KINGDOM OF CAMBODIA
Nation Religion King

Ministry of Rural Development

Climate Change Action Plan for Rural Development Sector 2014-2018

Phnom Penh, 2014

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FREFACE

The Royal Government of Cambodia through its concerted efforts has been successfully rebuilding Cambodia from the state of near total destruction of all its assets; human capital; economic, educational and social institutions; government structures and physical assets in infrastructure. Responded to that destruction, Cambodia started to implement the basis of national reconciliation among different political factions in order to bring peace and real development to the people and country under the concrete contribution of all kind and efforts of existing-rolling party (CPP) in 1993 and finally the country reaches real peace and economic growth across the country and nation under win-win solution approach of Cambodia. The economic growth is one of the results from rural and social infrastructure development. Of which Ministry of Rural Development has its mandate to build up capacity of grassroots such as knowledge and economic capacity development of village development committee and commune councils and to build up capacity rural infrastructure by intensifying rural roads networks and rural water supply and sanitation, and long term maintenance of those infrastructures.

However, the on-going international financial crisis and the economic recession in advanced economies have resulted in declining demand for Cambodia's export and have increased macro-economic and financial risks. These external developments have presented unexpected new challenges for Cambodia. On the other big challenge of the Cambodia today is to cope with the impacts of climate change on rural and social infrastructures. Yearly, flood and drought damage huge national economy that needed to remedy rural structures such as irrigation, dams, roads, bridges, shelters, and rice field. The 2013 monsoon rainy season (May-October 2013) was the large-scale flooding return to South-East Asia after a calmer 2012. The flood was a combination of successive typhoons, a significant rise in the level of the Mekong River, trans-boundary flash floods in the western provinces and heavier-than-average monsoon rains caused extensive flooding across Cambodia. It damaged 1.8 million individual living in 20 provinces, killed 168 people, the majority of whom were children (HRF, 2013). Therefore, there is currently the emergency need to clearly establish the important national action plan on social and rural infrastructure against climate change impacts. In response to the second phase of the Royal Government's National Strategic Development Plan, and also in response to the current climate change issues, the Ministry of Rural Development (MRD) is now putting strong efforts under its 10-year strategic plan on rural and social infrastructure development that resistant and resilient to climate change. The strategy will improve the quality of rural structures in their resilience to climate change and sustainably, as well as building up rural economic growth that will contribute in terms of reducing rural poverty levels. To implement its 10-year strategic plan, there is the need to start with potential action plan that address to climate change.

The preparation of this Climate Change Action Plan (CCAP 2014-2018) is the result of commitment and political support from the royal government of Cambodia. As the result, the ministry has established the Climate Change Technical Team of (CCTT) which consists of all key technical departments representative as well as department of planning and training and research. In regular technical consultation with all technical and senior management level, 10 concrete climate change action plans (CCAP) have been addressed to climate change and climate relevance and they are ready to receive the supports from all kind of development partners and other national stakeholders. This CCAP is also developed in line with

commitment in preparing this action plan. MRD wishes to extend its thankful to all involved governmental staffs and other stakeholders in this climate change action plan development during the consultation phase.

Finally, we wish to acknowledge the support of Cambodian Climate Change Alliance (CCCA) trust fund donation for their cooperation, understanding and being friends throughout the planning process. Hopefully, these climate change action plan would have met with the financial supports from various donors under the coordination mechanism of CCCA.

Phnom Penh, July 2014

The Minister of Rural Development Ministry

CHEA SOPHARA

ACRONYMS

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
MEF	Ministry of Economics and Finance
MOE	Ministry of Planning
MOP	Ministry of Planning
MRD	Ministry of Rural Development
NPRS	National Poverty Reduction Strategy
NSDP	National Strategic Development Program
PDRD	Provincial Department of Rural Development
PIP	Public Investment Program
RGC	Royal Government of Cambodia

EXECUTIVE SUMMARY

The projections

Cambodia is one of the most vulnerable countries in the region due to its topography and its dependency on Mekong river system. Based on this strategic location, the country's existing 40,000 km and rural communities are often vulnerable to extreme events such as heavy rains, floods followed by droughts. Flooding with loss of rural connectivity can have a devastating effect on the livelihoods of the population. These impacts are expected to become more pronounced and severe under the influence of climate change. Climate change (including natural disaster) is key threat to rural infrastructure and people wellbeing in both rural areas and urban periphery.

Flooding with loss of rural connectivity can have a devastating effect on the livelihoods of the population. These impacts are expected to become more pronounced and severe under the influence of climate change. Climate change (including natural disaster) is key threat to rural infrastructure and people wellbeing in both rural areas and urban periphery.

Many scientific studies (MOE-SNC 2010, MOE-PPCR 2013) shows existing and potential impacts from climate change to key sector of rural development include:

- The impact on Rural Water Supply, mostly link with small scale irrigation whose role is to store water for paddy field and crop production for local community.
- The impact on ground water which is one of the key responsible of the ministry. Unlike surface water, ground water 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.
- Impact on rural road sector due to overall increase total annual rainfall, resulting in increased floods during the wet season and increased drought during the dry season.
- Impacts on the Rural Socioeconomic and Health Sector due to floods and droughts.

Experience in Cambodia suggests that much of the investments in rural infrastructure with regards to climate change have been made in response to current climate extreme events such as floods and droughts. These projects focus on the construction of water culverts, flood protection dykes in major provincial towns, and rehabilitation of roads and bridges damaged by floods. However, construction of water storage dams, pumping facilities, water gates, canals, and expansion of drainage and sewerage networks has been limited.

Some of these adaptation goals have involved in 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).

The CCAP methodology

CC Action Plans (CCAPs) include a planning matrix which identifies the priority actions required to deliver the CCSP strategies and priorities, proposed activities and costing and financial mechanism. The process

has taken place about 8 months through internal consultation, consultation with sector and public consultation with key stakeholders to ensure technical aspects.

The strategies and selected actions

Four major strategies developed in respond to the climate change adaptation. These strategies include:

1. Develop climate change resilient policies for rural infrastructure and to build resilient in rural infrastructure development to climate change
2. Support for adaptation to climate change through creating local business opportunities
3. Support for adaptation to climate change through increasing rural awareness to all vulnerable areas
4. Capacity development on CCA to village development committee (primary health care, and water sanitation).

To response to stated strategies, the team has selected 10 out of 23 actions that are highly relevant to the climate change adaptation and needed.

Table1: The proposed action and costing for 2014-2018 (USD, 000)

MRD Actions		**Total (USD)**
1	Mapping rural vulnerable infrastructure (road, water supply facilities) in provinces with high risk of climate change.	400
2	Developing adaptation options and guidelines to improve climate change resilience of rural infrastructure	500
3	Build awareness and capacity at national and sub-national level for mainstreaming climate change into rural development planning processes.	2,500
4	Scale up microfinance to support GHG mitigation and reduce climate change impact in vulnerable areas (currently 3 provinces)	4,000
5	Carry out risk assessment and management for the improvement of water supply and sanitation (WATSAN) in the Tonle Sap Great Lake provinces.	8,500
6	Build capacity on climate proofing rural infrastructure design, construction and maintenance for civil engineers (250) at national and sub-national level	600
7	Raising awareness of climate change for Village Development Committees (VDCs)	5,500
8	Pilot community based climate change adaptation for VDCs in the Cambodia Mekong Delta (Takeo, Svay Rieng, Prey Veng).	4,000
9	Climate proofing Mekong river islands' connectivity (roads and jetties).	30,000
10	Climate-Proof tertiary-community Irrigation Development to enhance agricultural production of paddy field in four communes of Mekong Delta Province.	530
	Grand Total	**56,530.00**

Indicators, Management & Monitoring

The main departments in MRD are: Water supply and sanitation, rural road development, rural economic development, community development, planning and finance. Most of the project development work in irrigation is managed by the Project Management Unit (PMU). The PMU is

supported by various Project Management Units and reports directly to the Minister, using an accounting system that is separate to the ministry and outside the treasury.

The key monitoring indicators are as follows:

- 50 % of entire technical staffs will be trained during the first 2-year project implementation, and 100% will be trained during these five years period.
- Four assessments will be first year conducted which include climate change vulnerability assessment, vulnerability mapping, and capacity need assessment, and socioeconomics survey of vulnerability group and gender. Technical guidelines for designing infrastructure will be completed during the first 2-year that include project manual, technical guidelines, checklist of climate change risk reduction.
- 5% of the current total water wells, 5% of current rural roads and irrigation schemes will be constructed by using proposed technical guideline resilient to climate change.
- 20% of current poor families that accessed to existing loan, will be improved their living incomes better off after access to this soft loan for biogas application.
- 30% of whole rural population, in the target to most climate change vulnerability areas, will be trained and educated on climate change, climate resilience, and infrastructure planning for rural public assets.
- 75% of households in vulnerable areas[1] with year round access to water supply (agricultural)
- Length (120 Km) of climate proofed rural roads will be improved and constructed resilient to climate change.

[1] See footnote No. 5

I.BACKGROUND

The MRD is a multi-disciplinary intervention institution, working in the areas of social and rural infrastructure in rural areas of Cambodia. The main activities of the rural infrastructure sector are rural road improvement, irrigation rehabilitation and water well construction. The social infrastructure sector comprises sanitation and hygiene, community development and capacity building, micro-credit provision, gender protection and indigenous population protection.

A. Policy review

A series of policies has emerged as current mandates of the MRD, such as:

The Policy of Indigenous People has the following objectives:

- All ethnic minority must have livelihood standards out of poverty and extreme poverty
- Ethnic minority must receive education at least up to basic level (grade 9) and obtained various vocation trainings suitable to their locality and communities
- Wellbeing of ethnic minority must be well treated
- Indigenous culture of ethnic minority must be protected and maintained with better manner.

The policy has highlighted that indigenous people should have better access to key priority sectors services such as culture, education, vocational training, health, environment, land, agriculture, water resources, infrastructure, justice, tourism, industry and mining.

The Policy of Rural Road Improvement is to ensure plan for restoration and development of short-term, medium and long-term rural roads through study, research and design for repairs, construction and maintenance of rural roads. The department of rural development plays key role to manage all rural roads and implement and analyze the traffic count of vehicles and inventory book of rural roads and to organize and improve rural road policies to meet with:

- Technology choices;
- Specification and size;
- Rules and formality of contact;
- Environmental and safety standard; and
- Men/women's role, social vulnerability and labor standard;

In addition, this policy is to provide guideline related to rural road operation and maintenance by the rural people themselves to ensure sustainable rural development; and to train civil servants in charge of performance and inspection of the implementation of rural road programs and projects.

The policy of rural water supply and sanitation aims to increase access road to clean water supply throughout the country. Further expansion to the coverage of clean water supply to the rural and urban areas through the rigorous implementation of **"The National Strategy for Rural Water Supply and Sanitation 2011-2025"**, including formulation of a clear action plan and encouraging participation from the private sector (see rectangular strategy III, mandate 5 of government 2013).The ministry has also mandate to implement other major policies such as the Policy of Rural Development.

Overall, these policies are being implemented through the projects and programs of Provincial and rural infrastructure project which include:

- 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
- Rural road improvement project

The NSDP 2009-201313 updated versions highlighted one goal on rural infrastructure development. This has employed various strategies which include:

> To continue strengthening the capacity building of national and sub-national institutions, develop human resource, basic skills, develop integrated planning, improve public finance and administration, providing rural transport infrastructure, supporting commune and Sangkat to implement small scale infrastructure projects, promoting settlement of border areas, improve clean water supply and introduce one village, one products, promote rural economic development, promote food security and improved access to credit for rural families.

For the next five year policy strategies (2014-2018) approved by the national assembly, MRD will carry out two priority policy objectives:

Policy 1: Ensuring the improvement of the living standards of people in rural areas to get closer with urban areas by 2025. Key indicators include:

- Improvign income of rural families through knowledge and skill development
- Creating more jobs and reduces migration for rural communities by improving rural infrastructure such as road and electricity.

Policy 2: Promoting rural economic growth through integrated rural development with the participation of the national and international communities. Key indicators include:

- The connection of rural economic from isolated production areas to town and urban areas by improving road networks throughout the country.
- The provision of clean water and sanitation to all communities with 100% by 2025.
- Promotion of the development and conservation of indigenous ethnic minorities in order to maintain the cultures and traditions of ingenious people.

B. Situation analysis

Cambodia has over 40,000 km of rural road and the country's topography is dominated by several surrounding mountain ranges, the Mekong River and Tonle Sap, the largest fresh water lake in Asia. The lake is connected via the Tonle Sap River to the Mekong River at Phnom Penh. Their conjunction leads to an unusual event. When the Mekong is higher than the Tonle Sap River the river flows backwards into

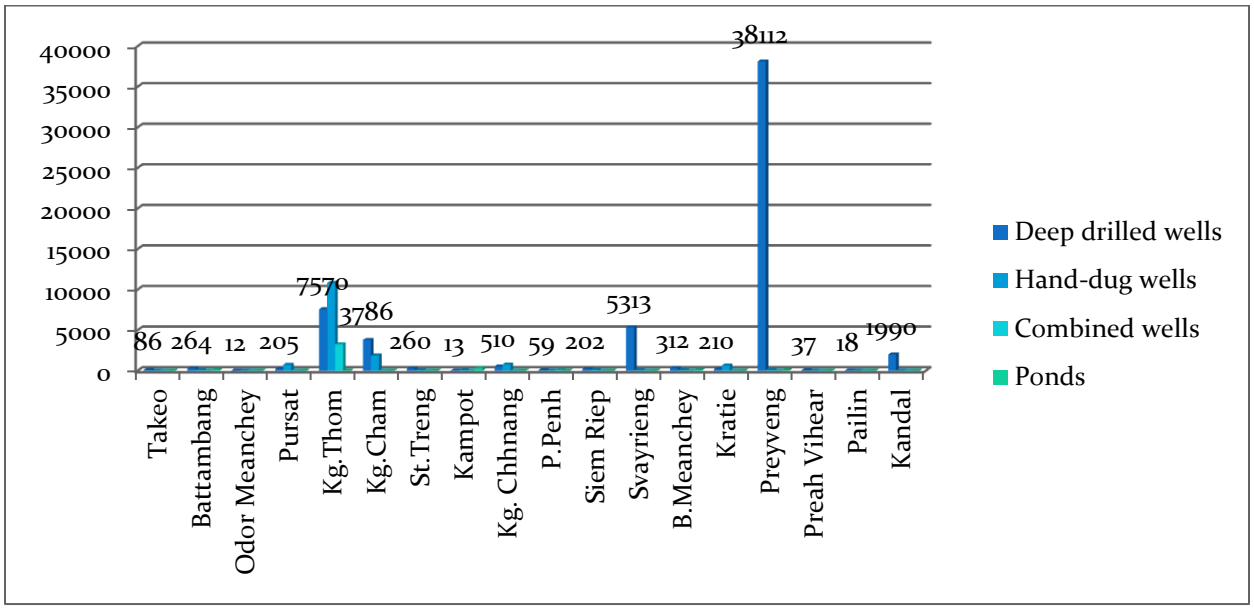
the lake causing it to expand its surface are by 400%. Then when the Mekong water recede, the lake discharges into the Mekong and returns to its original size.

The country, and rural communities and rural roads are annually suffered from heavy rains and flooding followed by droughts. Flooding with loss of rural connectivity can have a devastating effect on the livelihoods of the population. These impacts are expected to become more pronounced and severe under the influence of climate change. Climate change (including natural disaster) is key threat to rural infrastructure and people wellbeing in both rural areas and urban periphery.

Many scientific studies (MOE-SNC 2010, MOE-PPCR 2013) show existing and potential impact from climate change to key sector of rural development. These include:

- **The impact on Rural Water Supply**, mostly link with small scale irrigation whose role is to store water for paddy field and crop production for local community.
- **The impact on ground water which is one of the key responsible of the ministry.** Unlike surface water, ground water 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 ground water 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.

Figure 1: Flood Affected Wells in 18 Provinces in 2011



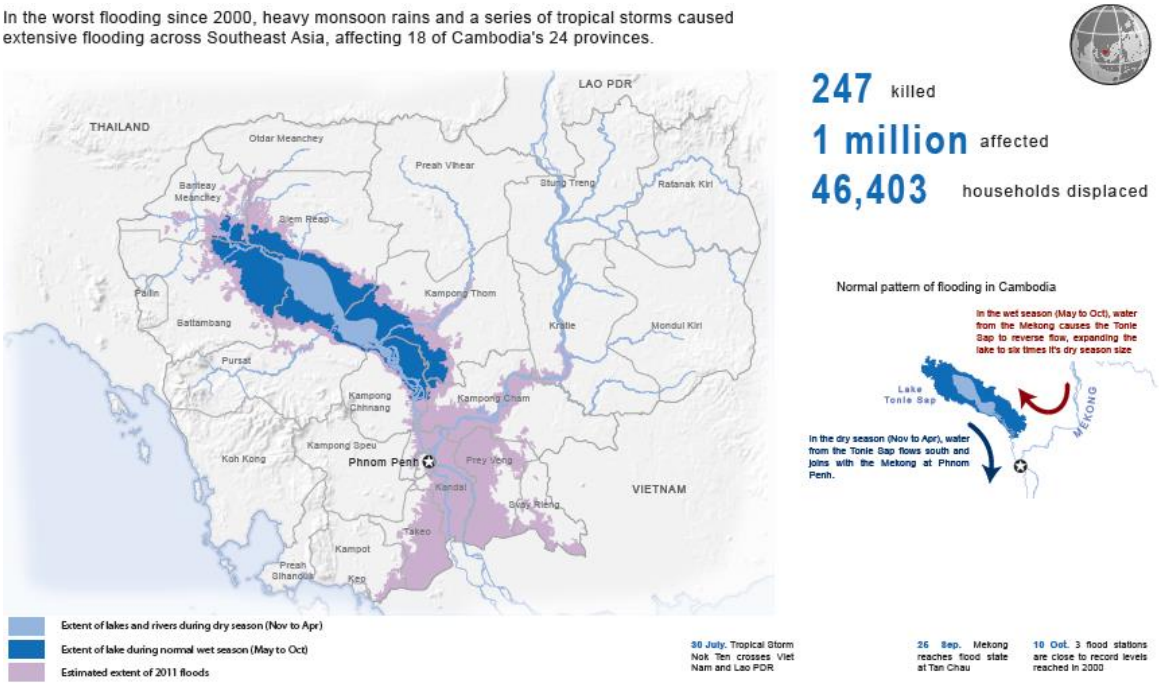
Overa impact from extreme events of floods in 2011 shows Crops lost about 265,804 hectares (full damage) with 247 people reported deaths. 350,274 houses and 1.6 million of people affected. Other rural infrastructure include 1,000 schools, 240km of rural roads, as well as other water infrastructure[2]

[2] 15 Provinces, namely Battambang, Pursat, Kampong Thom, , Kamong Cham, Steung Treng, Kampot, Kampong Chhnang, Phnom Penh, Siem Riep, Svay Rieng, Banteay Mean Chey, Kratie, Preyveng, Preah Vihear and Kandal

which form key component for rural economy were also affected. It was estimated with overall lost about US$521,000,000 in total.

- **Impact on rural road sector**: there appears to be an overall increase in average total annual rainfall, which is poorly distributed over the seasons, resulting in increasing floods during the wet season and drought during the dry season. Droughts are significant, especially for unpaved roads such as dust levels increasing, reducing visibility and creating 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).
- **Increasing flood and flash flood:** Existing damage to the road, including washouts, is primarily due to flooding from typhoon Ketsana in September 2009, though they were in poor condition prior to the typhoon. The reconstruction and recovery work from the typhoon will include managing the increased runoff, especially increased peak rainfall events and storms will be part of the adaptation measures. This implies building additional risk assumptions into the engineering design, which carries an important cost, and has been incorporated into the project design already.

Figure 2: The damage in late 2011; mostly in Mekong provinces and the provinces surrounded Tonle Sap Lake.



- **Impacts on the Rural Socioeconomic and Health Sector:** Floods destroyed farming systems and homesteads in 2011, resulting in a loss of some $500 million 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. Savings, by not spending income from their businesses, (made possible by the loans) can compensate for losses incurred by climate change impacts (such as flood and drought).

The vulnerability of a population is depending on key indicators 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.

Changes in temperature 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).

There are 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 seasons, resulting in increased floods during the rainy season as well as increased drought incidence during the dry season.

The interventions to climate proof transport projects include engineering or structural adjustments such as drainage design; ecosystem based approaches such as improved natural flood management and tree planting have been implementing in the Rural Roads Improvement Project (RRIP) year 2010-2015.

C. Priority issues

The recent assessment by MOE-PPCR (2013) shows infrastructure conditions in Cambodia indicates that roads, bridges, drainage and sewage networks, and other critical infrastructure in Cambodia largely fail to meet the needs of socio-economic development, and that inadequate infrastructure increases the vulnerability to climate hazards. Recently, development assistance has focused on rural roads, electricity, and establishing wholesale markets in border zones to enable farmers to connect with regional markets.

Experience in Cambodia suggests that much of the investments in rural infrastructure with regards to climate change have been made in response to current climate extreme events such as floods and droughts. These projects focus on the construction of water culverts, flood protection dykes in major provincial towns, and rehabilitation of roads and bridges damaged by floods. However, construction of water storage dams, pumping facilities, water gates, canals, and expansion of drainage and sewerage networks has been limited.

Some of these adaptation goals involve in 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).

II. STRATEGIES

The current shift in policy within MRD focus on key priority areas is to establish policy and study profile that make rural road infrastructure more resilience to climate change. These strategies include: (i) Support climate change adaptation through micro-credit, increase income for those affected by flood and drought, (ii) Strengthening rural infrastructure resilience to flood and drought (to quantify the impacts and modify designs in order to make roads resilient to climate change, the project being

implemented), (iii) Awareness raising on CC impact to all vulnerable areas, (iv) Capacity development on CCA to village development committee (primary health care, and water sanitation).

On the basis of these principles, MRD proposes that resilience to climate change requires the rural development, particularly rural infrastructure development, should focus on following four strategic priorities:

1. Creating policies and study profiles makes rural infrastructure development (roads, irrigation schemes, wells, ponds and bridges) resilient to climate change.
2. Supporting adaptation to climate change through creating local business opportunities that focus on micro-credit provision for socioeconomic development.
3. Promoting climate resilience through strengthening the quality of rural infrastructures (roads, irrigation, wells and culverts) to be resilient to flood and drought. (Pilot project implementation.).
4. Promoting adaptation to climate change through capacity and institutional development and increasing rural awareness rising on climate change adaptation and response options. Key action include promote primary health care, water sanitation, research results dissemination and community development.

III. ACTION PLAN

This section list down the proposed action plan for climate change action plan. It covers the scope of planning, the planning matrix, the impaction of expenditure and the potential benefit of applying these prioritized actions.

3.1 Summary of scope of planning

MRD has prepared a serious of long lists that are relative importance for both adaptation and mitigation. Based on guideline, the Action Plan covers the following categories of action.

- *Category 1: **Re-scaling** existing and planned actions to take account of their contribution to adaptation and/or mitigation. This may include up-scaling pilot activities.*
- *Category 2: **Modifying** existing actions through climate proofing and/or by adding mitigation*
- *Category 3: **Developing** new climate change actions*

In response to this concern, MRD raised four strategic priorities of its strategic plan and implement the action plan under each strategic priority as below:

Action Plan in Response to Climate Change in the Area of Infrastructure Development

Strategic Priority 1

1. Identification and Mapping vulnerable group of rural infrastructure in province of high risk due to climate change impact
2. Developing adaption guideline and other options in order to improve rural infrastructure resilience to climate change.
3. Capacity building and awareness raising at national and sub national level for mainstreaming climate change in to rural development planning process ($2 million)

Strategic Priority 2

4. Up scaling existing micro-finance to support GHG mitigation and reduce climate change

impact in the vulnerable area (currently in 3 provinces)

Strategic Priority 3

5. Climate change Risk Management and improvement of Rural Water Supply and rural infrastructure in the Tonle Sap Basin.
6. Capacity building on climate change -proof infrastructure design for civil engineering of National and sub-national (215 engineers)

Strategic Priority 4

7. To promote awareness rising of CC for VDC.
8. Piloting community base CC adaptation for VDC in Cambodia Mekong delta (Takeo, Svay Rieng and Prey Veng Provinces)
9. Strengthening connectivity network resilient to climate change both rural road and jetties among Mekong River Islands.
10. Climate-Proof tertiary-community Irrigation Development to enhance agricultural production of paddy field in four communes of Mekong Delta Province.

Table 2: Action plan matrix for key prioritized action

MRD Actions		Category of action	Preliminary Estimated budget (USD'000) (note: present costs to the nearest 1000 USD)					
			2014	*2015*	*2016*	*2017*	*2018*	*Total*
Develop climate change resilient policies for rural infrastructure								
1	*Map rural vulnerable infrastructure (road, water supply facilities) in provinces with high risk of climate change*	*2*	150	150	100			400
2	*Develop adaptation options and guidelines to improve climate change resilience of rural infrastructure*	*2*	50	250	200			500
3	*Build awareness and capacity at national and sub-national level for mainstreaming climate change into rural development planning processes.*	*3*	500	500	500	500	500	2,500
	Sub-Total		700	900	800	500	500	3,400
Support for adaptation to climate change through creating local business opportunities								
4	*Scale up microfinance to support GHG mitigation and reduce climate change impact in vulnerable areas (currently 3 provinces*	*2*	0	1,000	1,000	1,000	1,000	4,000
	Sub-total		0	1,000	1,000	1,000	1,000	4,000
Support for resilience to climate change through strengthening rural infrastructure quality								
5	*Carry out risk assessment and management for the improvement of water*	*3*	0	2,000	2,500	2,000	2,000	8,500

	supply and sanitation (WATSAN) in the Tonle Sap Great Lake provinces.							
6	*Build capacity on climate proofing rural infrastructure design, construction and maintenance for civil engineers (250) at national and sub-national level*	*3*		300	300			600
	Sub-Total		00	2,300	2,800	2,000	2,000	9,100
Support for adaptation to climate change through increasing rural awareness								
7	*Raise awareness of climate change for Village Development Committees (VDCs)*	*3*	0	1,800	1,800	1,900	00	5,500
8	*Pilot community based climate change adaptation for VDCs in the Cambodia Mekong Delta (Takeo, Svay Rieng, Prey Veng)*	*3*	0	1,000	1,000	1,000	1,000	4,000
9	*Climate proofing of Mekong river islands' connectivity (roads and jetties), (50% Climate Change Proofing)*	*3*	6,000	6,000	6,000	6,000	6,000	30,000
10	Climate-Proof tertiary-community Irrigation Development to enhance agricultural production of paddy field in four communes of Mekong Delta Province.	*1,3*	00	176.6	176.6	176.6	00	530
	Sub-Total		6000	8,977	8,977	9,077	6,000	40,030.00
	Grand Total		6,700.00	13,177.00	13,577.00	12,577.00	9,500.00	56,530.00
	Ceiling							**59,000.00**

3.2 Implications for Expenditure in the Ministry

The actions above shows USD **56,530,000.00** is required to operate the proposed actions. According to MDR's budget strategic plan 2014-2016, it shows 24 projects with total budget with US$254,355,030.00. These projects are proposed to response to two majors policy objective of the ministry: (i) Ensuring the improvement of the living standards of people in rural areas are closed with downtown areas by 2025 and (ii) promoting rural economic growth through integrated rural development with participation of the national and international communities (MRD 2013).

According to the list of project documented in the Public Investment Program (PIP) 2013-2015, it shows total project budget with US$401,704,200.00 out of total planned expenditure of US$286,083,000.00. Based on this PIP, there are total committed fund with US$234,529,500.00 from 2013-2015 of which additional US$51,553,500.00 are needed.

In addition, during the long list discussion process, there are 23 on-going projects being implemented by the MRD with total budget allocated of US$428,380,006. Different sources of funds are coming from (i) government budget, and (ii) foreign grants and loans while the details of these projects are listed in annex 1.

IV. MANGEMENT AND FINANCING MECHANISM

4.1 Analysis of existing management and financing mechanisms

The ministry develops a portfolio of projects based on national priorities as reflected in the rectangular strategy of the Government and in the Strategy for rural road development and improvement, rural water supply and sanitation and indigenous people development. However, most external resource mobilization in MRD is done on a bilateral basis, through discussions with individual donors on one or several of the pipeline projects identified in the Public Investment Plan (rolling three-year plan). Domestic capital resources are allocated as counterpart funds and on the basis of decisions from the Prime Minister.

Both donors funded and nationally funded projects are managed through the central project management office and its units, and subsidiary provincial project implementation units. The PMO and its structure is not shown on the organization chart of MRD as it is outside the line management structure. The PMO reports to the Minister via a project manager for each project, who may be at Secretary of State Level. The PMO financial accounting system is separate from that of the Ministry and funds do not flow through the Department of Finance, or line departments. The establishment of a project management office (PMO) with project management units (PMUs) and project implementation units (PIU) outside line departments has created overlapping mandates of line departments and the PMOs. Staff has been attracted from departments into PMUs, because funding arrangements are more free and workable than in the ministry itself.

The working group in charge of CCAP development, including representatives from relevant ministries, will remain active and coordinate the implementation of the CCAP within the ministry.

There is a need to strengthen the provincial offices PDRD of MRD to enable them to implement national and sub-national level programs.

4.2 Analysis of potential sources and volume of finance for Climate Change actions

The CCAP includes 10 actions for a total of US$56,530.00.00 over 5 years. Two thirds of the budget is allocated to the rehabilitation and rural road proofing of infrastructure. Other actions include research, testing of technologies, capacity development, as well flood risk management, clean water and sanitation.

The ministry expect to source a significant portion of these resources through its existing donors, by raising the profile of climate change at project identification and design stage. Additional climate resources may be raised from LDCF and the Green Climate Fund.

Expenditure on infrastructure could be scaled up or down depending on whether a high or low climate change financing scenario materializes.

4.3 Entry points for climate change mainstreaming in management and financing mechanisms

Investment funds under MRD are exclusively managed through a project modality. In the absence of strong coordination mechanisms, it is recommended to introduce standard procedures including climate

change as a criterion for the identification and formulation of projects. The PMO could play a role in enforcing these standards for all new projects. A priority activity would be to conduct the necessary research to define adequate CC proofing standards for irrigation infrastructure.

Many CCAP actions are directly linked to projects already included in the ministry's PIP. New actions will be incorporated in the PIP by the Department of Planning.

V.MONITORING AND EVALUATION

5.1 Develop a framework for monitoring, reporting, evaluation and learning

Monitoring and evaluation of the CCAP will be conducted consistently with the national framework for M&E of climate change response established by the CCCSP.

An effective monitoring and evaluation strategy and implementation in Cambodia, which is critical to the success of any climate change, programme (PPCR 2, 2014), and would have the following characteristics:

- Institutionalized M&E system including officially mandated M&E roles and responsibilities;
- Centralized M&E system, coordination and guidelines;
- Sustained and pervasive training on centralized M&E system, coordination and guidelines;
- Funding to implement an M&E system.

Ministry of Rural Development which has just launched its Monitoring and Evaluation Guideline that will importantly guide every department pay its attention to development of their indicators can easily compilation into core indicators under the framework of MRD's M&E. In this stage, MRD will have its focus on core M&E system.

For further necessary step MRD will - A template will be developed in order to facilitate collection of baselines on these entire proposed ten action plan (output level). These will be collated and analyzed for inclusion in the first M&E report. A baseline data at the outcome level of proposed action plans will be collected within the first program's year (2015). Activities under the M&E of this action plans are:

- Using new guideline of M&E, it is to develop monitoring and reporting format for these **action** plans in order to ensure that climate change indicators are utilized and data collection related to climate change indicators are collected.
- Developing gender inclusive results framework and management information system for these action plans M&E ensuring every action plan are gender inclusive by utilizing effective gender-related indicators and reporting against those indicators.
- Prepare annual monitoring and evaluation reports on action plan achievement.

The department of planning and public relation will have responsibility to manage the monitoring, reporting and evaluation process with the technical support from the working group of the climate change. It carries out these tasks with the support and in coordination with the NCCC and MoP. For details of the institutional arrangements see also the diagram of Figure 3.

A mid-term evaluation will be organized in year 2016 and a final evaluation in 2018. The evaluations will assess the progress in implementing the CCAP and CCSP, its relevance and contribution in addressing climate change and water issues and achieving impacts foreseen in sectoral plan and NSDP, the effectiveness in terms of mainstreaming climate change within the MOWRAM services, and integration in planning and monitoring systems of the ministry. The evaluations will also assess the alignment and contribution towards achieving the objectives set in the CCCSP[3], and will provide recommendations for future adjustment of the policy response. This effect will be important in evaluations identify lessons learned and, if needed, entry points for improving policies and actions. A precondition for organization of quality evaluations at program (CCAP) and action levels will be sufficient resources for monitoring and evaluation are budgeted in the actions.

The monitoring of the CCAP will be based on the following indicators framework:

Indicator Type	Purpose	Frequency
1. CCAP delivery and mainstreaming	Tracking the progress in fundamental aspects of CCAP implementation, such as fund mobilization.	Annual
2. Institutional readiness[4]	Tracking the progress in improving capacities and integration of climate change into sectoral policies and planning.	Annual
3. Results	Assessing the results of Actions.	Annual or depending on the nature of the action[5].
4. Impact	Assessing the progress towards ultimate climate policy and development objectives.	Annual, ad-hoc for indicators that require specific studies (e.g. sectoral climate change vulnerability assessments).

To minimize costs and improve mainstreaming, whenever possible indicators will be based on relevant indicators already being monitored[6]. Baseline and targets for indicators for CCAP delivery and mainstreaming, and for impact indicators will be established by the end of 2014, and will be included in the first CCAP progress report. Result indicators will be finalized, and respective baselines and targets established as the actions are financed. The indicator framework will be reviewed in 2016 during the mid-term evaluation.

[3] The national framework for M&E of climate change response foresees the establishment of a Long Term National Evaluation Program. Evaluations of the CCAP as a whole and of specific actions will be organized in coordination with the national evaluation program.

[4] These indicators will be using a qualitative assessment based on scorecards.

[5] Given that most actions will require formulation of project proposals to access the funds required for implementation, the indicators identified are preliminary and will be updated to reflect the actual scope of the action. Only indicators related to actions that have been funded for implementation will be monitored.

[6] Additional processing and analysis of existing indicators will often be required to address the climate change aspects; this might include classifying the data according to the vulnerability analysis included in the Draft SNC to the UNFCCC and subsequent vulnerability assessments.

The indicators for the CCAP are:

1. CCAP delivery and mainstreaming indicators	
1. Funds planned and actually disbursed, compared with the CCAP planning matrix[7] 2. Proportion of actions funded from national budget, which will indicate the progress in mainstreaming financing into national budgets	
2. Institutional readiness indicators	
3. Integration of Climate Change into sectoral policy and budgeting • Knowledge Level of village development committee on climate change, climate resilience and infrastructure planning after awareness raising delivery at sub national level. 4. Capacities for climate change mainstreaming • Capacity Development of technical staffs who are in charge of infrastructure designing at both levels, nationally and sub nationally. • Development of technical guidelines, project manuals, and other related tools that assist the infrastructure design be resilient to climate change • Percentage of rural water supply allocation and length of rural roads and small scale irrigation that designed and constructed resilient to climate change Availability and use of data and information • Four assessments will be first year conducted that include climate change vulnerability assessment, vulnerability mapping, and capacity need assessment, and socioeconomics survey of vulnerability group and gender. Technical guidelines for designing infrastructure will be completed during the first 2-year that include project manual, technical guidelines, checklist of climate change risk reduction.	
3. Results indicators	
1. Mapping vulnerable rural infrastructure (roads, water facilities) in provinces at high risk from climate change	• 100 engineers of MRD strengthened and developed • Guideline and standard for infrastructure resilient to climate change developed • Climate maps and climate vulnerability index developed for rural infrastructure, communities, and location • Coordination of three ministries: MRD, MOWRAM and MPWT strengthened and more data available for sharing.
2.Develop adaptation options and guidelines to improve climate change resilience of rural infrastructure	• Adaptation option guideline developed and adopted by the ministry
3. Build awareness and capacity at national and sub-national level for mainstreaming climate change into rural development planning processes.	• Rural roads and water facilities inventories and quality indexes • Rural infrastructure vulnerability maps for all provinces.
4. Scale up microfinance to support GHG mitigation and reduce climate change impact in vulnerable areas	• Number of farmers in seven provinces will obtained soft loan for biogast installation (in-kind contribution). • Percentage of family income increase (actual baseline to

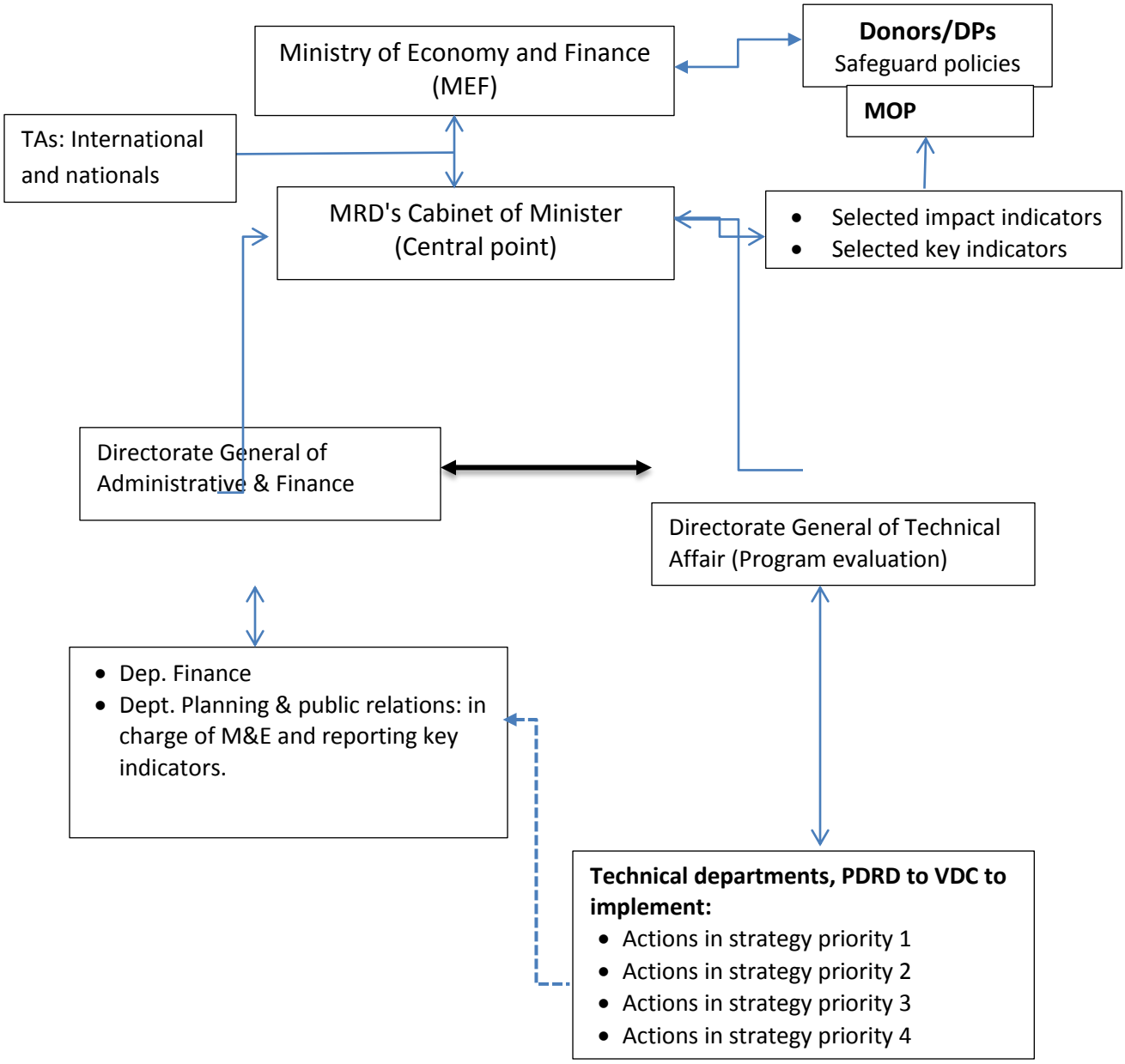
[7] This indicator will be calculated as the ratio of actual funds allocated and the budget foreseen in the planning matrix. For example if by 2016 the total funds actually allocated are 15 M (4 million in 2014, around 11 million in 2015, and more than 11 million in 2016 and the total budget is of 44.2 million for this CCAP).

	be done in feasibility study). • Number of farmers trained on how to use and produce biodigesters.
5. Carry out risk assessment and management for the improvement of water supply and sanitation (WATSAN) in the Tonle Sap Great Lake provinces.	• Detail based line studies developed • At least 348,000 farmer/villager will have full access to clean water ad water for domestic supply and use • 105,000 farmers are actively using their community ponds for agricultural diversification and strengthening community sense of belonging. • 180 community pond committee established and functioning in six provinces • 1,500 wells community committee established in 6 provinces
6.Build capacity on climate proofing rural infrastructure design, construction and maintenance for civil engineers (250) at national and sub-national level	• *240 rural engineers capacity developed and strengthened* • *40 technical staffs both from national and provincial level developed in dealing with climate resilient in infrastructures* • *Project technical guideline on infrastructure resilience to climate change to be mainstreamed into sectoral development*
7. Raise awareness of climate change for Village Development Committees (VDCs).	• Number of VDC has been trained. • Result of KAP survey would be considered as qualitative indicators
8. *Pilot community based climate change adaptation for VDCs in the Cambodia Mekong Delta (Takeo, Svay Rieng, Prey Veng)*	• *At least 85 communities based Climate Change Adaptation are established in order to Improve access to markets, jobs and social services in response to Climate Chang Impacts.* • *At least 200 VDCs along Mekong Delta are well trained and well equipped in order to fully participate in the community planning and community investment programs, in particular in the Rural Economics, livelihood, and early warning system appropriate to local communities.*
9. Climate proofing of Mekong river islands' connectivity (roads and jetties).	• At least 50 km of rural roads rehabilitation in the islands will be climate resilient and provide year-round access to markets and other social services for communities. • At least 11 jetties with climate resilient standards. • Vulnerability maps of rural roads climate proofed developed • Adaptation guideline and planning option including cost and benefits of road development. • 1 million people benefit from the project starting to post project implementation. • Engineering designs, standards and guidelines of resilience to climate change are jointly developed by MRD and MWPT. • Climate office is official established by MRD. • Local early warning systems and pilot program for emergency management for rural roads developed.
10. Climate-Proof tertiary-community Irrigation Development to enhance	• 5 community-based irrigation system developed and implemented

agricultural production of paddy field in four communes of Mekong Delta Province.	• 20-30% of rice yield increase with small scale irrigated intervention • Capacity of all level from project design to project implementation will be improved • Climate resilience will be integrated into project design and local community is aware of this objectives and project resilient to climate change. • At least Income of 5,000 local communities are enhanced
Impacts	
1. 50 % of entire technical staffs will be trained during the first 2-year project implementation, and 100% will be trained during these five years period.	
2. Four assessments will be first year conducted that include climate change vulnerability assessment, vulnerability mapping, and capacity need assessment, and socioeconomics survey of vulnerability group and gender. Technical guidelines for designing infrastructure will be completed during the first 2-year that include project manual, technical guidelines, checklist of climate change risk reduction	
3. 5% of the current total water wells, 5% of current rural roads and irrigation schemes will be constructed by using proposed technical guideline resilient to climate change. The structure designs of that infrastructure will be the model for other overall rural infrastructure designs	
4. 20% of current poor families that accessed to existing loan, will be improved their living incomes better off after access to this soft loan for biogas application.	
5. 30% of whole rural population, in the target to most climate change vulnerability areas, will be trained and educated on climate change, climate resilience, and infrastructure planning for rural public assets	

5.2 Monitoring diagram and procedure

Figure 3: MRD's monitoring and evaluation framework



According to Standard Operation Procedure (SOP) for all externally financed projects/programs in Cambodia as published by the MEF in May 2012 highlights MEFF is the key responsible for identifying the line ministry or other RGC or autonomous agency to act as the EA/IA5 for externally assisted projects, taking into account the following factors:

a. The mandate of the line ministry or agency to undertake the project, in line with the Royal Decree and Sub-Decrees mandating it to carry out its various functions;
b. The interest and commitment of the EA/IA to effectively carry out the project;
c. The administrative and managerial skills required to effectively manage and administer the project, or at least the willingness and commitment to develop the required skills; and

d. The ability to mobilize and commit the human resources required to support project implementation.

Once the EA/IA has been identified, the assessment of the required capabilities as outlined above is done in partnership with the representatives of the relevant DPs. At this stage, the absorptive capacity and ability of the EA/IA to handle development assistance is also taken into account in partnership with the relevant. There are times when more than one EA or IA may be involved in the implementation and administration of projects and programs. Where possible it is best practice to designate only one EA to simplify coordination and implementation.

DONORS/DPs

A number of DPs have set up their own templates to identify the capabilities and capacities of the selected EA/IA. At this stage, an Action Plan is also developed to address any constraints identified during the assessment process. If any proposed corrective measures identified are beyond the scope of the RGC's resources, then DPs support is also agreed at this stage, to ensure that the project will be successfully implemented so as to achieve the identified Project Development Objective (PDO).

The MEF must confirm in writing the designation of a line ministry or other agency as the EA/IA, and clearly state that the guidelines and systems and procedures of both the RGC and the relevant DP must be adhered to. For its part, the designated EA/IA must confirm agreement to adhere to these in writing.
MEF plays an important role on behalf of the line ministries when entering into contractual arrangements for loan/credit/grant and technical assistance (TA) support from DPs. It plays the following role:

- Negotiates, with the participation of the line ministry and/or EA/IA, and signs the Financing Agreement, Subsidiary Loan, Project and TA agreements with Development partners (DPs). In the case of autonomous agencies however, MEF signs the Financing Agreement and the agency signs the Subsidiary Loan Agreement or Project Agreement ;
- Is responsible for amendments to loan/credit/grant agreements, including any subsequent amendments, including reallocations and extension of closing dates;
- Is accountable to the National Assembly and the Council of Ministers, with regards to all financial aspects of projects and TA activities. It also ensures that the line ministry complies with all financial covenants and other obligations in the Financing , Subsidiary Loan / Grant and TA agreements;
- Attends all wrap-up meetings between the project and DP's missions;
- Ensures the effective management and administration of loans/credits/grants and TA grants provided to Cambodia;

The ministry of planning (MOP)
The MOP under Sub-Decree No. 55 on its Organization and Functioning has the following roles and responsibilities:

- To act as the government's arm in formulation of concepts, strategies, policies and in determining of priorities for national development in order to ensure the sustainability and balance between development equity and social justice and between economic development, and social and cultural development, between urban and rural areas, between exploitation and regeneration of natural resources and between development and environmental protection;

- To guide and manage methodologies and procedures used in the formulation of socioeconomic development plans according to the decentralized system in the whole country;
- To prepare long term, medium term and short term plans and national programs by coordinating with all relevant ministries/institutions in the provinces and regions in the whole country; Takes the lead role and in consultation with other arms of the RGC produces the National Strategy and Development Plan (NSDP) and ensures that the NSDP and the Rectangular Strategy of the RGC is implemented.
- To monitor the implementation of plans, national programs and projects in all sectors and make assessment and proposes measures to correct those plans and programs as needed;
- To work with concerned ministries/institutions in formulating strategies and policies and identifying priorities for investments both in public and private sectors in order to promote efficiency and optimize the use of internal and external potential resources;
- To collaborate with the Ministry of Economy and Finance in fixing the amount and in allocating annual budget for public investments; and

NCCC

NCCC[8] will ensure climate indicators are mainstreaming into national development planning. NCCC and MEF will work together to encourage donors to consider providing support for CC in the form of budget support as soon as the PFM reforms deliver greater confidence in the transparency of public expenditure and more detailed budgets, at least down to the level of departments

VI. LAWS AND REGULATION DRAFTING SCHEDULE

In 2012, the ministry has provided significant steps in establishing the Working Group of Climate Change on water and meteorology with major role in formulating strategic plan, and policy formulation. However, there is no legal framework required for the ministry to implement its mandate in the Climate Change response. There are would be two types of responses which might include:

1. Legal and regulatory changes required for mainstreaming (eg procedures for regular climate screening of new projects, inclusion of climate change unit during annual workplan development, reference to climate change in budget submissions).
2. The principles and regulatory changes required for the feasibility of actions, especially where these changes affect several actions.

Table 3: Typical format for legal framework requires for action plan implementation

Type of instrument	*Ministerial decision (prakas)*
Title	*Procedures for Climate Change Screening of New Projects*
Purpose	*Establish standard procedures for all new projects to be screened, and, if there are considered climate-relevant, for the inclusion of climate-related activities, budgets and M&E tools*
Responsible department / unit	*Climate Change Working Group* *Legal Unit of Administration Department*
Drafting schedule	*By July 2014*

[8] So far, there is no report on climate change indicators to MOP by NCCC. It is suggested that a separate secretariat of this institutions should be established rather than anchoring in the MOE.

Requires inter-ministerial coordination?	☐ *Yes, if so indicate which ministry(ies):* ☐ *No*

VII. CONCLUSIONS AND NEXT STEPS

The preparation of priority actions for CCAP is one of the starting points in mainstreaming climate change plan into formal development planning. It is important that these actions included with the next or on-going and rolling plan for PIP of the ministry.

The CCAP can be a very effective tool to mobilize national and international resources. Thus, developing effective communication materials based on the CCAP will be become one of the next steps to assist in mobilise resources and coordination with CCD and other ministries to present the CCAP in national and international events (eg UNFCCC side events, national climate change forum, DP coordination meetings). It could also include a launch workshop.

The key process by which the CCAP should influence domestic resource mobilization is by achieving marginal shifts in the budget in favour of those ministries, departments and actions that provide the most effective contribution to adaptation and mitigation. This could include the following.

- How best to refer to climate change in ministry budget submissions, including an analysis of how the proposed budget is going to improve adaptation and mitigation and the value of this improvement to the country.
- Implementation of a screening system for project preparation in which PIP submissions include a statement of the adaptation and mitigation benefits of all climate relevant projects. This could use the Action Fiches in the CCAP, though modification of the PIP template to take more account of climate change would also be useful.
- CCCA as the multi-trust fund coordination will also provide overall assistant to the ministry in identifying the potential sources of funding allocation and additional policy and capacity development for the officials from the working group of climate change on agriculture, forestry and fisheries.

VIII. REFERENCES

ADB (2011) Proposed loan, Technical Assistance, and Administration of loan and grant in the Kingdom of Cambodia: Provincial Roads Improvement Project. Asian Development Bank, Manila.

Darong, Chan and David Lees (na) Climate Change Adaptation Strategies for Rural Infrastructure Design in Cambodia.

MOE (2001) Vulnerability and Adaptation Assessment to Climate Change in Cambodia. Ministry of Environment (MoE), Phnom Penh.

MOE (2002) Cambodia's Initial National Communication under the United Nations Framework Convention on Climate Change. Ministry of Environment (MoE), Phnom Penh.

MOE (2002) Environmental Management in the Coastal Zone-Cambodia: Physical Framework Plan for Koh Kong Province, Cambodia. Ministry of Environment, Phnom Penh.

MOE (2002) Environmental Management in the Coastal Zone-Cambodia: Physical Framework Plan for Kampot Province, Cambodia. Ministry of Environment, Phnom Penh.

MOE (2002) Environmental Management in the Coastal Zone-Cambodia: Physical Framework Plan for Sihanouk Vill, Cambodia. Ministry of Environment, Phnom Penh.

MOE (2002) Environmental Management in the Coastal Zone-Cambodia: Physical Framework Plan for Kep Province, Cambodia. Ministry of Environment, Phnom Penh.

MOE (2005) Vulnerability and Adaptation to Climate Hazards and to Climate Change: A survey of Rural Cambodian Households. Ministry of Environment (MoE): Phnom Penh.

MOE (2006)National Adaptation Programme of Action to Climate Change (NAPA). Ministry of Environment (MOE), Phnom Penh.

MOE/SNC (2010).Second national communication to UNFCCC.Ministry of Environment, Phnom Penh.

MOE/PPCR (2013) Synthesis Report on Vulnerability and Adaptation Assessment for Key Sector Including Strategic and Operational Recommendations. PPCR Phase 1: Ministry of Environment (MOE), ADB, WORLD BANK AND Hatfield, Phnom Penh.

MRD (2013) Budget Strategic Plan 2014-2016 of the Ministry of Rural Development. Ministry of Rural Development, Phnom Penh.

RGC (2006) Handbook on Financial Management Activities: For externally Financed Decentralized and De-Concentrated Projects in the Kingdome of Cambodia. Ministry of Economic and Finance (MEF), Phnom Penh.

RGC (2009) National policy on Indigenous Development. Ministry of Rural Development, Phnom Penh.

RGC (2010) National Strategic Development Plan Update 2009-2013. Royal Government of Cambodia,

RGC (2012) Standard Operation Procedures for all externally financed projects/Program in Cambodia. Ministry of Economic and Finance (MEF), Phnom Penh.

RGC (2013) Pilot Program for Climate Resilience (PPCR): Revised Strategic Program for Climate Resilient for Cambodia, December 2013.Royal Government of Cambodia (RGC), Phnom Penh.

UNDP and MOE (2011a) Cambodia Human Development Report 2011: Climate Change and Water Resources Thematic Highlight. United Nation Development Program (UNDP), Ministry of Environment (MOE), Phnom Penh.

UNDP and MOE (2011b) Cambodia Human Development Report: Building Climate Resilient in Rural Livelihood in the Face of Climate Change. United Nation Development Program (UNDP), Ministry of Environment (MOE), Phnom Penh.

IX. LIST OF ANNEXES

9.1 Long list of actions for or MRD's CCAP 2014-2018

No	Ministry of Rural Development (MRD)	Project status	Type of project	Proposed Terms of Project Funding	Total Project Budget (USD)	Action classified/target
1	Basic skills training center	Planned	Free-standing technical assistance	mix of RGC, Grant, and Loan	900,000	CD on CCA and health care? Rural business opportunities/livelihoods
2	Community Development Center	Planned			765,000	CD on CCA and health care? Rural business opportunities/livelihoods
3	Environmental and Sanitation Project	Planned			1,047,236	
4	Establishment of center for Research and Vocational Training Center of Ethnic Minority	Planned			1,047,120	
5	Family food security	Planned			1,944,120	CD on CCA and health care? Rural business opportunities/livelihoods
6	Human Resource Development	Planned			2,100,000	
7	Human Resource Development	Planned			90,000	
8	Internal Audit Support Project	Planned				
9	Ketsana emergency Reconstruction and Rehabilitations Project (KERRP)	on-going	Free-standing technical assistance	mix of RGC, Grant, and Loan	40,000,000	
10	Mass Media Education and Research	Planned	Free-standing technical assistance	mix of RGC, Grant, and Loan	384,000	Research on vulnerability and CC proofing of infrastructures
11	MRD credit scheme	on-going	investment project	Grant	598,000	

12	Non-formal education	Planned				CD on CCA and health care? Rural business opportunities/livelihoods
13	Provide Basic Skills and job creation	Planned				Rural business opportunities/livelihoods
14	Rural road rehabilitation/Reconstruction and Rural Infrastructure Construction	Planned	investment project	RGC	140,000,000	CC proofing of rural infrastructure
15	Rural road upgrading from laterite to DBST or other surface	Planned	investment project	RGC	73,000,000	CC proofing of rural infrastructure
16	Rural road improvement	on-going	investment project	mix of RGC, Grant, and Loan	69,000,000	
17	Rural Water Supply System	Planned			44,370,000	CC proofing of rural infrastructure
18	Rural Water Supply and Sanitation III	on-going	investment project	mix of RGC, Grant, and Loan	20,000,000	
19	Rural Water Supply and Sanitation Project Phase II	on-going	investment project	Grant	25,825,000	
20	Small Scale Irrigation Scheme[Dr.Doma to add >10 million)	Planned	investment project	RGC	2,760,000	CC proofing of rural infrastructure
21	Strengthening the capacity of Village Development Committee (VCD)	Planned	investment project	RGC	810,000	CD on CCA and health care? Rural business opportunities &livelihoods
22	Technical Capacity Building on the Production of Biogas and Improved Stoves	Planned	investment project	mix of RGC, Grant, and Loan	2,197,530	CD on CCA and health care? Rural business opportunities/livelihoods
23	Village Development	Planned	investment project	RGC	1,542,000	CD on CCA and health care? Rural business opportunities/livelihoods
	Total (U$D)				**428,380,006**	

Scoring of Priority Action Selected for Rural Development 2014-2018

No	Action	Effectiveness			Co-benefits			Feasibility		
	Scoring of Priority Action Selected for Rural Development	**Scale of climate risk**	**Cost per beneficiary**	**Mitigation cost effectiveness**	**Economic**	**Social**	**Environmental**	**Political commitment**	**Capacity**	**Ease to implement**
		-1 – 3	0 – 3	-1 – 2	0 – 2	0 – 2	0 – 2	Green (G), Yellow (Y), Red (R)		
1	Map rural vulnerable infrastructure (road, water supply facilities) in provinces with high risk of climate change.	2	3[9]	1	2	2	2	G	Y	G
2	Develop adaptation options and guidelines to improve climate change resilience of rural infrastructure	3	3	2	2	2	2	G	Y[10]	G
3	Build awareness and capacity at national and sub-national level for mainstreaming climate change into rural development planning processes	3	3	2[11]	2	2	2	G	Y	G
4	Scale up microfinance to support GHG mitigation and reduce climate change impact in vulnerable areas (currently 3 provinces)	2	2[12]	2	2	2	2	G[13]	G	G
5	Carry out risk assessment and management for the improvement of water supply and sanitation (WATSAN) in the Tonle Sap Great Lake provinces.	3	3	2	2	2	2	G	G	G
6	Build capacity on climate proofing rural infrastructure design, construction and maintenance for civil engineers (250) at national and sub-national level	3	3	2	2	1	2	G	Y	Y

[9] This project will provide evidence for planning and adaptation intervention nationally.
[10] The ministry has recently established policy working group with representative from each department.
[11] It is expected with knowledge enhance, planners at sub-national and national level can make better option to mitigate the impact through their projects
[12] Bio-digester reduces methane (CH4) emission and converted into energy for household consumption which provides triple benefit for household.
[13] Department of rural economic development are implanting this and will scale up with additional financing.

7	Raise awareness of climate change for Village Development Committees (VDCs[14])	3	3	1	2	2	2[15]	G	G	G
8	Pilot community based climate change adaptation for VDCs in the Cambodia Mekong Delta (Takeo, Svay Rieng, Prey Veng)	2	2	1	2	2	2	G	G	G
9	Climate proofing Mekong river islands' connectivity (roads and ferries), 50% Climate Change Proofing	3	3	2	2	2	2	G	G	G
10	Climate-Proof tertiary-community Irrigation Development to enhance agricultural production of paddy field in four communes of Mekong Delta, District Kamong Ro, Svay Rieng Province.	3	3	1	2	2	2	G	G	G

[14] Korea might be able to support new village movement (SMU-Sae Maul Udon in Korea) project with 5 years long with strong support from the PM approval

[15] VDC always play important role in mobilize community resources in development, facilitation and environmental protection in response to climate extreme events when they have better knowledge from this awareness raising actions. VDC often play role in mainstreaming Climate Change into Commune/Sangkat Development Plan.

9.3 List of actions fiches

MRD ACTION FICHE No 1 (MRD)

Action	**Mapping vulnerable rural infrastructure (roads, water facilities) in provinces at high risk from climate change**
CCCSP and Sector CCSP Strategic Objective	"To build the adaptive capacity and resilience 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" (MRD, 2012). 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. One of the four priority areas is: 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.*)
Rationale	Prior to design and determine cost of investment on the infrastructure, it has to know clearly the condition of the areas and socioeconomic feature of the location. Vulnerable mapping to climate change will provide great data and information to designer for infrastructure development. The action is designed to help consolidate rural development by preventing damage and losses to rural infrastructure from climate hazards. There are some recent report assessing the climate change adaptation infrastructure capacity and governance, such as Joint Study on Effective Technical Cooperation for Capacity Development: Cambodia Case Study (CDC, 2008), Thematic Assessments and Action Plan for the three Conventions – CBD, UNFCC and UNCCD (MOE, 2007) .Ministry of Environment, Phnom Penh, Cambodia, Cambodia Climate Public Expenditure and Institutional Review (ODI, 2012), Ministry of Environment, 2010. Climate Change Training Need Assessment for Government Officials, Academia and Media, Cambodia Post Ketsana Disaster Needs Assessment (RGC, 2010), Scoping Assessment for National Implementation in Cambodia- (AIT/UNEP 2010), Climate Change Training Needs Assessment for the Agricultural Sector (CCCA 2013) and CAMBODIA HUMAN DEVELOPMENT REPORT 2011 Building Resilience: The Future of Rural Livelihoods in the Face of Climate Change (MOE and UNDP, 2011) etc. The recently released Report "Climate Change Financing in Cambodia" (NGO Forum, 2014) also well documents and analyzes the key actors in the climate change adaptation in the country. These assessments and studies have also indicated the lack of development of vulnerable supported tools for infrastructure development, especially support tools for infrastructure development such as mapping vulnerable rural infrastructure for road, water facilities and the mapping for socioeconomics feature in the climate change vulnerable areas. It is confirmed by the ministries that most of the infrastructure is old and in cases, dilapidated due to inadequate repair and maintenance regimes of any kind and those infrastructure are in different vulnerability to climate change some areas are most vulnerable and some moderate vulnerable to climate change. However, during the design phase they have not clearly known which rural areas are the most high impacted by climate change due to lack of data and information addressed in the map. Virtually all the older roads and bridges for example were not designed/built to take into account the effects of climate change impact considerations suitable to the level of vulnerability of climate change and suitable to the cost of project expenses. And because of lack of the map of vulnerability the most of the newly-built infrastructure is also not

	designed/built taking into account climate change consideration either. Therefore they are vulnerable to climate hazard/impacts in different level and the structure constructed in the same quality and cost level; for examples: floods, embankment erosion/collapse, droughts, etc. In order to respond to the climate change impacts, the line ministries have prepared their Climate Change Strategic Plan (CCSPs), for newly design/build and improving (retrofitting) climate resilient infrastructure for their future developments. Key capacity deficiencies were identified. Little specific detail is provided in these broad-based documents. CCSP of MRD has addressed its concern in producing vulnerability of climate change map as the first priority prior to identify the cost of investment and provide proper design standard of the structure. Overall, there is clear consensus on the state of disrepair and deterioration of much of the country's existing infrastructure. Priorities differ by Ministry. This action will protect rural infrastructure against extreme climate events but mostly against flooding. For this purpose, the action will provide an inventory of rural infrastructure (roads and water facilities, mainly wells). It will also provide information and data to identify and locate those rural infrastructures at risk of damage from extreme climate events, especially flooding which is likely to be exacerbated by climate change.
Category of climate change action	Cat 2 – Modified
Type of action	Adaptation
Short description of the action and expected results and benefits	*Short description* (I) Conduct baseline survey of rural roads and water supplies in 24 provinces; (ii) workshop consultations with MRD national and subnational technical departments on the vulnerability status of rural infrastructure; (iii) use baseline data to produce GIS maps; (iv) produce maps, (v) conduct national workshop to disseminate data and information on the quality and risks to rural infrastructure. Funds are currently allocated for a rural road inventory (in the Programme Budget), but there is no provision for water supply. *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* The end result would be to provide information to clearly identify and index vulnerable assets in the context of climate change. The direct beneficiary would be MRD and its staff. Rural local government authorities and rural populations in "at risk" areas would be indirect beneficiaries.
Cost effectiveness of the action	*Where possible, an estimate of the benefit cost ratio of adaptation actions and the marginal abatement cost of mitigation actions, along with any notes about key assumptions or sensitivity analysis* Several hundred MRD technical staff at the national and sub-national levels would be the beneficiaries. The numbers of ultimate beneficiaries i.e. the populations using climate risk infrastructure, will not be known until the baseline survey has been carried out. The cost of providing a national inventory and creation of climate change vulnerable maps of rural roads and water facilities would be $400,000 over three years.
Preconditions needed for successful implementation	This action plan is compliance with the priorities area proposed in the strategic plan of rural development on climate change. It is also a starting point of actions in response to climate change measures in the context of rural and social infrastructure development, Cambodia. This would be approved internally by the

	Minister of Rural Development, with support from MEF, and liaison with NGOs and donors. However, to achieve good results for this action plan, the coordination with MOE, NCDM and MOWRAM is the most important, of which *Mention any minimum capacity requirements* Effectively functioning Rural Roads, Water Supply, Planning and Public Relations departments at national and sub-national levels.
Indicator(s) of success	*Up to three SMART indicators for measuring if the action has reached the expected result. Indicators can be either qualitative or quantitative, e.g. integration of climate change into planning processes, GHG emissions avoided, share of renewable sources in electricity generation, Km. of roads climate proofed.* 1. Build up capacity of designer, currently about 100 engineers of MRD because mapping created for all rural infrastructure designers getting to know and build up their capacity to clearly identify the right location of project that impacted by flood and drought. 2. Easily iinvestigates where and how climate change poses threats to stability in Cambodia. 3. Beside structure design of infrastructure, vulnerability map can make a measure of exposure, sensitivity, and adaptive capacity in the rural areas through factors that can be mapped at different levels of analysis and the level chosen for analysis can highlight or mask important differences. For example, global mapping of vulnerability can mask important regional differences, while local mapping can overemphasize minor differences. Assessing and mapping vulnerability can be difficult due to gaps in available data and questions over how to handle these. By creating maps of climate vulnerability of rural infrastructure the researchers can be able to communicate their data results effectively and simply. 4. Explaining past patterns of exposure; Indicating potential consequences of climate change in the future; and Identifying potential hotspots of high stress in the short- to medium-term. 5. By collaboration with other line ministries such as MPWT and MOWRAM, the tools will be useful for all infrastructure implementation. Capacity of three ministries; MRD, MOWRAM and MPWT will be built up and get more understanding about the climate change impacts.
Implementation arrangements	*Responsible department(s)* - MRD Rural Roads, Water Supply, Planning and Public Relations Departments. MRD will play its role as Executive Agency (EA) - PDRD, MOWRAM, MPWT will play role as implementing agency (IA) - Under the involvement of subnational level, NCDD of MOI will cooperate to conduct data collection, trainings and workshop for information sharing.
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* USD400,000 in 2013 prices over five years
Possible funding sources	Government will contribute as 5%-10% of the whole project cost in kind such office space, some vehicle, and other office materials. ADB is financing the on-going rural roads inventory
Timeframe	*Indicate the start and end year* 2014 – 2016

MRD ACTION FICHE No 2

Action	**Develop adaptation options and guidelines to improve climate change resilience of rural infrastructure**
CCCSP and Sector CCSP Strategic Objective	*Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers* Develop climate change resilient policies for rural infrastructure
Rationale	*Links to the sector and national strategies* The action is designed to help consolidate rural development by preventing and reducing damage and losses to rural infrastructure, especially roads and water facilities, from climate hazards. *What type of climate risk/opportunity or mitigation objective is addressed by this action* This action will adopt appropriate technical standards to protect against damage and losses caused by extreme climate events but mostly against flooding. National guidelines and engineering standards will be developed to provide a set of specifications for road and water facility construction and maintenance which will protect assets against extreme climate events exacerbated by climate change. These standards would then be applied in all rural roads and water supply projects regardless of the source of finance.
Category of climate change action	Cat 2 – Modified
Type of action	Adaptation
Short description of the action and expected results and benefits	*Short description* (i) Conduct strategic review of existing infrastructure guidelines, policies and manuals in the context of climate change; (ii) carry out field survey to collect data as inputs to the guideline preparation process; (iii) national consultation workshop to further develop and finalise the guidelines; (iv) prepare national construction and maintenance standards for climate resilience, (v) hire technical assistance and consultancy support to the guideline and standards preparation process. *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* The end result would be to provide adequate standards of construction and maintenance for climate proofing rural infrastructure. The direct beneficiary would be MRD and its planning and technical staff in the Rural Roads and Water Supply Departments. Rural local government authorities and rural populations in "at risk" areas would be Indirect beneficiaries.
Cost effectiveness of the action	*Where possible, an estimate of the benefit cost ratio of adaptation actions and the marginal abatement cost of mitigation actions, along with any notes about key assumptions or sensitivity analysis* The numbers of ultimate beneficiaries i.e. the populations using climate risk infrastructure, will not be known until the baseline survey has been carried out. The cost of providing climate change infrastructure policies, guidelines and standard operating manuals would be $500,000 over three years.
Preconditions needed for successful implementation	*Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works* This would be approved internally by the Minister of Rural Development, in liaison with MEF, civil society, NGOs and donors.

	Mention any coordination required with actions under the responsibility of other ministries or external stakeholders Coordination with MOE, NCDM and MOWRAM. *Mention any minimum capacity requirements* Effectively functioning Rural Roads, Water Supply, Planning and Public Relations Departments at national and sub-national levels.
Indicator(s) of success	Adaptation option guideline developed and adopted by the ministry
Implementation arrangements	*Responsible department(s)* Rural Roads, Water Supply, Planning and Public Relations Departments *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)* Provincial Departments of Rural Development. Provincial Development Committees.
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* USD 500
Possible funding sources	*If identified, name the proposed source(s) of funding.* ADB is financing the ongoing rural roads inventory *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*
Timeframe	*Indicate the start and end year* 2014 - 2016

MRD ACTION FICHE No3

Action	**Build awareness and capacity at national and sub-national level for mainstreaming climate change into rural development planning processes.**
CCCSP and Sector CCSP Strategic Objective	"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" (MRD, 2012). MRD has its climate change strategic plan and 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 One of the four priority areas is: 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 (MRD, 2012).
Rationale	The action is designed to help consolidate rural development by preventing damage and losses to rural infrastructure from climate hazards through capacity development for engineers, planners, and communities over climate change. The following gaps are to be addressed:

	• Addressed more detail the gaps of capacity of the three levels above; • Develop the trainings tools to deliver the capacity of central staffs of MRD and communities for climate sensitive planning, budgeting and execution; • Deliver the tools through coaching, mentoring, and educating, the central staffs and designers and engineers, and the communities where the most vulnerable groups to deal with increasing climate variability; • Enabling environment at the all levels for attracting and managing greater volume of Resilience and adaptation finance for building resilience of rural livelihoods. Currently Capacity Constraints Identified briefly under the various documents of MRD, strategic plan, climate change strategic plan, rural road improvement project, water supply and sanitation plan, are found as below: • Weak Knowledge-based decision making at planner and engineering staffs; • Lack of Proper Standard Operating Procedures for structural design of rural infrastructure; • Lack of reliable and accessible information for addressing climate impacts at both ministerial level and rural communities; • Limitation in human resources with proper motivation, skills and competencies at all level of MRD • Mainstreaming planning is not a common practice at central and local level of MRD; • Limited knowledge-base on climate change found at all level; • Limitation in scientific and technological research capacity that related to climate change and infrastructure; and • Limited financial resources to cope with climate change impact on rural infrastructure. • Limited participation from stakeholders From this preliminary assessment, MRD should play its substantial role in integrating climate change into development planning of infrastructure and communities awareness. On the other hand MRD should pay attention to the below cross cutting issue in a meaningful and effective fashion through its roles in: • Promoting and engaging the participation of stakeholders and sectors in identification of climate change response measures which address to the rural infrastructure. • Strengthening coordination mechanism for coherent policy response to climate change that not only internally but between line ministries; • Strengthening the individual and oversight capacity of the MRD, as well as some other stakeholders related to rural works such as construction contractors and private sector at rural areas, and to strengthen its collaborations with others whose activities affect the environment; and • Integrating climate change in the environmental impact assessment process, management of the protected areas, economic land concessions (ELC) and community protected areas (CPA) by association with ministry of environment and ministry of agriculture forestry and fisheries.

	This action will build up the knowledge capacity of rural people and technical staffs of MRD to protect rural infrastructure against extreme climate events but mostly against flooding. For this purpose, the action will provide an inventory of rural infrastructure (roads and water facilities, mainly wells). It will also provide information and data to identify and locate those rural infrastructures at risk of damage from extreme climate events, especially flooding which is likely to be exacerbated by climate change.
Category of climate change action	Cat 2 – Modified
Type of action	Adaptation
Short description of the action and expected results and benefits	*Short description* It is widely accepted that capacity is an imperative for either adaptation or mitigation to climate change (UNFCCC, 2013). Some globally accepted definitions of capacity as the combination of all the strengths, attributes, and resources available to an individual, community, or organization, which can be used to achieve established goal" (IPCC, 2012). In the context of climate change policies, the capacity building is the development of technical skills and institutional capability (the art of doing) and capacity (sufficient means) of countries to enable their participation in all aspects of adaptation to, mitigation of and research on climate change (IPCC, 2011). In the particular case of Cambodia today, the capacity of understanding climate change and find measures to challenges the impacts of climate change is still very low, especially for the sector of rural infrastructure; design structure and planning for the project and program. Strategic plan of MRD has indicated clearly that there is a need to interfere urgently on building up capacity of general staffs and 100 engineers across 24 provinces/municipalities on how to mainstream climate resilience and other adaptation means into development of infrastructure. MRD categorizes three levels of capacity building activities under the Its strategic plan that endorsed by MRD in 2012: "Individual level: developing educational, training and awareness raising activities; institutional level: fostering cooperation between organizations and sectors, as well as the development of organizations and institutions, including their missions, mandates, cultures, structures, competencies, and human and financial resources; and systemic level: creating enabling environments through economic and regulatory policies and the accountability frameworks in which institutions and individuals operate." This action plan is at the core of the MRD's intervention across the countries over climate resilience and adaptation, especially in the strong focus on communities, and rural engineers. A key measure of the success of the action will be the extent to which both policy-makers and engineering staffs of MRD can, in practical and measurable terms, design, develop, implement and maintain appropriate tools and practices necessary for a sustained process of adapting to climate change and other factors inherent in disaster risk management. To achieve the above objectives of capacity delivery the main tasks will be taken systematically as below: 1. Identify firstly existing (baseline) capacity in MRD at national staffs and sub-national levels which include communities for addressing climate-related risks and vulnerabilities; 2. Identify gaps through theoretical review and interview in capacity and existing and planned measures to address the priority capacity

	needs at technical level, planning level and communities; 3. Formulate recommendations for how the MRD can fill these gaps at technical level, planning level and communities levels; and 4. Inform the formulation of the specific work-plan for rural capacity development activities through coaching, mentoring, on job training, and non-education system at communities level; 5. Develop trainings modules to deliver at least 30% of technical planner staff and 30% of communities of VDC at first second year of project.
Cost effectiveness of the action	*Where possible, an estimate of the benefit cost ratio of adaptation actions and the marginal abatement cost of mitigation actions, along with any notes about key assumptions or sensitivity analysis of CBA.* 100 engineers and a number of planners of MRD at central and provincial level would be the beneficiaries to have capacity built up. It is expected that by understanding the real impacts of climate change and taken action mainstreaming to design and planners, the cost of damage of rural infrastructure by floods and storm will reduced by 50% of the current worth damage cost, it means this action will be benefited to 50% of the actual loss.
Preconditions needed for successful implementation	• This would be approved internally by the Minister of Rural Development, with support from MEF, and liaison with NGOs and donors. • Collaboration and coordination with MOE, NCDM and MOWRAM. • Effectively functioning Rural Roads, Water Supply, Planning and Public Relations departments at national and sub-national levels. • Rural communities will take strong participations on this action plans and will convert the knowledge into practice in their real adaptation and mitigation.
Indicator(s) of success	• Rural roads and water facilities inventories and quality indexes • Rural infrastructure vulnerability maps for all provinces.
Implementation arrangements	*Responsible department(s)* • MRD Rural Roads, Water Supply, Planning and Public Relations Departments; • Associate with other line ministries such as MPWT and MoE on the development of trainings module and delivery of training module; • Associate with other NGOs working in climate change awareness to share and disseminate the results in their target areas; and • Provincial departments of rural development will collaborate with PDOWRAM and PDE for disseminate the results and provide trainings to all stakeholders at subnational level.
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* USD2.500,000 in 2014 prices over four years
Possible funding sources	*If identified, name the proposed source(s) of funding.* *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector):* Will apply funding from climate change investment fund and United Nation.
Timeframe	*Indicate the start and end year* 2014 - 2018

MRD ACTION FICHE No 4 (MRD)

Action	***Scale up microfinance to support GHG mitigation and reduce climate change impact in vulnerable areas***
CCCSP and Sector CCSP Strategic Objective	Objective 2: Support for adaptation to climate change through creating local business opportunities
Rationale	This action links to ministry policy 2 of rural economic development and NSDP goal: rural development. The NSDP 2009-2013 updated versions highlighted one goal on rural infrastructure development. This has employed various strategies which include: To continue strengthening the capacity building of national and sub-national institutions, develop human resource, basic skills, develop integrated planning, improve public finance and administration, providing rural transport infrastructure, supporting commune and Sangkat to implement small scale infrastructure projects, promoting settlement of border areas, improve clean water supply and introduce one village, one products, promote rural economic development, promote food security and improved access to credit for rural families. For the next five year policy strategies (2014-2018) approved by the national assembly, MRD will carry out priority policy objectives 2: Promoting rural economic growth through integrated rural development with the participation of the national and international communities.
Category of climate change action	Cat 2 – Modified
Type of action	**Adaptation/mitigation**
Short description of the action and expected results and benefits	**Short description** Cambodia rural provinces have its own resource that can be modified into economic and innovative practice, in particular the shift in using of fuel wood to biogas from agricultural residue and animals waste. This practice will help to reduce forest degradation, generate local employment, reducing migration, and reducing emission from human activities. The provision of micro-credit through the construction of bio-digester/ biogas stoves will also help to improve rural economic, providing access to rural energy sources for the cooking, lighting and heating for households. Key activities • Conduct baseline survey on current income and attitude of the farmers on fuel wood consumption. • Upscale existing bio digester from three provinces: Kg. Cham, Prey Veng and KT to Prey Veng, Kandal, Takeo, Svay Rieng and Battambang. • Provide technical skills to selected farmers: 1,000 per provinces total 7,000 farmers. • Provide soft loan and encourage rural family to use biogas which result with triple wins (economic, environment and emission reduction). • Document lesson learnt and enhance capacity of farmer within VCD. Key beneficiaries: Farmers from Prey VENG, Kandal, Takeo, Svay Rieng and Battambang. Environment sustainability, increase family income, contributes to CDMG on energy supply in every village.

Cost effectiveness of the action	Family income to be measured, energy supply in families Reduce impact on household
Preconditions needed for successful implementation	- Staff capacity and institutions in place - Political support from government and key partners - farmers are willing to cooperate
Indicator(s) of success	- Number of farmers in seven provinces will obtained soft loan for biogast installation (in-kind contribution). - % of family income increase (actual baseline to be done in feasibility study). - Number of farmers trained on how to use and produce bio digesters.
Implementation arrangements	*Responsible department(s)* *Department of rural economic development* PDRD will be join-implementers with community councils Others: • Department of animal health and livestock's of MAFF • Department of renewable energy of Ministry of Mine and Energy • SNV, and other registered NGOs
Estimated total cost	*USD 4,000,000*
Possible funding sources	Government: PIP and other donors to be identified
Timeframe	*Indicate the start and end year* 2014 – 2018

MRD ACTION FICHE No 5 (MRD)

Action	***Carry out risk assessment and management for the improvement of water supply and sanitation (WATSAN) in the Tonle Sap Great Lake provinces.***
CCCSP and Sector CCSP Strategic Objective	This action is to contribute to CCSP strategy (1) *Develop* climate change resilient policies for rural infrastructure and to build resilient in rural infrastructure development to climate change, (3) Promoting climate resilience through strengthening the quality of rural infrastructures and CCSP strategy (4) Promoting adaptation to climate change through capacity and institutional development and increasing rural awareness raising on climate change adaptation and response options.
Rationale	This action will also contribute to current ministry strategic plan 2014-2018's policy 2: Promoting rural economic growth through integrated rural development with the participation of the national and international communities. Selected key indicators for this action are the provision of clean water and sanitation to all communities with 100% by 2025 as set out by the strategic plan. This action will also focus on rural community living surrounded Tonle Sap Lake which often faced by the recent extreme events of climate change such as flood and drought
Category of climate change action	Cat 2 – Modified

Type of action	Adaptation
Short description of the action and expected results and benefits	**Short description:** Many scientific studies (MOE-SNC 2010, MOE-PPCR 2013) shows existing and potential impacts from climate change to key sector of rural development include (i) the impact on Rural Water Supply, mostly link with small scale irrigation whose role is to store water for paddy field and crop production for local community and the (ii) the impact on ground water which is one of the key responsible of the ministry. Unlike surface water, ground water 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. In some areas of the 6 provinces surrounded Tonle Sap Lake often faced with water availability during dry season, in particular access to clean water. **Key activities** *(soft and hard):* 1. Conduct baseline assessment and provide training on hygiene, BC (Behavior Change), **2.** Provide latrines, wells, community ponds (250 wells/province x 6 provinces x $5,000/well). CPs: 30 m x 20m x 4 m deep= $7,000 x 30 ponds= $210,000. Latrines: $250 x500 units/provincex6=*$750,000.* **3.** *Strengthening and formation of local community committee to manage community ponds, latrines and wells.* **Expected result:** • At least 348,000 villagers/local communities' member surrounded Tonle Sap Lake will benefit from this project intervention • Increase access to clean water, water for domestic supply and use, and improve welling of local community.
Cost effectiveness of the action	• Cost estimation per beneficiary is $114 over five year or it is $22.8/per son/year. • Economic return expected from the project intervention is to be estimated in the feasibility studies (health benefit, cost of clean water reduce/person/year, and economic return of agricultural diversification)
Preconditions needed for successful implementation	• Staff members and its capacity of MRD will be ready • Financial and technical support • Political support and participation from local authority and community
Indicator(s) of success	• Detail based line studies developed • At least 348,000 farmer/villager will have full access to clean water ad water for domestic supply and use • 105,000 farmers are actively using their community ponds for agricultural diversification and strengthening community sense of belonging. • 180 community pond committee established and functioning in six provinces • 1,500 wells community committee established in 6 provinces
Implementation arrangements	*Responsible department(s)* MRD Rural Roads, Water Supply
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions*

	USD 4,000,0000 in 2015 prices over five years
Possible funding sources	Government annual budget allocation, grant and loan from donors/bilateral aids
Timeframe	*Indicate the start and end year* 2014– 2018

MRD ACTION FICHE No 6 (MRD)

Action	Build capacity on climate proofing rural infrastructure design, construction and maintenance for civil engineers (250) at national and sub-national level
CCCSP and Sector CCSP Strategic Objective	"To build the adaptive capacity and resilience 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" (MRD, 2012). 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. One of the four priority areas is: 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.*)
Rationale	Cambodia is one of the most vulnerable countries to the adverse effects of climate change in Southeast Asia (PPCR, 2012). The country suffered by the results of climate change such as drought and floods seasonally. The rating from international bodies ranked Cambodia very high for its vulnerability to climate-induced disasters based on indicators that were strongly related to mortality and economic losses inferred from climate-related disasters (PPCR 1, 2012). The capacity of MRD, rural communities and individuals to adapt to climate change is generally rated very low and other indicators strongly related to water and rural food security. A recent study carried out by ADB and the Government of Cambodia under the Technical Assistance TA8179 in the context of the PPCR shows that climate variability and extreme events are already a danger for Cambodia. There are at least 4 provinces most vulnerable to climate change such as Battambang, Kampong Thom, Prey Veng, and Svay Rieng. Mostly rural facilities such as road networks and domestic water supply are damaged by seasonal floods (flash flood and river flood). The damage of rural facilities are the course of (1) insufficient information on climate change available for community's planners, MRD provincial staff, and engineers who design infrastructure projects (rural road and rural water supply).
Category of climate change action	Cat 2 – Modified
Type of action	**Adaptation**
Short description of the action and expected results and benefits	This action project will enhance planning capacity for climate infrastructure resilience at national and local levels' implementation, and within vulnerable rural areas and vulnerable population groups. This action fiche will: 1) - Establish a climate knowledge management mechanism related to rural infrastructure resilience in department of rural roads and rural water supply- Develop climate-proof infrastructure guideline after conducting climate risk assessments on roads, small scale irrigation, small-scale energy, and rural drainage. 2) - Introduce climate change science training modules for climate-proof infrastructure. 3) - Government officials of about 20% designing staffs of MRD

	will be trained on scientific-design procedure to protect infrastructure. 4) - Support a process to formulate national and local adaptation plans - Develop a knowledge management system to collate and disseminate data and information on climate change to all level of rural infrastructure designers. Specific objectives are: 1. Develop climate change information for multiple uses. 2. Climate change risks are integrated into rural infrastructure's development planning and implementation of development projects. 3. Knowledge management systems for climate change are developed and applied in particular rural infrastructure planning. 4. Develop and strengthen current climate change technical group to be capable on climate change impacts on rural infrastructure and through this group the project implementation manual, technical standards, and other related project-design activities will be developed and disseminated to all stakeholders and planners.
Cost effectiveness of the action	*Where possible, an estimate of the benefit cost ratio of adaptation actions and the marginal abatement cost of mitigation actions, along with any notes about key assumptions or sensitivity analysis* Several hundred MRD technical staff at the national and sub-national levels would be the beneficiaries. The numbers of ultimate beneficiaries i.e. the populations using climate risk infrastructure, will not be known until the baseline survey has been carried out. The cost of providing a national inventory and creation of climate change vulnerable maps of rural roads and water facilities would be $400,000 over three years.
Preconditions needed for successful implementation	This action plan is compliance with the priorities area proposed in the strategic plan of rural development on climate change. It is also a starting point of actions in response to climate change measures in the context of rural and social infrastructure development, Cambodia. This would be approved internally by the Minister of Rural Development, with support from MEF, and liaison with NGOs and donors. However, to achieve good results for this action plan, the coordination with MOE, NCDM and MOWRAM is the most important, of which *Mention any minimum capacity requirements* Effectively functioning Rural Roads, Water Supply, Planning and Public Relations departments at national and sub-national levels.
Indicator(s) of success	*Up to three SMART indicators for measuring if the action has reached the expected result. Indicators can be either qualitative or quantitative, e.g. integration of climate change into planning processes, GHG emissions avoided, share of renewable sources in electricity generation, Km. of roads climate proofed.* Community level: - Knowledge on climate resilience for rural public facilities, road, irrigation, and rural water supply, of commune councils participating with the project will be strengthened amount of 120 people in first year, 120 people at second year (project end). - Build up capacity of 10 communities after 20 km climate-proof roads with culverts and bridges will have been designed during the feasibility study of the project. - Build up capacity of 10 communities after 20 of climate-resilience rural water wells will have been designed by PDRD designers and Project implementation level:

	- Build up capacity of 20 technical staffs at provincial level and 20 technical staffs at national level on how to design rural roads and rural water supply resilient to climate change. - 20 km rural climate-resilient roads will be designed by both engineers at national and provincial level. - 20 climate-resilient water wells will be designed after conducing site section raised by communities (community needs). National level: - New climate change technical specification and terms for rural infrastructure in focus to rural road and rural water supply will be modified from the existing in place. - Project technical guidelines for integration of climate change measure into structure designing will be developed and endorsed to use nationally and provincially. - National Monitoring and Evaluation template to monitoring the project will be introduced by team at national level, and trained all concerned projects-targets technical staffs to collect information data and capacity of analysis.
Implementation arrangements	*Responsible department(s)* - MRD Rural Roads, Water Supply, Planning and Public Relations Departments. MRD will play its role as Executive Agency (EA) - PDRD will be join-implementers with community councils
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* USD400,000 start from 2014 over two years
Possible funding sources	Government will contribute as 5%-10% of the whole project cost in kind such office space, some vehicle, and other office materials.
Timeframe	*Indicate the start and end year* 2014 – 2015

MRD ACTION FICHE No 7

Action	***Raise awareness of climate change for Village Development Committees (VDCs).***
CCCSP and Sector CCSP Strategic Objective	*Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers* **Support for adaptation to climate change through increasing rural awareness**
Rationale	*Links to the sector and national strategies[link to ministry strategy and national strategic development planning],* The action is designed to raise understanding of VDC [prakas], which is a grass-root rural development mechanism, on climate change issues in general and particularly help them to problematize within their local contexts and define adaptation strategies for the local development as well as daily living. *What type of climate risk/opportunity or mitigation objective is addressed by this action* This action will support VDC and their community members to be readiness for challenging with changes of environment in the local context both in local development planning and daily living.
Category of climate change action	Cat 2 –
Type of action	Mitigation and Adaptation

Short description of the action and expected results and benefits	*Short description* • Conduct training needs assessment for VDC by focusing on knowledge and experiences on Climate Change (scientific and local knowledge assessing). • Conduct a quick study on history of environment changes and its impacts in the local context for case study developing for training manual. • Develop training manual based on participatory technique • Arrange and conduct training for VDC • Evaluate impacts of training *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* The end result would be VDC and respective community members would understand about climate change and be able to adapt with the changes in their context that would contribute to improve the local living standard as well as the poverty reduction policy of the government. The direct beneficiary would be VDC members and people in the community. Local government authorities and private sector (businessmen, traders…..) Would be Indirect beneficiaries.
Cost effectiveness of the action	In general, VDC and the local people would be actively participating in their local development process and well cooperate amongst themselves in responding and adapting to climate Changes affected their community. To see more clearly, we may need to conduct Knowledge Attitude and Practice survey (KAP survey) .
Preconditions needed for successful implementation	*Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works* This would be approved internally by the Minister of Rural Development, and support from MEF, and cooperated by civil society, NGOs and donors. *Mention any coordination required with actions under the responsibility of other ministries or external stakeholders* Coordination with MOE, NCDM and Local authorities. *Mention any minimum capacity requirements*
Indicator(s) of success	• Number of VDC has been trained. • Result of KAP survey would be considered as qualitative indicators
Implementation arrangements	*Responsible department* Department of Rural Community Development and MRD- CCWG Provincial Departments of Rural Development
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* USD5,500
Possible funding sources	*If identified, name the proposed source(s) of funding.* *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*
Timeframe	*Indicate the start and end year* 2014 – 2016

MRD ACTION FICHE No 8 (MRD)

Action	*Pilot community based climate change adaptation for VDCs in the Cambodia Mekong Delta (Takeo, Svay Rieng, Prey Veng)*
CCCSP and Sector CCSP Strategic Objective	*Code of the CCCSP and Sector CCSP Strategic Objectives: Support for adaptation to climate change through creating local business opportunities that focus on micro credit provision for socioeconomic development. The increase families' income from local business will create preparedness to compensate for the loss of income during the flood and draught periods.*
Rationale	*Links to the sector and national strategies* - Improve livelihood of people in rural area through providing micro finance with low interest rate to vulnerable area in order to create job opportunity in local community. - The action is designed to link to micro-credit policy of MRD - (to be add NSDP, NAPA, Rectangular strategy)
Category of climate change action	Cat 3 – New dedication
Type of action	Adaptation
Short description of the action and expected results and benefits	*Short description* *Roads are the principal mood of transportation in Cambodia, about 40,000 km of rural roads are under the Ministry of Rural Development. It annually suffers heavy rains and flooding followed by draughts. Flooding with loss of rural connectivity can have a devastating effect on the livelihoods of population.* *It is expected that the remote rural economy is becoming increasingly dependent on an improved national and provincial networks.*[16] *(1) Practical research to find out integration of scientific-local community knowledge on climate adaptation.* *(2) Introduce practical-communities base adaptation to at least 85 communities and 200 VDCs across Mekong Delta on agricultural planning.* *(3) Introduce community-based early warning system on weather forecasting. And introduce best prevention measure to cope with flood and draughts.* *(4) This project mostly focuses on in Prey Veng and Svay Rieng provinces. The two provinces have a high poverty level (Prey Veng has a poverty level of 37 % and Svay Rieng have a poverty level of 36%, while the national poverty level is 35%).*
Cost effectiveness of the action	*Where possible, an estimate of the benefit cost ratio of adaptation actions and the marginal abatement cost of mitigation actions, along with any notes about key assumptions or sensitivity analysis* Several hundred MRD technical staff at the national and sub-national levels would be the beneficiaries. The numbers of ultimate beneficiaries i.e. the populations using climate risk infrastructure, will not be known until the baseline survey has been carried out. • The cost of providing a national inventory and maps of rural roads and water facilities would be $400,000 over three years.
Preconditions needed for successful implementation	- *Need Political commitment from lead ministry and The RGC.* - *Need good corporations with department of Rural Community*

[16] ADB (2011), Proposed Loan, Technical Assistance, and Administration of Loan and Grant Kingdom of Cambodia: Provincial Roads Improved Project.

	Development, Provincial Department of Rural Development, and local authorities.
Indicator(s) of success	- *At least 85 communities based Climate Change Adaptation are established in order to Improve access to markets, jobs and social services in response to Climate Chang Impacts.* - *At least 200 VDCs along Mekong Delta are well trained and well equipped in order to fully participate in the community planning and community investment programs, in particular in the Rural Economics, livelihood, and early warning system appropriate to local communities.*
Implementation arrangements	*Responsible department(s)* Department of Rural Community Development
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* USD 400,000,000
Possible funding sources	*If identified, name the proposed source(s) of funding.* Government annual budget allocation, ADB and bilateral Aids, and NGOs
Timeframe	*Indicate the start and end year* 2014 – 2018

Action fiches 9: MRD

Action	**Climate proofing Mekong river islands' connectivity (roads and Jetties), Kampong Cham and Tbong Khmom island networks**
CCCSP and Sector CCSP Strategic Objective	This action contributes to CCSP objectives: (1) Improve quality of rural roads to be resilient to climate change; (2) Support adaption to climate change through creating local business opportunities; create family income to compensate the loss of income during flood and drought period. (3) Support climate resilience of rural infrastructure development, protecting the road infrastructure from impacts of climate change, and ensuring that the road infrastructure of those island connectivity does not increase the vulnerability of the surrounding wetland ecosystem to climate change
Rationale	Links to the sector and national strategies The action is designed to help consolidate rural development by preventing damage and losses to rural infrastructure from climate hazards. This action also links to the ministry sectoral policies on rural road improvement, and the government's rectangular strategy III, as well as the national strategic development plan 2014-2018. **What type of climate risk/opportunity or mitigation objective is addressed by this action?** This action will protect rural infrastructure against extreme climate events in the Mekong island cluster of Kampong Cham province but mostly against flooding and cyclone. The advantage from this action is to reduce the vulnerability of villages in the Mekong River island cluster (Koh Mitt, koh Pir, Koh samrong, Koh Soutin and Koh Thmei)[17] by rehabilitating roads and jetties to improve accessibility and reduce risk to flooding with better water management

[17] Please see Pilot Program for Climate Resilience (PPCR) Revised Strategic Program for Climate Resilience (SPCR) for Cambodia 2013

	practices. The propose work includes provisions for small-scale levees and water management interventions to minimize flooding, development of a climate change adaptation framework and its associated investments of multi-sector nature (agriculture, renewable energy, tourism, water supply, etc.) and a community-based emergency management system. Moreover, the project design places emphasis on the importance of economic diversification and access to markets and critical services such as schools and clinics. This will, in effect, reduce social and economic vulnerability to climate shocks by securing mobility of island populations to the mainland Kampong Cham for trade, education, and health care. Reducing the reliance on agriculture will partly lessen the impact of floods or droughts on livelihoods.
Category of climate change action	Cat 2 – Modified
Type of action	Adaptation
Short description of the action and expected results and benefits	**Short description** Kampong Cham is one of the nine provinces situates along the Mekong river in Cambodia. This province is vulnerable to floods according to various studies which include MOE 2002, 2005 and 2006. It has become more serious with climate projected impact on the Mekong River Basin; in particular the area will become wetter in the wet season and dryer in the dry season. This action will help improve climate resilience of rural infrastructure, primarily in Kampong Cham province, in terms of rural road improvements, rural road asset management, rural road safety and community awareness program, and connectivity improvements. The project will also support a sustainable road maintenance regime in the Ministry of Rural Development (MRD) and a community based road safety program[18]. **Key activities include:** • Prepare vulnerability maps of rural roads by using climate modeling, climate change impact modeling of the Mekong islands areas, hydrological calibrations, impact assessment for project and national level. • Identify and prioritize potential adaptation options: Economical reports, road inventory guideline, road maintenance manual, road design manual, climate adaptation options including cost model, cost and benefit analysis of adaptation options. • Review current engineering designs, standards and guideline from MRD and MWPT. • Capacity development for technical staffs regarding climate resilient in infrastructure development, in particular rural road. **Expected results and benefits**: The islands of the Mekong River would have been connected with road infrastructure resistant to flood and drought. Enhanced connectivity even under extreme climate events including floods and cyclones; and climate resilient development of remote rural communities by supporting their efforts to enhance food security, clean energy, and develop green tourism. Every road improvement of each island will have been upgraded to be resilient to climate change, and 11 jetties instalments will have been sufficiently safety to connect the islands. Around 1 million people will benefit from the island's connectivity through economic improvement, social and political accessibility, and environmental sounds.
Cost effectiveness of the action	This project will provide direct benefit to people in 5 propose islands in Kampong Cham Province. With road improvement and keys infrastructure connection, the area will be transformed from subsistence agriculture economy into commercial centre, being centre for

[18] See Royal Government of Cambodia (2013) Pilot Program for Climate Resilience (PPCR): Revised Strategic Program for Climate Resilient for Cambodia, December 2013.

	tourism and trade facility in the GMS not only in Cambodia.
Preconditions needed for successful implementation	• Political commitment from lead ministry and government. • Staff capacity and availability in place. • Coordination by Minister of Rural Development, with support from MEF, and, liaison with NGOs and donors.
Indicator(s) of success	1. At least 50 km of rural roads rehabilitation in the islands will be climate resilient and provide year-round access to markets and other social services for communities 2. At least 11 jetties with climate resilient standards 3. Vulnerability maps of rural roads climate proofed developed 4. Adaptation guideline and planning option including cost and benefits of road development. 5. 1 million people benefit from the project starting from design period to post project implementation. 6. Engineering designs, standards and guidelines of resilience to climate change are jointly developed by MRD and MWPT. 7. Climate office is official established by MRD. 8. Local early warning systems and pilot program for emergency management for rural roads developed.
Implementation arrangements	Responsible department(s) MRD Rural Roads, Water Supply, Planning and Public Relations Departments Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners) Provincial departments of rural development. Provincial development committees. **Others include:** • National committee for Disaster Management (NCDM) • Ministry of Water Resources and Meteorology (MORAM) • Ministry of Public Work and Transportation (MPWT)
Estimated total cost	USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions USD 30 million (SPCR mentioned: US$178 million from 2014-2019)
Possible funding sources	If identified, name the proposed source(s) of funding. SPCR's project, NDF, KOICA
Timeframe	Indicate the start and end year 2015 – 2018

MRD ACTION FICHE No 10 (MRD)

Action	Climate-Proof tertiary-community Irrigation Development to enhance agricultural production of paddy field in four communes of Mekong Delta Province.
CCCSP and Sector CCSP Strategic Objective	This action is to contribute to CCSP strategy 3: Promoting climate resilience through strengthening the quality of rural infrastructures and CCSP strategy 4: Promoting adaptation to climate change through capacity and institutional development and increasing rural awareness raising on climate change adaptation and response options.
Rationale	This action plan is compliance with the priorities area proposed in the strategic plan of rural development on climate change. It is also a starting point of actions in response to climate change measures in the context of rural and social

	infrastructure development, Cambodia. This would be approved internally by the Minister of Rural Development, with support from MEF, and donors. It aims to increase quality of irrigation structures resilient to climate change, to iincrease participation of local communities in understanding of climate resilience for local public assets, irrigation and other structures and to increase knowledge of local and technical staffs for designing and mainstreaming climate measure into structure design.
Category of climate change action	Cat 2 – Modified
Type of action	**Adaptation**
Short description of the action and expected results and benefits	**Short description:** Kampong Ror is one of the districts in Svay Rieng province bordering Vietnam. Some communes in this district are heavily using ground water through constructed tube wells to irrigate their dry season rice cultivation, some other commune buy water from Vietnam and some obtain water from formal irrigation scheme. The district is one of the major rice trading within the border and access to irrigation remain problem which often affecting their rice crop. This action is to focus on small scale irrigation renovation that is the key factor to upgrade rural farmer livelihood and diversify their economy. Even though the poverty rate has reduced to 19% by 2014 at national scale, there are still signification gaps in those provinces that are vulnerable to flood and drought such as Svay Rieng. The province has received various investment both from government and individual traders on water infrastructure development in particular irrigation work to facilitate to farm level **Key activities:** 1. Construct and modify existing small scale irrigation scheme at farm levels to four remote communes in in Kampong Ror, Svay Rieng (construct ponds, canals, and quaternary canals) 2. Rehabilitate 5 traditional tertiary irrigation systems at an estimated civil works cost of $100,000 per system. 3. Develop community based farming organization and enhance capacity of existing VCDs. **Expected result:** • This action will help to reduce dependency of the competing use of tube wells from groundwater. • To increase access to irrigation service at farm level by creating more surface water availability during wet season. • To reduce drought spell during both wet and dry season that are constantly faced by the farmers
Cost effectiveness of the action	Effectiveness ranking from 0 – 1. Cost effective must be higher than 1 – • *Investment is estimated around 1,000,000.00 USD for structure design, construction, and capacity development on climate resilience of technical staffs and local communities. It is for the total command area of about 100000 ha of wet paddy field and 50000 ha of dry seasonal paddy field.* • *Paddy field will provide yield of 3 tons per hectare in wet season, and 4 to 5 tons per hectare in dry season.*

	• *First year investment return (after irrigation completed) – [(100000 ha x 3 tone x 1000 Riel) + (50,000 ha x 4.5 tons x 1000 Riel)] = 525,000,000 = 131,250 USD* • *Five years return is about 131250 x 5years = 656250 USD* • *Cost of operation for 5 years (5% of return cost = 6,000USD x 5 years = 30,000 USD) plus investment cost (500,000 USD) = 530,000 USD* • Effectiveness cost = Total cost of 5 years return / (cost of operation + cost of investment) = 656250 USD / 530,000 USD = 1.2 (project will be benefit to beneficiaries) • Capacity benefit will also take into account for this project.
Preconditions needed for successful implementation	However, to achieve good results for this action plan, the coordination with MOE and sub national administration will be required, especially participation from irrigation beneficiary, farmer water user group that is the most important.
Indicator(s) of success	• 5 community-based irrigation system will be designed and implemented • Yield of paddy field will be improved better off than current condition • Capacity of all level from project design to project implementation will be improved • Climate resilience will be integrated into project design and local community is aware of this objectives and project resilient to climate change. • Income of local communities are enhanced
Implementation arrangements	*Responsible department(s)* - MRD Rural Roads, Water Supply, Planning and Public Relations Departments. MRD will play its role as Executive Agency (EA) - PDRD, MOWRAM, PDA will play role as implementing agency (IA) - Under the involvement of subnational level, NCDD of MOI will cooperate to conduct data collection, trainings and workshop for information sharing.
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* USD 530 in 2015 prices over 3 years
Possible funding sources	Government annual budget allocation, grant and loan Other possible source of funding can be IFAD who is currently funding PADEE project with US$48 million which also cover this district.
Timeframe	*Indicate the start and end year* 2015– 2017