**Ministry of Rural Development**

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**First Draft**

**Strategic Plan of Rural Development**

**for Climate Change Adaptation in Cambodia**

**Ministry of Rural Development**

**Cambodia**

**Phnom Penh, June 2012**

**Acronyms and Abbreviations**

ADB - Asian Development Bank

CCCA - Cambodian Climate Change Alliance

CCTT - Climate Change Technical Team

CCWC - Commune Council for Women and Children

CMDGs - Millennium Development Goals

D&D - Decentralization and Deconcentration

GDP - Gross Domestic Product

IPCC - Intergovernmental Panel on Climate Change

MoEF - Ministry of Economics and Finance

MRD - Ministry of Rural Development

NDC - National Development Council

NPRS - National Poverty Reduction Strategy

PDRD - Provincial Department of Rural Development

PLAU - Provincial Local Administration

RGC - Royal Government of Cambodia

RWSS - Rural Water Supply and Sanitation

TWG-RWSSH- Technical Working Group for Rural Water Supply, Sanitation

WHO - World Health Organization

**Executive summary**

The speed and intensity of climate change are outpacing the ability of poor rural people and societies to cope. Many areas where MRD interfered are already reporting impacts on the key ecosystems and biodiversity as well as physical and social infrastructure that sustain agricultural production, rural infrastructure, market opportunities and rural livelihoods. The MRD’s response will have an impact on the ground through the degrees of temperature increase; whether smallholders will be able to benefit from delivery strong qualify of rural infrastructure and delivery of capacity build-up for adaptation and mitigation, and whether additional public climate rural financing will reach poor rural people to create their livelihoods business to restrain any flood and draught impacts.

MRD is already active on climate change at the sub-national level, but it can do more, if there is any cooperation with donors and line institutions such as CCCA and Ministry of Environment. The main strategy output is the strengthening of rural roads and water supplies, where climate change – alongside other risks, opportunities and themes – is systematically integrated into current core programs, policies and activities: On operations, integration of project safeguards into rural roads and water supply planning and programing where today have been seen in all rural road improvement and construction projects and Tonle Sap water supply and sanitation projects. This means incorporating it into our toolkit for the early stages of its program and project design and for implementation. On knowledge, innovation and advocacy, MRD will is to explore new arrangements for sourcing climate-related expertise in rural infrastructure, share ground-level experiences to ensure their application throughout MRD’s programs, and continue our work to shape the global dialogue on climate change for smallholders. However, there are some lacks of policies instruments and quality improvement of rural infrastructure to be resilient to climate change, therefore MRD provides their 10-years strategy (2013-2022) of actions on climate change impacts and adaptation on the four main priorities areas.

MRD is enhancing its approach and strategy to rural development in the context of increasing environmental threats, including climate change. MRD’s program will continue to reflect the complex reality of poor people, where issues are not contained neatly in boxes labeled according to global issues. MRD addresses the four priorities areas to help rural poor restrained with the climate change impacts. Those priorities areas are; (1) development of policies and regulations which related to upgrading rural infrastructure quality and rural adaptation, (2) Create rural business opportunities for savings and improved rural livelihoods, (3) Provision of upgrading rural infrastructure project as demonstration in some areas, (4) Provision of capacity building on climate change adaptation to community and on rural health care awareness.

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**1. Introduction**

The Intergovernmental Panel on Climate Change (IPCC) predicts that global temperatures will rise between 1.8oC and 4.0oC by the last decade of the 21stCentury. The impacts of global warming on the climate change, however, will vary in different regions of the world (MoEF, 2008).

Our planet is very close to reaching a tipping point where climate change and global warming will become irreversible. Many scientists believe that this decade may be our last chance to do something effective against climate change. The tipping point represents a global temperature increase of two degrees Celsius. This increase in global temperature will among other things, lead to melting of polar ice sheets and massive loss of rainforests. What one country quickly needs is new international climate deal but this doesn't look to be happening any time soon because there are still major differences between developed and developing world in proposed decrease. Rainforests are becoming drier and oceans are becoming increasingly acidic, all because of the increased climate change impact. Extreme weather events such as hurricanes are becoming more frequent and there is also a danger of new diseases (Tailor and Francis, 2009).

The only solution to climate change issue is to significantly reduce greenhouse gas emissions and this can only be done by shutting down fossil fuel fired power plants and switching to clean, renewable energy sources. On the other hand, the newer developing countries such as Cambodia should address its national strategic plan on possible mitigation, adaptation, and resilient to climate change in the level it could. Therefore, every single field of activities, project, and program of institution must take the climate change perspective into strong consideration in their work plan (John, 2010).

After the 1993 Cambodian General Election and the establishment of the Kingdom of Cambodia, the Royal Government established the Ministry of Rural Development (MRD). The creation of the MRD demonstrates the Government's dedication to improving living standards and alleviating the poverty of rural people. MRD has focused on the three main themes:

* To improve the quality of life of the rural people by encouraging and facilitating economic self-sufficiency and an active social awareness, rather than these people always relying on central government or aid agencies to help them out. In fact, encouraging and achieving a more independent attitude to solving some of their own problems lead to getting personal satisfaction from making progress themselves.
* To encourage and assist the rural community to participate more directly in improving farm production, rural-based industry and the marketing of their products. The successful development of these aims would make a significant contribution by strengthening the national economy.
* To seek, by all sensible means, to discourage the current movement of individuals and families from the countryside to the towns. Urban congestion represents an increasingly serious problem in Cambodia. Improving the rural economy as a matter of priority could, to some extent, help reverse the present trend by restoring confidence in rural life, and encourage community developments that would raise rural living standards.

Organizationally, MRD has three general departments: Administration and Finance, Technical Affairs and the General Inspectorate. The General Department of Administration and Finance has control of the Department of Administration and Personal Affairs, the Department of Procurement and Finance, and the Department of Planning and Public Relations. The General Department of Technical Affairs plays an important technical role for the Ministry. It controls the Department of Rural Roads, the Department of Rural Water Supply, the Department of Rural Health Care, the Department of Community Development and the Department of Rural Economic Development. The particular stand, the department of internal audit is under direct controlled by the ministerial office. The MRD has also 17 fields of activities, these fields are as below:

* Border development
* Rural infrastructure
* Rural water supply
* Rural sanitation
* Ethnic development
* Community development
* Rural economic development
* Training and research
* Administration and personnel
* Internal audit
* Planning and public relations
* Supply and finance
* General inspection
* International cooperation
* NGO management
* Gender
* Provincial department

A series of policies have emerged as current mandates of the MRD, such as the policy of indigenous people, the policy of rural road improvement, the policy of rural development and the policy of rural water supply. These policies are being implemented through the projects and programs of:

* Provincial and rural infrastructure project,
* Food for Work project,
* Rural water supply and sanitation project,
* Tertiary road improvement project,
* Tonle Sap rural water supply and sanitation sector,
* Second rural water supply and sanitation sector project,
* Financial management for rural development program,
* Border development program,
* School and community water sanitation and hygiene,
* Ketsana emergency reconstruction and rehabilitation project, and
* Rural road improvement project

Fields of activities in the sector of rural development will need to interface with the full perspectives of the climate change mitigation planning process, the adaptation planning process and the **resilience design to climate change impacts.** Therefore, projects and programs of the MRD will specify the climate change mitigation, adaptation and resilience in their planning activities as a priority. This report describes the strategic activities planned for the current further mandate of the Ministry of Rural Development in the link with climate change actions and perspectives in all rural development. These activities for improving the livelihoods of rural people must be carried out in the right way and in the correct social, economic and environmental contexts.

**2. Sector-Related Profiles**

Under the Fourth legislative term of the National Assembly, the Royal Government of Cambodia continues to consider the need for poverty reduction in a rapid way as a top priority through a rural development approach. The role of rural development plays an indispensable role for poverty reduction as well as rural resources contributing to the national economy because 85 per cent of Cambodia’s poor live in rural areas. The RGC continues its interventions to implement integrated rural development approaches that focus on positive impacts for rural poor people. These approaches include the strengthening of institutional capacity at national and sub-national administration levels, human security, implementation of an integrated sub-national plan, improvement and construction of rural roads, provision of rural water supply, primary health care and rural sanitation, community development and rural economic development in order to enhance rural living standards and to contribute to the regional and national growth process. Encouraging rural development plays an essential role and provides a positive impact on the national poverty reduction strategy.

A National Poverty Reduction Strategy (NPRS) was adopted in 2002. In furtherance of the Millennium Declaration of the United Nations Summit in 2000, a set of Cambodia Millennium Development Goals (CMDGs) was prepared in 2003through an intensive and inclusive consultative process. The very first major decision of the Royal Government of Cambodia (RGC), in the third term of 2004, was to adopt a holistic and comprehensive Rectangular Strategy for addressing governance and socio-economic development issues and efforts. Currently, Cambodia has approximately 14 million people, of which 87% live in rural areas. Cambodia has achieved impressive economic growth with gross domestic product (GDP) averaging an increase of 10% per annum during the 2004–2010 period. Despite its declining GDP share from 46% in the 1990’s to 34% in 2010, agriculture in rural areas, especially in remote communities, remains an important sector in the national economy as it is the primary source of livelihood for 85% of the population.

The Ministry of Rural Development (MRD) is a multi-disciplinary intervention institution. It works in the areas of social and rural infrastructure in the rural areas of Cambodia. MRD’s organizational structure is shown in Fig.1. The main activities of the rural infrastructure sector are rural road improvement, irrigation rehabilitation and water well construction. The social infrastructure sector comprises of sanitation and hygiene, community development and capacity building, micro-credit provision, gender protection and indigenous population protection. Given its significant share of the national GDP, social and rural infrastructure development continue to play a crucial role in enhancing macro-economic stability in the rural area, long-term food security and poverty reduction. Rural development, however, must be aligned with consideration to climate change impacts and these impacts must be addressed during the planning process, the implementation process and for the post-project implementation period as well. The rural sector can contribute significantly in the attainment of the set targets of the Royal Government of Cambodia (RGC) to sustain an annual GDP growth rate of 7% and a poverty reduction rate of 1% from 2009 onwards. To realize this potential, the rice value chain system has to be strengthened by the removal of various constraints that hinder the more efficient flow of the product from the farmers’ fields to the ultimate consumers.



Figure 1: Organizational Structure of MRD

**2.1 Rural Water Supply Sector**

The Ministry of Rural Development has overall responsibility for the strategy and implementation of rural water supply under the guidance of the Technical Working Group for Rural Water Supply, Sanitation and Hygiene (TWG-RWSSH). The intended users of the strategy are relevant institutions at all levels, including national institutions, sub-national institutions, development partners, national and international NGOs, and the private sector. A summary version and information brochure will be available for sub-national institutions.

With regard to rural water supply service and rural sanitation, there is an urgent need to safeguard and enhance rural people’s health and livelihoods and to improve the economic conditions of the rural poor. The Cambodian Millennium Development Goals have already stated that by 2015, “50 per cent of the people living in rural areas will have access to water supply and 30 per cent of the people living in the rural areas will have access to improved sanitation services.” (RWSS, 2010)

Responding to this basic need, the working group for rural water supply and sanitation and hygiene – under the full coordination of the MRD – has developed the national strategy on rural water supply, sanitation and hygiene for implementation over a 15 year period which started from 2011. The strategy has identified measures including: strengthening of institutions; determining responsibilities of relevant agencies – both at national and sub-national levels; enhancement of participation of communities that are beneficiaries of improved water supply service and sanitation; strengthening service quality; involvement of the private sector; and, encouraging local communities to become owners after the program or project completion. The sector aligns with the principle of Decentralization and Deconcentration (D&D) guidance. In accordance with the D&D principle, the sector operates at a number of different levels: household and community, commune, district, province and national. At each of these levels, there are several different actors, stakeholders and individuals, each of whom has different views and ideas. All of these factors add up to a complex sector in terms of shared values, understanding the challenges, systems and procedures, and the means to address the overall challenge of enabling rural people to have sustainable access to water supply and sanitation services. The strategy to address all these challenges is similarly complex. There needs to be a range of strategic and detailed actions to address the individual challenges, and all these actions need to be coordinated to achieve the overall purpose.

The sector has also adopted a participatory approach to developing the strategy by commissioning a specialist consultant to lead the process and establishing a core group comprising directors of relevant departments and representatives of development partners – especially NGOs who work in the area of water and sanitation. The consultation included field work in some provinces, and situational analysis workshops that included representatives of commune councils, the Commune Council for Women and Children (CCWC), district governors, the Provincial Department of Rural Development (PDRD), Provincial Local Administration Units (PLAU), line ministries, development partners, NGOs and the private sector. It included workshops to address specific technical issues with key specialists in rural water supply, sanitation and hygiene, and briefings to the TWG-RWSSH. The sector vision is that every person in a rural community will have sustained access to safe water supply and sanitation services and will live in a hygienic environment by 2025.This strategy defines the water supply, sanitation and hygiene services to be made available to people living in rural areas and identifies the institutional arrangements and the financial, human and other resources needed to provide these services*.* ***Main project profiles related to the rural water supply sector are still gap of some insights of climate change impacts on the sectors importantly should be integrated in the implementation***. For instance, the current profiles are emphasized as below.

(**1)** Continuing on from the first rural water supply project, the Second Rural Water Supply and Sanitation Project (the Project) is designed to expand access to improved rural water supply and sanitation (RWSS) and to better the health of rural residents in six provinces around the Tonle Sap Basin in Cambodia (ADB, 2010). It will contribute to the Government of Cambodia’s efforts to achieve its Millennium Development Goal targets of improved rural water supply coverage by 50% and improved rural sanitation coverage by 30% by 2015, and its long-term sector targets a 100% improved water supply and sanitation coverage by 2025. The Project will support current institutional reform for improved service delivery in the sector, including project management, through: (i) A sub-national administration capacity development program, and (ii) An enhanced partnership between the provincial departments of rural development (PDRDs) and non-government organizations (NGOs). It will also link to public financial management activities for rural development. The Project will support the provision of improved RWSS services for about 377,000 residents, of which 290,000 will benefit from improved sanitation facilities in 400 villages in 40 communes. The 40 communes are located in 16 districts in the six provinces of Banteay Meanchey, Battambang, Kampong Chhnang, Kampong Thom, Pursat and Siem Reap. The Project will cover 100% of all villages in each commune and will aim to achieve a 100% water supply and a75% physical sanitation coverage in each commune. The Project is a sector investment project with the following outputs: (i) Improved community health and hygiene practices through community mobilization and action; (ii) Rehabilitated, upgraded and developed water supply facilities in 40 communes; (iii) Improved public and household sanitation facilities; (iv) A stronger and more sustainable RWSS sector through support to private sector development and improved monitoring of RWSS coverage; and, (v) Improved capacity for project implementation. The Project will improve the quality of life and health of rural Cambodian people through improved access to safe drinking water and sanitation based on community demand and needs. Improved water supply, sanitation, and hygiene practices are expected to enhance health and productivity. The Project also particularly improves the capacity among infant government institutions and communities to plan, construct, manage, operate, and maintain village water and sanitation infrastructure. Better-quality water and improved hygiene have been reducing the prevalence and severity of waterborne and water-related diseases affecting young children and the elderly, leading to a reduction in sick days and health expenditures. This has also improved social welfare and facilitated efforts to improve the economic welfare of beneficiaries. Reliable access to safe water and sanitation reduces the time and effort currently required to obtain clean water, increasing the time and capacity available for income-generating activities. Given the high proportion of poor households in rural areas of the participating provinces and the proposed targeting on the poorest communes within these provinces, poverty incidence among project beneficiaries is estimated at 50–70%.The active participation of the rural communities in selecting, planning, co-financing, implementing, operating and maintaining the investments has strengthened communities’ ownership of their own developments. The Project assists the Government in preparing a RWSS strategy and guidelines, as well as improved coordination and partnerships nationally and locally, which will lead to improved knowledge sharing, avoid duplications of effort and better facilitate sector planning.

The Project emphasizes an integrated approach to rural water supply, sanitation, and hygiene awareness. It applies a commune-based approach to project implementation. Full benefits of household access to improved water cannot be realized unless the water is managed properly – both between the source and the home, and within the home. Sanitation cannot be achieved without access to water for hand and body washing and latrine flushing. Hygiene awareness is the activity that effectively links water and sanitation and maximizes project benefits. Rural infrastructure is one of the core community-driven development sectors. The Project supports three hallmarks of the community-driven development approach: (i) Local capacity development; (ii) Participatory decision making (in site selection, technology choices, and O&M of community infrastructure); and, (iii) Community control of resources through an innovative community-managed procurement system for sanitation. Support to community-driven development also includes developing community group capacity; supporting an enabling environment through policy and institutional reform; and, strengthening local governance relationships, such as by strengthening links between community organizations and local government. By promoting community participation and ownership and engaging commune councils, the Project will strengthen the institutional arrangements for planning, financing, and managing RWSS investments, and will make services more responsive and accountable to the poor in the Tonle Sap Basin.

To encourage greater stakeholder participation, transparency and accountability, the Project will be focused to: (i) Strengthen the capacity within the MRD to comply with the project administration manual; (ii) Establish a project website to disclose information about project-related issues, including procurement (e.g. contracts, bidding procedures, contract awards, and lists of goods and services to be procured) and grievance redress procedures; (iii) Establish or use the existing system on information disclosure at commune council offices (e.g. notice boards that display information on contracts, list of participating bidders, name of the winning bidder, basic details on bidding procedures, contract awards, and lists of goods and services to be procured); (iv) Notify communities of the date and location of selected events in the procurement process (e.g. public bid openings, progress reviews and handover ceremonies); and, (v) Establish a grievance redress mechanism at the PCU and PDRD project team levels in each project province to receive complaints from communities or contractors. The PCU or PDRD project team will provide a formal reply within 20 working days, and report all grievances in their progress reports to the Government and the ADB. The project will also encourage the equality of gender in all phases of project activities. Women will have the highest priority in the participation, especially promoted them to be heads of water user groups after project completion.

(**2)** In 2005, the IMF Board completed an assessment of the first group of eligible countries for the multilateral debt relief initiative (MDRI). The amount of debt relief granted to Cambodia was S$82million, which became effective on January 5, 2006; of which $18.6 million was utilized for the implementation of the Rural Water Supply and Sanitation Project. In this regard, the Rural Water Supply and Sanitation Project is being implemented using a village engagement process that is to provide water and sanitation infrastructure to the vulnerable people in rural communities. The objective of the project is to support the government efforts to reduce poverty by improving the health and living conditions of the low income communities in the rural areas through greater access to sustainable safe drinking water and improved sanitation.

**2.2 Rural Road Construction Sector**

In the last two parliamentary mandate of the Royal Government of Cambodia, Cambodia has made significant advances in rural transport network development, particular so during this mandate. The rural economy grows significantly at a satisfactory level, thereby generating a strong and growing demand for rural transport services. To meet this demand, the MRD undertook investments in rural transport infrastructure, rising from about 10 million dollars in 2009 to 15 million dollars in 2012 (DRR, 2012), and currently total rural public investment on rural road improvement and construction.

Generally, rural road construction programs in Cambodia are supported by loans and grants from the ADB, the World Bank and other foreign aid institutions. In particular, rural improvement projects were basically designed to promote the RGC’s national program of poverty reduction through: increasing rural food production and incomes; promoting regional balance in socio-economic development by establishing growth poles away from the country’s capital and cities (in rural areas); and, expanding industrial production for domestic and foreign markets. It is widely believed that rural road improvements will help bring multiple socioeconomic benefits that will form a strong economic base for the nation.

Theoretically, rural transport models, as generally provided in the theoretical framework in rural road planning, comprise classic models, agricultural models, linear programming models, general equilibrium models and land-transport interaction models. The MRD considered classic models as the most appropriate application in the rural areas of Cambodia. In particular, the choice of classic model is the consumer surplus and producer surplus model. This model helps the rural people to strongly adapt to natural disasters that damage their assets seasonally, because by lowering traffic cost, rural people can increase their savings and generate other off-farm business – thereby compensating the losses due to climate change. Therefore, this model has a strong link of response to climate change in the rural areas of Cambodia.

Currently, the MRD is implementing climate change adaptation component activities. Those activities are: (i) Improved planning for rural road infrastructure development to accommodate climate change, and (ii) Increased resilience of road infrastructure to climate change through the planning process and identification of adaptation options. These activities receive support from international loans and grants by the ADB and the WB.

**2.3 Rural Socioeconomic and Community Development Sector**

The Department of Rural Socioeconomic Development is currently collaborating with the private sector to work on loan provision to poor families in some provinces. There are several activities under this initiative, of which soft grant provision is undertaken that has successfully achieved growth of household incomes from both agricultural activities under the loan and from family business locally.

The Department of Rural Community is one of the MRD’s technical departments and is responsible to formulate guidelines and regulations for community development. This department has also engaged in strong activities to mobilize the community and provided them with vocational training to improve livelihoods.

**3. Climate Impacts and Climate Risk Profiles**

Cambodia is one of the most climate vulnerable countries in the world and will become even more so as a result of further climate change. Floods, tropical storm surges and droughts are likely to become more frequent and severe in the coming years. These changes will threaten the significant achievements that Cambodia has made over the last 10 years under the strong Third and Fourth parliamentary mandate of the Royal Government of Cambodia in increasing incomes and reducing poverty, and will also make it more difficult to achieve the Cambodian Millennium Development Goals. Over the last 10 years, the Government of Cambodia, with the support of development partners, has invested large funds to make the country less vulnerable to natural disasters. These investments include flood management schemes (flood control), awareness raising, storm and flood shelters (Ketsana, 2011) and the raising of rural roads, dams, and reservoir’s dykes above flood levels. Climate resilient varieties of rice and other crops have also been developed. The challenge Cambodia now faces is to scale up these investments to create a suitable environment for the economic and social development of the country and to secure the well-being of our people, especially the rural poor and the most vulnerable rural groups, including women and children. The Royal Government of Cambodia's plan is to eradicate poverty and achieve economic and social, and environmental-friendly results. It is essential that Cambodia now prepares to adapt to climate change (rural adaptation as a priority) and to safeguard the future well-being of her people. Four sectors in rural adaptation preparedness are rural road construction and improvement, rural water supply construction and improvement, rural socioeconomic development and community development, and primary health care. These four sectors have been strongly affected by climate change in the country.

With our forward-thinking current prime minister, the Royal Government of Cambodia's vision is, therefore, to eradicate poverty and to achieve economic and social well-being for all the people, especially rural people. This will be achieved through a pro-poor **climate change strategy by sector**, which prioritizes adaptation and disaster risk reduction, and also addresses climate change awareness development, mitigation, technology transfer and the provision of adequate finance to sub-national levels. However, there is a need to clearly know to what extent the climate change impacts have been experienced by the various sectors of rural development. These can be addressed as follows:

**3.1 Impacts on the Rural Water Supply Sector**

The MRD, especially its climate change team, has conducted a rapid study on several water points and small scale irrigation, which also included domestic water supply by both combined well sand deep wells. The team used multi-disciplinary skills for both physical and social conditions that are thought to be affected by climate change. Those small scale irrigation schemes include Tram Pluk, Krang Ponley and Chrey Bak. The conclusions have been drawn as follows:

**3.1.1Climate Change Impacts on Small Scale Irrigation**

The climate change impacts on the small scale irrigation water supply schemes were similar for all general impacts. The rural small scale irrigation water supply schemes provide stock water to small polders of farmland. The water demand for these schemes is much smaller than for small scale irrigation schemes, and very much smaller on a per hectare basis. Given the priority accorded to domestic and stock water, future restrictions on supply are unlikely for the projected climate changes of the study. The impacts will be on scheme operations and the service levels given increased stock water requirements with increasing temperatures, the effect on peak demand of higher maximum temperatures and the number of very hot days during summer months. Schemes with direct stream intakes and screens would be affected in the same way as small scale irrigation schemes with direct intakes. Given the low water takes of rural water supply schemes, many intakes are indirect, through infiltration galleries or bores beside the stream or canal. These intakes and groundwater supplies will be little affected, if at all, by changes in river or stream water flows or quality. The schemes are generally flow-restricted, with a continuous and constant flow to each property. The peak demand on farms is managed through on-farm small scale storage reservoirs. If peak stock water demand increases, both on-farm and off-farm infrastructure would have to be upgraded. Most of the schemes have a pumped supply to storage reservoirs, and the distribution network is fully piped. Thus additional flow could be delivered by adding extra pump and reservoir storage capacity. This additional capacity could be installed as add-ons, and would only have a small area footprint within the rural landscape.

The importance of storage water for animal purposes makes several small scale irrigation scheme upgrades a likely response following future episodes of high stock stress because of prolonged droughts or a period of very hot days beyond that of past experience. The schemes would face the same organizational issues as irrigation schemes with respect to community agreement about **upgrade options** and **financing**. Consent variations may also be required, depending on the **type of upgrade**.

Economic evaluations carried out at the time of scheme approval have been obtained for three of the case study schemes (Tram Pluk, Krang Ponley and ChreyBak). These evaluations were based on benefits from increases in stock-carrying capacity, improved stock performance and hence productivity, and saved costs of pre-existing supplies, mostly for on-farm dams. The estimated increases in stock numbers were around 10– 15% of farm carrying capacity, while improved stock performance (over all farm stock) could be 50–100% of the benefits from greater stock numbers.

The increase in stock numbers was because of better grazing management due to more watering points and subdivision fencing, while the more accessible and better quality water of the scheme supply improved stock health and performance. For the projected climate changes, the grazing management benefits of the schemes, which included on-farm reticulation and subdivision fencing, would probably not be much affected. The installed infrastructure remains in place and continues to provide this benefit, albeit with higher stock watering demands.

Climate changes may affect stock-carrying capacity for reasons other than water supply, in terms of the amount of water available to stock and the number of or proximity to watering places. The more severe the extremes of temperature and dryness, the greater the pressure on stock in terms of both feed and water.

A sufficient supply of water is critical to stock health and the maintenance of sufficient stock conditions to minimize longer term effects. The additional stock performance and stock numbers resulting from the schemes could be affected by the impacts of the projected climate changes of the study. This would reduce farm production and hence, economic returns. However, the overall impacts on farm economics is likely to be relatively marginal, with other impacts and market changes in produce price and farm costs being more significant.

The **likely responses to climate change** would be a combination of **scheme upgrades** and reduced stock numbers where the supply constraints of the existing schemes were having significant impacts. The small irrigation scheme infrastructure, both off- and on-farm, could be significantly impacted by an increase in the intensity of storm events, or the frequency of high rainfall events. The infrastructure of these rural water supply schemes is vulnerable to erosion and surface damage. Many of the canal distribution networks pass through steep and erosion-prone land, while small scale irrigation storage reservoirs and pump stations may also be at relatively high risk from these hazards. Operation and maintenance costs could then be affected by these hazards. However, these additional costs are not predictable.

The rural water supply schemes would be less affected by impacts on river flows and quality than irrigation schemes, given their low per hectare demands for water and generally less exposed and at-risk intake systems. The water demand of stock is related to plant watering requirements (of dryness and water deficits), but is not the same, and the effects on stock of water restrictions have not been well researched.

Having sufficient water for stock through dry periods is critical for stock health and condition, while the relatively low flow rates and canal reticulation of the schemes makes add-on upgrading more practical for these schemes. These upgrades would increase operational costs, such as power charges, as well as the capital investment required. At the same time, there could be some increase in operational costs at intakes, although probably relatively small. Costs could increase for other reasons as well, for instance from more erosion and slope damage.

The rural irrigation water supply schemes provide a critical service to farms; they will provide significant advantages to the communities within the scheme areas, in terms of water security and management flexibility.

**3.1.2 Climate Change Impacts on Wells**

Yearly, the Department of Rural Water Supply has constructed at least 2,000 to 3,000 wells (combined wells, deep wells and open wells). The implementation of rural water supply (by well construction), that is carried out by the Department of Rural Water Supply, faces strong challenges on the climate change impacts on the water points, especially during droughts and floods. Predicting the effects of climate change on rural water wells in Cambodia is difficult, not least because of the considerable uncertainty in climate change predictions and the even greater uncertainty within derived hydrological models. There are also large data and knowledge gaps in existing run-off and recharge processes within Cambodia’s watersheds. To help deal with this level of uncertainty in climate science, it is useful to adopt a three-sided approach to examine how climate change is likely to affect rural water supplies, particularly regarding wells, focusing on water availability, water use and the ability to access available water. Ultimately it is the interplay between these three factors which will determine future water security in rural Cambodia.

Within a warmer climate, there will be a higher evaporative demand, and higher sea and land-surface temperatures, so consequently, existing climatic variability in Cambodia will be intensified, so that rainfall will occur in more intense events of higher spatial and temporal variability, and dry periods will be both more prolonged and more frequent. Whilst this climate change is highly likely, how it will translate to changes in effective rainfall and the partitioning of this effective rainfall between different water resources through altered patterns of surface run-off, soil moisture and groundwater recharge, is unclear. Collectively, there are too many uncertainties, and the processes and feedback processes involved are too complex for the effect of climate change on hydrological systems to be modelled adequately at present. It is, therefore, very difficult to predict the likely impacts of climate change on rural well water points from climate model projections. However, examining how the different water resources in Cambodia respond to existing climatic variability can provide an insight into the likely effects of climate change. Improved supplies generally rely on groundwater resources, whilst for unimproved supplies, surface water and very shallow, perched groundwater (<10 m deep) resources are important. The effects of climate change impacts, which will be encountered by the water supply sector of the MRD, are also addressed in the following points:

**Groundwater Resources-** Most improved water supplies in rural areas depend on groundwater in dry periods. As rainfall and surface waters become less reliable in the dry season, the demand on groundwater-based supplies is likely to increase further from year to year, and from one community to another. Unlike surface water, groundwater is less responsive to short-term climatic variability and will be buffered against the effects of climate change in the near-term as a result of the storage capacity of the aquifer. The potential long-term impact of climate change on the availability of groundwater is, however, largely unknown, not least because of the complexity of recharge processes in rural areas, which are poorly constrained at present, even without the complications of climate change.

**Recharge***-* Climate change is likely to modify groundwater recharge patterns, as changes in precipitation and evaporation translate directly to shifts in soil moisture deficit and surface water run-off. Increases in rainfall intensity and evaporative demand will, more likely than not, result in increased irregularity of groundwater recharge. There is no simple, direct relationship between rainfall and recharge, and recharge patterns will additionally be affected by soil degradation and vegetation changes that are likely with increased climatic variability. Even though rainfall intensity is likely to increase in the future, soil degradation and vegetation changes might in fact mean that more rainfall becomes surface run-off, so that recharge amounts may decrease. There is still, therefore, a large degree of uncertainty as to what the final effect of climate change will be on recharge patterns, particularly within upper regions of the country, as a result of the complexity of the process.

**Aquifer Storage** *-* Recent studies of rural water supply by JICA, and the response of groundwater supplies, have indicated that, even with reduced and more irregular recharge patterns, groundwater resources at depth (probably deeper than 10–20 m) in many aquifers will generally be of sufficient storage capacity to remain a secure water resource for the domestic water need in rural areas. Groundwater-based domestic supplies require little recharge (< 10 mm), as rural domestic water use is low (average hand pump yield is 5–10 m3d-1, JICA, 2010). However, it is only *improved* water supplies which access deeper, more sustainable groundwater resources. Instead, the majority of the rural population relies on unimproved supplies which use shallow groundwater sources within deep soils. This groundwater is often ephemeral and the soil layers are of much lower storage capacity than aquifers at depth; the shallow groundwater relies on frequent and regular recharge for the resource to be sustainable. During extended dry seasons, under existing climatic variability, shallow groundwater resources already often dry up. Increased rainfall variability predicted with climate change is likely to mean that unimproved water supplies in low storage regolith (weathered soil material) aquifers could fail more often more of the time.

Expected climate change in rural areas exacerbates these existing water quality issues, so that the quality of surface water and shallow groundwater may be further impacted. Increased flooding of latrines and unimproved sources could lead to a rise in diarrheal disease and infant mortality, and warmer water temperatures could lead to greater transmission of disease in the rural families of the country. Reduced functioning of water supplies during extended droughts could increase the burden of disease. In regions where surface water and groundwater recharge are projected to decrease, general inorganic water quality may also decrease due to the lower dilution capacity of the water resources. However, predictions of how, and by how much, future water quantities will change are so uncertain that the potential for dilution of the contaminant loading – if water quantities were to increase – cannot be relied upon to counter the flushing effect of more intense rainfall.

**3.2 Impacts on the Rural Road Sector**

The previous report of climate change impacts on rural roads, which was undertaken during the fact-finding mission in October 2009, highlighted two major concerns related to current and future climate changes. Specifically, there appears to be an overall increase in average total annual rainfall and this increase is poorly distributed over the seasons, resulting in increased floods during the wet season as well as increased drought incidence during the dry season. Droughts are significant especially for unpaved roads as dust levels increase and reduce visibility and create poor local air quality. Flooding and soil moisture content is a primary concern for protecting investments in road works and should be addressed as a priority in the adaptation strategy (ADB, 2009). Another aspect was found in 2010 during a donor visit. This was that three potential priority road concerns were identified based on observations because of their apparent vulnerability and historical damage from climatological and hydrological events. The damages by climate impacts were recorded as:

* Existing damages to the road, including washouts, are primarily due to flooding from typhoon Ketsana in September 2009, though they were in poor condition prior to the typhoon. Today segments of the road are impassible. During the dry season, dust from road traffic on unpaved rural roads is observed and could worsen if warming continues and droughts deepen, which current projections seem to suggest. Together with diarrhea, acute respiratory infections are the top reasons for infant mortality and managing dust levels can reduce respiratory illnesses. Poor environmental management such as slash and burn increase vulnerability of the area as well. The main project will be paving this road segment which will reduce dust in dry months, but could increase runoff to surrounding areas during rainy seasons. Measures to manage the increased runoff, especially with increased peak rainfall events and storms, will be part of the adaptation measure. This implies building in additional risk assumptions into the engineering design, which carries an important cost and has been incorporated into the project design already.
* Segments of the road, impacted by climate change in Kampong Speu Province, appear to be eroded – possibly from flash flooding. Unlike other parts of the project road, there is no irrigation and there is only wet season rice farming and livestock grazing. Vegetative covers are extremely low, and slash and burn agriculture appears to be practiced. High levels of environmental degradation make this area particularly exposed to climate changes.
* Embankment erosion is evident and a small river may be eroding sections of the road in some segments. This may in part be due to improper floodwater release timing from an upstream dam which is sending large volumes of water downstream. The level of the road is very low and may flood during the rainy season. Current drainage capacity is poor though a new irrigation project is underway which should assist in better management of water resources. Increased coordination with the Ministry of Water Resources and Meteorology on the timing of water releases is important.

The proposed responses strategy in the form of climate adaptation must include a combination of engineering, non-engineering and planning activities to manage the changes observed and predicted in the rural infrastructure of Cambodia.

**3.3 Impacts on the Rural Socioeconomic and Health Sector**

Climate change impacts on the rural socioeconomic development sector are serious. Flood destroyed farming systems and homesteads in 2011, resulting in a loss of some five hundred million dollars of socioeconomic gain made pre-disaster (NDC, 2012). Farmers have regularly faced no water for rice crops due to droughts which seriously downscales socioeconomic gain. Provision of loans to farmers at these times is important. The saving of not spending income from their business, made by the loan provision, can compensate the loss of causality during the climate change impacts (such as flood and drought).

The long-term good health of populations depends on the continued stability and functioning of the biosphere’s ecological and physical systems, often referred to as life-support systems. We ignore this long-established historical truth at our peril: yet it is all too easy to overlook this dependency, particularly at a time when the human species is becoming increasingly urbanized and distanced from these natural systems. The world’s climate system is an integral part of this complex of life-supporting processes, one of many large natural systems that are now coming under pressure from the increasing weight of human numbers and economic activities (WHO, 2011).

Change in the world’s climate would influence the functioning of many ecosystems in Cambodia and the biological health of plants and creatures. Likewise, there have been health impacts on rural human populations, some of which were beneficial. For example, milder winters in December and January would reduce the seasonal winter-time peak in rural deaths that occurs in rural areas of Cambodia, while in currently hot vulnerable areas a further increase in temperatures would reduce the viability of disease-transmitting mosquitoes. However, many studies consider that most of the health impacts of climate change would be adverse anyway and produce negative impacts rather than positive impacts.

Rural populations, as with individuals, vary in their vulnerability to certain health outcomes. A population’s vulnerability is a joint function of, firstly, the extent to which a particular health outcome is sensitive to climate change and secondly, the population’s capacity to adapt to new climatic conditions. The vulnerability of a population depends on factors such as population density, level of economic development, food availability, income level and distribution, local environmental conditions, pre-existing health status, and the quality and availability of rural public health care.

Adaptation refers to actions taken to lessen the impact of (anticipated) climate change. There is a hierarchy of control strategies that can help to protect population health. These strategies are categorized as: administrative or legislative, engineering and personal-behavioral. Legislative or regulatory action can be taken by the government, requiring compliance by all or designated classes of persons. Alternatively, adaptive action may be encouraged on a voluntary basis via advocacy, or by education or economic incentives. The former type of action would normally be taken at a supranational, national or community level; the latter would range from supranational to individual levels. Adaptation strategies may be reactive, in response to climate impacts.

**4. Current Policy Response to Climate Change**

By definition, policy refers to **those plans, positions and guidelines of development projects/programs** which influence decisions by government (e.g. policies in support of sustainable economic development, policies to enhance access to government services by persons with disabilities and policies in support of quality scaled-up infrastructure). The activity of policy development generally involves research, analysis, consultation and synthesis of information to produce recommendations. Similarly, policy development in response to climate change in the sector of social and rural irrigation involves problem identification, improvement of structures, management and operation of projects, provision of awareness, etc.

Given the strong impacts of climate change on rural rice production, we need to find ways to increase yields to ensure sustainable rural development. We also need to estimate the role of different inputs and government policy options in rice production and climate change adaptation. In this respect, rural irrigation infrastructure policy will need to be formulated in practical terms and realistically.

Given the strong impacts of climate change on rural society, we need to find ways to accommodate all social issues that include social conflicts of interest, social and political beliefs, and assurance of rural social equity and gender involvement.

Given the strong impacts of climate change on rural poor socioeconomics, we need to find ways to increase family’s savings to ensure family food security during periods of natural disasters. That may require the intervention of rural micro-credits for the opening of rural off-farm and on-farm business opportunities. In that respect, some socioeconomic policies need to be created that will both help and be accessible to the poor. There also needs to be a policy of rural transport and road construction for sustainable development (Bingsin and Tingju, 2010).

Among the rural infrastructure variables to enhance rural socioeconomic development and agricultural yield, the quality of roads, small scale irrigation and the distance to rural markets are all significant factors. A study by Bingsin and Tingjuin 2010 showed that a 1% percent increase in rural road and small scale irrigation construction investment resilient to climate change increases the output of rural social transformation (economy, society, and environment) by 2% percent. Investment in transportation is an effective way to improve yields. Thus, improved infrastructure brings out the yield potential among rice farmers. Investment in irrigation facilities at the commune level will boost rice yield. Other studies have also indicated that: “The yield function approach identified small scale irrigation as one of the most important means to improve rice productivity and to adapt to climate change. Substantial regional variations are observed, requiring localized policy packages to achieve food security and income generation”.

Many policies and strategies are not currently in place, and the MRD in its mandate commits strongly to working on the establishment of social and rural infrastructure policies. So far, the MRD has already developed the policy of community development, but has not yet fully completed it. It will be improved so that it can respond to climate change impacts. The MRD is in the process of establishing a strong road maintenance policy linked to climate change resilience.

The MRD currently has a policy of rural water supply that both responds to climate change impact and seeks poverty reduction. The vision of rural water supply is that: “Every person in a rural community will have sustained access to safe water supply and sanitation services and will live in a hygienic environment by 2025”. The policy declares where the sector is headed in the future and it formulates a picture of what the future will be. The policy sets a 25-year development goal (vision) for the RWSS sector. It also outlines the roles, rules and approaches that will need to be adhered to in order to achieve the goal. Therefore, the means by which policy is carried out (the bridge between policy goals and detailed actions) comprises a set of medium- to long-term objectives and associated components to support achieving the development goals and to implement the policy.

**5. Proposed Possible Actions to Climate Change for Rural Infrastructure**

**5.1 Vision of MRD to Climate Change**

Most of current rural infrastructure facilities have not been designed or constructed to be resilient to climate change impacts (particularly concerning floods and droughts). Another concern is that the amounts of rural roads and water supplies are amongst the lowest nationally. Likewise, there is a low proportion of irrigated land and communities often lack reliable and convenient access to water. Local market structures tend to be poorly sited and constructed. In addition, where there is infrastructure, it is typically either of poor quality or in a poor state of repair.

In response to the national strategy of the Royal Government of Cambodia on poverty reduction, the MRD contributes strong efforts and urges all governmental and non-governmental institutions to eradicate rural poverty and achieve economic and social well-being for its entire people. This is expected to be achieved through a pro-poor, climate resilient and low-carbon development strategy as it is formulated here. This strategy will be based on four building blocks: (**1**) Adaptation to climate change in the rural areas, (**2**) Mitigation in the best possible ways, (**3**) Technology transfer and design adequacy, and (**4**) Timely flow of funds for investment within a framework of rural infrastructure, social infrastructure, primary health care and community development. The four prioritized areas are all aimed at creating: **“Climate risk-resilient rural areas of Cambodia with healthy, safe, prosperous and self-reliant rural communities, and a thriving and productive rural development situation**”.

This will be achieved by implementing this action plan, which will have some pillars: (1) A quality upgrade of rural infrastructure design and construction, (2) Provision of safe access to rural water supply, (3) Provision of awareness on climate change, (4) A build-up of community resilience to climate change, (5) Provision of action on primary health care resilient to climate change, (6) Elaboration of environmental and social safeguard procedure in the rural infrastructure planning process, and (7)Ongoing rural climate change research. The action plan will be an integral part of the national development policies, plans and programs of the CCCA.

**5.2 Mission of MRD to Climate Change**

Cambodia’s topography and exposure to monsoons make it highly prone to climate-related disasters. The impacts of climate-related disasters are high and increasing, due to a series of ecological and socio-economic factors that increase vulnerability, as well as due to climate change itself. The increase in extreme events that are expected under climate change predictions will lead to damage to rural infrastructure. All lowland provinces already experience a large number of climate-related challenges. The most notable of these are:

* Increasingly intensive and increasingly regular flash floods leading to damage to rural public, private property and lives. These are typically caused by either the heavy, lengthy monsoon rains, or by the passage of tropical storms;
* Increasingly intensive and regular runoff leading to damage to rural infrastructure, in particular to the cutting of roads – also caused by monsoon rains and the passage of tropical storms; and,
* Localized droughts leading to water shortages for rural agriculture and domestic consumption.

**The MRD is a key public agency to provide good services protecting all vulnerable rural infrastructure facilities from climate change impacts**. The MRD is formulating this five year strategy to cope with these challenges in order to improve local living standards. The strategy to address climate change impacts means physical infrastructure intervention through increasing quality and formulating policies for climate change adaptation options. The output will emerge during the first five years of the project implementation.

**5.3 Goals and Objectives**

“To build the adaptive capacity of rural vulnerable communities (**knowledge, primary health care, infrastructure and socioeconomics**) and to increase the resilience of rural and social infrastructure to climate change, and optimize mitigation opportunities for sustainable development”

In the first five years of this strategy is to increase the resilience and reduce vulnerability of local, critical economic infrastructure in the vulnerable rural areas of Cambodia to the adverse impacts of climate change as physical conditions of all rural infrastructure facilities and to support a policy framework conducive to promoting resilient rural area development.

**5.4 Strategy Frameworks**

The capacity to adapt to climate change is determined by factors such **as rural economic resources and other assets, rural technology and information accessibility, rural infrastructure, and stable and effective management**. Since many rural communities in the rural areas of Cambodia are poorly endowed with these attributes and are consequently highly vulnerable to climate change, the enhancement of their adaptive capacity is therefore likely to both reduce vulnerability to climate change and promote sustainable development. Therefore, three important sectors (rural water supply, road construction and socioeconomic development) play essential roles to respond to climate change for the enhancement of rural sustainable development.

Adverse effects on rural infrastructure in rural economic sectors will affect poor people hardest. Climate change could cause many complex alterations: a shift in temperature caused by climate change could lead to reservoir depletions, depletion of groundwater tables, insufficiency of portable water for humans and animals, depletion of aquatic animal and plants, and changes of socio-ecological conditions. In many rural locations where the warm seasons will become dryer, many areas will be at the risks of land degradation, drought and desertification. The Ministry of Rural Development, together with the Department of Rural Water Supply, must take strong actions in response to these phenomena in the context of climate change adaptation.

Changes in temperatures and precipitation are also likely to increase the geographic range of vector-borne diseases such as malaria, dengue fever, cholera and diarrhea. The loss of low-lying landmass in coastal areas, which could be ravaged by severe storms and increased sea-level rises, is likely to lead to displacement of populations, loss of life and damage to rural infrastructure (cutting rural roads and overflows onto rural roads, irrigation channels and culverts). To address the challenge of climate change, the Provincial Department of Rural Development’s central administration must ensure that rural communities can adapt to these changes and mitigate the causes. Concerns will be such as: maintaining rural road traffic flows, providing to safe water in both seasons and protecting rural household incomes (perhaps by compensation during drought and flood periods). Some of these adaptation goals involve: improving the design of rural infrastructure and increasing long-term investments, especially social services (such as provision of micro-credit to open up business opportunities); increasing the flexibility of vulnerable systems (e.g. changing activity or location); and, improving the preparedness and awareness of rural society (dissemination of the concept of agricultural practices being able to adapt to climate change).

Adaptation refers to the adjustment in natural and human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities. The world’s concerns on climate change and sustainable development highlights the importance of adaptation as “a high priority for all countries”. With the physical and socioeconomic characteristics of rural areas of Cambodia, more emphasis must be given on adaptation to risks associated with current climate variability and extremes, especially the impacts on rural and social infrastructures in the context of rural development in Cambodia.

In another context of climate change adaptation to rural infrastructure development, the ADB has been developing a number of rural infrastructure pilot projects to develop knowledge and replicable models in developing member countries on how to climate-proof transport projects and programs. This project in Cambodia represents one of those case studies and is the only one in Southeast Asia. The aim has been to incorporate concerns about climate change impacts into project design in order to reduce the damages caused to plan and existing transport infrastructure and affected areas. Overall methodology and lessons learned are being incorporated into the development of guidelines which can be replicated elsewhere. This intervention can be supportive to the current MRD’s proposed possible response to climate change on some levels of actions. The MRD continues its role to further design and consider other important options with other innovation methods towards rural sustainable development. The levels of intervention to climate change through rural transport projects must therefore include:

**(i)** Engineering or structural adjustments. This shall include provision of appropriate drainage to expected levels of climate impacts. This option will focus on subsurface conditions for road and irrigation schemes, material specifications, hydrological investigation, cross section and standard dimensions, drainage and erosion, and protective engineering structures.

**(ii)** Integration of social and environmental safeguards into the planning process on the basis of ecosystem-based approaches in rural areas. This shall include local improved natural flood management, re-alignment of road sand irrigated canal networks. A combination of these types of options are ideal as part of a comprehensive climate-proofing adaptation strategy. In addition, policy level reforms for rural infrastructure are needed, such as prioritizing activities in particularly vulnerable areas, reviewing alignments to avoid flood prone areas, and introducing screening criteria to include climate change. The MRD will need to use the environmental safeguards checklist of the EIA during screening processes to ensure that projects will comply with climate change resilience.

**(iii)**This adaptation option is also to ensure that vulnerable family’s savings will remain secure during periods of seasonal disasters (flood and drought). The MRD will propose the intervention of socioeconomic development action, of which the vulnerable rural will be a priority in receiving credit loans for opening off-farm business to protect savings and to provide compensation for any loss of assets due to climate change impact.

**(iv)**Increasing rural awareness on the concepts of climate-related issues, such as in primary community health care, hygiene, research results of rural energy consumption, and best climate change-agriculture practices, will be also be options for rural adaptation.

Taking part of climate change mitigation, MRD has been working on the field of changing behavior of rural people on the use of biogas instead of firewood and other materials that produce carbon in the atmosphere. Since 1993, MRD run the project of biogas for rural livelihoods. MRD continues its efforts to change rural behaviors in this field in order to contribute to the low- carbon development.

**5.5 Strategic Priorities**

The overall objective of this strategy is to implement rural development projects with strong consideration of the challenges posed by climate change facing communities and other stakeholders, in particular by supporting them during the planning process, the implementation process, and during post-project evaluation. The planning process will focus during the feasibility study stage on environmental impact assessment. The implementation stage needs to provide adequate designed rural infrastructures with full response to climate change. Post-project evaluation will help the communities to work on best agricultural practices and other business (scheduling crop patterns, preparation of post-harvest and family saving incomes). In the implementation of this strategy the MRD will be guided by principles such as the contribution to the overreaching objective of poverty reduction as stated in national programs, development policies and the Millennium Development Goals. Policy coherence, and complementarily between the rural communities and government is also vital. On the basis of these principles, the MRD proposes that resilience to climate change requires that rural development, particularly rural infrastructure development, should focus on the following four strategic priorities:

|  |
| --- |
| * **Strategic Priority #1**: Creating policies and study profiles make rural infrastructure development (roads, irrigation schemes, wells, ponds and bridges) resilient to climate change. (*Policy design for quality-based rural infrastructures against climate extreme events.*) |
| * **Strategic Priority #2**: Support for adaptation to climate change through create opportunity of local business, of which focus on micro-credit provision for socioeconomic development. The increase of family’s income from local business will create preparedness to compensate for the loss of income during flood and drought periods. (*Policy design and project implementation.*) |
| * **Strategic Priority #3**: Support for resilience to climate change through strengthening the quality of rural infrastructures (roads, irrigation, wells and culverts) resilient to flood and drought. (*Pilot project implementation.*) |
| * **Strategic Priority #4**: Support for adaptation to climate change through increasing rural awareness about the concepts of climate change and response options. To provide capacity development to village development committee members on climate change adaptation and mitigation options and to use other scientific knowledge which can be adapted for use by local people. (*Primary health care, water sanitation, research results dissemination and community development.)* |

In response to each of the Strategic Priorities listed above, the MRD needs international fund support to develop a number of necessary policies which will ensure an appropriate response to climate change, thereby creating climate change resilience as well as improving rural socioeconomics.

**Strategic Priority #1:**

Responding to the climate change adaptation and mitigation, MRD addresses its core activities in the 10-years program under the priority area #1 which are on the focus of policies development as below:

* Identification of climate change vulnerable areas, groups and individuals in all provinces.
* Identification of adaptation options in the respective vulnerable areas.
* Policy on rural road construction (project implementation manual, technical manual and procurement process, involvement of public-private partnership).
* Policy on maintenance of local road network
  + Rise awareness locally and regionally where the roads networks are.
  + Set-up appropriate technical groups who benefit from the roads.
  + Establish a human resources development process.
  + Establish a decentralized planning process.
  + Ensure uniformity in the planning process.
  + Ensure a needs-based budget.
  + Establish a district-wise standard implementation process.
  + Establish of an operation and maintenance mechanism.
  + Establish effective monitoring and evaluation at commune and district levels.
  + Communication with supporting donors.
* Policy on rural road safeguards (social and environmental safeguard mechanisms, EIA).
* Standardized quality design resilient to climate change (scale-up quality, quantity).
* Expansion of bitumen-covered rural roads.
* Small scale irrigation (technical standards, water user groups, maintenance and planning).
* Scale-up rural socioeconomic development through micro- and macro- credit provision.
* Rural water supply (wells construction, rain water harvesting, small scale energy, irrigation and water quality).
* Women’s participation in rural development projects.
* Capacity building (dissemination of information and awareness rising).
* Primary health care.
* Master plan formulation on rural roads maintenance elaborating all concepts of climate change resilience.
* Formulation of rural roads maintenance guidelines elaborating all concepts of climate change resilience, especially social and environmental safeguard mechanisms.
* Reformulation of existing guidelines of technical standards to align with climate change resilience.
* Reformulation of existing guidelines of M&E mechanisms.
* Formulate concrete guidelines for road user groups in order to scale up the resilience to climate change.
* Set up guidelines of rural road numbers.
* Formulate guidelines for public-private partnerships in order to mobilize all non-government and governmental sectors for rural road maintenance.
* Community Development
  + Enable rural people to bring about their own development by working to improve production so that they may have increased income which will enable communities to build a better life through self-reliance, especially self-resilience to climate change, and the use of locally available resources.
  + Enable rural people to use their wealth to improve their welfare and bring about social and economic development.
  + Enable the majority of rural people to enter into an economic system in which they can exchange their goods for money and use the money to pay for goods and services that will raise their standard of living.
  + Enable rural poor to enter into a budget system and spend their income carefully and develop the habit of placing their savings in the rural credit services.
  + Enable rural people to join together in groups and increase their commitment to self-development resilient to climate change.
  + Continue to implement integrated strategic plans, which can complement each other among rural sectors. These include helping the poor with road access, safe water access, credits, small scale irrigation, community health care and literacy education. It is important to address these integrated strategic plans on the concept of climate change impacts through community-based mentor training and consultation.

**Strategic Priority #3**

1. Protecting the road infrastructure from climate change impacts through an improved planning process and consideration of environmental and social safeguards points:
   * Preparation of vulnerability maps for rural roads due to climate change to improve planning for climate changes, including potential climate change downscaling.
   * Identification of potential adaptation options for rural road construction and prioritizing them – using tools of economic analysis of climate-proofing measures, including engineering and non-engineering adjustments – to support the decision making process.
   * Review sustainability and capacity of current engineering designs, standards and guidelines to withstand climate changes.
   * Develop and implement training and curricula for the MRD and at the university level for engineering students.
   * Provide training on climate change to MRD staff and key professionals in rural road construction.
   * MRD continues to improve existing late rite rural roads to bitumen for climate change impact resilience and sustainability. In addition, MRD focuses to expand new bitumen rural road networks to ensure better transport of goods and services.
   * Repair and rehabilitate existing late rite rural roads in the best acceptable way to be resilient to climate change.
   * MRD continues to construct concrete bridges in the best acceptable method to be resilient to climate change. Increasing bridge spans will be based on long-term hydrology data and will be made with strong consideration of extreme events of climate change.
   * MRD continues to design and construct all kind of spillways and weirs in order to respond to the extreme events of climate change.
   * MRD continues to mobilize community-based roads maintenance groups, and to provide them with the concept of climate change resilience for their creative measures for road maintenance.
   * Identify busy rural road networks for routine and periodic maintenance.
   * Identify strategic road networks connecting with main roads for routine and periodic maintenance. These include bordering roads, and access roads to cultural sites and indigenous people.
2. Ensuring that road infrastructure does not increase the vulnerability of the surrounding area to climate change through increased resilience of road infrastructure to climate changes:
   * Green planning – design and implement of ecosystem-based adaptation strategies focusing on environmental/green planning for road projects to improve flood and drought management.
   * Develop and test a pilot local early warning system and a pilot program for emergency management planning for rural roads. In short, this will provide a fully equipped emergency management center (including a back-up mobile unit), with early warning systems installed in key locations, and with emergency management systems in place like appropriate communication, emergency and rescue equipment and vehicles, with trained personnel to manage the center (response teams, medical teams, etc.).
3. Design and develop rainwater harvesting systems such as tanks. It is necessary to reserve for the drought period. There will be 3,500 water storage tanks provided for vulnerable rural schools and communities over five years. There will be construction of tanks, wells and small scale reservoirs in northern border areas of Preah Vihear Province. Provide drinking water for vulnerable households continuously from year 1 until year 5 of the plan. The water tanks have a 2,500 liter capacity for households and a 50,000liter capacity for community use. All schools in the northern border areas will be provided with a roof catchment tank of size 50 m3when installed, with a capacity of 50,000 liters when full.
4. Taking care of community water, it will be necessary to design climate-proofing of pumping wells to adapt to climate change. There will be 5,000 wells treated over five years in the most vulnerable communities.
5. Assuring blue and green water for agriculture: Rainwater harvesting techniques are indispensable for supplying water to plants, as green water or as blue water. They enhance the efficiency of green water use, especially through taking care of the soil. This is done by transforming non-productive green water flow into productive green water through mulching, use of manure, direct planting, and increase of rainwater infiltration through contour planting, rainwater harvesting “in situ” and planting annual crops adapted to dry climates. Facilities will be designed and constructed with an initial 10 places in the northern border areas of Cambodia.
6. Provide shallow wells to vulnerable communities based on groups of circa 20 members and supply between 30 and 40 local households with an average of eight family members with freshwater.
7. Provide deep well and combined wells to vulnerable communities and households, which will total 500 new water points yearly.
8. Design and develop 50 small scale irrigation schemes to ensure full complementary irrigation of wet season paddy rice, even though they meet serious droughts and drying-up of their reservoirs.
9. Conduct groundwater quality testing for arsenic and other parameters to ensure that drinking water in rural areas is safe and healthy.

Figure 3: Types of rainwater harvesting tank

The financial requirement for the activities under the four priority areas is estimated to be approximately 83 million dollars. The budget is proposed to any donors for their support over the five-year plan. This amount includes the contribution of 10% from the national budget on the government side. The budget will cover the period of five years commencing from 2013 (Table 1).

Table 1: Cost Estimation by Proposed Category of Strategic Priority, (in millions USD)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Strategic Priority** | **Ten – Year Budget Plan** | | | | | | | | | | **Total**  **Million USD** |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Strategic Priority #1**: | 8 | 5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 29 |
| **Strategic Priority #2**: | 8 | 10 | 15 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 89 |
| **Strategic Priority #3**: | 8 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 152 |
| **Strategic Priority #4**: | 8 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 53 |
| **Total** |  |  |  |  |  |  |  |  |  |  | **323** |

**10 Years Strategic Plan**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goal / Priority Area** | **Indicators** | **3 Year Target** | **6 Year Target** | **10 Year Target** |
| **Goal**: Support to CCCA through the development of related policies and regulations on rural and social infrastructure  **Priority Area**: Creating policies and study profiles make rural infrastructure development (roads, irrigation schemes, wells, ponds and bridges) resilient to climate change. (*Policy design for quality-based rural infrastructures against climate extreme events.*) | Establishment of M/E monitoring framework review and establishment, recruitment and installation of human and logistic resources) | Identification of indicators and people to consolidate data information  Produce coherent M/E framework system  Review M/E framework, 3 years program evaluation | Review M/E framework, 6 years program evaluation | Review M/E framework and final program evaluation |
| Policy research and policies development:  On roads, water supply, community health care, community socioeconomics, indigenous people, and  Development of regulations, project guidelines, policies, consultation workshops) | - Policy research for revision, updating, and dissemination to all vulnerable peoples in the areas targeted about 30% of all.  - 3-years Policy application evaluation | - Policy research for revision, updating, and dissemination to all vulnerable peoples in the areas targeted about 50% of all.  - 6-years Policy application evaluation | - Policy research for revision, updating, and dissemination to all vulnerable, targeted about 100% of all peoples in the areas  - 10-years Policy application evaluation |
| Identification of vulnerable project areas, preparation of standardized technical manuals and terms of rural infrastructure in response to climate change | Identification of vulnerable project areas at 30% of the whole country’s total rural areas and people.  Preparation of standardized technical manuals and terms of rural infrastructure in response to climate change | Identification of vulnerable project areas at 50% of the whole country’s total rural areas and people.  Dissemination of technical papers and regulations to 50% of the vulnerable people | Identification of vulnerable project areas at 100% of the whole country’s total rural areas and people.  Dissemination of technical papers and regulations to 100% of the vulnerable people. |
| Socioeconomics and awareness of rural infrastructure resilient to climate change | Develop baseline study on rural and social infrastructure in the context of climate resilience, adaptation, and mitigation. | Extended baseline to 50% of the total vulnerable people and conduct 6 years impact assessment. | Extended baseline to 100% of the total vulnerable people and 10 years impact assessment. |
| Rural and social infrastructure safeguards development (environment, social and indigenous people) | Conduct monitoring assessment on rural and social infrastructure safeguards, dissemination of safeguards tools at national levels (project implementer). | Revision of the mechanism of social, environmental safeguards, and indigenous groups and dissemination of tools to district and commune level in the whole vulnerable area. | Revision of the mechanism of social, environmental safeguards, and indigenous groups and dissemination of tools to household level in the whole vulnerable area. |
| **Goal**: Damages by flood and drought will be compensated by the income of on-farm and off-farm business  **Priority Area #2**: Support for adaptation to climate change through creates opportunity of local business, of which focus on micro-credit provision for socioeconomic development. The increase of family’s income from local business will create preparedness to compensate for the loss of income during flood and drought periods. (*Policy design and project implementation.*) | Soft loan provision for livelihoods improvement in order to have savings income for compensating the damages occurred by climate change | Provision of soft loan to vulnerable groups for improving on-farm business such as agricultural production, livestock, fisheries, irrigation, water supply, and off-farm business. 30% of total vulnerable people have been well adapted with the flood and drought | Provision of soft loan to vulnerable groups for improving on-farm business such as agricultural production, livestock, fisheries, irrigation, water supply, and off-farm business. 50% of total vulnerable people have been well adapted with the flood and drought | Provision of soft loan to vulnerable groups for improving on-farm business such as agricultural production, livestock, fisheries, irrigation, water supply, and off-farm business. 100% of total vulnerable people have been well adapted with the flood and drought |
| **Goal**: Build resilient rural infrastructure in the whole vulnerable areas.  **Priority Area #3**: Support for resilience to climate change through strengthening the quality of rural infrastructures (roads, irrigation, wells and culverts) resilient to flood and drought. (*Pilot project implementation.*) | Feasibility study  Planning & design of structures  Pilot projects of rural road construction , small scale irrigation, rural water supply and sanitation  Pilot projects for green planting | Conduct feasibility studies in 75 km for bitumen and concrete road construction. Buildup 10 irrigation schemes subjected to flood and drought, 100 water points, and 10 places of local markets developments  Apply functional design of flood control to build up 75 km of bitumen and concrete rural roads. Concrete irrigation schemes and water supply.  75 km of resilient roads, 10 irrigation schemes, 100 water points, and 10 rural markets.  Provision of green planting along the alignment of roads, irrigation, and growing centers. | Conduct feasibility studies in 150 km for bitumen and concrete road construction. Buildup 15 irrigation schemes subjected to flood and drought, 500 water points, and 20 places of local markets developments  Apply functional design of flood control to build up 150 km of bitumen and concrete rural roads. Concrete irrigation schemes and water supply.  150 km of resilient roads, 15 irrigation schemes, 500 water points, and 20 rural markets.  Provision of green planting along the alignment of roads, irrigation, and growing centers. | Conduct feasibility studies in 300 km for bitumen and concrete road construction. Buildup 30 irrigation schemes subjected to flood and drought, 700 water points, and 30 places of local markets developments  Apply functional design of flood control to build up 150 km of bitumen and concrete rural roads. Concrete irrigation schemes and water supply.  150 km of resilient roads, 30 irrigation schemes, 700 water points, and 30 rural markets.  Provision of green planting along the alignment of roads, irrigation, and growing centers. |
| **Goal**: Delivery of awareness campaign on climate change adaptation and mitigation to all communities in the vulnerable areas  **Strategic Priority #4**: Support for adaptation to climate change through increasing rural awareness about the concepts of climate change and response options. To provide capacity development to village development committee members on climate change adaptation and mitigation options and to use other scientific knowledge which can be adapted for use by local people. (*Primary health care, water sanitation, research results dissemination and community development.)* | Policies and guidelines of rural infrastructure development  Training modules of climate change adaptation and mitigation  Integration adaption and mitigation management into local planning process | Coaching 30% of total vulnerable areas on developed policies and guidelines  Provision of training modules to 100 local focal points of the communities  Design template to integrate adaptation and mitigation action plan in the local planning process of 30% vulnerable communes | Coaching 50% of total vulnerable areas on developed policies and guidelines  Provision of training modules to 300 local focal points of the communities  Design template to integrate adaptation and mitigation action plan in the local planning process of 50% vulnerable communes | Coaching 100% of total vulnerable areas on developed policies and guidelines  Provision of training modules to 600 local focal points of the communities  Design template to integrate adaptation and mitigation action plan in the local planning process of 100% vulnerable communes |

**5.6 Additional Priority Area for Rural Climate Change Adaptation**

**Long-term Objective:** To build the adaptive capacity of **rural and social infrastructures** and to increase the resilience of rural and social facilities to climate change.

To achieve this long-term objective, the MRD would propose several projects for this five year plan; some of those projects will be raised in this report, while others are as yet unidentified. The following KRAs, from which the Ministry of Rural Development and the Provincial Department of Rural Development shall draw local action plans, are adopted. A list of strategic priorities is provided under each KRA to serve as an initial guide for action planning. This is also called: *Possible response of rural development to climate change*.

**KRA#1**

|  |  |
| --- | --- |
| **Theme** | Capacity Building of Climate-Resilience for Rural Development |
| **Project** | Enhanced rural poor people vulnerability adaptation assessments with the focus on of rural infrastructure. |
| **Objective** | Enhance the availability and quality of vulnerability and adaptation assessments to serve as the country’s scientific basis for formulating appropriate climate change adaptation strategies for rural development. |
| **Justification** | The development of a science-based approach to climate change adaptation requires the establishment of a comprehensive knowledge system which has, as its components, the rigorous collection, database maintenance, and publishing of country-specific data towards the generation of methods, tools and assessments for better decision-making. Vulnerability assessment is the process of identifying, quantifying and prioritizing (or ranking) the vulnerabilities in a system. It means assessing the threats from potential hazards to the population and to **existing rural infrastructure**.  Vulnerability and adaptation assessments need to be generated to serve as the country’s scientific basis towards **quantifying and prioritizing** climate-related vulnerabilities and refining adaptation strategies in both national and local settings. As a matter of principle, such assessments shall be iterative as they will be subject to constant methodological and data enhancement. |
| **Actions** | 1. Ensure the formulation of effective and efficient vulnerability, impact and adaptation assessment tools that are relevant to target sectors and implementers. 2. Improve mechanisms for addressing gaps and limitations of existing assessment and vulnerability approaches in relation to the needs and objectives of climate change plans. 3. Increase access to climate change adaptation knowledge products and support services for the purpose of guaranteeing that the needs of the marginalized and vulnerable sectors are addressed. |
| **Timeline** | Medium to long term |
| **Responsibility** | Department of Research and Human Resource Development / Department of Community Development, MRD |
| **Financing** | International funding to be sought. |

**KRA#2**

|  |  |
| --- | --- |
| **Theme** | A Climate-Responsive Rural Health Sector |
| **Project** | Rural people health care provision. |
| **Objective** | Manage rural health risks brought about by climate change. |
| **Justification** | The global climate is now changing faster than at any point in human civilization, and one of its main impacts on human health is increasing morbidity and mortality rates, especially due to vector-borne diseases. Climate change profoundly impacts communicable diseases as its vectors adapt, resulting in greater vulnerability of the marginalized sectors. The health sector must formulate proper climate-sensitive interventions in ensuring a healthy rural people and a disease-resilient community. |
| **Actions** | 1. Assessment of the vulnerability of the rural health care sector to climate change. 2. Improvement of climate-sensitivity and increase in responsiveness of rural health care systems and service delivery mechanisms to climate change. 3. Establishment of mechanisms to identify, monitor and control rural diseases brought about by climate change, and to improve rural surveillance and dissemination of possible response to communicable diseases to the rural poor, especially climate-sensitive water-borne and vector diseases. |
| **Timeline** | Medium to long term |
| **Responsibility** | Department of Community Health Care, Ministry of Rural Development |
| **Financing** | International funding to be sought. |

**KRA #3**

|  |  |
| --- | --- |
| **Theme** | Climate-Proofing Infrastructure |
| **Project** | Standardized rural road design resilient to climate change impacts and implementation of a number of pilot projects. |
| **Objective** | Improve the rural infrastructure sector (roads, irrigation and water supply) resilient to the escalating impacts of climate change. |
| **Justification** | The impacts could be severe in rural areas where rural infrastructures are not designed to fully cope with the effects of climate change. Thus, these impacts have potential implications for where we locate and how we build our new rural infrastructure (road network and canal system), as well as make existing infrastructure robust or resilient to the effects of climate change.  Currently, infrastructure in the rural areas has not kept pace with the requirements of a growing rural economy and the increase in rural population. Yet, in the rural areas of Cambodia there has not provided infrastructure that is sufficient in quantity and quality to meet global economic challenges as well as poverty reduction goals under such international commitments as the Millennium Development Goals. This will be further exacerbated by climate change and the need for urgent adaptation action is increasing by the day. To cope up with the climate change impacts, rural roads networks must play two functional roles – transportation and flood control. Thus, this project will need to design both rural roads and small scale irrigation systems for the functions of transportation and flood control. |
| **Actions** | 1. Establish baseline data and benchmarks for climate change as a basis for adaptation actions in the rural infrastructure sector. 2. Collaborate and integrate climate change adaptation plans for rural infrastructure with other stakeholders. 3. Rationalize climate change adaptation in infrastructure policy, planning and programming. |
| **Timeline** | Medium to long term. |
| **Responsibility** | Department of Rural Roads/ others, MRD |
| **Financing** | 18 million dollars, seeking international funding. |

**KRA #4**

|  |  |
| --- | --- |
| **Theme** | Rural Food Security, Rural Social Protection and Rural Health Care |
| **Project** | Rural adaptation against drought. |
| **Objective** | Develop drought management options for farmers. |
| **Justification** | Climate change is likely to result in increasingly erratic rainfall patterns and droughts.  Traditionally the main stable crop is rice, which is planted in the wet season and harvested early in the dry season, except lower land areas where it is planted in the dry season using small scale reservoirs or it is planted recession rice. Rice currently accounts for over 50% of the total agricultural land. Since paddy rice can suffer from drought stress, farmers developed indigenous methods of supplementary irrigation. Major irrigation projects in Cambodia were developed to provide supplementary irrigation in the worst affected parts of the country, especially at the end of wet periods.  Farmers in these areas are currently reporting increasingly frequent drought affecting the paddy rice, especially in Kampong Speu and Kampong Cham provinces. With climate change, these conditions are likely to be exacerbated. The development of appropriate adaptive measures combining robust indigenous and new cultivars, new cropping systems and improved water management practices need to be developed, tested and disseminated to farmers. |
| **Actions** | 1. Prepare GIS maps of areas vulnerable to droughts. 2. Develop and test adaptive measures in drought-prone areas by combining appropriate cultivars, cropping patterns and land and water management through small scale irrigation infrastructure design, and effective dissemination to farmers. |
| **Timeline** | Short to medium term. |
| **Responsibility** | Department of Rural Water Supply / Provincial Department of Rural Development/ others, MRD |
| **Financing** | 5 million dollars, seeking international funding. |

**5.7 M&E Framework**

There is a needed to establish a Monitoring and Evaluation Unit of Climate Change in the MRD. Monitoring and evaluation will be providing comprehensive analysis and review of the implementation of the activities under the four priority areas. This is a commitment to designing a system that will be used in management and decision-making and not only as a reporting mechanism. To do this, it is necessary that a well-structured and dynamic monitoring and evaluation system be established with MRD’s existing resources committed for its operation. In this way, the M&E unit will be able to monitor the ongoing activities of the four priority areas, make adjustments to the program in a transparent and responsive manner, and communicate to the CCCA on the impact of the overall program on the lives of rural poor people. The M&E framework used by the program will not only include measurement of both outputs and outcomes, but also the use of this information will help manage and improve programs and services. Thus it will serve two key purposes: providing accountability and improving programs and services so as to make them more effective.

**5.7.1 M&E Framework Links to Priority Areas and M/E Objectives**

The M&E Framework supports a dynamic process for refining and developing additional indicators as needed over the five year program implementation period (2013–2022). This framework will allow the MRD, its Provincial Department of Rural Development, other stakeholders and the development partners to monitor implementation of each program area over time, to assess whether the expected outcomes are being achieved, and to develop targeted policies and program interventions designed to address problem areas.

The Logical Framework sets out the indicative outcomes that form the base for the M&E Framework. The outcome indicators specified in the Master Log Frame are the key (or core) set of indicators that will be tracked, and regularly reported on by the MRD as it monitors the impact and implementation of the five year program.

**5.7.2 Proposals for M&E Monitoring Activities**

The MRD will use the following data sources for data collection:

* **Household survey:** Four stratified random household surveys will be conducted over the five years. The first in 2013 will establish the baseline and four additional follow-on surveys in every three years will be made. The household survey will ask a randomly-chosen adult in a household questions about knowledge of climate change concepts, impacts of the climate change on rural society, access to information on climate change, and the physical resilience of rural infrastructure to climate change impacts, socioeconomics gains, ecosystems changes over time, etc., and also obtain demographic information such as age, marital status, income and education so that data can be analyzed by different respondent characteristics. While data will be collected at the commune, district, and provincial levels, it will be representative, and therefore not allow analysis for each individual commune, district or province.
* **Physical damage and improvement records:** With the intervention of the program, the M&E team will create templates for regular physical records for changes over the program periods on rural infrastructure against the variability of climate conditions.
* Data will be collected from each province under the program target by MRD staff from representative provincial offices. MRD staff in the provinces will include, for example, the finance and budget officer, human resource manager, etc., who will be requested to provide information on program-specific issues quarterly, biannually or annually as needed.

**6. Conclusion**

In the rural areas of Cambodia, overall social, environmental and economic vulnerability increases the effects of droughts, floods and other climatic events. From reality, it shows that “many factors contribute to and compound the impact of current climatic variability in rural regions of Cambodia and negatively affect the region’s ability to cope with climate change. These include poverty, illiteracy, inadequate skills, weak institutions, limited infrastructure, lack of technology and information, low levels of primary education and health care, poor access to resources, low management capabilities and competency of resources”.

It is, evident that rural poverty in Cambodia is aggravated by climate change and variability. To address the challenge of rural development, investment in sustainable rural infrastructure project interventions is urgently needed to ensure improved rural livelihoods, while promoting integrated all sectors such as community awareness, community health care, socioeconomics development, water supply and sanitation, and roads and minimizing environmental degradation through rural adaption of climate change.

Currently, increasing investment in rural development, especially rural and social infrastructure, is one of the promising climate change adaptation strategies for the rural poor. MRD can contribute to rural socioeconomics growth and reduce poverty through better application of this proposed 10-years strategic plan that will translate into intensification and diversification in developed land, expansion of irrigated areas, rural roads improvement, rural water supply and sanitation, awareness raising and the increases in food and feed production and environmental conservation.