures and mechanisms at national level to address CC are adequate but limited at community level. The existence of the structures is beneficial to local people unless the adaptive capacity is enhanced with sufficient technological alternatives, implications and applications with wider sector involvement and a decentralization system. An emerging barrier to resilient building of community and the country is limited of fiscal decentralization as the current financial sources for CC resilient building are solely dependent on external funds for decades while these sources are declining. Additionally, informational, technical and managerial inputs are still strongly required for local communities in order to ensure that the least consequences of any occurred climatic hazards can be obtained. Involving private sector would, therefore, be a good option for local communities in the future provided that private investors have skills to effectively manage rural infrastructures, for example irrigation systems.

Keywords rural development, climate change mechanism, environment

INTRODUCTION

In the year 2012, Cambodia was ranked as the 26th most vulnerable country to CC in the world (Kreft and Eckstein, 2013). In 2011, Cambodia was ranked as the 10th most affected country in the world with more than 250 people being killed as a result of flooding (Kreft and Eckstein, 2012) and 270,000 hectares of cultivated land being destroyed, affecting more than 50,000 households (Wise, 2012). Despite being a fairly-small country (181,035 km^2), the temperature in the year 2030 is estimated to vary greatly per its geographical location with the average increase of about 2^{0}C (MoE et al., 2011). The variation in these conditions makes the country's level of vulnerability differ as well. Despite being in a high level of vulnerability, the country has paid attention to the problems of CC only in the last decade. Since early 2010, CC concepts have been integrated into several new emerging national programmes and onto the development agendas of more state institutions and civil societies development organizations, including National Strategic Development Plan (NSDP), Rectangular Strategy Phase II (Pheakdey, 2013), and Sub-National Reform Strategy. These concepts are eventually in the Cambodia Climate Change Strategic Plan 2014-2023 (RGC, 2013). These have been added to the CC resilience building agenda for the country at both national and sub-national levels. Despite CC concepts being arguably captured and integrated into various policy documents at national level with some tangible accomplishments to be proud of; exposure, sensitivity and adaptive capacity of local communities to CC have posted continuous questions and doubts.

© *ISERD*

OBJECTIVE

The purpose of this paper is to explore the extent to which local communities are ready to face up to the upcoming repercussions of the ever-changing climate. The objectives of the article are to provide an overall understanding on climate change issues and impacts on rural livelihood, to explore and assess the existing mechanisms to cope and build rural community capacity and resilience in the face of CC in rural communities in Cambodia.

METHODOLOGY

Literature reviews in combination with actual experience working in the field of climate change is a method being used for preparing this study. Various documents including research articles, government policy documents and project implementation reports of related institutions on climate resilience and mechanism had been consulted. The information relevant to climate change policy, studies, and decentralization and deconcentration (D&D) policies and mechanisms of three main stakeholders; Cambodian governments, development partners and civil society organisations; was gathered and synthesized so that insights of climatic issues and responses can be revealed and appropriate measures can be suggested. Prior to the analysis, the socio-economic context, particularly poverty and responses of rural people was studied to determine the relationships of climate change impacts on rural livelihood and effectiveness of the existing measures can be identified. From these associations, the possible approaches would be able to propose.

RESULTS

Cambodia Rural Livelihood

Agriculture and natural resources: In Cambodia, there is still a majority of poor inhabitants residing in rural area with agriculture as their main occupation, employing more than half of the country's labour force. Rice production, covering more than 80% of total cultivated land areas, is the most dominant crop. Nearly 80% rural families are rice farmers. Rice production contributed 10% of country's total export commodities in 2007 (Yu and Diao, 2011). Fishing is also an important part of rural people's daily life. Nearly 80% of Cambodian animal protein consumption is from fish (Hortle, 2007). Animal husbandry is one of the key drivers in rural livelihood, contributing to 7.6% of GDP. Cattle and buffaloes are the biggest share of the sector with nearly 80% of the total animals in the country (FAO, 2004) and number of animals in 2009 was 29 million being known as not only the source of draught forces but also savings (Bansok et al., 2011). Forestry is a subsistence source of livelihood for nearly 80% of the population in rural areas. However, the pressure being put on these forest areas by economic land concessions is gradually putting the livelihood of the rural people under threat (Bansok et al., 2011).

Poverty and migration: Poverty and inequality are still rampant in Cambodia. Poverty rate was reported to be around 25.8% in 2010 of which 91.1% of them were residing in rural areas (MoP, 2010) and the figure was 20.5% in the year 2011 (The World Bank, 2013). Despite the small proportion of the poor, the group that is sensitive to poverty is proportionally large, i.e. a small change in consumption should bring 41% of the rural people back into the group under the poverty line (The World Bank, 2013). The vulnerability of the rural people is very high as low income is unable to cope with natural shocks and migration to other parts of Cambodia and abroad is a kind of an autonomously adaptive mechanism to disaster events (Bylander, 2013). Floods caused migration as in the floods of year 2011, which caused around 9% of rural poor migrated to obtain jobs (RGC, 2012). This would be

© ISERD

greater in the near future because of the upsurge of rural labour forces and less available land for agricultural production due to economic land concessions (Scheidel, 2013).

Impacts of Climate Change

Direct impacts of natural phenomena such as storms, floods and droughts are significant. Typhoon Ketsana in 2009 resulted in large damages and losses. For rural road alone, the costs were estimated to be about USD 28 million (RGC, 2010). The adverse effect of the 2011 flood on rural infrastructure was one of the worst impacts in Cambodia's recent history resulting in immense damages on rural infrastructures (Wise, 2012). In addition to floods, droughts have been found to have the most frequent effect on rural people despite being paid less attention from related state authorities (UNDP, 2010). CC has a strong association with rural livelihood. Any changes can make profound impacts on food security and way of life in the rural areas. For example, changes in rainfalls and temperatures have a significant impact on productivity of rainfed rice (Mainuddin et al., 2012), resulting in decreasing rice yield (Johnston et al., 2010). The effect is even worse as agricultural production in rural areas generally depends mainly on rainfall and only 18% of the cultivated land areas have irrigation systems (Yu and Diao, 2011). Animal husbandry is reported to be sensitive to changes in temperature (Jhonston et al., 2010). Infections and diseases are more likely to occur (Seo and Mendelsohn, 2007), especially during the hottest period of the year (Bansok, 2011). All of these have made people think that agriculture is not a good choice (Bylander, 2013). These factors have made rural people greatly vulnerable to the impacts of CC as their adaptive capacity is weak (Gallopin, 2006).

Climate Change Adaptation Mechanism

National adaptation mechanism: Adaptive mechanism to CC in Cambodia is complicated with overlapping roles of institutions. The most well-known institution dealing with disaster and risk reduction is National Committee for Disaster Management (NCDM), albeit having limited authorities and budgets for implementation. A number of state institutions have declared that they have the mandates to tackle the issues. In late 2006, the National Climate Change Committee was established with a coordinating body under Ministry of Environment and a number of state institutions as members including the Ministry of Agriculture, Forestry and Fishery, Ministry of Water Resources, and Meteorology, Ministry of Health and Ministry of Planning as implementing agencies. Another agency is Ministry of Interior that involves mainly with deconcentration and decentralization reform (CCCN, 2014). The Ministry of Interior is leading a nationwide reforming programme of the country and is also involved in the process of integrating CC concepts into local authority plans and budgets. The state budget has channelled funding to local level authorities through this programme (Kimchoeun, 2011). Despite having a coordinating institution, the actual process in coordinating is difficult and time consuming.

Sub-national level mechanism: There is no specific study spelling out the mechanism at sub-national level in response to CC, except the common state administrative system; national, provincial, district, community, and village level. Each administrative area can have a chance to be supported on the topic of CC unless the area has been included in any CC programmes or projects. Apart from this common administrative structure, the system being used to respond to climatic hazards of the National Committee for Disaster Management and the CC capacity building of Ministry of Environment is almost the same to the existing administrative system of the government.

Non-governmental organizations: Non-Governmental Organizations and Civil Society Organizations are playing a major role in developing rural areas and communities. International development organizations coordinate for financial support, implement climate change related projects and advocate the establishment of policy documents. These organizations include UNDP, the World Bank, Asia Development Bank, DANIDA, IFRC-RCS, SIDA, Plan Cambodia, and Oxfam (AIT, 2010). The

© ISERD

organizations provide financial, technical, and policy advocacy in the country. Local organizations make proposals for financial support from these international development organizations to implement projects at community level.

Community Mechanism and Resilience

Sovacool et al. (2012) have indicated four domains of CC resilience: institutional, capacity, financial, and infrastructural; that should be included in any development project implementation. These four domains have been so far accomplished to some extent. Insight analyses of these domains depicting the level to which local communities that are capable to adaptation and being resilient to CC are provided below.

Institutional resilience: Cambodia has made its progress in sub-national reform. In the year 2001, a Commune, Sangkat Law, was established to decentralize the state authorities to local authorities. Another move was made in 2008 as the establishment of Organic Law giving birth to the deconcentration reform making the district and provincial levels closer to community level rather than national level (Niazi, 2011). Apart from the administrative reform, the efforts in integrating CC concepts at grassroot level have already been framed and legalized to some extent. These include the establishment of livelihood based groups, such as water user groups, livelihood improvement groups, and farmer water user groups at community level. However, these groups are not in a good position to respond to the challenge of climatic events in a broader perspective because their capacities are at the stage of requiring further supports, including technical, managerial and financial. Moreover, these groups minimally contribute to their livelihoods (Conan et al., 2013; UNDP, 2013a; Silva et al., 2013). In this regard, a number of established local organizations are unable to survive long after their support has ended. Additionally, poor governance in almost all sectors at all management levels is observed rampant and is hindered the country's sustainable development (Nguyen et al., 2010).

Capacity resilience: Institutional and individual capacity of Cambodian rural communities is weak. Cambodia is ranked as the 138th in the world Human Development Index (UNDP, 2013b). According to MoE et al. (2011), the Human Development Index of each province varies greatly based on location. Knowledge on CC is found to be limited among villagers who find it difficult to define and information regarding their problems for practical purposes. This has brought another barrier for local community to respond to CC as they have limited and irregular sources of information about the coming weather related events from Early Warning System or responsible institutions (CCCN, 2014). Without proper information and institutional support, the capacity of rural communities tends to be weak putting them at immense risk, particularly the poor and the near poor. In addition, the adaptive capacity of the communities is limited. These require continuous technical support to strengthen the capacity for both individual and communities.

Financial resilience: As the people of the country become aware of the concept of CC and external funding for providing this issue is more available, there is a shift in conventional development focus of NGOs toward CC resilience building and adaptation. One major concern of finance is that external sources contributed nearly 90% of the country's development investment since 2005 (Sato et al., 2011). The current external support of CC finance is reported to be worth about US$ 655.6 million out of which US$ 338.8 million has been disbursed and US$ 316.8 million is for the years 2014-2020 (Pheakdey, 2013). A decentralized system should have been a long-term source of budget for local development. However, fiscal decentralization is not in place for implementation (Kimchuen, 2011). Though, there is room for collective actions for communities - including water user groups, farmer water user groups and livelihood improvement groups - in mobilizing local resources for specific purposes. However, the groups are either more self-dependent or rely more on support of non-governmental organizations that are themselves generally facing the problem of viability. These have given the authorities limited financial solutions toward both conventional development needs and consequences of climatic events.

© *ISERD*

Infrastructural resilience: The majority of Cambodian rural infrastructures are designed for normal situations without consideration for climate hazards or natural phenomenon. As a result, these infrastructures can be damaged easily. According to RGC (2010), poor quality of foundations and subgrades, prolonged wet conditions and poor standard of designs, e.g. inadequate drainage systems are identified as factors contributing to rural roads being unable to withstand bad weather. The concept of climate resilience infrastructure has been newly introduced into various sector infrastructure developments. Climate resilient infrastructure projects are being integrated into various related Ministries with the support of Project for Piloting the Climate Resilience (PPCR) that allocates budget of US$86 million to improve the climate resilience of Cambodia's core sectors. This includes water management, agriculture, and rural infrastructure as well as institutional capacity development (CIF, 2012). There is no other sign of allowing for CC integration into the infrastructure development of the country.

DISCUSSION

Despite availability of provision for good CC structures and mechanisms at national level, and for decentralization and de-concentration systems at sub-national level, there are still major concerns regarding financial, capacity and infrastructural resilience building. Considering poor governance and management at all levels, in combination with dependence on external sources of finance, it is hard to forecast a strong future for Cambodian rural communities (Hill and Menon, 2013; Nguyen et al., 2011). This has become worse with the rural infrastructures being insensitive to environmental shocks and weak individual capacity. It will be difficult to reverse this situation because external funding is going to decline over time. The situation could become better when there are proper financial mechanisms to provide adequate sources of investment in each community and the introduction and implementation of fiscal decentralization. By making this reform, communities would be able to mobilize local resources and be able to respond immediately to the occurrence of any climatic disasters. This does not necessarily mean that the problem of making provision for CC in the future is insurmountable. Administrative reform in enhancing a community based taxation system, encouraging safe migration as an additional source of funds replacing agriculture, and strengthening the ecological system as a secondary source of livelihood would mitigate the problem. The concern related to water shortage could be solved by enhancing small scale irrigation systems. This would bring back community capacity to systematically cope with CC nationwide. For example, a government program on micro-finance credits – with low interest rates to involve more private sector participation to invest in the water sector – would help farmers escape from the water shortage which occurs frequently in Cambodia. Being aware of the possibility of natural disasters happening and being ready to respond to disasters should be encouraged. Farmers or local people should have adequate and accessible to information and knowledge on how risks can be mitigated. This needs more attention to the existence of CC and more understanding of the problems by both national and sub-national level of CC related institutions.

CONCLUSION

Cambodian rural communities are facing barriers in coping with CC with very limited resources including financial, capacity and infrastructure, albeit institutional mechanism slightly strengthened lately. Programmes based on *ad hoc* supports will not improve the situation since the financial and technical capacity of local people varies so greatly from one location to another. Construction and maintenance of irrigation systems and climatic event information dissemination need to be done regularly. As migration is the farmers' coping mechanism in response to environmental shocks, it measures to ensure that migration is safe for them is required. Additionally, natural resources

© *ISERD*

conservation is significant because migrants utilize natural resources as part of their livelihood activities. It would, therefore, be better for the farmers to be trained to be resilient so that all livelihood activities - including agriculture, forestry, animal husbandry, water and provision of climatic information - can properly interact and all the farmers and villagers can be reliably informed. In the face of CC and limited financial resources, fiscal decentralization for creating local sources of funds and encouraging private sector participation would be optimal for community people to give them freedom in choosing solutions to tackling the issues though technical and managerial supports should never be left out of the agenda.

REFERENCES

AIT. 2010. Scoping assessment for national implementation in Cambodia-Summary. Asian Institute of Technology and Adaptation Knowledge Platform for Asia, Bangkok, Thailand.

Bansok, R., Phirun, N. and Chhun, C. 2011. Agricultural development and climate change, The case of Cambodia. Cambodia Development Resource Institute. Working Paper Series No. 64. Phnom Penh, Cambodia.

Bylander, M. 2013. Depending on the sky: Environmental distress, migration, and coping in rural Cambodia. International Migration. John Wiley & Sons Ltd.

CCCN. 2014. Many factors in an uncertain future: Situation climate change among local community priority in Cambodia. Cambodian Climate Change Network, Cambodia.

CIF. 2012. Pilot program for climate resilience: Cambodia. Climate Investment Fund.

Conan, A., Ponsich, A., Goutard, L.F., Khiev, R., Tarantola, A., Sorn, S., and Vong, S. 2013. A community-based education trial to improve backyard poultry biosecurity in rural Cambodia. Acta Tropica, 125, 294-302.

FAO. 2004. Livestock sector brief: Cambodia. FAO. Rome, Italy.

Gallopin, C.G. 2006. Linkages between vulnerability, resilience, and adaptive capacity. Global Environmental Change, 16, 293-303.

Hill, H., and Menon, J. 2013. Cambodia: Rapid growth with weak institutions. Asian Economic Policy Review, 8, 46-65.

Hortle, K.G. 2007. Consumption and the yield of fish and other aquatic animals from the lower Mekong basin. Mekong River Commission, MRC Technical Paper no. 16. Vientiane, Lao PDR.

Johnston, R., Hoanh, C.T., Lacombe, G., Noble, A., Smakhtin, V., Suhardiman, D., Pheng, K.S. and Sze, C.P. 2010. Scoping study on natural resources and climate change in southeast Asia with a focus on agriculture. Report prepared for SIDA. IWMI: Vientiane, Lao PDR.

Kimchoeun, P. 2011. Fiscal decentralisation in Cambodia: A review of progress and challenges. Cambodia Development and Research Institute. Working Paper Series No. 50, Cambodia.

Kreft, S. and Eckstein, D. 2012. Global climate risk index 2014. Germanwatch. Bonn, Germany.

Kreft, S. and Eckstein, D. 2013. Global climate risk index 2014. Germanwatch. Bonn, Germany.

Mainuddin, M., Kirby, M. and Hoanh, T.C. 2012. Water productivity responses and adaptation to climate change in the lower Mekong basin. Water International, 37 (1), 53-74.

MoE, UNDP and MEF. 2011. Building resilience: The future of rural livelihoods in the face of climate change. Cambodia Human Development Report 2011. Ministry of Environment, Cambodia.

MoP. 2010. Achieving Cambodia's millennium development goals update 2010. Ministry of Planning, Cambodia.

Nguyen, H., Shaw, J. and Prabhakar, S.V.R.K. 2010. Climate change adaptation and disaster risk reduction in Cambodia In: Shaw, R., Pulhin, M.J., and Pereira, J.J. (Ed.) Climate Change Adaptation and Disaster Risk Reduction: An Asian Perspective. Emerald Group Publishing Limited, UK.

Niazi, T.H. 2011. Deconcentration and decentralization reforms in Cambodia: Recommendations for an institutional framework. Asian Development Bank. Mandaluyong City, Philippines.

Pheakdey, H. 2013. Climate change financing in Cambodia. The NGO Forum in Cambodia.

RGC. 2010. Cambodia post-Ketsana disaster needs assessment. Royal Government of Cambodia.

RGC. 2010. National strategic development plan update 2009-2013. Royal Government of Cambodia.

RGC. 2012. Cambodia post-flood relief and recovery survey. National Committee for Disaster Management, Cambodia.

RGC. 2013. Cambodia climate change strategic plan 2014–2023. Royal Government of Cambodia.

© *ISERD*

Sato, J., Shiga, H., Kobayashi, T. and Kondoh, H. 2011. Emerging donors from a recipient perspective: An institutional analysis of foreign aid in Cambodia. World Development, 39 (12), 2091-2104.

Scheidel, A., Giampietro, M. and Ramos-Martin, J. 2013. Self-sufficiency or surplus: Conflicting local and national rural development goals in Cambodia. Land Use Policy, 34, 342-352.

Seo, N.S. and Mendelsohn, R. 2007. Climate change impacts on animal husbandry in Africa: A ricardian analysis. World Bank Policy Research. Working Paper 4261.

Silva, D.S., Johnston, D. and Thuon, T. 2013. Local institutions for irrigated agriculture in Cambodia. IWMI Issue Brief No.2, Sri Lanka.

Sovacool, K.B., Agostino, D.L.A., Meenawat, H., and Rawlani, A. 2012. Expert views of climate change adaptation in least developed Asia. Journal of Environmental Management, 97, 78-88.

The World Bank .2013. Where have all the poor gone? Cambodia Poverty Assessment 2013. World Bank, Washington D. C.

UNDP. 2010. Listen to villagers on climate change: Vulnerability reduction assessment. UNDP, Cambodia.

UNDP. 2013a, Case study in Cambodia community based adaptation: Two examples from rural affected communities. UNDP, Cambodia.

UNDP. 2013b. The rise of the south: Human progress in a diverse World. UNDP Human Development Report 2013.

Wise, S. 2012. Cambodia post-flood relief and recovery survey. WFP and NCDD. Phnom Penh,Cambodia.

Yu, B. and Diao, X. 2011. Cambodia's agricultural strategy: Future development options for the rice sector. A Policy Discussion Paper. Cambodian Development Resource Institute, Cambodia.

© *ISERD*