**Kingdom of Cambodia**
Nation Religion King

**Ministry of Agriculture, Forestry and Fisheries**

# Climate Change Priorities Action Plan for Agriculture, Forestry and Fisheries Sector 2014-2018

***Technical Working Group***
***for Policy and Strategy to Response to Climate Change***
***of the Ministry of Agriculture, Forestry and Fisheries***
***(TWG-CCAFF)***

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## PREFACE

Over the last decade, Cambodian agricultural sector has played important role in reducing poverty, generated employment for rural people, contributed to national development goals and regional market integration. However, this sector is sensitive to on-going climate changes mainly due to on the fact that its majority of its main production areas are under rain fed and seasonal flooding system associated with the Mekong and its tributaries.

To respond to these challenges, the ministry has formally established a Technical Working Group of Climate Change for Agriculture, Forestry and Fisheries (TWG-CCAFF) in 2011 with 16 members representing all key technical departments, directorates and research and academy institutions, ranging from deputy director of department to policy makers within the ministry. The main objectives of this working group can be summarized as follow:

- Conduct research; formulate policy, strategies, legal instrument, plan programs and project on the climate change including emission reduction in agriculture, forestry and fisheries sectors.
- Cooperate with relevant stakeholders to conduct the study, formulate, and effectively implement the policy, strategies, regulations, plans, programs and projects on climate change, in responding to CMDGs, particularly in relation to poverty alleviation and environmental sustainability.
- Propose recommendations to MAFF in relation to climate change impacts and responses.
- Joint monitor (follow up) global issues on climate change and its impact on agriculture, forestry, and fisheries, and proposed the actual response measures in agriculture, forestry and fisheries sector.
- Share information related to cc and response measure to the sector.
- Facilitate and mobilize necessary resources, especially grand to support the study, formulations and implementation of policy.
- Monitor and evaluate program related to climate change by line departments, institutions of MAFF.

This priorities action plan is unique as such as it involved more participatory processes, which involved internal consultation, consultation based on sectors and public consultations with key stakeholders in order to get constructive inputs and improve our action plan in the a transparent manner.

Thanks to our development partners who were actively participated in our consultation workshop. To name a few, these include EU, IFAD, World Bank, Asian Development Bank, UNDP (CCCA, NAPA FU), USAID, AfD, FAO, CCAFS, CI, WWF, WCS, SNV, CCAFS and Oxfam.

Finally, we wish to acknowledge the support of CCCA trust fund donors for their cooperation, understanding and being friends throughout the planning process.

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## EXECUTIVE SUMMARY

### THE PROJECT IMPACTS

It has been projected that Cambodia will be among the most vulnerable country to climate change within the ASEAN. In most international indices, Cambodia falls amongst the 30 most vulnerable countries in the world and, in many indices is in the top 10. This is because the country is exposed to frequent flooding and other unpredictable rainfall event, drought as well as to tropical storms and sea-level rise and has a low adaptive capacity. In addition, a large part of the population depends on agriculture and natural resources for their livelihoods and has few other sources of income on which to depend in bad years.

The Draft Second National Communication (SNC) identified the main risks from climate change. By 2050, temperatures are expected to be 0.5°C to 1.5°C higher. CC models do not yet give clear indications of the expected change in total annual rainfall, but it seems likely that total rainfall will increase in some areas and decrease in others. However, it is clear that floods and droughts will become increasingly frequent and severe. The SNC shows that climate change is likely to affect agriculture, health, energy and infrastructure. For the next decade, the damage caused will be modest. However, the damage will accelerate and, by 2050, climate change could reduce growth to zero, if the country does not adapt to the change and if international efforts to mitigate climate change are not successful

### THE CCPAP METHODOLOGY

Climate Change Prioritised Action Plans (CCPAP) 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 STRATEGY

Up to now, Cambodia's agriculture continues to play an important role in supporting economic growth, ensuring equity, ensuring food security, and promoting development of the rural economy. The Royal Government's vision is to modernize Cambodia's agriculture, based on a new approach and with changed scope and pace, to transform this sector from extensive stage of development, i.e. primarily depending on expanded use of available resources (such as land and other natural resources) and traditional agricultural inputs, into an intensive stage of development that primarily depends on the application of techniques, new technologies, R&D, mechanization and increased capacity of irrigation to improve productivity, and diversify into high value crops and other agricultural products including livestock farming and aquaculture while taking into account the need to ensure efficient management of land and sustainability of environment and natural resources. Moreover, further promotion of commercialization and agro-industry development will increase added-value of agricultural products and income of people.

MAFF CCCSP's goals is to participate in reducing and mitigating any negative impacts on agricultural sector, animal production, forestry, fishery that caused by climate change and to restore and recover impacted loss through various adaptation and mitigation approaches. The strategies include:

1. To ensure food security and farmers' livelihood improvement through an increase of crop production, agro-industry at 10% per annum by enhancing development and effective

application of appropriate technology, renewable energy, water utilization , and strengthening capacity to adapt and mitigate climate change .

2. To enhance sustainable natural rubber development by focusing on climate change's adaptation and mitigation measures.
3. To increase sustainable livestock production 3% per year and animal health control, through capacity development and appropriate technology application, to avoid adverse impacts on public welfare and contribute to reduce 1% greenhouse gases emission from animal production after 2015.
4. To enhance sustainable forest management through forestation and reduce emission from forest degradation and deforestation, to obtain carbon credit, to enhance local community whose livelihood depending on forestry, by ensuring zero balance deforestation by 2020, and
5. Enhance management, conservation and development of fishery resource in a sustainable manner through strengthening capacity, taking appropriate actions and actively participating to deal with climate change at local level, national and Mekong River Basin.

**THE PROPOSED ACTION AND COSTING**

The proposed prioritized actions and costing from 2014-2018 are presented in table below:

| | PRIORITIES STRATEGIES BY COMPONENTS | Total (M$) |
|---|---|---|
| **AGRICULTURE AND AGRO-INDUSTRY** | | |
| 1 | Promoting and up- scaling climate smart farming system that resilient to climate change | 13.47 |
| 2 | Promote post-harvest technology for cereal crop and tuber crop, and conduct the research and transfer appropriate post-harvest technology | 3.5 |
| 3 | Develop crop variety suitable to AEZ resilient to climate change (include coastal zone). | 13.38 |
| 4 | Promote research work on appropriate climate smart Agriculture technology/techniques to adapt and mitigate climate change | 18.77 |
| 5 | Development of knowledge and information system on climate change | 2.6 |
| 6 | Institutional Capacity Development for natural disaster coordination and intervention | 0.70 |
| 7 | Strengthening capacity of Agricultural and agro-industry development entrepreneur and the agricultural cooperative in low carbon production. | 1.55 |
| **Sub-total** | | **53.97** |
| **RUBBER SECTOR** | | |
| 1 | Promoting, piloting and scaling up rubber clones from IRRDB (International Rubber Research Development Board) member country in responding to climate change. | 1.97 |
| 2 | Promoting new rubber clone trial | 2.9 |
| 3 | Established Experimental networking sites and develop growth, yield, biomass, and carbon stock within existing rubber plantation in five AEZ | 1.52 |
| 4 | Modifying existing Agricultural Good Practice (GAP) through additional training to technical staff related to climate change | 0.35 |
| 5 | Promoting an integrated approach in efficiency energy and inputs used in latex and rubber wood production. | 0.25 |
| **Sub-total** | | **6.99** |
| **LIVESTOCK SECTOR** | | |
| 1 | Promoting resilience in animal production and adaptation to climate change | 8 |

| | | |
|---|---|---|
| | (technical package) | |
| 2 | Enhancing animal waste management and climate change emission mitigation | 6.50 |
| 3 | Promoting and enhancing technology development on the improvement of animal breed, animal feed, and animal health to adapt climate change. | 11 |
| **Sub-total** | | **25.55** |
| **FORESTRY SECTOR** | | |
| 1 | Promoting sustainable forest management | 2.25 |
| 2 | Promoting reforestation and afforestation to increase carbon stock | 8.20 |
| 3 | Conducting capacity development, research and awareness raising on REDD+ | 1.60 |
| 4 | Developing and implementing regulations and mechanism on REDD+ | 2.25 |
| 5 | Building climate resilient capacity in forestry sector | 2.10 |
| **Sub-Total** | | **16.4** |
| **FISHEREY SECTOR** | | |
| 1 | Promoting aquaculture production systems and practices that are more adaptive to climate change | 3.40 |
| 2 | Promoting climate resilience of wild fishery resources. | 1.30 |
| 3 | Enhancing the climate resilience in fishery sector (ECRF) | 3 |
| 4 | Promoting aquaculture production systems and practices that are more adaptive to climate change | 3 |
| **Sub-total** | | **10.70** |
| **CROSS-CUTTING ISSUES** | | |
| *1* | Mapping of agriculture's productions (agricultural production, rubber, livestock, forestry and fisheries) and of land use. | 19.40 |
| *2* | Developing and using integrated socio-economic and climate scenarios with climate, and land use models and Establishment of Carbon Accounting Systems for agriculture, forestry and fisheries. | 7.85 |
| *3* | Institutional Mainstreaming Climate Change Adaptation by building capacity and scaling up community resilience. | 30.99 |
| *4* | Promote marginalized groups and women participation to climate change adaptation and mitigation strategy. | 5.75 |
| *5* | Enhance knowledge management related to climate change adaptation and promote innovation that is needed based. | 10 |
| **Sub-total** | | **73.99** |
| ***29*** | **GRAND TOTAL** | **187.55** |

**THE EXPECTED IMPACTS**

With enough funding, institutional readiness and result indicators from each proposed action, we expect the key impact as highlight below:

1. Agricultural output increased from 22.85 million tons i 2013 to 36.80 million tons by 2018. Rice yield will increase from 3,117 kg/ha by 2012 to 3,250 kg by 2018. Rice surplus will increased from 4.74 million tons in 2012 to 6 million tons by 2018
2. Beneficiary income in areas vulnerable to climate change increased by 20% (about $30/month/household increase in rural areas)
3. Employment in agri-business and agro-industrial sector increased by 20%
4. Area planted (ha) with cash crops resilient to climate change increased by 20%
5. Value of agricultural exports increased by 30%
6. Value of formal bank loans for capital investment in agriculture increased by 25%
7. Number agri-business SME's increased by 10%
8. Mapping areas of cropping land, forest demarcations for agricultural zoning, multi-development areas established

9. 10,000 aquaculturists promoted and serves as model farmers for climate resilient and aquaculture expect to increase from 74,000 tonnes in 2012 to 171,160 tons by 2018
10. About 5 million farmers received agricultural extension services aimed at improving resiliency to climate change
11. Livestock production increased by 3% per year
12. Loss of livestock due to floods, droughts and diseases linked to climate change decreased within 5% annually." while morbidity/mortality rate normally stand around within 5% for animal raising
13. Three REDD+ projects fully operated and obtained carbon credit for trading on international markets.
14. 50 enhanced rubber clones are expected to distribute to the planters to be planted in any AEZ from 2014 – 2018.
15. 10,000 hectares of forest rehabilitated to enhance carbon stock and biodiversity.
16. Carbon Credits or avoided emissions (tons of CO2 equivalents) through REDD+ and mitigation in agriculture, rubber, fisheries and livestock sectors.
17. Approximately 0.78M Ha of healthy mangrove forest and 0.068M Ha of mangrove forest
18. 30 of fish species and their critical habitats that are identified and protected.

**CONCLUSIONS**

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

The CCPAP can be a very effective tool to mobilize national and international resources. Thus, developing effective communication materials based on the CCPAP will be one of the next steps to assist in mobilise resources and coordination to present the CCPAP in national and international events.

## ACRONYM

| | |
|---|---|
| ACIAR | Australian Center for International Agricultural Research |
| ADB | Asian Development Bank |
| AFD | Agent Francaise de Dévelopment |
| BAU | Business As Usual |
| BSO | Budget Strategy Paper |
| CARDI | Cambodia Agriculture Research and Development Institute |
| CC | Climate Change |
| CCCSP | Cambodia Climate Change Strategic Plan |
| CCPAP | Climate Change Priorities Action Plan |
| CCD | Climate Change Department (MOE) |
| CDC | Council for Development of Cambodia |
| DAHP | Department of Animal Health and Production |
| EA/IA | Executive Agency/Implementing Agency |
| ELC | Economic Land Concession |
| FA | Forestry Administration |
| FiA | Forestry Administration |
| GDA | General Directorate of Agriculture |
| GDR | General Directorate of Rubber |
| GEF | Global Environmental Facility |
| JICA | Japan International Cooperation Agency |
| KOICA | Korea International Cooperation Agency |
| MAFF | Ministry of Agriculture, Forestry and Fisheries |
| MMPFP | Mid-term Macroeconomic and Public Finance Policy |
| MOE | Ministry of Environment |
| MOWRAM | Ministry of Water Resource and Meteorology |
| MRD | Ministry of Rural Development |
| NCCC | National Committee for Climate Change |
| NSDP | Strategic Development Planning |
| PIP | The Public Investment Programme |
| PPCR | Pilot Project for Climate Resilient |
| R&D | Research and Development |
| REED | Reducing Emission through Degradation and Deforestation |
| SAW | Strategy for Agriculture and Water |
| SOP | Standard Operation Procedures |
| TA | Technical Assistance |
| TWGAW | Technical Working Group on Agriculture and Water |
| UNDP | United Nation Development Programme |
| UNFCCC | United National Framework Convention for Climate Change |

## 1. BACKGROUND

Cambodia's agriculture continues to play an important role in supporting economic growth, ensuring equity, securing food security, and promoting development of the rural economy. The Royal Government's vision is to modernize Cambodia's agriculture, based on a new approach and with changed scope and pace, to transform this sector from extensive stage of development, i.e. primarily depending on expanded use of available resources (such as land and other natural resources) and traditional agricultural inputs, into an intensive stage of development that primarily depends on the application of techniques, new technologies, R&D, mechanization and increased capacity of irrigation to improve productivity, and diversify into high value crops and other agricultural products including livestock farming and aquaculture while taking into account the need to ensure efficient management of land and sustainability of environment and natural resources. Moreover, further promotion of commercialization and agro-industry development will increase added-value of agricultural products and income of people[1].

Agricultural sector[2] cover five sub-major sectors including agro-industry[3], agriculture (crop production), Rubber, livestock, forestry and fisheries. Rice production still remains dominant and its production is closely related to climatic conditions. Other factors also contribute to production levels and limited economic returns. Soil fertility in some part of the country is low, with much of the country characterized by sandy soils (Johnston et al. 2009). Access to irrigation is limited, and questions persist with regard to the viability of irrigation for such soil conditions.

Livestock rearing is a key part of rural livelihoods, providing a source for savings in the case of larger livestock and sources of income and food with regard to pigs and poultry. Production remains largely small-scale, and its contribution to total agricultural production has remained largely static, providing only 15.3 percent of total agricultural production in 2009 (MAFF 2010). Livestock production has great potential, but is largely constrained by limited extension and veterinary services as well as weak marketing channels throughout rural areas. Poor livestock health is a major factor in household insecurity.

Forests generate important livelihoods benefits in Cambodia. Over 80 percent of Cambodians rely on fuel wood and around 8 percent on charcoal for cooking (NIS 2009). The Forest Administration (2010) estimates that nearly 4 million rural people – more than 30 percent of the population -- live within 5km of the forest, with forest resources accounting for an average of 10 to 20 percent of household consumption and income sources. For example, resin harvest by Phnon people in Mondulkiri generates an average household income of US$340 per year – equivalent to the annual cost of purchasing rice to support a family of five people (Evans et al., 2003).

Fishing holds a central place in rural livelihood strategies and cultural practices provides over 80% of the animal protein consumed by Cambodians. Together with rice, it forms the mainstay of the Cambodian diet – as it has done for countless generations.

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[1] See Rectangle I on Promotion of Agriculture Sector of the Royal Government of Cambodia 2013.

[2] This sector employs more than 70 percent of a population of 13.5 million, or about 9.5 million people, are engaged in agriculture to some extent (FAO/MoP 2010). The vast majority are smallholder farmers.

[3] Rubber and sugarcane (agro-industry) are expected to increase, as well as tree crops (Eucalyptus, teak) and cassava. For rubber, the small holder sector grew by 9,000 ha in 2006 alone. Cassava production 4 grew by 4 times between 2004 and 2007. Maize and Soybean: high demand for export to feed industries 4 grew by 4 times between 1999 and 2007.

The fishery strategy 2010-2019 shows the fisheries sector has for many years contributed significantly to the employment and livelihoods of the poor, to food security, and to GDP and foreign exchange balance. Cambodia's fisheries provide full-time, part-time and seasonal employment for up to 6 million people and the fisheries sector contributes very significantly to domestic food security, providing over 81.5% of the animal protein in the national diet and also forming a critical source of essential vitamins and micro-nutrients. In addition, fisheries production is estimated to be worth around US$200-300 million per year at the point of landing and fisheries harvesting, processing and trade contributes 8-12% of GDP. The value of fish exports has been estimated to be as high as US$100 million per year.

**1.1 POLICY ANALYSIS**

The Key strategic policies for agricultural sectors can be summary below:

***NSDP 2009-2013 UPDATE VERSION***

The midterm review of SNDP 2009-2013 conclude that **"although the significant progress has been made in increasing the land area for crops, paddy cultivation areas, yield per ha, etc.., further challenges are needed especially for "**:

- Increase of productivity of rice and other crops
- increase and improvement of access to extension services, credit and inputs,
- increase of irrigation
- Ensuring the better benefits for farmers through marketing, and
- Improvement of farmer's knowledge in using agricultural inputs, techniques and soil management.

As for irrigation system management, NSDP Update suggests a need to strengthen irrigation infrastructure management to (i) select priority locations for rehabilitation and construction within the irrigation infrastructure that have high potential for generating income in rural communities, (ii) engage commune councils in managing commune irrigation infrastructure, (iii) take action to encourage water resources management in order to contribute to the maximization of the increase in agricultural production, (iv) increase participation of farmers and farming communities in matters dealing with the use and maintenance of irrigation system, and (v) cost the financial sources for maintenance of irrigation scheme.

***THE SAW 2010-2013***

The strategy for Agriculture and Water 2010-2013 prepared by the joint Technical working group on Agriculture and Water (TWGAW) lay out ambitious goal, *"To contribute to poverty reduction, food security and economic growth through enhancing agricultural productivity and diversification and improve water resource development and management".* To achieve the goal, the programs are:

- Institutional and capacity building and management support programs for agriculture and water
- Food security support program
- Agriculture and agri-business (value chain) support programs
- Water resources, irrigation management and land programs, and
- Agricultural and water resource research, education and extension programs

SAW is a rolling medium to long term program to guide the implementation of individual projects and actions aimed at improving food security and economic growth through (i) enhancing agricultural

productivity and diversification and (ii) improving water resource development and management. SAW comprises of 24 components arranged over 6 strategic pillars:

- Policy and Regulations
- Institutional Capacity building and Human Resource Development
- Research and Education,
- Food security
- Water resource management and agricultural land management, and
- Agricultural business and marketing

***AGRICULTURE STRATEGIC DEVELOPMENT PLAN 2009-2013***

ASDP 2010-2013 was prepared by on an update of NSDP 2009-2013. It defined long term vision which is to, "**Ensure enough and safe food availability for all people, reduce poverty, increased GDP per capita and sustainable natural resource management and conservation**". To achieve the long term goals, MAFF decided the major sectoral goals to contribute the national economic development and accelerate the poverty reduction through enhancement of agricultural productivity and safety. To achieve pectoral goal, MAFF defines its specific policy goals for the development of agriculture sector, such as:

- Policy goal 1: Food security, productivity and diversification
- Policy goal 2: Market access for agricultural products
- Policy goal 3: Improving institutional capacity program and legislative framework, and
- Policy goal 4: Fishery reform.
- Policy goal 5: Forestry Reform

Then five priority programs which are parts of the Public Financial Reform Program of RGC are formulated to achieve these specific goals. These priority programs are:

- Enhancement of agricultural productivity and diversification
- Increased of market access for agricultural products,
- Strengthening of institutional, legislative framework and human resource development
- Sustainable fisheries resource management and
- Sustainable forest management

***RICE AND CROP PRODUCTION***

Rice production is vulnerable to flood and drought. In the wake of the global food crisis of 2008, the government has priority this sector as white gold and hopes to replicate the successes of Thailand and Viet Nam in exporting rice (Radey and Bandary 2009, RGC 2010).

A recent policy paper (RGC 2010) on the promotion of paddy rice production and export of milled rice prioritizes the following: (1) Infrastructure building and enhancement, (2) Improved provision of extension services and agricultural inputs, (iii) Land management reform, (iv) Finance and marketing, (v) Expanded farmer organizations, and institutional building and coordination. It is cleared that by 2015, the country hopes to achieve a rice surplus of 4 million tonnes, of which 1million would be exported (RGC 2010). These ambitious plans have not yet fully addressed the challenges of either human development or of climate change.

***RUBBER PLANTATION***

Rubber sector in Cambodia has started since 1902 during the French colonial period. In recent years, this sector has increased significant due to market demand and regional market integration and the wish to achieve economic growth and employment generation in the country. Key policy relate to this sector include Rubber Development Strategy 2010-2022, rubber sector profile 2012 and the current draft law[4] on rubber management in Cambodia. The draft draw seek to provide holistic view on how the rubber sector should be developed and managed through research and development and identification of trademarks as well as the aim to established its own clones seed and the revenue tariffs on experts where the money can be used for sectorial development and management with more sustainable way.

This sector has rapidly progress of which by 2010, 429,730 ha of forest land are allocated for rubber plantation of which 181,433 are planted with different stages. Currently, there are 122 ELC companies being active in the country holding total land with 1,200,000 ha. Among these, 99 companies of ELC have involved with rubber plantation, covering with 17% of total land (which mean 204,000 ha out of 1,200,000 ha).

With new political mandate (2014-2018), the Rubber directorate of MAFF has started to play its important role in managing and reviewing the rubber development work. The directorate is currently review the profile of each company, the master plan, the contracts status, and actual activities and implementation of the companies at the ground and verifies what are actual achievement and practices at the ground. Key area to be report by the directorate will include technical follow up such as progress, labor work employed, social aspects which include labor, infrastructure for workers, shelter, and payment.

***LIVESTOCK***

The Strategic planning Framework for livestock 2011-2020: A livestock Revolution for Cambodia set out the objectives to improve the livelihoods of small producers, household income and food security and provide a safe and efficiently supply of livestock's products to the urban consumers and potential expert markets. Throughout history, this sub-sector[5] is an integral part of the agricultural production system in Cambodia. Currently, the production efficiency of the this sector is low due to lack of effective support systems for disease control and a poorly developed infrastructure for the supply of animal feed and other inputs. Nearly all the production of cattle, pigs, and poultry is in the hand of small-scale farmers who practice subsistence agriculture. These small scale farmers use their livestock as the draft power for cultivation and for the transport of farm produces; they will slaughter their cattle and buffalo for meat when they no longer can pull the plough. two

[4] The rubber directorate is drafting the law on rubber to secure proper financing which include tariff on exports. CESS (the special tariff on rubber exports of which portion of its go to rubber secretariat activities and 10-15% of benefit goes to research work to improve rubber production and plantation practice.

[5] Cambodian cattle owners typically own two head; some authors have associated cattle ownership with wealthier households, though other estimates suggest cattle ownership is much more widespread, Maclean (1998) estimated an average 2 cattle per rural household. Average carcass weights are estimated at 120kg (FAO 2005). Cattle are closely associated with rice growing through draught and manure and as such are concentrated in rice cultivating areas (Knips 2004). Cambodian cattle are typically Brahmin crosses, yellow cattle or other zebu crosses.

The trend of livestock consumption is projected to be increased (ICEM and DAI 2013). The significance of commercial systems are expected to increase over the coming years with rising demand for livestock products, increasing urbanization of populations, evolving land regulations and the increasing presence of large agribusinesses. Traditional systems will likely remain prominent in more remote areas, in some areas they may become more commercially oriented with the uptake of improved technologies and as access to input and output markets increases. Meanwhile, animal disease and feed are affected by flood and drought and precipitation change as well as the shift of climate comfort zones.

***FORESTRY***

The key priority of this sector is to maintain forest cover aims to restore up to 60% of total territory[6] by 2015. Its policy initiatives have attempted to address these threats and ensure benefits to local people by handing over forest management rights to local communities through CFs (under MAFF) and Community Protected Areas (under MoE). Under the Forest Law, the recognition of the rights of local communities and the importance of decentralized management of natural resources are clearly highlighted. However, the process of legal recognition remains a challenge for local communities living inside and close to forest areas.

The new National Forest Program (20 years from 2010-2029) aims to allocate 2 million hectares to community management[7]. The strategy also recognizes that climate change impact is not the only key drivers behind the vulnerability of forests, but also huge economically-driven pressures from external development project on forest land.

***FISHERY***

To meet the population growth and other challenge such as climate change, the current fishery strategies action plan 2010-2019[8] highlight the shift from large-scale to small scale fishery management. It highlights the follow strategies:

- An important of fishery community (Cfi) which increases from 246 in 2002 to 469 in 2010, covering an area of 683,734 Ha. By 2015, the strategies aim to achieve 470 CFi throughout the country.
- Fishing holds a central place in rural livelihood strategies and cultural practices, involving 2 million to 4 million rural people.
- The productivity of the natural capture fisheries of Cambodia is closely related to natural hydrological patterns and the integrity of fish habitats.

In addition, the strategies have clearly addressed the trend of fish production, food, livelihood and economic growth which highlight key priority sector below:

- The sustainability of fish production/catch: improved livelihood, economic growth as well as ensuring food and nutrition security. The master plan on Fishing for the Future 2010-2019 lay out three indicators:
- Wild fish capture production is stabilized and sustained at not more than 500,000 tonnes/ year.
- Rice field fish production is increased by 15% annually, to reach 500,000 tonnes/ year by 2019.

[6] This figure has been shift to 2030 to achieve 60% of forest cover within total territory of the country.

[7] The new program cover various key activities which include: demarcation, classification and registration of forest land, forest reserve management and conservation, forest law enforcement and governance and sustainable financing through forest carbon credits or voluntary carbon market on REED.

[8] See the Strategic Planning Framework for Fisheries: 2010-2019: Fishing for the Future prepared by FiA as adopted by the Royal Government of Cambodia in 2010.

- Aquaculture production is increased by 15% (50,000 t) annually, to reach 185,000 tonnes per year by 2019.

## 1.2 SITUATION ANSLYSIS: CLIMATE CHAGNE RISK AND IMPACT

### AGRICULTURE

The Cambodian floodplain supports a diverse rice-based farming system, where the different cropping patterns for rice depend on flood duration and receding water. In this ecosystem, investments in agricultural intensification have developed or rehabilitated irrigation areas. Between 2001 and 2010, the harvested area of dry season rice increased by 5% per annum to 404,800 ha. Other commercial crops such as maize, soya or cassava, with growing importance are mostly rainfed (ICEM and DAI 2013).

A recent economic analysis suggests that with a 1°C rise in temperature, annual mean crop loss falls by around ten percent, which essentially indicates that for an average farm, climate change may render cropping agriculture an unprofitable activity (MOE&UNDP 2011, Pen et al 2004).

Yet agricultural impacts of climate change may not be felt evenly across the country. Increased wet-season precipitation in drier areas can be beneficial, especially if this coincides with a reduction in frequency and duration of droughts in the wet season (Eastham et al. 2008). In wetter areas of the country, however, potential increases in flooding may make rice cropping unviable in low-lying areas if they are too frequently inundated; in turn, this may require a more transformational change to production systems, such as through shifting rice cropping into the dry season through irrigation (ACIAR 2009).

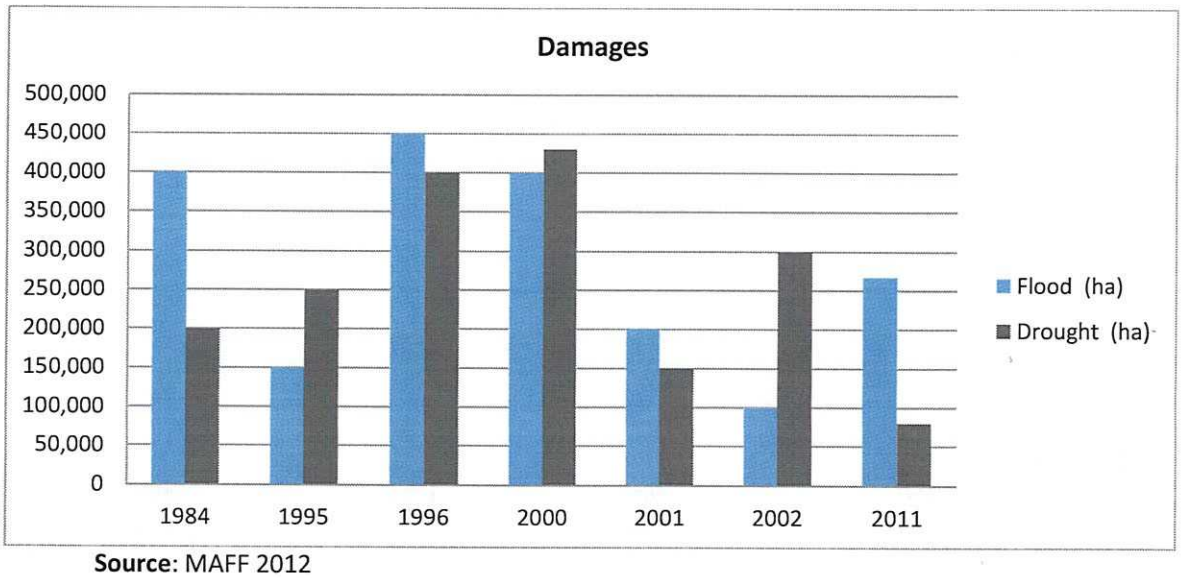
Cambodian agriculture is extremely vulnerable to climate change. Below is the summary of projected impact on crop productivity:

- ***Increase of temperature can reduce yield***: the yield of rice decreases by 10% for every 1 °C increase in the minimum temperature during growing -season (Peng et al., 2004). Similar impacts have been reported for wheat and other crops (Cruz et al. 2007).
- ***Increase in pest and diseases***, due to longer growth cycle, warm winter, higher growth rate of pathogens and increase weed completion due to increase CO2.
- ***Fertilization effect to increase C02***: plant can react with increase vegetative growth, but the response varies according to plants and species and nitrogen with be the main limitation factor.
- ***Increased water demand***: due to higher temperature inducing higher evapotranspiration. Irrigation demand in semiarid regions of Asia is estimated to increase by at least 10% for each 1 °C rise in temperature (Fischer et al. 2002).
- ***Increase incidence of extreme events*** with aggravated flooding.
- ***Seas level rise and saline water intrusion*** will reduce viable crop area in the Mekong Delta, with flooding in the tidally influenced area and increased area affected by saline water (1.4 Mha today).
- **Changes in rainfall patterns.** Predictions suggest that wet seasons will be shorter but with higher levels of rainfall, while the dry season will be longer and drier. This will result in shifts in the distribution of rainfall between areas. The changes to the length of seasons, combined with the delayed onset of the wet season after a longer dry season, will affect traditional cropping practices.
- **Increase flood and drought.** These are the major influences on rice production in Cambodia. The regular seasonal pattern of flooding and drought is central to traditional agricultural practice,

ensuring fertility and productivity. Traditionally farmers have been able to plant different rice varieties according to what they expect from the upcoming seasons. Yet climate change will not only result in more floods and droughts – more intense and more frequent – but also will make the onset of seasons less predictable. This has a large impact on productivity, especially for rice, which is very sensitive to timing of first rains. Climate change is also associated with "mini-droughts" in the wet season and unexpected rains during the dry season, all of which further affect productivity and the livelihoods of farmers.

MoE (2010) records areas of rice crop that have been affected by flood and drought in various years (see below). Such events happen with some regularity, and floods and droughts can occur in the same year (for example, 1996 and 2002). The period 2000-2002 also saw three consecutive years of significant flooding. In addition, MAFF (2012) has also recorded floods and droughts affected agricultural sector throughout the whole country as presented in the figure below:

**Figure xx: Effects of Climate Change on Agriculture**




**Source**: MAFF 2012

The projected impact on other commercial crops includes:

- **Rubber:** main change in suitability includes: Decrease due to increase rainfall such as in Kratie, Preah Vihear.
- **Cassava:** decrease suitability due to increase precipitation such as in Stung Treng, Preah Vihear, Battambang.
- **Soya:** decreased suitability due to increased precipitation such as in Kampong Chhnang, Battambang, Preah Vihear, Pursat, Kampong Cham, Siem Reap, Kratie, and Kampong Thom. This area is known as low-elevation dry broadleaf forest, low mid elevation moist broadleaf forest. It is projected that more than 60,000 km$^2$ will experiences decreased suitability for soybeans due to increase in precipitation.

**Rubber, Robusta coffee and rice experience positive shifts in various areas of the high- and mid-elevation ecozones.** Altitude shifts in climatic conditions due to increase of temperature are also

important for rubber cultivation and new areas suitable for industrial plantations will become available by 2050.

Yet, rubber plantations experience large negative shifts in production area in Western Cambodia, the Vietnamese Central Highlands and in recently planted areas like Champasak Province in Lao PDR due either to increase in rainfall or prolonged drought. Those changes in climate suitability are relevant for future planning. Similarly, future coffee plantations in Mondulkiri Province of Cambodia will be affected by changes in rainfall and temperature - future coffee plantations in this province might need to be reconsidered.

**LIVESTOCK**

Small- and medium-scale commercial operations are most vulnerable and have limited capacity to adapt. The presence of commercial livestock production units has increased dramatically in recent decades, a trend highly likely to continue. The increase in commercial units is associated with an increase in the use of higher performance genetics and higher productivity management practices such as heightened stocking rates. High-performance breeds managed in high-density systems will be negatively affected by expected climate changes.

Threats that were considered include temperature change, precipitation change, change in soil water availability, and changes in frequency and intensity of drought, flooding, and storms. In the livestock theme report these threats were each considered at provincial level where exposure to specific threats varied considerably.

**Table 1: Vulnerability assessment of livestock to climate change threats**

| System | Impact | Adaptive Capacity | Vulnerability |
|---|---|---|---|
| ***Smallholder cattle/buffalo*** | Low | Low | Medium |
| ***Dairy/large commercial*** | very high | high | high |
| ***Small commercial pig*** | High | Medium | High |
| ***Smallholder low-input pig*** | Low | Low | Medium |
| ***Small commercial chicken*** | Very high | Low | Very High |
| ***Scavenging chicken*** | Low | Low | Medium |
| ***Field running layer duck*** | Very Low | Low | Low |

Source: ICEM/DAI (2013)

**FORESTRY SECTOR**

Forest resources have, however, been seriously degraded. From the 1980s to 1990s, the rate of deforestation was estimated at around 2 percent (200,000 ha/year), declining to 0.8 percent from 2002 to 2006 (75,000 ha/year).

In 2008 forest cover was reported at 59 percent, but this fell significantly in just one year, to 57.59 percent in 2011 (MAFF 2011). The RCG has now set a policy target of maintaining 60 percent forest cover, which would mean that Cambodia would have one of the highest such percentages in the world.

A recent study conducted by Leng *et al* (2010) shows a total of 2.96 Gt of carbon is stored in Cambodia's forest ecosystems.

- 30% of forest carbon stock is estimated to be in the Forestry Concessions (Production Forest, PFR) managed by the Forestry Administration
- 26% in the Protected Areas managed by the Ministry of Environment.
- 12% under Conversion Forests gazette as Economic Land Concessions owned by the land concessionaires, and
- 19% in other Forests (private forests, or plantations) for which management responsibility is unclear[9].

Climate change predictions suggest that forests will be affected by changes in temperature, precipitation and shifts in seasons. Such changes directly affect the existence and vitality of species and ecosystems, and will increase the risks associated with pests.

**MOE (2010) predictions of climate change impacts on forestry[10] (SNC Report 2010, in press):**

- **Lowland forest (< 500m):** No change until 2025, but by 2050 some 8,948 ha will be exposed to a longer dry period of between four and six months, or six and eight months, depending on the climate change scenario; the baseline is less than four months.
- **Upland forest (500 – 1 000 m):** 50, 000 ha will be exposed to a longer dry period until 2050; in 2080 some forests will be exposed to a dry period of less than four months.
- **Mountain forests (> 1 000 m):** All mountain forests will be exposed to a longer dry period (more than four months) until 2050, then in 2080 will return to a baseline of less than four months
- Under emission scenarios SRESB1 and SRESA2, up to 2050 most lowland forest will be exposed to a longer dry period, particularly forest areas located in the northeast and southwest. More than 4 million ha of lowland forest, which currently has a water deficit period of between 4 and 6 months, will become exposed to a water deficit period of between 6 and 8 months or more. However by 2080 soil water conditions will be similar to current conditions.

The above projected impact has implied exposing forests to a longer dry period might reduce forest productivity and increase risk of fire. If forests are being logged, there exists a risk that it will take longer for them to regenerate. With increased risk of fire, forests are at risk of turning into shrub or unproductive lands.

**KEY AREAS BASED ON AGZ IMPACT BY CC:**

**Tonle Sap zone.** Given the central importance of agriculture, particularly rice, for rural livelihoods in Cambodia and national economic development, it is implied that any impacts on production will have far-reaching implications, most notably for the poor. Even with rising levels of production and rice exports (RGC 2010), the number of people considered food- insecure remains high.

- With a large concentration of poor people and heavy dependence on agriculture and fisheries production, the Tonle Sap zone stands out as being particularly vulnerable to climate change.

[9] Cambodia REDD+ Roadmap, revised draft 27 September 2010, version 3.0. , pp. 12-13

[10] In addition to temperature changes discussed in the SNC, rainfall changes also will adversely affect forests. Changes in rainfall patterns will affect survival of seedlings, cropping calendars and crop varieties, with risks of increased soil erosion and degradation of watersheds due to intermittent drought and flooding.

- **Plains zone (the Mekong delta).** This area comprises from Phnom Penh down to the Viet Nam border, which include the Mekong and Basac floodplains. It has an estimated population of 4,326,825, including 2,251,752 women involved with agriculture. It is one of the main agriculture production areas, already susceptible to floods, droughts and siltation, all causing agricultural losses and soil degradation. While poverty levels are not as high as in other parts of the country, the relatively high population density means that there are many people who are vulnerable to climate stress within this zone.
- **Coastal zone**. This zone includes areas of four provinces (Koh Kong, Sihanouk Ville, Kampot and Kep) and is projected to be vulnerable to SLR rise and increased salinization, with impacts for agriculture, fisheries and access to safe drinking water. Mangrove ecosystems and coastal erosion are especially vulnerable, and their degradation can intensify climate change vulnerability. Poverty levels within the coastal zone are high, with few alternative employment options. Coastal resources are coming under greater pressure particularly from tourism development, industrialization and urban expansion.
- **Plateau/mountain zone.** This zone covers the upper stretches of the Mekong River and its tributaries (the Sekong, Sesan and Srepok in the north-east) as well as other upland areas, such as the Cardamom Mountains. These forested uplands contain a diverse range of relatively undisturbed old-growth rainforest and support globally significant biodiversity. The zone consists of sparsely populated areas of semi-subsistence shifting cultivation, but recent rapid land use change has given rise to increasing pressure from encroachment of agricultural land for plantations, grazing, deforestation and mining. More pressure is occurring with regard to livelihoods dependent on natural hydrological systems and productivity of natural forests. The zone includes some of the poorest areas and already faces numerous development constraints.

**FISHERY SECTOR**

Capture fisheries in the LMB is buffered against climate change by the exceptionally large aquatic ecosystem biodiversity. As a result, some species will likely benefit from the changing conditions, possibly maintaining the overall fisheries productivity, while other less adaptive species will decline. This is likely to lead to an overall loss in biodiversity.

However, very little is known about the tolerances to water quality conditions of most Mekong fish species. However, species within the same groups do have similar water quality requirements. When examined in this way, the threats from climate change look daunting. Increased temperatures, changes in rainfall and river flows, sea level rise, and increasing storm intensity will all affect fish biodiversity and productivity.

Cambodia fishery sector are vulnerability to climate change. A recent global study of the vulnerability of national economies to the impact of climate change on fisheries ranks Cambodia as 30$^{th}$ most vulnerable in the world (Allison et al., 2009). Thus, its production is closely related to natural hydrological patterns and the integrity of fish habitats. This is not simply a matter of volume of water equalling volume of production. The onset of the flood season acts as a trigger for migration, with fish moving along the main stems of the rivers or between the rivers and floodplains, where they migrate to breed, spawn and feed and then retreat as waters recede. While the amount of water in any given year is a contributory factor, the timing of the flood, combined with the number of peaks during the flood season and the area of land inundated, are also important factors. The area of land flooded provides important habitats for feeding, breeding and spawning, while the quality of the vegetation, such as flooded forests and wetlands, and the

interconnectivity of the floodplain ecosystems also represent important factors in fishery production (Baran 2007).

Various studies thus suggest possible climate change impacts on fisheries, as summarized below.

**Table2: Summary predicted impacts on Cambodia's fisheries**

| CLIMATE CHANGES | IMPACTS ON FISHERIES |
|---|---|
| ***Delayed onset of flood season*** | Change the trigger effect of flood season – unknown response to fish migrations |
| ***Longer, drier dry seasons*** | Some species are able to survive for the dry season, as long as there are some viable fish refuges. It is not known how well they will be able to survive for longer, drier and potentially hotter periods<br>Reduction of key habitats – for example, flooded forests<br>Dry-season brood stock more exposed to fishing effort |
| ***Shorter, wetter rainy seasons*** | Migration triggers affected<br>Reduced season for breeding and spawning, as well as feeding – reduced opportunity for juveniles to reach suitable size and maturity to continue migration and life cycle. |
| ***Sea Level Rise (SLR)*** | Even a modest SLR of 20 cm would cause contour lines of water level in the Mekong delta to shift 25 km inland during the flood season and saltwater to move further upstream during the dry season<br>Alter the fish species composition of fisheries, but may not be detrimental of overall fisheries yield (ADB 2009). |

Sources: ADB 2009, Allison et al 2009, MoE 2010, FiA 2010.

The Tonle Sap fishery will be especially vulnerable, but so too the people dependent on fisheries of the upper Mekong and 3S tributaries in Stung Treng, Kratie, Rattanakiri and Mondulkiri. The vulnerability assessments conducted by ICEM and DAI (2013) confirm the hypotheses:

- Upland fish will be the most vulnerable to climate change
- Migratory white fish will be vulnerable to climate change
- Black fish will be more 'climate-proof' than other fish types
- Invasive species will become more prevalent through climate change

**AQUACULTURE**

Aquaculture has been a long-established activity in parts of the LMB, particularly on the Tonle Sap Great Lake and the Mekong Delta (ICEM and DAI 2013). Aquaculture appears to be more vulnerable to climate change scenarios than capture fisheries, although it tends to have a high adaptive capacity. The existing three types: Intensive, semi –intensive and extensive aquaculture systems all appear to be vulnerable to climate change.

- Intensive aquaculture looks particularly vulnerable in lowland and coastal areas.
- Semi-intensive and extensive systems have a lower risk of failure but also have a lower adaptive capacity.

- Whilst aquaculture may become possible or more viable in new (higher elevation areas), this will not come close to compensating the production losses from lowland areas.

A recent study by ICEM and DAI (2013) projected that:

- An increase temperature and changes in **rainfall** patterns are likely to affect aquaculture as it becomes more difficult to prevent the loss of stock through flash flooding. Longer dry seasons may affect freshwater availability, especially if there is increased competition from other users, thereby constraining fish production.
- **Storm intensity and frequency** could affect coastal and reservoir aquaculture infrastructure and inland aquaculture farm flood security
- Increased **sea levels** are likely to reduce the area available for aquaculture. Increased inland flooding may result from more extensive inland reach of tides and restrictions of freshwater runoff.

The vulnerability assessments confirm the hypothesis that aquaculture will be more vulnerable to climate change scenarios than capture fisheries.

**CROSS-CUTTING ISSUES**

Climate change impact on agriculture is not fall into one single sub-sector as mentioned above. However, this impact will cut across the sectors which involve all five components including water resource.

Agriculture (on which 71 percent of men and women in Cambodia are dependent[11]) and natural resources management will be central for (medium-term) adaptation and to reduce vulnerability. This sector remains the single largest source of primary employment for women and men. However, yields are very low and agricultural extension services are limited. Although women comprise 51 percent of the primary workforce in subsistence agriculture and 57 percent of the workforce in market-oriented agriculture, they receive only 10 percent of agricultural extension services (MoWA 2008). Women are actively engaged in off-farm income generating activities to supplement household income, however, there is very little understanding of or support for the development and promotion of these activities.

Fishing activity also cut across the sector. This sub-sector, in particular capture fisheries production is highly sensitive to hydrology and land use changes – and thus, to climate change. Any declines in natural productivity would have serious food security implications that could not be offset by other forms of food production. It is likely that the poorest would suffer most from ensuing food insecurity, while increased competition over remaining fishery resources would most likely lead to poor people being denied access to fishery resources.

Beside this, the continue pressure on forest and land resources , which make the largest contributions to GHG emissions in Cambodia – forest resources are likely to be further degraded by human activities. The impact of climate change may also contribute to changes in forest types in the future. Almost 4 million people are dependent on forest resources, which have also traditionally provided safety nets in times of crisis.

[11] This also includes livestock raising.

Under the current projections on climate change, there will be shift in climate zone suitable for agricultural production which post threats to single crops productions. In this regard, the proposed actions will need to focus on a clear demarcation of the land, soil, livestock, forest, and fishery, the need for an integrated planning and development and the need to diversify current agricultural practices by adopting new technology and innovation in order to meet future food demand, economic growth, poverty alleviation, and reduce tension of conflicting over access to these resources.

## 2. STRATEGIES FOR CLIMATE CHANGE ADAPATION AND MITIGATION

The MAFF CCCSP's goals is to participate in reducing and mitigate any negative impact on agricultural sector[12], animal production, forestry, fishery that caused by climate change and to restore and recover impacted loss through various adaptation and mitigation approach.

**The Objectives:**

1. To enhance human and institutional capacity in developing new technology of rubber seed, animal production, forestry, fishery and tolerance to flood and drought, salinity water, disease and insect devastation again crops and animals.
2. To enhance capacity to farmers with new technology in coping with climate change
3. To reduce GHG emission through forest degradation, animal production, crop production, and to encourage for sustainable forest management in particular forest community, renewable energy (biomass) and appropriated agricultural technology.
4. to development and enhance the effectiveness of fishery management through water ecological improvement, protected flooded forest and mangrove forest, increase research development on aquaculture and post-harvest processing and to continue strengthening capacity of the fishery community.
5. Capacity development strengthening on crop production, rubber, livestock, forestry and fishery through trainings, awareness raising, exchange visits in relation to climate change and the process of global warming.

**STRATEGIC OBJECTIVES FOR SUB-SECTOR**

1. To ensure food security and farmers' livelihood improvement through an increase of crop production, agro-industry at 10% per annum by enhancing development and effective application of appropriate technology, renewable energy, water utilization , and strengthening capacity to adapt and mitigate climate change .
2. To enhance sustainable natural rubber development by focusing on climate change's adaptation and mitigation measures.
3. To increase sustainable livestock production 3% per year and animal health control, through capacity development and appropriate technology application, to avoid adverse impacts on public welfare and contribute to reduce 1% greenhouse gases emission from animal production after 2015.

[12] FAO (2009) lay out the strategy for climate change adaptation and mitigation in agricultural sector. **Adaptation in agriculture** refers to actions (on-going or new) intended to improve the **resilience** of agriculture, **enhance its capacity** to deal with conditions associated with climate change, and hence reduce the vulnerability of agriculture to changing climate while **Climate Change Mitigation** refers to organized processes whereby society seeks to reduce emissions of Carbon and other greenhouse gases and increase the sequestration of atmospheric Carbon through absorption by carbon sinks.

4. To enhance sustainable forest management through forestation and reduce emission from forest degradation and deforestation, to obtain carbon credit, to enhance local community whose livelihood depending on forestry, by ensuring zero balance deforestation by 2020, and
5. Enhance management, conservation and development of fishery resource in a sustainable manner through strengthening capacity, taking appropriate actions and actively participating to deal with climate change at local level, national and Mekong River Basin.

## 3. PROPOSED KEY ACTIONS

This section is to 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 SCOPE OF PLANNING

MAFF has prepared activities list that are considered as essential and relevant 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:* ***Dedicated*** *new climate change actions*

### 3.2 ACTION PLAN MATRICES

This section presents a prioritized matrix of actions, with the corresponding estimated budgets, constrained by the total resources available in the baseline resource scenario. The Planning Matrix has been prepared and discussed through a three stage process: long listing of all actions; shortlisting of actions; resource allocation to these actions. For long list of action (see annex 1) for short list of actions or prioritize of actions and resource allocation can be summarized table below:

**Table 3: Priorities Action Plan Matrices by components**

| Action Number | COMPONENTS | Category of actions | Responsible Depts. | Preliminary Estimated budget (US$ M) (note: present costs to the nearest 1000 USD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2015 | 2016 | 2017 | 2018 | Total |
| **AGRICULTURE AND AGRO-INDUSTRY** | | | | | | | | | |
| 1 | Promoting and up- calling sustainable farming system that resilient to climate change | 1,2 | GDA | 2.694 | 2.694 | 2.694 | 2.694 | 2.694 | 13.47 |
| 2 | Promote post-harvest technology for cereal crop and tuber crop, and conduct the research and transfer appropriate post-harvest technology | | DAI | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 3.5 |
| 3 | Develop crop variety suitable to AEZ resilient to CC (include coastal zone). | 2,3 | GDA/ CARDI | 2.676 | 2.676 | 2.676 | 2.676 | 2.676 | 13.38 |
| 4 | Promote research work on appropriate climate smart Agriculture technology/techniques to adapt and mitigate climate change | 2,3 | GDA CARDI | 3.754 | 3.754 | 3.754 | 3.754 | 3.754 | 18.77 |
| 5 | Development of knowledge and information system on climate change | 2,3 | GDA,CA RDI | 0.433 | 0.433 | 0.433 | 0.433 | 0.433 | 2.6 |
| 6 | Institutional Capacity Development for natural disaster coordination and intervention | 2,3 | GDA, DAI | 0.140 | 0.140 | 0.140 | 0.140 | 0.140 | 0.70 |
| 7 | Strengthening capacity of Agricultural and agro-industry development entrepreneur and the agricultural cooperative in low carbon production | 2,3 | GDA, DAI, CARDI | 0.310 | 0.310 | 0.310 | 0.310 | 0.310 | 1.55 |
| **Sub-total** | | | | | | | | | **53.97** |
| **RUBBER** | | | | | | | | | |
| 1 | Promoting, piloting and scaling up rubber clones from IRRDB (International Rubber Research Development Board) member country in responding to climate change. | 3 | GDR | 0.394 | 0.394 | 0.394 | 0.394 | 0.394 | 1.97 |
| 2 | Promoting new rubber clone trial | 3 | GDR | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 2.9 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | Established Experimental networking sites and develop growth, yield, biomass, and carbon stock within existing rubber plantation in five AEZ | 3 | GDR | 0.304 | 0.304 | 0.304 | 0.304 | 0.304 | 1.52 |
| 4 | Modifying existing Agricultural Good Practice (GAP) through additional training to technical staff related to climate change | 2,3 | GDR | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.35 |
| 5 | Promoting an integrated approach in efficiency energy and inputs used in latex and rubber wood production. | 3 | GDR | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.25 |
| **Sub-total** | | | | | | | | | **6.99** |
| **LIVESTOCK** | | | | | | | | | |
| 1 | Promoting resilience in animal production and adaptation to climate change (technical package) | 1,2 | DAPH | 1.60 | 1.60 | 1.60 | 1.60 | 1.60 | 8 |
| 2 | Enhancing animal waste management and climate change emission mitigation | 1,3 | DAPH | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 6.5 |
| 3 | Promoting and enhancing technology development on the improvement of animal breed, animal feed, and animal health to adapt climate change. | 1,2 | DAPH & RUA | 2.20 | 2.20 | 2.20 | 2.20 | 2.20 | 11 |
| **Sub-total** | | | | | | | | | **25.50** |
| **FORESTRY** | | | | | | | | | |
| 1 | Promoting sustainable forest management | 1,2 | FA | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 2.25 |
| 2 | Promoting reforestation and afforestation to increase carbon stock | 1,2 | FA | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 8.20 |
| 3 | Conducting capacity development, research and awareness raising on REDD+ | 2 | FA | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 1.60 |
| 4 | Developing and implementing regulations and mechanism on REDD+ | 2 | FA | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 2.25 |
| 5 | Building climate resilient capacity in forestry sector | 2 | FA | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 2.1 |
| **Sub-Total** | | | | | | | | | **16.40** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **FISHEREY** | | | | | | | | | |
| 1 | Promoting aquaculture production systems and practices that are more adaptive to climate change | 2 | FIA | 0.68 | 0.68 | 0.68 | 0.68 | 0.68 | 3.40 |
| 2 | Promoting climate resilience of wild fishery resources. | 2 | FIA | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 1.30 |
| 3 | Enhancing the climate resilience in fishery sector (ECRF) | 2 | FIA | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 3 |
| 4 | Promoting aquaculture production systems and practices that are more adaptive to climate change | 3 | FIA | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 3 |
| **Sub-total** | | | | | | | | | **10.70** |
| **CROSS-CUTTING ISSUES** | | | | | | | | | |
| 1 | Mapping of agriculture's productions (agricultural production, rubber, livestock, forestry and fisheries) and of land uses. | 2 | MAFF | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 19.40 |
| 2 | Developing and using integrated socio-economic and climate scenarios with climate, and land use models and Establishment of Carbon Accounting Systems for agriculture, forestry and fisheries. | 3 | MAFF | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 | 7.85 |
| 3 | Institutional Mainstreaming Climate Change Adaptation by building capacity and scaling up community resilience. | 2 | MAFF | 6.198 | 6.198 | 6.198 | 6.198 | 6.198 | 30.99 |
| 4 | Promote marginalized groups and women participation to climate change adaptation and mitigation strategy. | 3 | MAFF | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 5.75 |
| 5 | Enhance knowledge management related to climate change adaptation and promote innovation that is needed based. | 2 | MAFF | 2 | 2 | 2 | 2 | 2 | 10 |
| | **Sub-total** | | | | | | | | **73.99** |
| ***29*** | **Grand Total** | | | | | | | | **187.55** |

### 3.3 IMPLICATION FOR EXPENDITURE FOR THE MINISTRY

This section is to compare the total expenditure in the Action Plan with the existing expenditure of the departments in the Ministry and comment on which departments are receiving a higher share of expenditure and show how the change is consistent with the CCSP, which should give some indication of which departments respond to the greatest climate risks.

**Table 4: Annual budget and expenditures of MAFF from 2007 to 2012 without climate action responses**

Summary budget and expenditures (Unit: million Riel)

| Items | 2007 | 2008 | 2009 | 1010 | 2011 | 2012 |
|---|---|---|---|---|---|---|
| **Budget (R)** | 39,274 | 42,873 | 48,758 | 54,779 | 64,048 | 87,695 |
| **US$** | 9,558 | 10,434 | 11,866 | 13,331 | 15,587 | 21,342 |
| **Actual expenditure** | 36,896 | 49,132 | 52,257 | 54,525 | 57,878 | NA |
| **(US$ 1,000)** | 8,979 | 11,957 | 12,718 | 13,270 | 14,086 | NA |

Source: Department of Finance, MAFF
*: US$ 1 = 4,109 Riel.

### 3.4 Expected benefits from the Implementation of the Action Plan

This section discusses the Cost Benefit Analysis by estimating the economic and other qualitative benefits of the action plan implementation and to provide the results of the estimation. Detail of cost benefit of each action is described in each action fiches.

## 4. MANAGEMENT AND FINANCING MECHANISM

MAFF has a mission to support the economic growth of Cambodia by providing high quality of services which result in a secure safe food supply, increased agricultural outputs and add value on a sustainable and cost effective basis to agriculture fishery and fishery based sectors.

### 4.1 ANALYSIS OF EXISTING MANAGEMENT AND FINANCING MECHANISMS

MAFF has shortlist 29 actions from its long list with 186 actions proposed. Based on its shortlist action, the total costs of the proposed actions for the next five years are estimated with US$ 206,003,000 (two hundred six million and three thousand USD). Key sources of financing foreseen by the secretariat working group on Agriculture, Forestry and Fisheries (SCAFF) government annual budget allocation, loan and grant from multilateral banks such as from World Bank/ Asian Development Bank (SPCR program), International Financial for Agricultural Fund (IFAD), European Union, various bilateral aids, Official Development Assistant (ODA), Global Climate Fund mobilized by various UN agencies and from private sector.

Based on preliminary climate change financing framework updated by the CCCA, there are potential ceiling cost for climate fund for the ministry with USD 122 (of which US$ 86 million expect for adaptation) from 2014-2018. The climate finance can significantly be increased through mainstreaming the climate aspect into usual development projects. This is achievable through greater awareness of the implication and impact of climate change is every mainstream sector. Although the magnitude of awareness is rather

wide, it varies among sectors within the ministry. For example, the association of climate change is more obvious to stakeholders in sectors such as forest, energy, irrigation, agriculture, and disaster, but less in other sectors.

## 4.2 ENTRY POINTS FOR CLIMATE CHANGE MAINSTREAMING IN MANAGEMENT AND FINANCING MECHANISMS

Based on the analysis in the previous section, this section include a description of steps to be taken to include climate change in the regular planning and budgeting tools of the ministry (sector strategies, PIP, budget strategic plan, NSDP submission, annual work plans, programme budgets. Box below is the summary of budget cycles for Cambodia ministry in submission for budget allocation.

**Box 1: The Budget Cycle**

| |
|---|
| Budget Strategy Paper (March-May). The budget process starts in the first week of March, when MEF prepare the Mid-term Macroeconomic and Public Finance Policy (MMPFP) in line with national development policy. The MMPFP is developed based on a prognosis of macro-economic variables (GDP growth and inflation, balance of payments, money growth and the exchange rate) and provides a forecast of the total resources available to government over the medium term. The MMPFP is submitted to the CoM for approval and is then used as the basis for the preparation of a Budget Strategy Paper (BSP). A circular on preparation of the BSP is issued by MEF Budget Department and line ministries and local authorities then prepare their submissions for the BSP and submit these to MEF by mid-May. The BSP includes three year projections of spending for each ministry, and it is the foundation for: the linkage between the budget and policy, including the Rectangular Strategy and NSDP; the calculation and justification of budget needs; the sustainability of programmes; and the evaluation of the budget package and budget appropriation.<br><br>The BSP is the tool for line Ministries to prepare their medium term and annual expenditure plans. The BSPs have a programmatic structure based on the identification of organisational objectives, budget activities, output targets and indicators for Ministry spending. At the moment, the BSPs only capture government resources. In the future, they will also include donor flows. One of the difficulties in incorporating donor funds into the BSPs is associated with the parallel modalities which are used to manage many donor projects. |
| Budget Circular (June-September). Once the BSP has been approved, MEF drafts a circular on budget preparation, specifying the conditions and procedures to be followed. This is approved by the Council of Ministers and is then forwarded to line ministries and local authorities for drawing up detailed revenue and expenditure estimates to be submitted to MEF by July 25. In August, MEF consolidates the revenue and expenditure estimates and invites line ministries and local authorities to perform necessary adjustments before incorporating these into the draft Finance Law by September. |
| Adoption of Budget (October-December). MEF submits the draft budget law to the Council of Ministers during the first week of October and to the National Assembly during the first week of November for approval. Finally, the draft budget law is submitted to the Senate by the first week of December and for adoption prior to December 25. |

The Budget Cycle has evolved since 2005, when the government started a comprehensive programme of reform through its Public Finance Management Reform Programme (PFMRP), with donor support. The PFMRP aims to transform the PFM system into one practicing accepted international best standards. The

ten year timescale (2005-15) recognizes the time required to achieve the reforms and has four sequenced stages of: i) strengthening budget credibility; ii) enhancing financial accountability; iii) the progressive development of policy-based budgeting and iv) increasing performance accountability.

In the next step, the PFMRP aims to improve and expand the implementation of program budgeting and improve budget comprehensiveness and integration. As part of the promotion of results based budgeting, the government adopted a Sub-decree, in May 2013, to establish a Budget Entity inside ministries and institutions. The detail guidelines are to be determined by a Prakas of MEF.

Programme Budgeting. The conventional budget system in Cambodia does not define budgets or monitor expenditure at any functional level below the Ministry. To help government to align resources with policy priorities, a partial form of programme budgeting was introduced in the early 2000s, with the adoption of Priority Action Programmes. These were replaced in 2007 by programmes. There are 33 budget entities, of which 8 currently have programmes identified (MLVT, MLMUC, MOJ[13], MWA, MRD, MAFF, MEYS, and MOH). These innovations have helped ministries to pursue policy priorities and encourage the integration of recurrent and capital budgets. However, there are practical difficulties particularly relating to capturing donor flows.

The Public Investment Programme (PIP). The budget includes a list of projects that comprise the PIP, which is based on the National Socio-Economic Development Plan (NSDP). The PIP is prepared by line ministries, under the coordination of the Ministry of Planning (MOP), which approves all projects and ensure that they are consistent with the NSDP. MoP has prepared guidelines and a template table to align the donor-funded programmes with the NSDP policy. In practice, most of the capital budget is funded by donors and line ministries tend to deal directly with donors, or with the Council for the Development of Cambodia (CDC), whose role is to coordinate external funding for projects as well as to maintain a database on these projects.

According to MOP, CC related activities have not yet been mainstreamed in the PIP process, although some line ministries have identified their priority departments, activities, or subgroups related to CC activities. Prioritisation in the PIP is done only by line ministries within their sectors of responsibility. Some sectors require Environmental Impact Assessments for certain types of project, but this is not done in a systematic manner. MOP compiles line ministry submissions, without any prioritisation between sectors.

## 5. MONITORING AND EVALUATION

### 5.1 Developing framework for monitoring, reporting and evaluation

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

The department of planning and statistics (DPS) will have the responsibility to manage the monitoring, reporting and evaluation process with the technical support of the climate change working group. It will carry out these tasks with the support and in coordination with the NCCC and MoP. The following diagram describes the institutional arrangements.

[13] MLVT = Ministry of Labour and Vocational Training, MLMUC = Ministry of Land Management Urban Planning and Construction, MOJ = Ministry of Justice

Progress in the implementation of the CCPAP will be reviewed on an annual basis in the framework of the Annual Progress Review of [the sectoral strategy or plan such as Agricultural Strategy Development Plan (ASDP); a specific chapter reviewing the CCPAP progress will be included. The CCPAP indicator framework will be integrated within the indicator framework of the ministry; relevant indicators for climate change will be also included in the NSDP submission.

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 CCPAP and CCSP, its relevance and contribution in addressing climate change impacts on agriculture, forestry, fisheries and livestock and achieving impacts foreseen in sectoral plan and NSDP, the effectiveness in terms of mainstreaming climate change within MAFF, 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[14], and will provide recommendations for future adjustment of the policy response. To this effect it will be important that evaluations identify lessons learned and, if needed, entry points for improving policies and actions. A precondition for organization of quality evaluations at program (CCPAP) and action levels will be that sufficient resources for monitoring and evaluation are budgeted in the actions.

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

| Indicator Type | Purpose | Frequency |
|---|---|---|
| 1. CCPAP delivery and mainstreaming | Tracking the progress in fundamental aspects of CCPAP implementation, such as fund mobilization. | Annual |
| 2. Institutional readiness[15] | 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[16]. |
| 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[17]. Baseline and targets for indicators for CCPAP delivery and mainstreaming, and for impact indicators will be established by the end of 2014, and will be included in

[14] 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.

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

[16] 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.

[17] 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 first CCPAP 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.

**INDICATOR FOR MAFF'S CCPAP**

| **1. CCPAP delivery and mainstreaming indicators** | |
|---|---|
| 1. Funds planned and actually disbursed, compared with the CCPAP planning matrix[18]<br>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<br>4. Capacities for climate change mainstreaming<br>5. Availability and use of data and information | |
| **3. Results indicators** | |
| *Actions[19]* | *Indicators* |
| **AGRICULTURE AND AGRO-INDUSTRY** | |
| 1. Promoting and up-calling sustainable farming system that resilient to climate change | • *1,000 model farms (Key promoters) established and activated 1,000 communes throughout the 23 provinces.*<br>• *Income of the participated rural households improved* |
| 2. Promote post-harvest technology for cereal crop and tuber crop, and conduct the research and transfer appropriate post-harvest technology | • *10% of total loss and damage of agricultural products reduced.*<br>• *Technological and innovation improved and available for farmers* |
| 3. Develop crop variety suitable to AEZ resilient to CC (include coastal zone). | • *At least four crop varieties released which are more adaptable to climate change than ever.*<br>• *Capacity of bio-technology research improved, especially for R&D institutions.*<br>• *Crop yields are improved, and productions are more stable under climate variability.* |
| 4. Promote research work on appropriate climate smart Agriculture technology/techniques to adapt and mitigate climate change | • *At least 4 types of improved technology related to sustainable soil management, crop protection, and low C emission were developed and use in the Climate Smart ecosystem ( areas defined by the Gov).*<br>• *Improved knowledge on the impact of current farming practices on CC, soil degradation, adaptation option for different farming typologies, and strategy for bio-energy crop development.* |

[18] 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 28 M (10 M in 2014, 8 M in 2015, 10 M in 2016) and the total budget is of 35.7 M (11.9 for each year), the indicator will be 78%.

[19] Actions as defined in the Action Fiches.

| | |
|---|---|
| | • *Crop yields are improved and its productions are more stable, and the uses of soil resources are more sustainable under climate variability.* |
| 5. Development of knowledge and information system on climate change | • *Agro climatic information has collected and interpreted according to the Agro-ecological zone and disseminated to famers* |
| 6. Institutional Capacity Development for natural disaster coordination and intervention | • *The damage and losses of quantity and quality of agricultural products will be reduced.*<br>• *Appropriated technologies with good practices will be applied to adaptation and mitigation the impact of climate change.* |
| 7. Strengthening capacity of Agricultural and agro-industry development entrepreneur and the agricultural cooperative in low carbon production. | • *(50 persons) x 10 TOTs including M&E will be trained*<br>• *Stakeholders (100 persons x 2 times/year) will be trained*<br>• *Institutional capacity development on M&E (50 persons x 2 times).* |
| ***RUBBER*** | |
| 1. Promoting, piloting and scaling up rubber clones from IRRDB (International Rubber Research Development Board) member country in responding to climate change. | • *40 ha of clones experimented and scaled up into 5 AEZ in Cambodia.*<br>• *1750 rubber farmers equipped with better knowledge and skills (An average 4.86 ha/family).*<br>• *1,200 copies of lesson learned to be published and disseminated.*<br>• *Economic return will be US$20.40 million* |
| 2. Promoting new rubber clone trial | • *New rubber clones will be created and scaled them up to planters throughout the country.* |
| 3. Established Experimental networking sites and develop growth, yield, biomass, and carbon stock within existing rubber plantation in five AEZ | • *Result from the investigation of 5 AEZ will be published through paper documentation or seminars.*<br>• *At least 200 students will use the proposed areas for their research work and graduation.* |
| 4. Modifying existing Agricultural Good Practice (GAP) through additional training to technical staff related to climate change | • *Stakeholders' capacities and awareness of mechanism to adapt or to mitigate on climate change impacts will be trained and improved.* |

| | |
|---|---|
| 5. Promoting an integrated approach in efficiency energy and inputs used in latex and rubber wood production. | • *Latex and rubber wood processors' capacities and awareness of mechanism to adapt or to mitigate on climate change impacts will be trained and improved.* |
| ***LIVESTOCK*** | |
| 1. Promoting resilience in animal production and adaptation to climate change (technical package) | • *Active participation of animal raisers*<br>• *Capability of Technical Staffs to operate full function.*<br>• *Available guideline on animal raising can be used for adaptation in time* |
| 2. Enhancing animal waste management and climate change emission mitigation | • *Active participation from biodigester users and animal raiser*<br>• *Capacity of technical Staffs to operate full function.*<br>• *Available guideline related to animal waste management can be used for mitigating greenhouse gas emission* |
| 3. Promoting and enhancing technology development on the improvement of animal breed, animal feed, and animal health to adapt climate change. | • *Technologies on improving animal breed, animal feed and animal health will be developed.*<br>• *Active participation from biodigester users and animal raiser.*<br>• *Capacity of technical Staffs to operate full function.*<br>• *Available budget* |
| ***FORESTRY*** | |
| 1. Promoting sustainable forest management | • *5,000 copies of forest cover maps published and distributed*<br>• *10 CF group participated in REDD+ Management and Benefit Sharing.*<br>• *Formulation of policy note on benefits received from the selling of carbon credit.* |
| 2. Promoting reforestation and afforestation to increase carbon stock | • *2500 ha/year of degraded forest land rehabilitated*<br>• *10 million tree seedlings produced*<br>• *increase carbon stock in proposed 2,000 ha of tree plantation*<br>• *5 Research stations established* |
| 3. Conducting capacity development, research and awareness raising on REDD+ | • *10,000 copies of assessment results on volunteer and compliance carbon market developed and distributed.*<br>• *10,000 copies of alternative livelihoods studies development and distributed.*<br>• *10,000 copies of Costa and Benefit Analysis Research on community based REED+ published and distributed.*<br>• *Case studies from five climate change related to forestry are published and disseminated and 20 students participated.* |
| 4. Developing and implementing regulations and mechanism on REDD+ | • *REED+ policies and related document were disseminated to at least 2,000 stakeholders/year.*<br>• *At least 50% of forest crime in REED+ areas reduced.*<br>• *Monitoring system and real time data collection are in place* |

| | |
|---|---|
| 5. Building climate resilient capacity in forestry sector | • *5 mitigation projects implemented as model*<br>• *Tissue culture and DNA analysis laboratory established and operated.*<br>• *At least 5 climate resilient tree species identified and produced for plantation.*<br>• *At least 5 forestry officials have improved knowledge on tissue culture techniques.* |
| ***FISHERY*** | |
| 1. Promoting aquaculture production systems and practices that are more adaptive to climate change | • *10,000 aquaculturists developed and become aquaculture promoters*<br>• *100,000,000 fingering are produced every year from fish stations both inland and coastal and small holder seed producers.*<br>• *10% of aquaculture production increased every year*<br>• *% reduction of illegal fishing natural fishery and endangered species.*<br>• *Reduce illegal fish and fishery products imported from neighbouring country (with uncontrolled quality).* |
| 2. Promoting climate resilience of wild fishery resources. | • *# of natural fishery habitats have been protected and maintained with proper management*<br>• *30 species of long distance migrations are protected and monitored (this play important role for economic and quantity values).*<br>• *Increase cultural value through fishery refuges restoration (through fingering releases, increase fish production).*<br>• *At least 500 fisheries refuges (1621 commune) applied annual fish release and enhance natural fish stocks with proper management.* |
| 3. Enhancing the climate resilience in fishery sector (ECRF) | • *Scientific base knowledge are ready for prioritisation and adaptation planning*<br>• *Institutional and capacity developed*<br>• *Knowledge management mechanism in place*<br>• *560 CFis adaptive capacity (institution, knowledge, skills, financial, infrastructure.....) have been strengthened.*<br>• *70% of 560 CFi members are women to be targeted.*<br>• *Capture fishery and aquaculture production increase 10%/year*<br>• *At least 1,000 fishery staffs from national to sub-national gain more knowledge on cc.* |
| 4. Promoting aquaculture production systems and practices that are more adaptive to climate change | • *Number of effective technologies are introduced and employed by fish processing industries.*<br>• *Certification of quality has been issued by a recognized ISO.* |
| ***CORSS-CUTTING ISSUE*** | |
| 1. Mapping of agriculture's productions (agricultural production, rubber, livestock, forestry and | • *Interactive maps and Database updated*<br>• *Land used, crop yields maps available*<br>• *Clear maps on land availability identified*<br>• *Reduce tension and cost investment*<br>• *Mapping and zoning of key production areas will be available for planning and investment.* |

| | |
|---|---|
| fisheries) and of land use. | • *Complete declaration of forest land for conservation, development and restoration.*<br>• *Maps for flooded forest and mangrove forest are available for conservation, development and restoration.*<br>• *Fish sanctuary and refuges are determined and delegate management to communities.* |
| 2. Developing and using integrated socio-economic and climate scenarios with climate, and land use models and Establishment of Carbon Accounting Systems for agriculture, forestry and fisheries. | • *Available Data used to support Decision Making Framework for Agricultural Development, Planning, and Investment.*<br>• *Available data for climate change scenarios will be ready by 2016 for agricultural planning*<br>• *Climate impacts are scientifically recorded and projected starting from 2017.*<br>• *% of total crops, livestock, and agriculture incident loss will be reduced.*<br>• *24 Scientist developed through short term and long-term trainings.*<br>• *Interactive maps and Database updated*<br>• *Land used, crop yields maps available.* |
| 3. Institutional Mainstreaming Climate Change Adaptation by building capacity and scaling up community resilience. | • *5,000 farmers are trained through farmer field schools using the 11 training manuals with at least 1000 CSFP ( Climate Smart Focal Points or Lok Kruh)*<br>• *3,000 extension workers trained by using 11 training manuals developed by the MAFF with the support of other ministers with possible certificate given and acknowledge by the*<br>• *500 programs will be broadcasting through local radio and TVs.*<br>• *At least 6 E reaction centre* |
| 4. Promote marginalized groups and women participation to climate change adaptation and mitigation strategy. | • *Research on the strength and weakness of women in the Agriculture sector in Cambodia maximising new opportunity*<br>• *At least 30,000 women are increased adaptive capacity to cope with climate change by maximising existent adaptive capacity and building new capacities*<br>• *30,000 women farmers become climate resilient farmers in agricultural sector by enhancing mental, technical and financial strength. WCRF ( women climate resilient farmer) will be the CC resource focal point in each community'*<br>• *30,000 women are active in farming cooperatives linked with the provincial levels* |
| 5. Enhance knowledge management related to climate change adaptation and promote innovation that is needed based. | • *Mapping existing knowledge and resources available*<br>• *Promote relevant weather forecast at the provincial level direct access to a local number*<br>• *Developing integrated model of knowledge from need identified to substantive knowledge that support a better adaptation to CC from all levels ( research agenda)* |

| | |
|---|---|
| | • *Creating a systematic and integrated platform of knowledge exchanges and discussion related to Agriculture and CC*<br>• *Multi-scales tools that translate information and research developed and being generated*<br>• *Providing tools box to ease decision makers/ private sectors to deal with trade-offs as well as better invest in a fair and sustainable manner*<br>• *Set of accessible visualisations of the issues of Agriculture and CC in Cambodia as well as key challenges that will be shared* |

**4. Impacts**

1. Agricultural output increased from 22.85 million tons in 2013 to 36.80 million tons by 2018. Rice yield will increase from 3,117 kg/ha by 2012 to 3,250 kg by 2018. Rice surplus will increased from 4.74 million tons in 2012 to 6 million tons by 2018
2. Beneficiary income in areas vulnerable to climate change increased by 20% (about $30/month/household increase in rural areas)
3. Employment in agri-business and agro-industrial sector increased by 20%
4. Area planted (ha) with cash crops resilient to climate change increased by 20%
5. Value of agricultural exports increased by 30%
6. Value of formal bank loans for capital investment in agriculture increased by 25%
7. Number agri-business SME's increased by 10%
8. Mapping areas of cropping land, forest demarcations for agricultural zoning, multi-development areas established
9. 10,000 aquaculturists promoted and serves as model farmers for climate resilient and aquaculture expect to increase from 74,000 tonnes in 2012 to 171,160 tons by 2018
10. About 5 million farmers received agricultural extension services aimed at improving resiliency to climate change
11. Livestock production increased by 3% per year
12. Loss of livestock due to floods, droughts and diseases linked to climate change decreased within 5% annually." while morbidity/mortality rate normally stand around within 5% for animal raising
13. Three REDD+ projects fully operated and obtained carbon credit for trading on international markets.
14. 50 enhanced rubber clones are expected to distribute to the planters to be planted in any AEZ from 2014 – 2018.
15. 10,000 hectares of forest rehabilitated to enhance carbon stock and biodiversity.
16. Carbon Credits or avoided emissions (tons of CO2 equivalents) through REDD+ and mitigation in agriculture, rubber, fisheries and livestock sectors.
17. Approximately 0.78M Ha of healthy mangrove forest and 0.068M Ha of mangrove forest
18. 30 of fish species and their critical habitats that are identified and protected.

## 5.2 MONITORING DIAGRAM AND PROCEDURE

**Figure 1: M & E Framework**

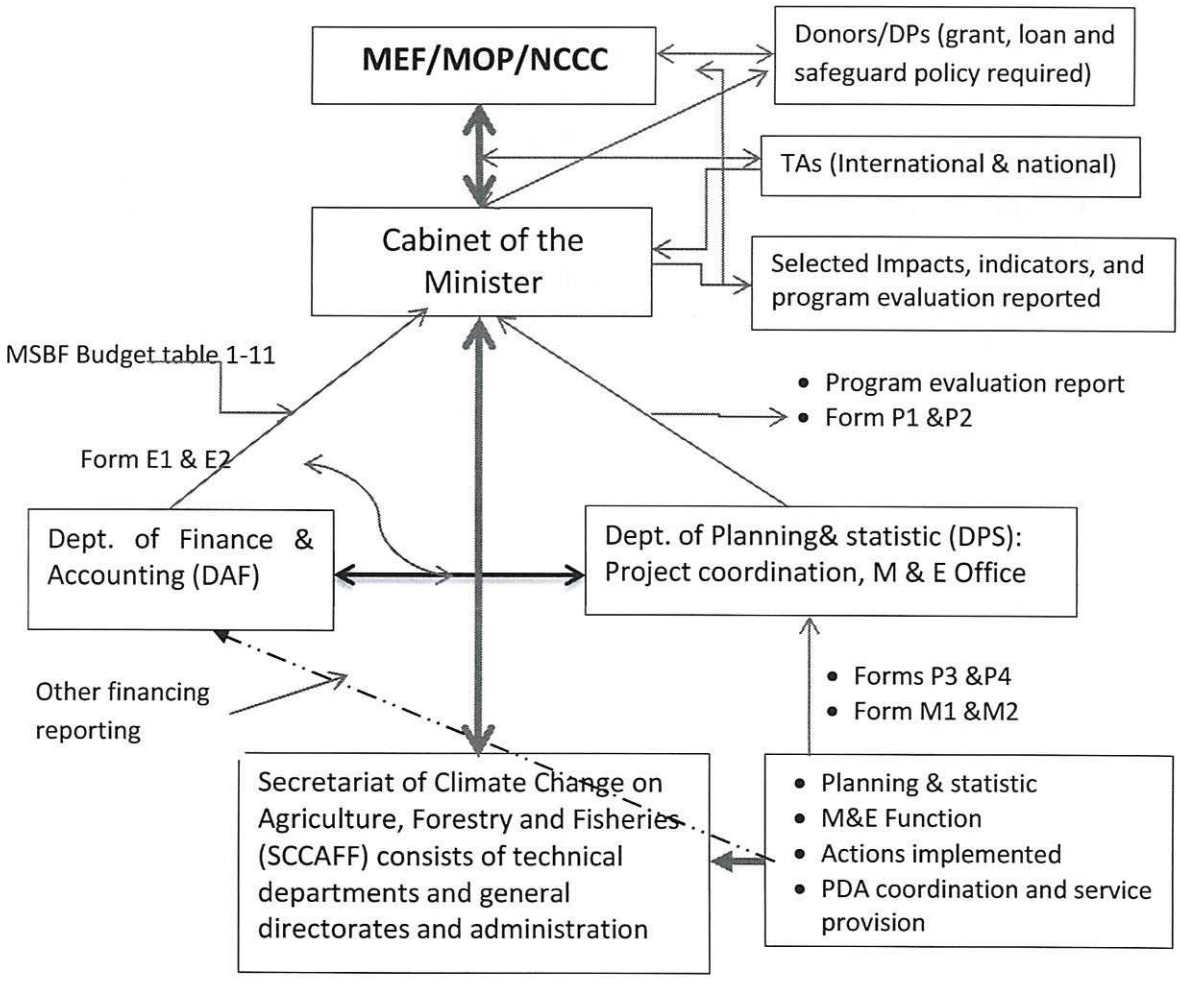



**Table 5: M&E Information System under MTEF (adopted from TWGAW 2001).**

| Planning Forms | Monitoring forms | Evaluation Forms |
|---|---|---|
| P1- ministry Program Budget Summary<br><br>P2-Program Profile<br>P3-Sub-Program Profile<br>P4-Activity Profile | M1- Quarterly Monitoring Report<br><br>M2- Annual Monitoring Report<br><br>M3-Site Visit Report | E1-Sub-Program Evaluation<br><br>E2- Program Evaluation summary |

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
- To work with relevant ministries/institutions to formulate strategy, policies, and identify priorities in order to ensure that the socioeconomic, technological, and cultural co-operations with foreign countries that are consistent with the national development objectives and policies.

## 6. LAW AND REGULATION DRAFTING SCHEDULE

In 2012, the ministry has provided significant steps in establishing the Working Group of Climate Change on Agriculture, Forestry and Fishery (WG-AFFF) 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 6: 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*<br>*Legal Unit of Administration Department* |
| ***Drafting schedule*** | *By July 2014* |
| ***Requires inter-ministerial coordination?*** | ☐ *Yes, if so indicate which ministry(ies):*<br>☐ *No* |

## 7. CONCLUSIONS AND NEXT STEPS

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

The CCPAP can be a very effective tool to mobilize national and international resources. Thus, developing effective communication materials based on the CCPAP will be one of the next steps to assist in mobilise resources and coordination with CCD and other ministries to present the CCPAP 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 CCPAP 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 CCPAP, 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.

## 8. REFERENCES


ACIAR (2009) Developing research options to mainstream climate adaptation into farming systems in Cambodia, Laos, Bangladesh and India. Final report. Australian Center for International Agricultural Research (ACIAR): Canberra, Australia.

GDA (2013) Annual Report for 2012 and direction for 2013. General Directorate for Agriculture (GDA), Ministry of Agriculture, Forestry and Fisheries (MAFF), Phnom Penh (In Khmer Version).

ICEM and DAI (2013) USAID Mekong ARCC Climate Change Impact and Adaptation Study: Main Report. USAID/Asia Regional Environment Office, Bangkok.

JICA, MOWRAM and MAFF (2007) Basin-Wide Basic Irrigation and Drainage Master Plan Study in the Kingdom of Cambodia: Interim Report. Japan International Cooperation (JICA), Ministry of Water Resource and Meteorology (MOWRAM) and Ministry of Agriculture, Forestry and Fisheries (MAFF), Phnom Penh.

MAFF(2010a) National Forest Program 2010-2029. Ministry of Agriculture, Forestry and Fisheries (MAFF), Phnom Penh.

MAFF (2010b) The Strategic Planning Framework for Fisheries 2010-2019: Fishing for the Future. Ministry of Agriculture, Forestry and Fisheries (MAFF), Phnom Penh.

MAFF (2011a) Strategic Development Plan for Agricultural Sector 2009-2013. Ministry of Agriculture, Forestry and Fisheries (MAFF), Phnom Penh. (In Khmer version).

MAFF (2011b) MAFF's Annual Conference Report for 2010-2011 and Direction for 2011-2012. Ministry of Agriculture, Forestry and Fisheries (MAFF), Phnom Penh. (In Khmer Version).

MAFF (2013) MAFF Annual Conference Report for 2011-2012 and Action Plan for 2012-2013. MAFF, Phnom Penh.

MAFF and MOWRAM (2009) Program design document for strategy for agriculture and water 2010-2013. Ministry of Agriculture, Forestry and Fisheries (MAFF) and Ministry of Water Resource Management and Meteorology (MOWRAM): Phnom Penh.

MOC (2012) Rubber Sector Profile 2012. Ministry of Commerce (MOC), Phnom Penh. (Draft version).

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 and UNDP (2011a) 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.

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

MOE and UNDP (2011c) Cambodia Human Development Report 2011: Climate Change and Agriculture Thematic Highlight. United Nation Development Program (UNDP), Ministry of Environment (MOE), 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.

MOWRAM and JICA (2012) Preparatory Survey for Irrigation and Drainage System Rehabilitation and Improvement Project in the Kingdome of Cambodia: Draft Final Report, Volume I. Ministry of Water Resource and Meteorology (MOWRAM) and Japan International Cooperation Agency (JICA), Phnom Penh.

MOWRAM and KOICA (2008) Master Plan of Water Resource Development in Cambodia: Final Report, Volume I Master Plan. Ministry of Water Resource and Meteorology (MOWRAM), Korea International Cooperation Agency (KOICA) and Korea Water Resources Cooperation, Phnom Penh.

Randey, Sushil and Humnath Bhandari. 2009. Rice production in Cambodia: will exports continue to growth?. Manila: International Rice Research Institute (IRRI).

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

RGC (2010b) Policy Document on Promotion of Paddy Rice Production and Export of Milled Rice. Royal Government of Cambodia (RGC), Phnom Penh.

RGC (2011) The Strategic Planning Framework for Livestock 2011-2020. Ministry of Agriculture, Forestry and Fisheries (MAFF, Phnom Penh.

RGC (2013) Rectangular Strategy for Growth, Employment, Equity and Efficiency Phase III. Royal Government of Cambodia (RGC), Phnom Penh.

## 9. LIST OF ANNEXES:

### ANNEX 1: LONG LIST SELECTION AND SCREENING

**Summary long list of MAFF CCAP 2014-2018 (from Khmer version)**

| Strategy No. | Sector | Key actions | Proposed budget (US$000) |
|---|---|---|---|
| I | **AGRICULTURE AND AGRO-INDUSTRY** | | |
| 1 | 1 | Implementing croping techniques and smart agricultural system resilient to climate change | |
| | 2 | Implementing post-harvest technology | |
| | 3 | Crop varieties development suitable to agro-ecosystem and climate zoning | |
| 2 | 4 | Conduct research and development appropriate technologies that resilient to climate change | |
| | 5 | Promote post-harvest technology development | |
| | 6 | Knowledge and information management of climate change for farmers and stakeholders | |
| 3 | 7 | Implementing SMART agricultural technology in responding with climate change | |
| 4 | 8 | Development and enhance policy and legal framework related to cc and DRR and HR development | |
| 5 | 9 | Policy development to encourage agriculture entrepreneur investment and agro-industry with more responsible and high responsibility in reducing climate change impact. | |
| | | **Sub-total** | **55,190** |
| II | **Rubber sector** | | |
| 1 | 1 | Promote rubber clone trial with neighboring countries in the region | |
| | 2 | Provide extension services to the rubber planters on the rubber clone resilient to climate change | |
| 2 | 3 | Established experimental and the use of rubber clone breeding in 3 sites | |
| | 4 | Develop Seedling Evaluation Trial (SET) | |
| | 5 | Establish Small Scale Clone Trial in 2 sites (SSCT) | |
| | 6 | Establish and development 1 Large-Scale Cline Trials (ISCT) | |
| | 7 | Develop newly recommend 8 rubber clones seeds based on each characteristic | |
| 3 | 8 | Establish experimental Networking Sites and install mini weather stations in each rubber farms based on five agro-ecological systems in Tbong Khum, Kamopng Thom, Battambang, Ratanakiri and Koh Kong. | |
| | 9 | Conduct data analysis and relationship between growth, yield and biomass of the rubber plantation | |

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| 4 | 10 | Participate in climate change network in order to obtain more information and share new findings related to climate change impact | |
| | 11 | Coordinate and cooperate with development partners for staff capacity development for medium and long term related to climate modelling, crop pattern in each climate zone in the country. | |
| 5 | 12 | Establish small scale rubber farmers association | |
| | 13 | Mainstreaming good agricultural practice (GAP) in small scale rubber production | |
| 6 | 14 | Establish waste treatment stations for solid waste from rubber processing and bio-gas emission capture | |
| | | **Sub-total** | **7,110** |
| **III** | **Animal Production and Health** | | |
| 1 | 1 | Promote animal raising with appropriate technology | |
| | 2 | Conduct studies on potential animal raising | |
| | 3 | Integrate animal health production into integrate agricultural system | |
| 2 | 4 | Promoting animal breeding | |
| | 5 | Enhancing animal feed | |
| | 6 | Promoting animal health | |
| 3 | 7 | Develop extension material for animal's health and production resilient to climate change. | |
| | 8 | Conduct monitoring and evaluation system of extension services and demonstration | |
| 4 | 9 | Develop market information system and extension services for animal production in particular in the face of climate change and extreme events such as floods. | |
| | 10 | Expending the existing animal raising association with broader target | |
| 5 | 11 | Develop post natural disaster preparedness (flood and drought) such as feed, medicines, materials and livestock reserve. | |
| | 12 | Develop safety hills and ensure safe shelter for livestock after natural disaster | |
| | 13 | Establish mobile working group of veneration to assist those areas relocated by natural disasters (livestock) | |
| | 14 | Develop recovery action plan for post natural disaster | |
| 6 | 15 | Introduce and promote mixed animal feed to improve effectiveness of animal feed | |
| | 16 | Encourage animal waste processing to reduce emission (biomass) | |
| 7 | 17 | Encourage feeding crop system to stock more carbon and increase nutrient for animal raising. | |
| | 18 | Encourage the use of shifting of grazing land | |
| 8 | 19 | Conduct study on the meat consumption affecting on public health | |

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| 9 | 20 | Continue promoting biodigesters to small animals family raiser | |
| | 21 | Develop National Biodigester for commercial animal raising | |
| | 22 | Conduct research and development for biodigestor technology for family and commercial animal raising | |
| | 23 | Capacity development for carbon credit trading from bio-digesters. | |
| 10 | 24 | Policy development grazing land utilization and management | |
| | 25 | Develop legal framework, policy and strategies for livestock production, animal health and animal waste management | |
| | 26 | Promote law enforcement, administrative and legal framework for animal health management and animal health production | |
| | | **Sub-total** | **31,350** |
| **IV** | **FORESTRY** | | |
| 1 | 1 | Conduct study and assessment of forest cover | |
| | 2 | Define structure and function of forest base on agro-ecosystem | |
| | 3 | Redefine forest cover based on its resource and function that has been changed and develop plan for national forest cover management based on forest management regime | |
| | 4 | Strengthening forest management with participatory approach in particular forestry communities in implementing REDD+ | |
| | 5 | Piloting the implementation of community forestry with REDD+ and agroforestry | |
| | 6 | Conduct research and policy dialogue on the mechanism on benefit sharing from carbon selling of REDD+ with equity and gender integration | |
| | 7 | Piloting the mechanism of benefit sharing from carbon credit | |
| 2 | 8 | Forest plantation and restoration | |
| | 9 | Develop forest research stations and trainings for forest seed resilient to climate change. | |
| | 10 | Encouraging tree nursery at triage forestry level | |
| | 11 | Promote participation of tree plantation resilient to climate change | |
| 3 | 12 | Conduct carbon market price under REDD+ mechanism | |
| | 13 | Conduct cost benefit of forestry community development under REDD+ mechanism | |
| | 14 | Conduct research on alternative livelihood to increase income of forestry community | |
| | 15 | Conduct impact assessment of climate change on forestry sectors ( insect, disease, fire, and forest seed lost and forest seed resilient to climate change) | |
| | 16 | Participating climate change network at national, regional and local to share and obtain more new knowledge and findings on climate change | |

| | | | |
|---|---|---|---|
| 4 | 17 | Awareness raising of forestry policy and legal framework of REDD+ to stakeholder | |
| | 18 | Strengthening law enforcement team and forest crime crack down happening in proposed REDD+ Projects. | |
| | 19 | Establish coordination work with stakeholder to crack down illegal logging in proposed REDD+ projects | |
| | 20 | Development monitoring system for illegal logging in proposed REDD+ projects by using modern technology (real time data). | |
| 5 | 21 | Determine priorities action for climate change adaptation such as solar oven, reforestration, tree plantation, and small scale infrastructure development | |
| | 22 | Capacity development for experiment stations (tree polarization) and seed production resilient to climate change | |
| | 23 | Capacity development for diagnostic for DNA, soil and elements of tree | |
| | | **Sub-total** | **19,500** |
| **V** | **FISHERIES** | | |
| 1 | 1 | Increase quantity and productivity of fishery to ensure food security, improve nutrition an increase income through better management and development in fishery sector | |
| 2 | 2 | Find out the impact of CC on freshwater fishery and aquaculture and preparing adaptation and mitigation to CC on this sector | |
| 3 | 3 | Promote food sanitation in fishery sectors with at least 80% of processors and producers to adopt food sanitory standards based on regulation by 2015 | |
| 4 | 4 | Encourage one village, one product in fishery and to improve community fishery wellbeing and livelihood in adapting to climate change | |
| 5 | 5 | Strengthening research capacity, development and dissemination on new technology in hatching , feed production and new processing method in responding to climate change and market demands | |
| 6 | 6 | Expanding and strengthening the institution and stakeholder in coordination of intervening as well human resource development through technical training of CC impact on fishery and its adaptation | |
| 7 | 7 | Strengthening flooded forest management, conservation, mangrove forest and flood forest rehabilitation | |
| 8 | 8 | Laws, regulation strengthening and other regulations, dissemination on new technology, and sciencitif to stakeholders such as fishers, fish raisers, fish processors and politicians. | |
| 9 | 9 | Promoting environmental protection and ecosystem protection through waste controlled from navigation, boats, ships, flooded forest and mangrove forest clearance, | |

| | | | |
|---|---|---|---|
| | | pollution from fish processing drained into water as well as emission reduction activities | |
| 10 | 10 | Promote gender in participating climate change adaptation in fisher activities | |
| | | **Sub-total** | **17,550** |
| **VI** | **CROSS-CUTTING ISSUE** | | |
| 1 | | Mapping of agriculture's productions (agricultural production, rubber, livestock, forestry and fisheries) and of land use. | |
| 2 | | Developing and using integrated socio-economic and climate scenarios with climate, and land use models and Establishment of Carbon Accounting Systems for agriculture, forestry and fisheries. | |
| 3 | | Institutional Mainstreaming Climate Change Adaptation by building capacity and scaling up community resilience. | |
| 4 | | Promote marginalized groups and women participation to climate change adaptation and mitigation strategy. | |
| 5 | | Enhance knowledge management related to climate change adaptation and promote innovation that is needed based. | |
| | | **Sub-total** | **74,230** |
| | **87** | **Grant total** | |
| | | **Agriculture and agroindustry** | **55,190** |
| | | **Rubber** | **7,110** |
| | | **Animal health and production** | **31,350** |
| | | **Forestry** | **19,500** |
| | | **Fishery** | **17,550** |
| | | **Cross-cutting issue** | **73,990** |
| | | **TOTAL** | **204,930** |

**ANNEX 2: SCORING OF PRIORITIED ACTIONS FOR AGRICULTURAL SECTOR 2014-2018**

| No | Action | Effectiveness | | | Co-benefits | | | Feasibility | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Selected Priority Actions for Agricultural Sectors | 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) | | |
| I | **AGRICULTURE AND AGRO-INDUSTRY** | | | | | | | | | |
| 1 | Promoting and up- calling sustainable farming system that resilient to climate change | 2 | 3 | 1 | 1 | 2 | 2 | G | Y | G |
| 2 | Promote post-harvest technology for cereal crop and tuber crop, and conduct the research and transfer appropriate post-harvest technology | 1 | 1 | 1 | 2 | 2 | 2 | Y | G | Y |
| 3 | Develop crop variety suitable to AEZ resilient to CC (include coastal zone). | 2 | 1 | 2 | 2 | 1 | 1 | G | G | G |
| 4 | Promote research work on appropriate climate smart Agriculture technology/techniques to adapt and mitigate climate change | 2 | 1 | 1 | 1 | 1 | 2 | Y | G | G |
| 5 | Development of knowledge and information system on climate change | 2 | 2 | 2 | 1 | 2 | 2 | Y | Y | G |
| 6 | Institutional Capacity Development for natural disaster coordination and intervention | 2 | 2 | 2 | 1 | 3 | 2 | G | Y | Y |
| 7 | Strengthening capacity of Agricultural and agro-industry development entrepreneur and the agricultural cooperative in low carbon production. | 2 | 1 | 2 | 2 | 3 | 2 | Y | Y | Y |
| II | **RUBBER SECTOR** | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Promoting, piloting and scaling up rubber clones from IRRDB (International Rubber Research Development Board) member country in responding to climate change | 2 | 2 | 2 | 2 | 1 | 1 | G | G | G |
| 2 | Promoting new rubber clone trial | 2 | 2 | 2 | 2 | 1 | 1 | G | Y | Y |
| 3 | Established Experimental networking sites and develop growth, yield, biomass, and carbon stock within existing rubber plantation in five AEZ | 2 | 3 | 2 | 2 | 1 | 1 | G | G | G |
| 4 | Modifying existing Agricultural Good Practice (GAP) through additional training to technical staff related to climate change | 2 | 3 | 2 | 2 | 1 | 1 | G | G | G |
| 5 | Promoting an integrated approach in efficiency energy and inputs used in latex and rubber wood production. | 2 | 2 | 2 | 2 | 1 | 1 | G | G | G |
| **III** | **LIVESTOCK SECTOR** | | | | | | | | | |
| 1 | Promoting resilience in animal production and adaptation to climate change (technical package) | 2 | 3[20] | 2[21] | 2 | 2 | 1 | G | Y | Y |
| 2 | Enhancing animal waste management and climate change emission mitigation | 2 | 3[22] | 2 | 2 | 2[23] | 2 | G | G | G |
| 3 | Promoting and enhancing technology development on the improvement of animal breed, animal feed, and animal health to adapt climate change. | 2 | 2[24] | 1 | 2 | 1 | 1 | G | Y | Y |
| **IV** | **FORESTRY SECTOR** | | | | | | | | | |
| 1 | Promoting sustainable forest management | 2 | 2 | 2 | 2 | 2 | 2 | G | G | G |
| 2 | Promoting reforestation and afforestation to increase carbon stock | 2 | 1 | 2 | 1 | 2 | 2 | G | G | G |
| 3 | Conducting capacity development, research and awareness raising on REDD+ | 1 | 2 | 1 | 1 | 2 | 2 | Y | G | G |
| 4 | Developing and implementing regulations and mechanism on REDD | 2 | 2 | 1 | 1 | 1 | 1 | Y | G | G |
| 5 | Promoting climate resilient capacity at community forestry | 2 | 2 | 2 | 1 | 2 | 2 | Y | Y | Y |
| **V** | **FISHEREY SECTOR** | | | | | | | | | |

[20] If farmer managed to improve their animal production system, then their income will be increased and generated.
[21] If we follow the technical package, farmers can manage animal waste.
[22] First, farmer earns benefit from garosin, fuel wood, clean environment and generates energy for household and finally farmers stop buying chemical fertilizers.
[23] Before, kids and wife spend time for collecting wood, spend time for cooking and with this bio digesters farmers save time and earn benefit.
[24] With technical package in place, farmer reduces treatment cost.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Promoting aquaculture production systems and practices that are more adaptive to climate change | 2 | 2[25] | 2[26] | 2[27] | 2[28] | 2[29] | G | Y | Y |
| 2 | Promoting climate resilience of wild fishery resources. | 2 | 3[30] | 2[31] | 2 | 2 | 2 | G | Y | G |
| 3 | Enhancing the climate resilience in fishery sector (ECRF) | 2 | 2 | 1 | 2 | 2 | 2 | G | Y | G |
| 4 | Promoting aquaculture production systems and practices that are more adaptive to climate change | 2 | 2 | 2 | 2 | 2[32] | 2[33] | G | Y | G |
| **IV** | **CROSS-CUTTING ISSUE** | | | | | | | | | |
| 1 | Mapping of agriculture's productions (agricultural production, rubber, livestock, forestry and fisheries) and of land use. | 2 | 0 | 1 | 2 | 1 | 2 | Y | Y | R |
| 2 | Developing and using integrated socio-economic and climate scenarios with climate, and land use models and Establishment of Carbon Accounting Systems for agriculture, forestry and fisheries. | 2 | 0 | 1 | 2 | 1 | 1 | Y | Y | Y |
| 3 | Institutional Mainstreaming Climate Change Adaptation by building capacity and scaling up community resilience. | 2 | 1 | 1 | 1 | 2 | 1 | G | Y | Y |
| 4 | Promote marginalized groups and women participation to climate change adaptation and mitigation strategy. | 1 | 1 | 1 | 2 | 1 | G | G | G | |
| 5 | Enhance knowledge management related to climate change adaptation and promote innovation that is needed based. | 3 | 1 | 1 | 2 | 2 | 2 | G | Y | Y |
| | | | | | | | | | | **Total: 29 Actions** |

[25] If this action success, it will help to extend to other benefits, and income

[26] Use machine to generate oxygen to stability the water condition and quality and intake and outlet system

[27] More spend on start up, but less spend during the operation cost and more generating from surviving rate, growth rate fast.

[28] Reduce illegal fishing from wild fish, increased social coherence and shift mindset for illegal fishing, reduce burden cost from government in patrolling and improved food safety system control.

[29] Reduce chemical impact and pollution and reduce pressure on wild fish capture.

[30] Wild fish production increase fast with better management and link to livelihood

[31] Link to flood forest and habitat protection and restoration; reduce erosion due to loss of forest.

[32] Value of food safety

[33] Reduce fishery waste to environment, reduce forest cutting and hit for processing

## ANNEX 3: ACTION FICHES FOR EACH PROPOSED AND PRIORITIED ACTIONS

### 3.1 AGRICULTURE and AGRO-INDUSTRY

**ACTION FICHE No. 1**

| **Action** | **Promoting and up- scaling climate smart farming systems resilient to climate change** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers*<br>Promoting crop diversification and intensification for different agro-ecosystems |
| **Rationale** | *Links to the sector and national strategies*<br>*ASDP and NSDP, Rice export policy, rectangular strategies*<br><br>*What type of climate risk/opportunity or mitigation objective is addressed by this action*<br>In rainfed lowlands of Cambodia, mono cropping of rice is a common practice. This practice is generally at risk of climate variability that causes flood and/or drought which in turn lower crop yield, and in severe case totally damage the crop. Enhanced farmers adoption of integrated farming system approach where conditions are favourable would help strengthen rural farming communities the capacity to adapt to climate change by increasing income. Crop diversification and/or intensification could also help improve nutrition of the rural households. |
| **Category of climate change action** | Cat 1, 2 |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>This action is designed to promote adoption by rural households of sustainable farming system approach which help generate more income through crop diversification and intensification.<br>(i) Promoting integrated farming system (model farming) with 1,000 communes in selected 23 provinces (Each commune should attract 10 households making a total of 11,000 HHs(farmer promoters); (ii) Promote and scaling up existing crop options that tolerant to flood and drought and pest and disease suitable to AEZ and climate hazard; (iii) Development technical package for selected crops resilience climate hazard; (iv) Enhancing crop establishment through micro-engineering: planting method, water saving techniques, laser land leveling, farm infrastructure to store water, enhancing IMP into farming practice; (v) Enhancing seed drill for upland crop AEZ; and (vi) Collection and conservation plant genetic resource horticulture and subsidiary crop.<br>Proposed funding for this action is estimated to be 13,470,000 USD.<br>*Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries*<br>Income of rural households increased by at least 50% more than the current farmer practice. About 1000 out of 1621 communes in 23 provinces adopted this improved practice. |
| **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*<br>Hundreds of extension workers from national to subnational level across the 23 provinces took part in implementation of this action. |

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| | A direct impact would be 1,000 communes which participated in this action.<br>Some of the 68% of the rural farmers would benefit from this action indirectly through farmer field days, and exchange farmer visit.<br>Based on a direct impact, the cost to beneficiaries would be 1,225 USD but on an indirect impact this would be 1.85 USD. |
| **Preconditions needed for successful implementation** | *Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works*<br>This would be approved internally by the Minister of MAFF, with support from MEF, and liaison with NGOs and donors.<br>*Mention any coordination required with actions under the responsibility of other ministries or external stakeholders*<br>Coordination with MOE, NCDM and MOWRAM.<br>*Mention any minimum capacity requirements*<br>Provincial department of agriculture and District Office of Agriculture of the targeted provinces, and local NGOs. |
| **Indicator(s) of success** | 1,000 model farms (Key promoters) established and activated 1,000 communes throughout the 23 provinces.<br>Income of the participated rural households improved. |
| **Implementation arrangements** | *Responsible department(s)*<br>CARDI, GDA (DAE)<br>*Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*<br>Provincial departments of agriculture (PDA)<br>Registered Local NGOs |
| **Estimated total cost** | *USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions*<br>USD 13.470 over five years (2014-2018) |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>Proposed EU, IFAD, AFD, AUSAID, USAID with in-kind from Govt/MAFF<br>*If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)* |
| **Timeframe** | *Indicate the start and end year*<br>2014 – 2018 |

**ACTION FICHE No. 2**

| **Action** | **Promote post-harvest technology for cereal crop and tuber crop, and conduct the research and transfer appropriate post-harvest technology** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | **Strategic Objective 1:**<br>To ensure food security and farmers' livelihoods improvement through an increase of crop production, agro-industrial at 10% per year, To enhance development, the use of appropriate technology, renewable energy, the effective use of water, adaptation and mitigation. |
| **Rationale** | Rice policy 2010, ASDP 2010-2013, NSDP Goal 6: |
| **Category of climate change action** | ☐Cat 1 – Re-scaled ☑ Cat 2 – Modified ☐Cat 3 – Dedicated |
| **Type of action** | ☑ Mitigation and adaptation |
| **Short description of the action and expected results and benefits** | In Cambodia, agricultural products during harvest and post-harvest are lost in quantity and quality from 35%-50% (UNIDO, 2010). |

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| | This action is to provide appropriate techniques to help to improve the losses of crops both quantities and quality during harvest and post-harvest technology implementation such as harvesting, drying, storage, transportation, while getting the risk from climate change such as Shorter and wetter rainy seasons, delayed onset of flood season, longer dry seasons, longer and higher temperature. This action mainly aims to improve livelihood of local people and reducing in environmental impact which is line with the strategic plan on adaptation and mitigation of climate change developed by MAFF.<br>**Key Activities**:<br>(1) Develop appropriate technologies for effectiveness of agricultural machinery and equipment used for harvesting<br>(2) Develop appropriate technologies used for post-harvest technologies such as drying, storage, transportation, processing and packaging agricultural products<br>(3) Promote linkage between small holders and private sector companies on machinery and equipment used for harvest and post-harvest implementation.<br>(4) Capacity building responsible organizations and transferring appropriate technologies to small holders on effectiveness of agricultural machinery and equipment used for harvesting and post-harvest technologies.<br>(5) Conduct research on effectiveness of agricultural machinery and equipment used for harvesting in 5 provinces within GDA research station and laboratory<br>(6) Conduct research and experiment on existing local technology crop dryer facilities (using rice husk, fuel wood), grading procession on existing research stations and farms.<br>(7) Establish Research Center for post-harvest, processing and packaging of Agricultural Product within DAI<br>(8) Conduct research to define appropriate technologies on post-harvest, of agricultural products, harvesting, drying, storage, packaging, transportation etc.<br>***Expected result include:***<br>– effectiveness of agricultural machinery and equipment used for harvesting is improved to adapt the climate change and reduced losses of agricultural products during harvesting<br>– Appropriate technologies used for post-harvest technologies such as drying, storage, transportation, processing and packaging agricultural products are developed to adapt the climate change and reduced losses of quantity and quality of agricultural products.<br>– The losses of quantity and quality of agricultural products during harvest and post-harvest will be reduced 10% a year.<br>– At the end of the project defined adequate appropriate technologies |
| **Cost effectiveness of the action** | *Small holders will be got the benefits to increase their income 10% a year in their agribusiness through reducing losses of their products during harvest and post-harvest. And also improved to adaptation and mitigation to the climate change.*<br>*Small holders will benefits to increase their income 10% a year in their agribusiness through reducing losses of their products during harvest and post-harvest. And also improved to adaptation and mitigation to the climate change.* |

| | |
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| **Preconditions needed for successful implementation** | – Financial support available<br>– Technical staff capacity of GDA, CARDI, DAI for implementation |
| **Indicator(s) of success** | – 10% of total loss and damage of agricultural products reduced.<br>– Technological and innovation improved and available for farmers<br>– The damage and losses of quantity and quality of agricultural products will be reduced 10% a year. |
| **Implementation arrangements** | *Responsible department(s): GDA, CARDI, DAI, PDAs will be key responsible for implementation and technical parts with technical and financial support from donors.*<br>*This action is also operated through sub-national line department throughout the country.* |
| **Estimated total cost** | *US$ 3,500* |
| **Possible funding sources** | Potential sources of funding:<br>ADB and in-kind contribution from MAFF |
| **Timeframe** | *2014-2018* |

**ACTION FICHE No. 3**

| **Action** | **Develop crop variety suitable to AEZ resilient to Climate Change (including coastal zone)** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers*<br>Strengthening scientific research capacity to deliver technology and innovations |
| **Rationale** | *Links to the sector and national strategies*<br>See action fiche 1:<br>*What type of climate risk/opportunity or mitigation objective is addressed by this action*<br>Crop damage and lowered yields, increased water shortages in the dry season, erratic rainfall causing prolong dry spell and/or more flooding in the rainy season, and persistent poverty caused by unsecured food supply are the imminent and inevitable results of climate change in Cambodia. Greater attentions on development and enhancing the utilization of improved crop germplasm which are more tolerant to flood, drought and heat are effective measures that would strengthen adaptive capacity of farmers and farming community to results of changing climate. |
| **Category of climate change action** | Cat 1, 2 |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>This action is designed to strengthen scientific research capacity to develop improved crop varieties and enhance adoption by farmers in the identified key agro-ecological zones (AEZ) including coastal zone of Cambodia<br>(i) Strengthening existing research on new crop variety tolerance to biotic and abiotic stresses (caused by climate shift, new disease and plants imported).<br>(ii) Enhancing scientific and technology development and appropriate adaption and mitigation for agricultural sector (technical training for staffs and officials). (iii) Development adaptation strategies for farming community in climate prone provinces (both research and scaling up), ex. ACIAR ACCA project (Australian Climate Change Adaptation in Svay Rieng and can be scale |

| | |
|---|---|
| | in other province. (iv) Research on impact of climate change on quality of cereal, horticulture and crop products in post-harvest and process at CARDI research centers. (v) Develop research capacity on bio-technology for agricultural crops and plant breeding (GDA and CARDI). (vi) Conduct research on GHG emission from agricultural sector.<br>Proposed funding for this action is estimated to be 13,380,000 USD.<br>*Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries*<br>Crop variety tolerant to submergence, drought, and heat will be developed at least one variety for each of the identified 4 AEZs (Tonle Sap region, Mekong plain, Coastal region, North-Northeastern Mountainous region). Some of the 68% of the rural farmers (about 6-7 million people) would benefit from this action indirectly through participatory on-farm adaptive trials, and farmer field days. Hundreds of researchers, extension workers from national to subnational level across the 23 provinces took part in implementation of this action. |
| **Cost effectiveness of the action** | Based on indirect impact, the cost to beneficiaries would be 1.82 USD. |
| **Preconditions needed for successful implementation** | *Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works*<br>This would be approved internally by the Minister of MAFF, with support from MEF, and liaison with NGOs and donors.<br>*Mention any coordination required with actions under the responsibility of other ministries or external stakeholders*<br>Coordination with MOE, NCDM and MOWRAM.<br>*Mention any minimum capacity requirements*<br>Provincial department of agriculture and District Office of Agriculture of the targeted provinces, and local NGOs. |
| **Indicator(s) of success** | At least four crop varieties released which are more adaptable to climate change than ever.<br>Capacity of bio-technology research improved, especially for R&D institutions.<br>Crop yields are improved, and productions are more stable under climate variability. |
| **Implementation arrangements** | *Responsible department(s)*<br>CARDI, Rice crop department (RCD) of GDA<br>*Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*<br>Provincial departments of agriculture.<br>Registered local NGOs |
| **Estimated total cost** | *USD 13.380 over five years (2014-2018)* |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>Proposed EU, IFAD, ACIAR, ADB with in-kind of Govt/MAFF<br>*If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)* |
| **Timeframe** | *Indicate the start and end year*<br>2014 – 2018 |

**ACTION FICHE No. 4**

| **Action** | **Promote research work on appropriate climate smart Agriculture technology/techniques to adapt and mitigate climate change** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers*<br>Strengthening scientific research capacity to deliver technology and innovations |
| **Rationale** | *Links to the sector and national strategies*<br>See action fiche 1:<br>*What type of climate risk/opportunity or mitigation objective is addressed by this action*<br>Enhanced adoption by farmers or farming community of improved farming technology has significantly increased crop yields and household income. The increased adaptive capacity of farmers to climate variability is then closely related to adoption of improved knowledge and technology. Improved technology helps farmers utilize natural resources such as land and water more productive for sustainable production of food and energy crops. |
| **Category of climate change action** | Cat 2, 3 |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>This action is designed to strengthen scientific research capacity to continuously develop improved technology that responds to climate variability in Cambodia.<br>I. Develop new technology for CC adaptation in crops production,<br>II. Assess the impact of existing technologies that generate more emission (crop residual management, soil tillage practice, water management, fertilizers, pesticide)<br>III. Promote scientific research on bio-energy crops, mostly in upland region (Kampong Cham, Kratie, Stung Treng, Mondulkiri).<br>IV. Conduct research on land degradation in agricultural production areas (mostly upland),<br>V. Aassess conservation agriculture and potential up scaling existing CA from Chamkar Leu of Kampong Cham.<br>VI. conduct research on soil management for sustainable crop production<br>VII. Conduct science research on pest outbreak projection in relation to climate change and control measure.<br>*VIII.* Developing technology that reduces GHG emission from crop production in order to obtain carbon credit (SMART agriculture).<br>*IX.* Expanding and modifying current conservation agriculture practices (Kg.Cham and Btt),<br>*X.* Promoting mulching technique, cover crops, and composting in all AEZ,<br>*XI.* Promote integrated watershed management for sustainable use of soil and water<br>*XII.* Develop bio char prototype for energy production and soil improvement in 5 provinces.<br>*XIII.* Promote agricultural and agro-industrial waste management that can be used for energy, animal feed, fertilizer (piloting with 4 companies) |

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| | *XIV.* conduct 24 trainings to MSME, small holders, entrepreneur in 24 provinces,<br>*XV.* Encourage private sector in promoting innovative technology for emission reduction.<br><br>*Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries*<br>– A series of research outputs addressing CC adaption and mitigation strategy, sustainable soil management, production of bio-energy crop, low carbon agricultural system, and crop protection.<br>– Some of the 68% of the rural farmers (about 6-7 million people) would benefit from this action indirectly through participatory on-farm adaptive trials, and farmer field days.<br>– Hundreds of researchers, extension workers from national to subnational level across the 23 provinces took part in implementation of this action. |
| **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*<br>Based on indirect impact, the cost to beneficiaries would be 1.58 USD. |
| **Preconditions needed for successful implementation** | – This would be approved internally by the Minister of MAFF, with support from MEF, and liaison with NGOs and donors.<br>– Mention any coordination required with actions under the responsibility of other ministries or external stakeholders<br>– Coordination with MOE.<br>– Mention any minimum capacity requirements<br>– Provincial department of agriculture (PDA) and registered local NGOs. |
| **Indicator(s) of success** | – At least 4 types of improved technology related to sustainable soil management, crop protection, and low C emission were developed.<br>– Improved knowledge on the impact of current farming practices on CC, soil degradation, adaptation option for different farming typologies, and strategy for bio-energy crop development.<br>– Crop yields are improved and its productions are more stable, and the uses of soil resources are more sustainable under climate variability.<br>– Conservation agriculture practice has been expanded, water saving technique has been enhanced and soil fertility has improved. |
| **Implementation arrangements** | *Responsible department(s)*<br>CARDI, GDA, DAI<br>*Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*<br>Provincial departments of agriculture (PDA)<br>Registered Local NGOs |
| **Estimated total cost** | *USD (more detail is not necessary). Costs should include inflation, for long duration actions*<br>*USD 18.770 over five years (2014-2018)* |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>Proposed EU, ACIAR, CCAFS with in-kind from Govt/MAFF<br>*If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)* |
| **Timeframe** | *Indicate the start and end year*<br>2014 – 2018 |

**ACTION FICHE No. 5**

| Action | Development of knowledge and information system on climate change |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | Strategic objective1: To ensure food security and farmers' livelihood improvement through an increase of crop production, agro-industrial at 10% per year. To enhance development, the use of appropriate technology, renewable energy, the effective us of water, adaptation and mitigation. |
| **Rationale** | The action is designed to collect al agro climatic data and related information for further study the impact of changing climate, interpretation of climatic information and dissemination of that information to local famers.<br>This action will help farmers for well preparedness with extreme climate event. It will also provide information and data to identify and locate those vulnerable areas to disaster risk. |
| **Category of climate change action** | Cat 2 – Modified |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | Key activities: (i) Develop bulletins on agro-meteorology for farmers (ii) Development micro-insurance scheme for rice crops, (III) Conduct vulnerability assessment to climate change on agricultural sector and agro-industry, (iv) Develop mechanism for knowledge management and dissemination to stakeholders.<br>Expected result: agro climatic data and information has been collected and interpreted for dissemination to local farmer. Information system of rice crop will be established for micro-insurance in targeted communes in Takeo and Kampong Speu. Vulnerability and impact assessment of climate change on main crops in specific area will be conducted. Mechanism for management of information and knowledge on climate change will be established. |
| **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*<br>Agriculture staffs at the national and sub-national levels would be the beneficiaries.<br>The numbers of beneficiaries i.e. the farmers are using climate information for crop planning. |
| **Preconditions needed for successful implementation** | This would be approved internally by the MAFF with support from MEF, and the donors.<br>Coordination with MOWRAM, MoE and NCDM |
| **Indicator(s) of success** | Agro climatic information has collected and interpreted according to the Agro-ecological zone and disseminated to famers |
| **Implementation arrangements** | *Responsible department(s):* GDA, CARDI, DAI and Provincial departments of Agriculture. |
| **Estimated total cost** | USD 2.600 |
| **Possible funding sources** | FAO is financing the on-going activities on disaster risk reduction in agriculture |
| **Timeframe** | 2014 - 2018 |

**ACTION FICHE No. 6**

| Action | Institutional Capacity Development for natural disaster coordination and intervention |
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| CCCSP and sector CCSP Strategic Objective | Code of the CCCSP and sector CCSP strategic objective to which the actions refer |
| Rationale | *Links to the sector and national strategies*<br>This action is to define appropriate guideline, Prakas and regulation to support adaptation and mitigation activities in agricultural and agro-industry sector especially in coordination and intervention. Moreover, Formulate technical guideline for good practice of post-harvest, processing, and packaging of agricultural products to help farmers, farmer cooperatives, farmer associations, collectors, entrepreneurs etc. aim to reducing damage and losses of quantity and quality of agricultural products caused by extreme climate events. This action is responded to current national strategies of climate change for Agriculture and Agro-industrial development. |
| Category of climate change action | Cat 2 and 3 |
| Type of action | Adaptation and mitigation |
| Short description of the action and expected results and benefits | – Short description of the actions :<br>(i) Formulate guideline, Prakas and regulation to support adaptation and mitigation activities in agricultural and agro-industry sector (ii) Formulate technical guideline for good practice of post-harvest, processing and packaging.<br>– Expected Results and benefits:<br>The guideline, regulation and technical standards to support adaptation and mitigation activities will be established and smoothly implemented for coordination and intervention in effective supporting adaptation and mitigation activities in agricultural and agro-industry. |
| Cost effectiveness of the action | With effective technical guideline and regulation, and more capable capacity of MAFF staffs from both national and provincial levels there will chanced to adaptation and mitigation the impact of climate change in agriculture and agro-industry sector. |
| Preconditions needed for successful implementation | This would be approved internally by the minister of MAFF with supported from MEF, and liaison with NGOs and donors. |
| Indicators of success | – The damage and losses of quantity and quality of agricultural products will be reduced.<br>– Appropriated technologies with good practices will be applied to adaptation and mitigation the impact of climate change. |
| Implementation arrangements | GDA, DAI |
| Estimated total cost | USD 700 over 5 years |
| Possible funding sources | UNDP/GEF and in-kind contribution from MAFF |
| Timeframe | 2014-2018 |

**ACTION FICHE No. 7**

| **Action** | **Strengthening capacity of Agricultural and agro-industry development entrepreneur and the agricultural cooperative in low carbon production** |
|---|---|
| CCCSP and sector CCSP Strategic Objective | Code of the CCCSP and sector CCSP strategic objective to which the actions refer |
| Rationale | *Links to the sector and national strategies*<br>This action is to strengthen capacity of MAFF technical staffs both national and provincial level and other government agencies, farmer groups, entrepreneurs, and other private sectors to be more capable in low emission development in their works. |

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| Category of climate change action | Cat 2 and 3 |
| Type of action | Adaptation and mitigation |
| Short description of the action and expected results and benefits | – Short description of the actions :<br>(I) Conduct TOT for technical officials both national and provincial (50 persons) x 10 TOTs on adaptation & mitigation practice including M&E, (ii) Awareness raising and trainings to stakeholders (100 persons x 2 times/year). (iii) Institutional capacity development on M&E (50 persons x 2 times).<br>– Expected Results and benefits:<br>Key beneficiaries include MAFF staffs from both national and provincial level and other government agencies, farmer groups, entrepreneurs, and other private sectors will get the knowledge and know-how on adaptation & mitigation practice including M&E in to be more capable in low emission development in their works. |
| Cost effectiveness of the action | With more capable capacity of MAFF staffs from both national and provincial level and other government agencies, farmer groups, entrepreneurs, and other private sectors will be able both knowledge and know-how in lowering emission including M&E in their works. |
| Preconditions needed for successful implementation | This would be approved internally by the minister of MAFF with supported from MEF, and liaison with NGOs and donors. |
| Indicators of success | – (50 persons) x 10 TOTs including M&E will be trained<br>– Stakeholders (100 persons x 2 times/year) will be trained<br>– Institutional capacity development on M&E (50 persons x 2 times). |
| Implementation arrangements | GDA, DAI, CARDI |
| Estimated total cost | USD 1.550 over 5 years |
| Possible funding sources | UNDP/GEF and in-kind contribution from MAFF |
| Timeframe | 2014-2018 |

## 3.2. ACTION FICHES FOR RUBBER SECTOR

**ACTION FICHE No. 1**

| **Action** | **Promoting, piloting and scaling up rubber clones from IRRDB (International Rubber Research Development Board) member country in responding to climate change.** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Rubber strategic objective from CCCSP (2): To enhance natural rubber development suitable climatic condition in Cambodia.* |
| **Rationale** | *The action is to contribute and response to current strategy for rubber development in Cambodia 2011-2020.*<br><br>*It is envisaged current climate change will affect various location in the country that current suitable for rubber growth. CC projection by 2050, 2080 shows some upland of Cambodia will face underground drought and temperature increase up to 15%.*<br><br>*The proposed is to response to this potential of climate risk.*<br>*What type of climate risk/opportunity or mitigation objective is addressed by this action* |
| **Category of climate change action** | ☐Cat 3 |
| **Type of action** | ☐Mitigation and adaptation |
| **Short description of the action and expected results and benefits** | *This action is to response to climate vulnerability to areas with prone to drought and pest and humidity change according to projected climate change scienarios. Key activities proposed in this action include::*<br>(i) Established 0.5 ha of clone gardening to be piloting with two farm trial with total 40 ha in Rubber Research institution in Kampong Cham).<br>(ii) Establish trial farm network on potential province with different AEZ: Kg. Cham, Kg.Thom, Btb, RKR, and Koh Kong.<br>*(iii)* Replicate and extend the clone trial from demonstration site to other provinces with different AEZ ( Kg. Cham, Kg.Thom, Btb, RKR, Koh Kong) with total established 10 experimental clone trial (2/province).<br>*(iv)* Monitoring and Evaluation of the clone trial on its growth (latex, yield, and resistance to disease).<br>*(v)* Document lesson learns and clone reconditions (extension services: workshop, exchange visit, documentation, dissemination).<br>*(vi)* Disseminate recommended rubber clone resilience to rubber planters (1750 rubber planters will be trained in 5 zones for five years: 1 extension service/year with 75 planters/province). (vii) Publication and dissemination to stakeholders (1,200 copies/year x 4 years).<br>*It is expected both staffs from GDR and rubber planters within 5 AEZ will be the key beneficiaries.* |
| **Cost effectiveness of the action** | – At least all key rubber farmers representing all AEZ will be the key benefits.<br>– Rubber clones suitable to 5 AEZs and replicated.<br>– Full Cost effectiveness to be identified after the experiment.<br>– Increase production from 1.2t to 1.5t/ha/year. |

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| **Preconditions needed for successful implementation** | *The action will be approved internally by MAFF, with support from MEF, and liaison with NGOs and donors.*<br>Coordination with MAFF, Authorities, Rubber Planter Associations and Rubber Estates.<br>Staffs capacity and enough staff numbers are in place |
| **Indicator(s) of success** | – 40 ha of clones experimented and scaled up into 5 AEZ in Cambodia.<br>– 1750 rubber farmers equipped with better knowledge and skills (An average 4.86 ha/family).<br>– 1,200 copies of lesson learned to be published and disseminated.<br>– Economic return will be US$20.40 million |
| **Implementation arrangements** | *Rubber Research Institute of Cambodia (RRIC) and Rubber Development Department of General Directorate of Rubber (GDR)*<br>*IRRDB's member countries, rubber planter associations and rubber estates.* |
| **Estimated total cost** | US$ 1.970 for 5 year |
| **Possible funding sources** | *Partially expected to get from IRRDB (International Rubber Research Development Board) and the rest are still seeking form government budget allocation, donors and private sectors*<br>*Government annual budget allocation* |
| **Timeframe** | 2014-2018 |

**ACTION FICHE No. 2**

| **Action** | **Promoting new rubber clone trial** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Rubber strategic objective from CCCSP (2): To enhance natural rubber development suitable climatic condition in Cambodia.* |
| **Rationale** | *The action is to contribute and response to current strategy for rubber development in Cambodia 2011-2020.*<br><br>*This action link to MAFF new seed production and ASDP 2010-13 on diversification of crops and the current mandate of government to proper manage of rubber sector in Cambodia as set out in the current draft of Rubber Law.* |
| **Category of climate change action** | ☐Cat 3 |
| **Type of action** | ☐Adaptation |
| **Short description of the action and expected results and benefits** | *This action is to provide various intervention activities which include:*<br>(i) Establish 3 budwood garden (BWG) with 10 to 15 clones per/trial for pollination breeding.<br>(ii) Development breeding process with 20,000 to 25,000 flowers from 3 BWG to obtain grain which can be used for multiplication.<br>(iii) Develop 2 Seedling Evaluation Trial (SET) in 1 ha for progeny and primary clone selection process (including data collection and analyzing).<br>(iv) Establish 2 small scale Clone Trial (SSTC) on 3 ha (data collection and monitoring on growth, yield and pest resistance/monthly follow up from 3-6 years period.<br>(v) Establish 01 Large Scale Clone Trial (LSCT) on 6 ha with 8 selected clones from SSCT (data collection, analyzing on growth, yield and disease resistance for period of 25 years (new expected to be developed).<br>(vi) New clone selected for recommendations. |

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| | *It is expected new rubber clones are suitable for agro-ecological condition of Cambodia will be created for the benefit of Cambodian rubber planters.* |
| **Cost effectiveness of the action** | *To be identified when project implemented* |
| **Preconditions needed for successful implementation** | *This would be approved internally by MAFF , with support from MEF, and liaison with NGOs and donors.*<br>Coordination with MAFF, Authorities, Rubber Planter Associations and Rubber Estates.<br>*Mention any minimum capacity requirements* |
| **Indicator(s) of success** | *New rubber clones will be created and scaled them up to planters throughout the country.* |
| **Implementation arrangements** | *Rubber Research Institute of Cambodia (RRIC)*<br>*Rubber planter associations and rubber estates* |
| **Estimated total cost** | *US$ 2.900 for 5 year* |
| **Possible funding sources** | *To be identified*<br>*Government annual budget allocation*<br>*Donors, DPs, bilateral aid, and international research institutes* |
| **Timeframe** | 2014-2018 (it will be extended for 25 years) |

**ACTION FICHE No. 3**

| **Action** | **Established Experimental networking sites and develop growth, yield, biomass, and carbon stock within existing rubber plantation in 5 AEZ** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Rubber strategic objective from CCCSP (2): To enhance natural rubber development suitable climatic condition in Cambodia.* |
| **Rationale** | *The action is to contribute and response to current strategy for rubber development in Cambodia 2011-2020.*<br><br>*It is envisaged current climate change will affect various locations in the country that current suitable for rubber growth such as prolong drought, outbreak of pest and change in precipitation. CC projection by 2050, 2080 shows some upland of Cambodia will face underground drought and temperature increase up to 15%. The proposed is to response to the potential of climate risk and also to build on internal good practice, suitable for agro-ecosystem of various rubber planting areas in Cambodia. All information gained from different planting area is fundamental for measures taken to response to climate change in each area.*<br>*What type of climate risk/opportunity or mitigation objective is addressed by this action* |
| **Category of climate change action** | ☐Cat 3 |
| **Type of action** | ☐Adaptation |
| **Short description of the action and expected results and benefits** | *This action is to focus on adaptive research by providing various intervention activities which include:*<br>*(i) Establish Permanent Sample Plot (PSP) equip with mini-weather station to be installed (5 station in five AEZ.*<br>*(ii) Sample data collection, analyzing on growth, yield, biomass, and carbon sequestration by clones and age of defined AEZA (Monthly work).*<br>*It is expected basic information on growth, yield, biomass and carbon sequestration by clones and age in 5 AEZ will be identified for the sustainable management of rubber plantation in Cambodia.*<br>*Students from RUA, in particular faculty of rubber sciences.* |

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| **Cost effectiveness of the action** | *To be identified with full cost effectiveness after experimentation. Students from faculty of rubber science, RUA.* |
| **Preconditions needed for successful implementation** | *This would be approved internally by MAFF, with support from MEF, and liaison with NGOs and donors.*<br>Coordination with MAFF, Authorities, Rubber Planter Associations and Rubber Estates. |
| **Indicator(s) of success** | – *Result from the investigation of 5 AEZ will be published through paper documentation or seminars.*<br>– *At least 200 students will use the proposed areas for their research work and graduation.* |
| **Implementation arrangements** | *Rubber Research Institute of Cambodia (RRIC) and Rubber Development Department of General Directorate of Rubber (GDR)*<br>*Rubber estates and small scale plantations* |
| **Estimated total cost** | *US$ 1.520 for 5 year* |
| **Possible funding sources** | *To be identified*<br>Government annual budget allocation<br>Other international research institutions collaboration |
| **Timeframe** | 2014-2018 |

**ACTION FICHE No. 4**

| **Action** | **Modifying existing Agricultural Good Practice (GAP) through additional training to technical staff related to climate change.** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Rubber strategic objective from CCCSP (2): To enhance natural rubber development suitable climatic condition in Cambodia* |
| **Rationale** | *The action is to contribute and response to current strategy for rubber development in Cambodia 2011-2020.*<br><br>*It is envisaged current climate change will affect various location in the country that current suitable for rubber growth such as prolong drought, outbreak of pest and change in precipitation. CC projection by 2050, 2080 shows some upland of Cambodia will face underground drought and temperature increase up to 15%. The proposed is to mitigate the potential of climate risk through awareness' raising on CC to rubber planters.*<br>*What type of climate risk/opportunity or mitigation objective is addressed by this action* |
| **Category of climate change action** | ☐ Cat 2,3 |
| **Type of action** | ☐ Adaptation and mitigation |
| **Short description of the action and expected results and benefits** | *This action is to provide various intervention activities which include:*<br>*(i) 750 (30 persons/time/year/zone x 5 zones/5 years) of selected staffs (extension workers) will be trained on GAP of which 30% are women ($500,000).*<br>*(ii) 1750 Small holder farmers (70 person/time/year/zone x 5 zones x 5 years)= 413,000 with at least 30% women.*<br>*(iii) Establish 15 rubber small holders association in proposed new development areas (4 support from AFD since 2004) of which 3 per year x 5 years=$83,000.*<br>*(iv) Mainstreaming the GAP model into rubber smallholding production (US$250,000) for 750 farmers.* |

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| | *It is expected trained technical staffs and rubber planters will contribute to climate change impact through GAP practices.* |
| **Cost effectiveness of the action** | – *NPK, herbicide, fungicide reduction affecting rubber plantation*<br>– *Full cost benefit to be estimated during project implementation.* |
| **Preconditions needed for successful implementation** | – *This would be approved internally by MAFF, with support from MEF, and liaison with NGOs and donors.*<br>– *Coordination with MAFF, Authorities, Rubber Planter Associations and Rubber Estates.*<br>– *Staff capacity to be further trained and more staff recruited.* |
| **Indicator(s) of success** | *Stakeholders' capacities and awareness of mechanism to adapt or to mitigate on climate change impacts will be trained and improved.* |
| **Implementation arrangements** | *Rubber Research Institute of Cambodia (RRIC) and Rubber Development Department of General Directorate of Rubber (GDR)*<br>*Authorities, Rubber planters.* |
| **Estimated total cost** | *US$ 350.000 for 5 year* |
| **Possible funding sources** | *To be identified*<br>• Government annual budget allocation and other sources |
| **Timeframe** | 2014-2018 |

**ACTION FICHE No. 5**

| **Action** | **Promoting an integrated approach in efficiency energy and inputs used in latex and rubber wood processing.** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Rubber strategic objective from CCCSP (2): To enhance natural rubber development suitable climatic condition in Cambodia.* |
| **Rationale** | *The action is to contribute and response to current strategy for rubber development in Cambodia 2011-2020.*<br><br>*What type of climate risk/opportunity or mitigation objective is addressed by this action*<br><br>*This action is to reduce the water use and proper waste management from rubber processing. This process is to establish clean mechanism technology by developing liquid waste treatment and CH4 capture and converted into biogas for energy generation.* |
| **Category of climate change action** | ☐ Cat 1 |
| **Type of action** | ☐Mitigation |
| **Short description of the action and expected results and benefits** | *This action is to provide various intervention activities which include:*<br>*(i) Piloting the establishment of establish affluence waste water treatment tank into factory: $174 K in RRIC.*<br>*(ii) Provide trainings on affluence water treatment and biogas capture technology as well as potential energy production (750 persons of which 30 persons/time/year/zone x 5years/5 zones) with at least 30% women participate: $405K.*<br>*(iii) Develop technology for liquid waste treatment and CH4 capture for energy production.*<br>*It is expected trained latex and wood processors will contribute to climate change impact through waste water treatment and biogas capture technology.* |

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| **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.* |
| **Preconditions needed for successful implementation** | *This would be approved internally by MAFF, with support from MEF, and liaison with NGOs and donors.*<br>Coordination with MAFF, Authorities, *latex and wood processors* and Rubber Estates.<br>*Mention any minimum capacity requirements* |
| **Indicator(s) of success** | *Latex and rubber wood processors' capacities and awareness of mechanism to adapt or to mitigate on climate change impacts will be trained and improved.* |
| **Implementation arrangements** | *Rubber Research Institute of Cambodia (RRIC) and Rubber Processing Department of General Directorate of Rubber (GDR)*<br>*Latex and rubber wood processors and rubber estates.* |
| **Estimated total cost** | *US$ 250.000 for 5 year* |
| **Possible funding sources** | *To be identified* |
| **Timeframe** | 2014-2018 |

### 3.3. LIVESTOCK SECTOR

**ACTION FICHE No. 1**

| Action | Promoting resilience in animal production and adaptation to climate change (technical package) |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | **Strategic objective 3**: To increase livestock product with 3% per year through health system improvement, and to reduce emission from animal waste with at least 1% per year starting from 2015 onward. |
| **Rationale** | *Links to the sector and national strategies*<br>*This action is to provide data and information related to appropriate technique and guideline on animal raising which is one of the key to adapt animal production of the country into climate change. This contributes to achieving what is mentioned in phase 3 of Rectangular strategy 1: Promotion of agriculture sector. It also contributes to Cambodia's Millennium Development Goals (CMDG) of which goal 1:* Eradicate extreme poverty and hunger and Goal 3: Promote gender equality and empower women. Improved nutrition from consumption of fish and fish products also plays an important role in helping towards Goal 4: Reduce child mortality and Goal 5: Improve maternal health and goal.<br><br>This action also aim to improve nutrient for livestock as an increase internal adaptive capacity by reducing undernourishment by increasing the quality and quantity of feed production, storage and the nutritional balance of diets. This action will increase adaptive capacity both internal and external. |
| **Category of climate change action** | ☐Cat 1,2 |
| **Type of action** | ☐Adaptation/mitigation |
| **Short description of the action and expected results and benefits** | ***Short description***<br>– *Establish the technical guideline for cattle, buffaloes, pig and poultry on smallholder and commercial scale*<br>– *Demonstrate cattle, buffaloes, pig and poultry husbandry*<br>– *Expand the integrated farming system based on animal production*<br>– *Improve use of current resources e.g., crop residues, wild forages.*<br>– *Increase forage cultivation*<br>– *Technology transfer e.g., seeds, cultivation practices, preservation.*<br>– *Reduce grazing pressure on protected areas, reducing contact and risk of disease reduction due to unpredictable of climate change*<br>– *Promoting One Health approach (Contextualizing animal health in relation to social, environmental and human health.*<br>***Expected results***<br>– *The technical guideline for animal raising is set up since 2014*<br>– *Animal raising is demonstrated in 1000 places annually*<br>– *Instruction on animal raising on commercial scale align with raising standard is conducted in 50 places by each animal species*<br>– *Integrated farming system based on animal production is expanded in 200 places by 2018*<br>***Key beneficiaries:*** *animal raiser, private sectors, technical staff, Village Animal Health Workers (VAHWs), animal trader.* |
| **Cost effectiveness of the action** | *The whole public will benefits from getting more information on appropriate technique for animal raising and integrated farming which is adaptable to climate change.* |

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| **Preconditions needed for successful implementation** | *Strong commitment and support from government*<br>*Technical Staff capacity for implementation*<br>*Financial support available* |
| **Indicator(s) of success** | *Active participation of animal raisers*<br>*Capability of Technical Staffs to operate full function.*<br>*Available guideline on animal raising can be used for adaptation in time* |
| **Implementation arrangements** | *Responsible department(s)*<br>*Department of Animal Production and Health (DAPH)* |
| **Estimated total cost** | *USD 8.000* |
| **Possible funding sources** | *Name the proposed source(s) of funding.*<br>*To be identified : EU,FAO* |
| **Timeframe** | *2014-2018* |

**ACTION FICHE No. 2**

| **Action** | **Enhancing animal waste management and climate change emission mitigation** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | **Strategic objective 3**: To increase livestock product with 3% per year through health system improvement, and to reduce emission from animal waste with at least 1% per year starting from 2015 onward. |
| **Rationale** | *Links to the sector and national strategies*<br><br>*This action is to strengthen biodgester sector contributing to decreasing farmer poverty set by MOP&MEFF and reducing in environmental impact, which is line with the Strategic Plan on Adaption and Mitigation of Climate Change developed by MOE. This action also aims to promote technologies while enhancing triple win-win strategies of enhancing livelihood of local people, environmental protection and enhancing social safety.* |
| **Category of climate change action** | ☐Cat 1,2 |
| **Type of action** | ☐ Mitigation |
| **Short description of the action and expected results and benefits** | ***Short description***<br>*This action is to build on existing bio-gas technology through methane capture and destruction from livestock and landfills, reduce odours and risk of groundwater contamination.*<br>– *Upscale smallholder biodigester programme in whole country*<br>– *Set up the commercial biodigester programme*<br>– *Conduct research on development of smallhoder and commercial biodigester programme*<br>– *Strengthen capacity of biodigester-based cabon credit trading*<br><br>***Expected results***<br>– *Smallhoder biodigester is construced by 1500 plants each year*<br>– *Commercial biodigester programme is developed and construction of commercial biodigester is made by 10 plants by 2018*<br>– *Technology of smallholder and commercial biodigers is developed for every 2 years*<br>– *At least carbon from 1500 plants of biodigester was traded annually*<br>***Key beneficiaries:*** *biodigester user, smallholder and commercial biodigester programme, contribution of environmental protection, reduction of chemical fertilizer utilization, biodigester technical staff, private sector, animal raisers.* |

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| **Cost effectiveness of the action** | *The whole public will benefits the reduction in forest logging, utilization of chemical fertilizer, and contribution to mitigating the greenhouse gases emission into environment. It also gets benefits from incomes gained from carbon trading for both farmers and country. Moreover, biodigester users will benefit on no cost for cooking, lighting and fertilizing and on saving time for labour and kids for school.* |
| **Preconditions needed for successful implementation** | *Strong commitment and support from government*<br>*Technical Staff capacity for implementation*<br>*Financial support available.* |
| **Indicator(s) of success** | *Active participation from biodigester users and animal raiser*<br>*Capacity of technical Staffs to operate full function.*<br>*Available guideline related to animal waste management can be used for mitigating greenhouse gas emission* |
| **Implementation arrangements** | *Responsible department(s)*<br>*Department of Animal Production and Health (DAPH)* |
| **Estimated total cost** | *USD 6.500* |
| **Possible funding sources** | *Name the proposed source(s) of funding.*<br>– *SNV, People in Need, IFAD for smallholder programme (on-going)*<br>– GEF (UNIDO) for commercial biodigester programme (on process in getting fund) |
| **Timeframe** | *2014-2018* |

**ACTION FICHE No. 3**

| **Action** | **Promoting and enhancing technology development on the improvement of animal breed, animal feed, and animal health to adapt climate change.** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | **Strategic objective 3**: To increase livestock product with 3% per year through health system improvement, and to reduce emission from animal waste with at least 1% per year starting from 2015 onward. |
| **Rationale** | *This action is designed to help improve the livestock production in Cambodia and reduce animal diseases even though the climate change is affected. It will protect animal from disease and forages damaged by flood and drought. Also, It will provide the finding of research on climate change-resistant animal and forages as well as new methodologies for diagnosis of emerging and re-emerging animal diseases.* |
| **Category of climate change action** | ☐Cat 2,3 |
| **Type of action** | ☐Adaption |
| **Short description of the action and expected results and benefits** | ***Short description***<br>– *Build research capacities for animal genetic, animal breed and animal feed to adapt the climate change*<br>– *Study and evaluate the animal breed with high yield and forages being resistant to climate change*<br>– *Develop technology for improving animal breed resistant to animal disease caused by climate change*<br>– *Develop technology for animal feed processing, which contribute to reducing greenhouse gas emission*<br>– *Build research capacities for developing vaccine against animal diseases, new methodologies for detecting animal diseases and emerging animal diseases, which is caused by flood and drought*<br>– *Develop Geographic Information System (GIS) technology to control animal disease induced by climate change* |

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| | ***Expected results***<br>– *Research capacities on animal genetic, animal breed, and animal feed is strengthened to adapt climate change*<br>– *High-yield animal breed and forages being resistant to climate change are identified*<br>– *Technology for animal feed processing is developed*<br>– *Research capacities is built to develop animal vaccine, new technologies for detecting animal diseases and emerging animal disease*<br>– *GIS technology to control animal disease is developed*<br>***Key beneficiaries:*** *researchers, technical officers, technology adaptor, private sector, extension officers.* |
| **Cost effectiveness of the action** | *Technical staffs of Department of Animal Production and Health and provincial Office of Animal Production and Health will be beneficiaries.* |
| **Preconditions needed for successful implementation** | *Strong commitment and support from government*<br>*Technical Staff capacity on research*<br>*Financial support available.* |
| **Indicator(s) of success** | *Technologies on improving animal breed, animal feed and animal health will be developed.*<br>*Active participation from biodigester users and animal raiser.*<br>*Capacity of technical Staffs to operate full function.*<br>*Available budget* |
| **Implementation arrangements** | *Responsible department(s)*<br>*Department of Animal Production and Health (DAPH) and partly Rural University of Agriculture* |
| **Estimated total cost** | *USD 11.000* |
| **Possible funding sources** | *Name the proposed source(s) of funding.*<br>FAO, UNDP (CCCA), OIE (World Organisation for Animal Health (OIE) World Bank (HPAI)<br>IAEA-International Atomic Energy Agency focusing on animal genetic and feed biotechnology.<br>Government and China (on pig farm establishment), EU, ADB (ISPH- Improved Sanitation and Phytosanitary Handling in GMS ...).<br>Australian Centre for International Agriculture Research (ACIAR) |
| **Timeframe** | *2014-2018* |

### 3.4. FORESTRY SECTOR

**ACTION FICHE No. 1**

| Action | Promoting sustainable forest management |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers* ***Strategic objective 3:*** Reduction of GHG emission through forest degradation, animal production, crop production, and to encourage for sustainable forest management in particular forest community, renewable energy (biomass) and appropriated agricultural technology. |
| **Rationale** | This action is to response to the priority issues highlighted in National Forest Program (20 years from 2010-2029). This national program cover various key activities which include: demarcation, classification and registration of forest land, forest reserve management and conservation, community forest development, governance and sustainable financing through forest carbon credits or voluntary carbon market on REDD+. The action will address forest degradation and deforestation through improved local participation in forest planning and management. This action is also help to ensure benefits to local people by integrating forest management with integrated agriculture and REDD+ mechanism. |
| **Category of climate change action** | ✔ Cat 1 – Re-scaled ✔ Cat 2 – Modified ☐Cat 3 – Dedicated |
| **Type of action** | ☐Mitigation ☐Adaptation ✔ Mitigation and adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>This action includes key activities:<br>*(i)* Recalculation of forest cover for 2013-14 and publishing 5000 copies of forest cover data.<br>*(ii)* identification of forest functions in 5 important areas<br>*(iii)* developing forest management plan using landscape and tiger skin approach<br>*(iv)* promoting participatory forest management through community forestry and other modalities<br>*(v)* Promoting integration of community forestry with REED+ and integrated agriculture.<br>*(vi)* Piloting benefit sharing mechanism (BSM) from selling carbon credit.<br>***Expected results and benefits:***<br>– *National community forestry network strengthened*<br>– *Capacity of forestry officials at national and sub-national level and target communities and local authorities within the proposed areas improved.*<br>– *Forest cover map updated*<br>– *CFs involved in REDD+ development and improved livelihoods.* |
| **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.*<br><br>*To be determined through feasibility study or baseline* |
| **Preconditions needed for successful implementation** | – *Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works*<br>– *Mention any coordination required with actions under the responsibility of other ministries or external stakeholders*<br>– *Mention any minimum capacity requirements* |

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| | – *International commitment on Climate Change Adaptation and Mitigation and agreement on carbon market.*<br>– *Strong support from central and local government*<br>– *There is a need for strong coordination among relevant agencies especially MLUPC, MOI and REDD Task Force.* |
| **Indicator(s) of success** | – *5,000 copies of forest cover maps published and distributed*<br>– *10 CF group participated in REDD+ Management and Benefit Sharing.*<br>– *Formulation of policy note on benefits received from the selling of carbon credit.* |
| **Implementation arrangements** | *Responsible department(s)*<br><br>*Department of Forest Management and Community Forestry and Institute of Forest and Wildlife Research and Development.*<br>*Others: Local forestry administration offices.* |
| **Estimated total cost** | *USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions*<br>USD 2.250<br>exclude 10% contingency |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>*If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*<br><br>GEF, ADB, EU, and government. |
| **Timeframe** | *Indicate the start and end year*<br>*2014-2018* |

**ACTION FICHE No. 2**

| **Action** | **Promoting reforestation and afforestation to increase carbon stock** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers*<br>***Strategic objective 3:*** Reduction of GHG emission through forest degradation, animal production, crop production, and to encourage for sustainable forest management in particular forest community, renewable energy (biomass) and appropriated agricultural technology. |
| **Rationale** | *Links to the sector and national strategies*<br>*What type of climate risk/opportunity or mitigation objective is addressed by this action*<br><br>This action is also link to National Forest Program 2010-2029under component of Forest Resource Management and Conservation. This action focuses on the implementation of existing and emerging sustainable forest management models, and adding value to forest products, to increase forest contributions to poverty alleviation, enhanced livelihoods, and economic development, whilst safeguarding environmental services, through: |
| **Category of climate change action** | x Cat 1 – Re-scaled  xCat 2 – Modified  ☐Cat 3 – Dedicated |
| **Type of action** | ☐Mitigation  ☐Adaptation  ☐Mitigation and adaptation |
| **Short description of the action and expected results and benefits** | *Short description* |

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| | Key activities: (i) Identification of forest areas to be rehabilitated in 5 important areas, (ii) establish forest research station to produce climate-resilient tree seedling (iii) replanting of degraded forest areas (iv) encouraging local forest administration to set up forest nursery at FA triage (v) promoting public participation in tree planting by using climate resilient tree seedling.<br><br>*Expected results and benefits, including number of beneficiaries and type of impact on 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* |
| **Preconditions needed for successful implementation** | – *Political support from government*<br>– *Good coordination among key implementation agencies from Forestation.*<br>– *Land availability for tree plantation*<br>– *Need participation from local community in tree plantation* |
| **Indicator(s) of success** | – *2500 ha/year of degraded forest land rehabilitated*<br>– *10 million tree seedlings produced*<br>– *increase carbon stock in proposed 2,000 ha of tree plantation*<br>– *5 Research stations established* |
| **Implementation arrangements** | – *Department of forest plantation and private forest*<br>– *Forest extension office* |
| **Estimated total cost** | *USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions*<br>USD 8.200 |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>*If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*<br>*Government: US$ 1 million, Government of Korea (US$3,800,000) and other donors* |
| **Timeframe** | *Indicate the start and end year*<br>*2014-2018* |

**ACTION FICHE No. 3**

| **Action** | **Conducting capacity development, research and awareness raising on REDD+** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers*<br>***Strategic objective 3:*** Reduction of GHG emission through forest degradation, animal production, crop production, and to encourage for sustainable forest management in particular forest community, renewable energy (biomass) and appropriated agricultural technology. |
| **Rationale** | *Links to the sector and national strategies*<br><br>This action will identify strategic capacity needs and initiate relevant capacity development programmes to better place stakeholders to meet the technical skills in carbon stock calculation in forest sector. These will response to current need of capacity development for FA officials and communities working in REDD+ sector. It also supports the implementation of NFP |

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| | component 5 dealing with capacity and research development in forest sectors. |
| **Category of climate change action** | ☐Cat 1 – Re-scaled ☐Cat 2 – Modified ☐Cat 3 – Dedicated |
| **Type of action** | ☐Mitigation ✔ Adaptation ☐Mitigation and adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>*Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries*<br><br>Key activities: (i) Conduct assessment of carbon market for REDD+, (ii) Conduct CBA of forest community-based REDD+, (iii) Conduct alternative livelihood activities research for income generation (iv) conduct assessment of climate change impact (pest, forest fire, extinction of tree species), (v) developing awareness raising materials on REDD+ for public dissemination and engage in climate change network at national, regional and international level. |
| **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* |
| **Preconditions needed for successful implementation** | – *Political support from government*<br>– *Good coordination among key implementation agencies from Forestation.*<br>– *Land availability for tree plantation*<br>– *Need participation from local community in tree plantation* |
| **Indicator(s) of success** | – *10,000 copies of assessment results on volunteer and compliance carbon market developed and distributed.*<br>– *10,000 copies of alternative livelihoods studies development and distributed.*<br>– *10,000 copies of Costa and Benefit Analysis Research on community based REED+ published and distributed.*<br>– *Case studies from five climate change related to forestry are published and disseminated and 20 students participated.* |
| **Implementation arrangements** | *Responsible department(s)*<br>*CAM REDD Secretariat and Institute of Forest and Wildlife Research and Development.* |
| **Estimated total cost** | *USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions*<br>USD 1.600 |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>*If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*<br><br>*UNDP,FAO,UNREDD,JICA, World Bank, USAID,EU* |
| **Timeframe** | *Indicate the start and end year*<br>*2014-2018* |

**ACTION FICHE No. 4**

| **Action** | **Developing and implementing regulations and mechanism on REDD+** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers*<br>***Strategic objective 3:*** Reduction of GHG emission through forest degradation, animal production, crop production, and to encourage for sustainable forest management in particular forest community, renewable energy (biomass) and appropriated agricultural technology. |
| **Rationale** | *Links to the sector and national strategies*<br><br>This action link to NFP component 3 dealing with law enforcement and governance, in particular through low carbon development and promotion of REDD+ in Cambodia. It promotes participation of all stakeholders in sustainable forest management and law enforcement and forest protection to enhance carbon stock and to avoid emission. Check with REDD road map. |
| **Category of climate change action** | ✔ Cat 1 – Re-scaled ☐Cat 2 – Modified ☐Cat 3 – Dedicated |
| **Type of action** | ☐Mitigation ☐Adaptation ☐Mitigation and adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br><br>Key activities: (i) Increase awareness on REED+ policy and related legal documents to relevant stakeholders (ii) Strengthening capacity of law enforcement officers in REDD+ areas, (iii) Enhance cooperation among stakeholders (NGOs, local authority and communities), (iv) establish monitoring system and real time data collection. |
| **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*<br><br>*To be identified on baseline* |
| **Preconditions needed for successful implementation** | *Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works*<br>*Mention any coordination required with actions under the responsibility of other ministries or external stakeholders*<br>*Mention any minimum capacity requirements*<br><br>– *Political support and financial commitment*<br>– *Sufficient means of law enforcement to protect forest*<br>– *Implementation agency has enough capacity to implement and operate.* |
| **Indicator(s) of success** | – *REED policies and related document were disseminated to at least 2,000 stakeholders/year.*<br>– *At least 50% of forest crime in REED+ areas reduced.*<br>– *Monitoring system and real time data collection are in place* |
| **Implementation arrangements** | *Responsible department(s)*<br><br>*Department of legislation and law enforcement.* |
| **Estimated total cost** | *USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* |

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| | USD 2.250 |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>*If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*<br><br>Government funding: 200,000 and the rest are still seeking other sources |
| **Timeframe** | *Indicate the start and end year*<br>*2014-2018* |

**ACTION FICHE No. 5**

| **Action** | **Building climate resilient capacity in forestry sector** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | *Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers*<br>***Strategic objective 3:*** Reduction of GHG emission through forest degradation, animal production, crop production, and to encourage for sustainable forest management in particular forest community, renewable energy (biomass) and appropriated agricultural technology. |
| **Rationale** | *Links to the sector and national strategies*<br><br>This action is to response to climate change adaptation in forestry sector of which many communities are depending on for their livelihoods. It will help to reduce pressure on forestry resource while enhancing local community capacity to adapt to climate change. |
| **Category of climate change action** | ☐Cat 1 – Re-scaled ☐Cat 2 – Modified ✔ Cat 3 – Dedicated |
| **Type of action** | ☐Mitigation ✔ Adaptation ☐Mitigation and adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>*Key activities: (i) define priority activities for adaptation such as solar oven, Improved cook stove, reforestation, agroforestry and small scale infrastructure (ii) Develop the capacity of tissue culture laboratory in producing climate resilient tree seedling, (iii) Strengthening research capacity on analysis of plant DNA, Soils and other elements.*<br><br>*Expected results and benefits, including number of beneficiaries and type of impact on 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* |
| **Preconditions needed for successful implementation** | *Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works*<br>*Mention any coordination required with actions under the responsibility of other ministries or external stakeholders*<br>*Mention any minimum capacity requirements*<br><br>*Political and financial commitment*<br>*Staff have enough capacity to implement* |
| **Indicator(s) of success** | – *5 mitigation projects implemented as model* |

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| | – *Tissue culture and DNA analysis laboratory established and operated.*<br>– *At least 5 climate resilient tree species identified and produced for plantation.*<br>– *At least 5 forestry officials have improved knowledge on tissue culture techniques.* |
| **Implementation arrangements** | *Responsible department(s)*<br>*Forest extension office and institute of forest research and wildlife research and development.* |
| **Estimated total cost** | *USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions*<br>*USD 2.100* |
| **Possible funding sources** | *ADB (PPCR): Promoting climate resilient in agriculture, forestry, water supply and coastal resources total fund: US$7.4 million* |
| **Timeframe** | *Indicate the start and end year*<br>*2014-2018* |

## 3.5. FISHERY SECTOR

**ACTION FICHE No. 1**

| **Action** | **Promoting aquaculture production systems and practices that are more adaptive to climate change.** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | This action can contribute to the strategic objective 1 "Promote climate resilient through improving food, water and energy security", strategic objective 2 "Reduce sectoral, regional and gender vulnerability to climate change impacts", and strategic objective 5 "Improve capacities, knowledge and awareness for climate change response". It also refers to the objective 4 of the MAFF Sector Climate Change Strategic Plan. |
| **Rationale** | Links to the sector and national strategies<br><br>This action contributes to Strategic Planning for Fishery 2010-2019 on sector aquaculture development with current production of 50,000 tonne per year with an estimated increase by 10% per year with this financial investment. In addition, there will be 85,000 farmers will be trained on how to apply aquaculture and additional 250,000,000 fish seed produced per year by the end of 2019.<br><br>Climate risk related to aquaculture will come from too much rain, less rain as well as increase temperature and extreme events such floods, droughts and storms. In this regard, some of the area suitable for aquaculture might not be relevant in the upcoming future due to these changes in climate threats and vulnerability.<br>This action will be built on lessons learnt from the current support of the CCCA trust fund and up-scale to cover other parts of the country. |
| **Category of climate change action** | Cat 2 – Modified |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | Short description<br><br>(i)Conduct assessment of climate change, impact and vulnerability on current and future aquaculture practices[34] in Cambodia; **(ii)** Identifying and prioritizing climate resilience aquaculture technologies ( from preparation stage to harvest stage which include digging ponds, feeds, stocking density, feeding, seed production from nursing to rearing, water quality and temperature control and management system in place ) in the Great Lake, Upper Mekong and Coastal region; (iii) Testing field demonstration of selected species[35] (500 aquaculturist in first 2 years and extend to 10,000 farmers in next 3 years) from all AEZ), 3 national fish hatchery at Bati, Decho Hun Sen National Aquaculture Research and Development Institution based in Kandal province, and Marine Aquaculture Research and Development based in Sihanouk Ville.<br>(iv) Strengthening existing aquaculture network based on climate change scenarios, (v) conduct lesson learnt and knowledge sharing for replication.<br><br>Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries<br>Aquaculturists |

[34] This need to conduct nationwide (all AEZ), then identify threat from climate change to species and identify key adaptive species selected for aquaculture practice.

[35] For those highly economic species and endangered species restoration.

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| | Fishery administration staff from national to local level<br>Aquaculture farmers<br>Research institutes, stations and centres<br>Increase food security and incomes for smallholder farmers<br>Policy makers and investors |
| **Cost effectiveness of the action** | The benefit from this action would be an incremental profit or the avoided lost of productivity in the event of climate change, which can be estimated during the demonstration of the selected fish species when more data and findings are known. |
| **Preconditions needed for successful implementation** | FIA (line departments and institutions), coordination with other stakeholders such as farmers, local authorities, research institute, academy, and specialized NGOs and private sector. |
| **Indicator(s) of success** | – *10,000 aquaculturist developed and become aquaculture promoters*<br>– *100,000,000 fingering are produced every year from fish stations both inland and coastal and small holder seed producers.*<br>– *10% of aquaculture production increased every year*<br>– *% reduction of illegal fishing natural fishery and endangered species.*<br>– *Reduce illegal fish and fishery products imported from neighbouring country (with uncontrolled quality).* |
| **Implementation arrangements** | Responsible department(s)<br>Fishery Administration and relevant technical departments.<br>Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)<br>MOE and World Fish Center. |
| **Estimated total cost** | UDS 3.400 |
| **Possible funding sources** | If identified, name the proposed source(s) of funding.<br>If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)<br>Government budget, CCCA, Adaptation Fund, JICA, WorldFish, FAO. |
| **Timeframe** | Indicate the start and end year<br>2014-2018 |

**ACTION FICHE No. 2**

| **Action** | **Promoting climate resilience of wild fishery resources** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers<br>This action can contribute to the strategic objective 1 "Promote climate resilience through improving food, water and energy security", strategic objective 3 "Ensure climate resilience of critical ecosystems (Great Lake, Mekong River, coastal ecosystems, highlands etc.), biodiversity, protected areas and cultural heritage", and strategic objective 5 "Improve capacities, knowledge and awareness for climate change response". It also refers to the objective 4 of the MAFF Sector Climate Change Strategic Plan. |
| **Rationale** | Links to the sector and national strategies<br>What type of climate risk/opportunity or mitigation objective is addressed by this action<br>Protection and conservation of key ecosystems and habitats is one of the win-win solutions that can address both fishery sustainability and system resilience to climate change. Key ecological ecosystems include the Tonle Sap Lake, the Mekong River and its unique ecological system (deep pool and rapids), and |

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| | marine ecosystems such as mangroves, sea grass and coral reef, which can support diversity of lives thus are more resilient to climate change than those without protection and conservation. |
| **Category of climate change action** | Cat 2 – Modified |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | Short description<br>Cambodia fishery is dominant by the wild species that survives within complex ecological system for thousands of years throughout history. Among these, key species of the fisheries remain sensitive with hydrological changes, and extreme events caused by both current and future of climate change and on-going Mekong mainstream and its tributaries developments projects. In addition, its coastal areas also being faced with storms, seas level increase as well as various economic developments that impacted on various streams, mangrove forest as well as estuaries which are key important habitat for fishery and other marine resources. Key activities proposed for this action include:<br>(i) Assessment of climate resilience (species and habitat) of wild fisheries resources in the Great lake and Mekong flood plain;<br>(ii) Identifying and prioritizing key species and habitats (flooded forest, deep pools and Mekong rapids) in Mekong river, flood plain and Great lake<br>(iii) Demonstration and testing the resilience species and habitats (using information technology) in the areas:<br>(a) Great lake: 10 species of none migration or short distance migration and 10 long species of long distance migration for 2 sites for each of 5 provinces for 2 time a year.<br>(b) Mekong flood plain: select 10 species of none and short distance migration and 10 species of long distance migration.<br>(c) Fish refuge pond: 5 species in each refuge pond in each province of Great lake and 4 provinces in Lower Mekong and 5 provinces at upper Mekong.<br>(iv) Zoning and promoting conservation of key habitats in the Tonle Sap Lake and the Mekong River.<br>Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries<br>– *The fishermen will continue to benefit from stable fish productivity and quality in the context of climate change and fishery sector remains an important share of GDP..* |
| **Cost effectiveness of the action** | There is no study on cost benefit of this action. Full cost benefit analysis will be done through feasibility study once the action receives property technical and financial support. |
| **Preconditions needed for successful implementation** | – *It requires coordination with MOE and Sub-national authorities for effective implementation.*<br>– *Mention any minimum capacity requirements*<br>– *Relationship between climate change, fish species and critical ecosystems.* |
| **Indicator(s) of success** | – *# of natural fishery habitats have been protected and maintained with proper management*<br>– *30 species of long distance migrations are protected and monitored (this play important role for economic and quantity values).*<br>– *Increase cultural value through fishery refuges restoration (through fingering releases, increase fish production).* |

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| | – *At least 500 fisheries refuges (1621 commune) applied annual fish release and enhance natural fish stocks with proper management.*<br>– *Trend in fish productivity and catch in areas protected and neighbouring ecosystems.* |
| **Implementation arrangements** | Responsible department(s)<br>FiA and relevant line departments and institutes<br>Local authorities, communities<br>NGOs, private sectors |
| **Estimated total cost** | USD 1.300 |
| **Possible funding sources** | If identified, name the proposed source(s) of funding.<br>If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)<br>Bilateral donors and World Fish Centre, CI, WWF |
| **Timeframe** | Indicate the start and end year<br>2014-2018 |

**ACTION FICHE No. 3**

| **Action** | **Enhancing the climate resilience in fishery sector (ECRF)** |
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| **CCCSP and Sector CCSP Strategic Objective** | Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers<br>This action can contribute to the strategic objective 1 "Promote climate-resilience through improving food, water and energy security", strategic objective 2 "Reduce sectoral, regional and gender vulnerability to climate change impacts", and strategic objective 5 "Improve capacities, knowledge and awareness for climate change response". It also refers to the objective 4 of the MAFF Sector Climate Change Strategic Plan. |
| **Rationale** | Links to the sector and national strategies<br><br>This action is to provide multiple responses to various national and sectoral policies. These include the overall goals of Strategic Planning Framework for Fisheries 2010-2019: Fishing for the Future by ensuring the, "Management, conservation and development of sustainable fisheries resources to contribute to ensuring people's food security and to socioeconomic development in order to enhance people's livelihoods and the nation's prosperity". The action also contributes to current draft version of ASDP (Agriculture Strategy Development 2014-2018, policy goal 4 of fishery reform and ASDP program 4: *Sustainable Fisheries Resources Management. In addition, fisheries sector also play key role in responding to the Cambodia's Millennium Development Goals (CMDGs), in particular fishery* providing food and employment, fisheries are core to Goal 1: Eradicate extreme poverty and hunger. The important roles played by women in the fisheries means that they also help contribute to 3: Promote gender equality and empower women. Improved nutrition from consumption of fish and fish products also plays an important role in helping towards Goal 4: Reduce child mortality and Goal 5: Improve maternal health. This sector also requires having good stewardship of the wetlands that need to have considerably Goal 7: Ensure environmental sustainability.<br><br>*More importantly, this action will contribute to set objective/strategies by the National Strategic Development Plan (NSDP 2019-2013) which* acknowledges |

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| | that "Fish continues to occupy a crucial position in terms of food, nutrition and income of millions of Cambodians."<br><br>What type of climate risk/opportunity or mitigation objective is addressed by this action<br><br>Climate change resilience issue have been addressed in fishery sector through capacity building, climate resilient fisheries and livelihood development, food security and safety, and coordinated with all related climate change projects in the country. It is projected that an increased irregular rainfall and prolonged drought will put more pressure on existing community fisheries and capture fisheries due to change in climate variables and the flood pulse can have negative effects on fish breeding and production system, consequently the livelihoods of CFi. Climate change impacts on CFi vary from region to region, likewise options for building resilience capacity. Diversification of livelihoods other than fishing those are more adaptive to climate change and also supplement family income, which result in better coping with climate change. |
| | Cat 2 – Modified |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | Short description<br>Climate resilience for fishery sector will require better management, conservation and development of sustainable way to ensure people's food security and socio-economic development as highlighted in the 10 years strategy of fishing for sustainable future 2010-2019. Key activities include:<br>– *Conduct BIV (Baseline, Impact and Vulnerable Assessment) and development appropriated prioritisation and adaptation planning.*<br>– *Institutional capacity building and policy development to make it fit with climate change context.*<br>– *Piloting an initiative in fishery sub-sector (aquacuture, conservation, post-harvest, management, and fishery affair) at community level (covering all AEZ) 560 Community Fisheries (CFi) include vulnerable group.*<br>– *Improve coordination mechanism with key stakeholder related to fishery sector.*<br>– *Introduce Information Technology Communication (fish migration, flood pulse...)*<br>– *Enhance knowledge management, develop database for fishery relevant projects, information dissemination, and lesson learnt.* |
| **Cost effectiveness of the action** | – *The benefit of this action would depend on the ability to identify and implement cost-effective capacity building and livelihood options that can supplement fishing income.*<br>– *2.5 million people direct benefit from fishery sector*<br>– *GDP contribution with US$1 to 1.2 billion from the sector.* |
| **Preconditions needed for successful implementation** | – *Good understanding of the climate change impacts and cost-effective capacity building and livelihoods.*<br>– *Political and financial commitment from government and DPs.*<br>– *Staff capacity in place*<br>– *Policy committeemen in place*<br>– *Good cooperation and commitment from other stakeholders* |

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| **Indicator(s) of success** | – *Scientific base knowledge are ready for prioritisation and adaptation planning*<br>– *Institutional and capacity developed*<br>– *Knowledge management mechanism in place*<br>– *560 CFis adaptive capacity (institution, knowledge, skills, financial, infrastructure.....) have been strengthened.*<br>– *70% of 560 CFi members are women to be targeted.*<br>– *Capture fishery and aquaculture production increase 10%/year*<br>– *At least 1,000 fishery staffs from national to sub-national gain more knowledge on cc.* |
| **Implementation arrangements** | Responsible department(s)<br>FiA<br>Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)<br>MoE, World Fish Centre, CI, WWF, and registered local NGOs.<br>Local and International research institutions<br>RUA and Prek Leap School of Agriculture<br>University of Kula Lumpore of Malaysia (UNiKL)<br>Sub-national authorities |
| **Estimated total cost** | USD 3.000 |
| **Possible funding sources** | EU, SIDA, UNDP, JICA, Bilateral donors and Climate Adaptation Fund and NGOs MRCs |
| **Timeframe** | Indicate the start and end year<br>2014-2018 |

**ACTION FICHE No. 4**

| **Action** | **Enhancing fish and fisheries products in the entire value chain in response to climate change impacts.** |
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| **CCCSP and Sector CCSP Strategic Objective** | Code of the CCCSP and Sector CCSP Strategic Objective to which the Action refers<br>This would contribute to strategic objective 1, strategic objective 2, and strategic objective 5 of CCCSP. It also contributes to the objective 4 of the Sector Climate Change Strategic Plan of MAFF. |
| **Rationale** | Links to the sector and national strategies<br>What type of climate risk/opportunity or mitigation objective is addressed by this action<br>The erratic rainfall and climate variables can have effects on the quality of fishery processing, for example smoked fish, dried fish, fermented fish, and fish sauces. Therefore appropriate technologies can be developed to enhance the quality and at the same time reduce the cost. There is some low cost technology for drying fish using a plastic based on GHG effect. Sanitation and hygiene are often lacking in making fermented fish, which is further implicated by variation of climate variables such as temperature and moisture, which can breed more harmful bacterias and viruses in the end fish products. |
| **Category of climate change action** | Cat 3 – Dedicated |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | Short description<br>(i) Conducting study on climate change impacts on the quality and safety of fish and fishery products in the fish processing industry; (ii) assessment of current technologies that can improve quality and safety of fish and fishery products in the context of climate change; (iii) developing and testing appropriate |

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| | technologies that can response to climate change impacts; and (iv) disseminating and transferring technologies to stakeholders.<br>Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries<br>Several technologies may be transferred or adapted to the Cambodian conditions and in the context of climate change. The beneficiaries would be those who work in the fish processing industries. |
| **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<br>The quality of fish products would add value to the existing income even in the absence of climate change. Cost saving can also be an added value through application of cost effective technologies, e.g. drying fish technology. |
| **Preconditions needed for successful implementation** | Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works<br>Mention any coordination required with actions under the responsibility of other ministries or external stakeholders<br>Mention any minimum capacity requirements<br>Fish processing industry and climate change. |
| **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.<br>Number of effective technologies are introduced and employed by fish processing industries.<br>Certification of quality has been issued by a recognized ISO. |
| **Implementation arrangements** | Responsible department(s)<br>FiA<br>Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)<br>FAO, World Fish Centre. |
| **Estimated total cost** | USD 3.000 |
| **Possible funding sources** | If identified, name the proposed source(s) of funding.<br>If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)<br>FAO and government budget. |
| **Timeframe** | Indicate the start and end year<br>2014-2018 |

### 3.6 CORSS-CUTTING ISSUE FOR AGRICULTURE AND CLIMATE CHANGE

### ACTION FICHE No. 1

| Action | **Mapping of agriculture's productions (agricultural production, rubber, livestock, forestry and fisheries) and of land use** |
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| **CCCSP and Sector CCSP Strategic Objective** | Contribute to CCSP strategic object 1: Mapping and zoning agricultural production areas (land use suitability study) and forestry. |
| **Rationale** | *Links to the sector and national strategies*<br>This link to NSDP's gaol 6: Enhancement agricultural productivity and national forestry program mapping and demarcation.<br>And ASDP 2010-2013's Policy goal 1: Food security, productivity and diversification.<br>This action is designed to build capacity of diverse stakeholders to share their raw statistics and to give quick overview of primary food crops, area harvested, crop yields and land use in Cambodia.<br>It will be a relevant tool of monitoring of crop diversification and intensification.<br><br>*What type of climate risk/opportunity or mitigation objective is addressed by this action*<br><br>By maintaining this baseline the MAAF will have the capacity to measure the impact of different activities as well as measure the damages related to a natural disasters.<br>Better documentation and reporting are key to better address current and future challenges related to agriculture and land use in the face of a changing climate in Cambodia. |
| **Category of climate change action** | Cat 1, 2,3 |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>*Up to now there is no clear mapping and land use suitability study and complete agricultural zonings which often result with conflicting over access and control. This action involves proposed key activities:*<br><br>1. Collection of Primary data, compilation and processing ( suggested partnership with FAO and IFPRI)<br>2. Build interactive maps of 5 majors crops in Cambodia<br>3. Capacity building at national and provincial level<br>4. Build interactive maps of 4 majors agriculture systems being Rubbers, Livestock, Forestry and Fisheries<br>5. Interpreted maps of land use, crop yields etc.. available in different website<br>6. Mapping for agricultural products, rubber, forestry and fisheries,<br>7. Zoning for agricultural production (crops and livestock),<br>8. Forestry management zonings (iv) Fishery management zoning,<br><br>*Expected results and benefits:*<br>Key benefits: Decision makers, investors, DPs, Researchers, agricultural practitioners. |

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| **Cost effectiveness of the action** | Dozens of government officials at the provincial level ( 10*23 provinces) and a team at the national level will take part to this activity from the collection of data to the analysis to feed policy makers. A team of IFPRI will ensure the trainings and proper follow up of this activity.<br>The year 1 will be the most expensive one with a budget of 1 000 000 usd including HR and materials. Y2-3-4 will be of 500 000 each including a sharing conference at the end of each year to ensure that the tools are well diffused and the maps well used.<br>– *Clear maps on land availability identified*<br>– *Reduce tension and cost investment* |
| **Preconditions needed for successful implementation** | – *This would be approved internally by the Minister of MAFF, with support from MEF, and liaison with NGOs and donors.*<br>– *Other coordination required include: Coordination with MOE, NCDM and MOWRAM.*<br>– *The minimum capacity requirements are provincial department of agriculture and District Office of Agriculture of the targeted provinces, and local NGOs. GPS data need to be shared.*<br>– *Political and financial support from government and DPs*<br>– *Staff capacities from MAFF*<br>– *Need technical assistance* |
| **Indicator(s) of success** | *Key indictors expected:*<br>– *Interactive maps and Database updated*<br>– *Land used, crop yields maps available*<br>– *Clear maps on land availability identified*<br>– *Reduce tension and cost investment*<br>– *Mapping and zoning of key production areas will be available for planning and investment.*<br>– *Complete declaration of forest land for conservation, development and restoration.*<br>– *Maps for flooded forest and mangrove forest are available for conservation, development and restoration.*<br>– *Fish sanctuary and refuges are determined and delegate management to communities.* |
| **Implementation arrangements** | *Responsible department(s)*<br>GDA, FIA, FA, GDR (General department of rubber), DAHP<br>Collaboration with: CCAFS- IFPRI<br>Provincial departments of agriculture.<br>Local NGOs. |
| **Estimated total cost** | USD 19.400 (2,500,000 expect from CCAFS-IFFRI) over five years (2014-2018) |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>To be identified |
| **Timeframe** | *Indicate the start and end year*<br>**2014 – 2018** |

**ACTION FICHE No. 2**

| **Action** | **Developing and using integrated socio-economic and climate scenarios with climate and land use models and establishment of carbon accounting systems for agriculture, forestry and fishery.** |
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| **CCCSP and Sector CCSP Strategic Objective** | This action contributes to CCCSP objective:(2) To enhance capacity to farmers with new technology in coping with climate change and (3) to reduce GHG emission through forest degradation, animal production, crop production, and to encourage for sustainable forest management in particular flooded forest and forest community, fishery community, renewable energy (biomass) and appropriated agricultural technology. |
| **Rationale** | *Links to the sector and national strategies*<br>– *This action links to national forestry program 2010-2029*<br>– *Strategic Planning Framework for Fishery 2010-2019*<br>– *Strategy for agriculture and water*<br>– *Strategy for rubber development 2011-2020*<br>– *Food security* |
| **Category of climate change action** | Cat 2,3 |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>This action is designed to build capacity of diverse stakeholders to share their raw statistics and to give quick overview of primary food crops, area harvested, crop yields and land use in Cambodia.<br>It will be a relevant tool of monitoring of crop diversification and intensification.<br><br>Key activities<br>– *Provide specialized trainings (both short and long term) with external technical assistance (TA)*<br>– *Data collection, testing, analyzing on key sectors (base on seasonality) and develop climate index modeling*<br>– *Formulating and development modeling of climate change impact (pest, disease and so on).*<br>– *Collection of Primary data, compilation and processing ( suggested partnership with FAO and IFPRI)*<br>– *Build interactive maps of 5 majors crops in Cambodia*<br>– *Capacity building at national and provincial level*<br>– *Build interactive maps of 4 majors agriculture systems being Rubbers, Livestock, Forestry and Fisheries*<br>– *Interpreted maps of land use, crop yields etc.. available in different website*<br>– *Identification of key categories and conducting inventory plan in fishery sector*<br>– *Encouraging participation of private sector and CFi in GHG inventory through benefit sharing scheme from carbon credit.*<br><br>*Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries*<br><br>*Expected results and benefits:*<br>Decision makers, planners and policy makers |

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| | Local practitioners, DPs, NGOs<br>The fishery officers, fishery communities and private sector are the main beneficiaries as they will learn about GHG source and sink from their activities and possible access to carbon credit scheme. |
| **Cost effectiveness of the action** | Dozens of government officials at the provincial level ( 10*23 provinces) and a team at the national level will take part to this activity from the collection of data to the analysis to feed policy makers. A team of IFPRI will ensure the trainings and proper follow up of this activity.<br>The year 1 will be the most expensive one with a budget of US$1 million including HR and materials. Y2-3-4 will be of 1 to 2 million per year including a sharing conference at the end of each year to ensure that the tools are well diffused and the maps well used. |
| **Preconditions needed for successful implementation** | – *This would be approved internally by the Minister of MAFF, with support from MEF, and liaison with NGOs and donors.*<br>– *Other coordination required include: Coordination with MOE, NCDM and MOWRAM.*<br>– *The minimum capacity requirements are provincial department of agriculture and District Office of Agriculture of the targeted provinces, and local NGOs. GPS data need to be shared. Political commitment and financial support*<br>– *Technical assistance*<br>– *Staff capacity in place* |
| **Indicator(s) of success** | – *Available Data used to support Decision Making Framework for Agricultural Development, Planning, and Investment.*<br>– *Available data for climate change scenarios will be ready by 2016 for agricultural planning*<br>– *Climate impacts are scientifically recorded and projected starting from 2017.*<br>– *% of total crops, livestock, and agriculture incident loss will be reduced.*<br>– *24 Scientist developed through short term and long-term trainings.*<br>– *Interactive maps and Database updated*<br>– *Land used, crop yields maps available*<br>– *Number fishery officers are trained and capable of doing the GHG inventory.*<br>– *The GHG accounting system is operational in agriculture, forestry and fishery sector.* |
| **Implementation arrangements** | *Responsible department(s)*<br>GDA, GDR, FA, FIA, DAHP,CARDI, CCAFS-IFFRI |
| **Estimated total cost** | USD 7.850 |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>Not identified |
| **Timeframe** | *Indicate the start and end year*<br>2014 – 2018 |

**ACTION FICHE No. 3**

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| **Action** | **Institutional Mainstreaming Climate Change Adaptation by building capacity and scaling up community resilience.** |

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| **CCCSP and Sector CCSP Strategic Objective** | Promoting crop diversification and intensification for different agro-ecosystems |
| **Rationale** | *Links to the sector and national strategies* |
| **Category of climate change action** | Cat 1, 2 |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>One of the key factor that determine adaptive capacity to climate change is linked to institutions who play key roles in coordination and delivering agricultural extension services and support both technically and financially from national down to local communities.<br><br>To response to this constraints, the key activities include: (i) Up scaling capacity building and farmer field schools on integrated farming in climate change (25 Post-harvest trainings, and current 11 training modules), (ii) Conduct training by using Training Materials on CC to train central and provincial government staffs and target farmers around 200 farmer cooperatives (on crops, livestock, aquaculture, small and medium scale rubber plantation), (iii) conduct (ten) trainings on REDD+ to FA staffs at national and sub-national.<br><br>Expected results and benefits:<br><br>*This action will provide benefit to extension services staff and local extension workers as well as current 200 cooperative farmers.* |
| **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* |
| **Preconditions needed for successful implementation** | This would be approved internally by the Minister of MAFF, with support from MEF, and liaison with NGOs and donors.<br><br>*Other coordination required include:* Coordination with MOE, NCDM and MOWRAM.<br><br>*The minimum capacity requirements are* provincial department of agriculture and District Office of Agriculture of the targeted provinces, and local NGOs. |
| **Indicator(s) of success** | *Up to three SMART indicators for measuring if the action has reached the expected result.*<br>– *5,000 farmers are trained through farmer field schools using the 11 training manuals.*<br>– *3,000 extension workers trained by using 11 training manuals.*<br>– *500 programs will be broadcasting through local radio and TVs.*<br>– *Number of Quick reaction centre for farmers established* |
| **Implementation arrangements** | *Responsible department(s)* |
| **Estimated total cost** | USD 30.990 |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>**Not identified** |
| **Timeframe** | *Indicate the start and end year*<br>2014 – 2018 |

**ACTION FICHE No. 4**

| **Action** | **Promote marginalized groups and women participation to climate change adaptation and mitigation strategy.** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | Contribute to CCSP objective for gender enhancement and climate change in agricultural sector |
| **Rationale** | *Links to the sector and national strategies*<br>To contribute to MAFF's policy and strategy for gender mainstreaming in agriculture in 2006 |
| **Category of climate change action** | Cat 2,3 |
| **Type of action** | Adaptation |
| **Short description of the action and expected results and benefits** | *Short description*<br>*Key activities: (i) provide training to selected 30,000 women in agricultural on climate change impact and response activities, (ii) Encourage and empower women to cope with climate change impact on farming and raisings, (iii) Encouraging financial resilient among smalls farmers in coping with climate change.*<br><br>*Expected results and benefits:*<br>*30,000 of women farmers will be directly benefit* |
| **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* |
| **Preconditions needed for successful implementation** | Political and financial support from the government<br>Staff capacity in place |
| **Indicator(s) of success** | *Up to three SMART indicators for measuring if the action has reached the expected result.*<br>– *At least 30,000 women are increased adaptive capacity to cope with climate change.*<br>– *30,000 women farmers become resilient farmers in agricultural sector by enhancing mental, technical and financial strength.*<br>– *30,000 women are active in farming cooperatives* |
| **Implementation arrangements** | *Responsible department(s)*<br>FA, FIA, GDA, GDR, DAHP and MAFF's Gender unit. |
| **Estimated total cost** | USD 5.750 |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>Not identified |
| **Timeframe** | *Indicate the start and end year*<br>2014 – 2018 |

**ACTION FICHE No. 5**

| **Action** | **Enhance knowledge management related to climate change adaptation and promote innovation that is needed based.** |
|---|---|
| **CCCSP and Sector CCSP Strategic Objective** | Promoting crop diversification and intensification for different agro-ecosystems |
| **Rationale** | *Links to the sector and national strategies* |
| **Category of climate change action** | Cat 1, 2 |

| Type of action | Adaptation |
|---|---|
| **Short description of the action and expected results and benefits** | *Short description*<br>*Key activities:*<br>*Piloting climate smart villages by introduce:*<br>*(i)* Agroforestry (maize, soybean, and other crops sandwiched between rows of multi-purpose trees that stabilize and enrich the soil).<br>*(ii)* Testing climate-smart services, such as tailored weather forecasts to plan planting, harvesting and other activities on the farm.<br>*(iii)* Provide technical advises and weather forecasts will be delivered by mobile phones, and phones will be used to enable farmers to buy index-based insurance that gives them a measure of protection in the event of extreme weather.<br><br>*Expected results and benefits:*<br>*100 villages from 15 provinces (coastal, upland, Tonle Sap and Cambodia delta).* |
| **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* |
| **Preconditions needed for successful implementation** | – This would be approved internally by the Minister of MAFF, with support from MEF, and liaison with NGOs and donors.<br>– *The minimum capacity requirements are* provincial department of agriculture and District Office of Agriculture of the targeted provinces, and local NGOs. |
| **Indicator(s) of success** | *Up to three SMART indicators for measuring if the action has reached the expected result.* |
| **Implementation arrangements** | *Responsible department(s)* |
| **Estimated total cost** | USD 10.000 |
| **Possible funding sources** | *If identified, name the proposed source(s) of funding.*<br>Climate Change, Agriculture, and Food Security (CCAFS) of CGIAR Program. |
| **Timeframe** | *Indicate the start and end year*<br>2014 – 2018 |

**Technical Working Group**
**for Policy and Strategy to Response to Climate Change**
**(TWG-CCAFF)**

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