Royal Government of Cambodia
Ministry of Land Management,
Urban Planning and Construction

ផែនការសកម្មភាព
ឆ្លើយតបនឹងការប្រែប្រួលអាកាសធាតុ
២០១៥-២០១៨

CLIMATE CHANGE ACTION PLAN
2015-2018

ឆ្នាំ ២០១៥

បុព្វកថា

ក្រសួងរៀបចំដែនដី នគរូបនីយកម្ម និងសំណង់ មានបេសកកម្មដឹកនាំ និងគ្រប់គ្រងវិស័យស្នូល ៣(បី) គឺការរៀបចំដែនដី នគរូបនីយកម្ម និងសំណង់ ដែលសុទ្ធសឹងជាវិស័យមានការពាក់ព័ន្ធនឹងការប្រែប្រួលអាកាសធាតុ ។

វិស័យទាំង៣(បី)នេះ មានចរិតលក្ខណៈជាអន្តរវិស័យ ធ្វើការសម្របសម្រួលរវាងវិស័យពាក់ព័ន្ធនានា ទៅក្នុងការកំណត់តំបន់គ្រប់គ្រងនិងអភិវឌ្ឍដី ដូចជាតំបន់សេដ្ឋកិច្ច តំបន់ឧស្សាហ៍កម្ម តំបន់កសិកម្ម តំបន់ទីប្រជុំជន តំបន់ជនបទ តំបន់ទេសចរណ៍ តំបន់អភិរក្សធម្មជាតិ និងតំបន់ការពារបេតិកភណ្ឌផ្សេងៗ ព្រមទាំងតំបន់សម្រាប់ការកសាងហេដ្ឋារចនាសម្ព័ន្ធសេដ្ឋកិច្ចសង្គម ទូរគមនាគមន៍ រដ្ឋបាលសាធារណៈ និងតំបន់ដទៃទៀតដែលកំណត់ដោយរដ្ឋ។

បណ្តាទីក្រុងទាំងតូច មធ្យមនិងធំ ត្រូវបានប្រមូលផ្តុំនៅក្នុងតំបន់ដែលមានតម្រូវការចាំបាច់នូវសេវាកម្មអេកូឡូស៊ីនិងធនធានធម្មជាតិ (ទឹក អាហារ និងជីវម៉ាស) ថាមពលនិងអគ្គិសនី បណ្តាញហេដ្ឋារចនាសម្ព័ន្ធនិងខ្សែចង្វាក់ផលិតកម្មនិងផ្គត់ផ្គង់នានា ដែលអាចត្រូវបានរំខានដោយបញ្ហាការប្រែប្រួលអាកាសធាតុ។ ដើម្បីឆ្លើយតបនឹងការប្រឈមទាំងនេះ ការគ្រប់គ្រងនិងការធ្វើផែនការប្រើប្រាស់ដីឱ្យបានត្រឹមត្រូវ ជាពិសេសការគ្រប់គ្រងលើការផ្លាស់ប្តូរមុខងារប្រើប្រាស់ដីនិងព្រៃឈើ ដើរតួនាទីយ៉ាងសំខាន់ក្នុងការធានាការអភិវឌ្ឍប្រកបដោយចីរភាព ដោយមានដីសម្រាប់លំនៅឋាននិងការបម្រុងទុកគ្រប់គ្រាន់ បញ្ចៀសពីទីតាំងគ្រោះថ្នាក់ និងមានប្រព័ន្ធការពារសេវាកម្មអេកូឡូស៊ីនិងធនធានធម្មជាតិសំខាន់ៗក្នុងទីក្រុងនិងក្នុងតំបន់ផ្សេងៗទៀត។ ផែនការដ៏ត្រឹមត្រូវនេះនឹងជួយកាត់បន្ថយការបំភាយឧស្ម័នផ្ទះកញ្ចក់ ដែលជាទូទៅបណ្តាលមកពីសកម្មភាពរបស់មនុស្ស។

នៅព្រះរាជាណាចក្រកម្ពុជាក្នុងប៉ុន្មានឆ្នាំចុងក្រោយនេះ មានកំណើននគរូបនីយកម្មក្នុងអត្រាខ្ពស់ជាពិសេសនៅក្នុងទីក្រុងធំៗ ដូចជារាជធានីភ្នំពេញ ក្រុងសៀមរាប ក្រុងព្រះសីហនុ ដែលមានកំណើនអត្រាប្រជាជនរស់នៅប្រមាណ២១,៥%។ តាមការព្យាករណ៍ជាទូទៅ អត្រានេះក៏កំពុងកើនឡើងខ្ពស់ផងដែរ នៅតាមបណ្តាក្រុងច្រករបៀងនៃមហាអនុតំបន់ទន្លេមេគង្គ និងតំបន់ឆ្នេរនៃព្រះរាជាណាចក្រកម្ពុជា។

នៅក្នុងឆ្នាំ២០០៦ មានការសិក្សាមួយបង្ហាញថា សកម្មភាពសេដ្ឋកិច្ចក្នុងទីប្រជុំជនបានរួមចំណែកដល់ទៅ៧០,៤% នៃផលិតផលសរុបក្នុងស្រុករបស់កម្ពុជា។

ទន្ទឹមនឹងកំណើនខ្ពស់នៃអត្រាប្រជាជនរស់នៅក្នុងទីក្រុងនិងទីប្រជុំជន តម្រូវការនៃការប្រើប្រាស់ថាមពលអគ្គសនីនិងការបញ្ចេញឧស្ម័នផ្ទះកញ្ចក់ក៏មានការកើនឡើង ជាហេតុធ្វើឱ្យទីក្រុងនិងទីប្រជុំជនប្រឈមនឹងគ្រោះថ្នាក់ពីការប្រែប្រួលអាកាសធាតុដូចជា ការកើនកម្តៅក្នុងទីក្រុង កំណើនទឹកភ្លៀង ទឹកជំនន់ ភាពរាំងស្ងួត និងខ្យល់ព្យុះជាដើម។ ដូច្នេះចាំបាច់ត្រូវមានវិធានការសមស្របដើម្បីធ្វើការកាត់បន្ថយនិងបន្សាំនឹងការប្រែប្រួលអាកាសធាតុនៅក្នុងតំបន់ទីក្រុង ទីប្រជុំជន សម្រាប់ធានាការអភិវឌ្ឍប្រកបដោយចីរភាព និងជំរុញភាពប្រកួតប្រជែងសេដ្ឋកិច្ចរបស់ទីក្រុង។

វិស័យសំណង់ ក៏កំពុងតែមានកំណើនយ៉ាងខ្លាំងដើម្បីផ្គត់ផ្គង់នូវតម្រូវការលំនៅឋានថ្មីនិងការពង្រីកទីក្រុង។ ទីតាំងនិងសម្ភារៈសំណង់លំនៅដ្ឋាន ក៏អាចងាយរងគ្រោះពីគ្រោះមហន្តរាយធម្មជាតិបណ្តាលមកពីការប្រែប្រួលអាកាសធាតុ។ ជាឧទាហរណ៍ជាក់ស្តែង ផ្ទះខ្មែរបែបប្រពៃណីបូរាណដែលមានជើងសសរឈើខ្ពស់ជាក់បន្តុបពីលើជើងតាងបេតុង តែងងាយដួលរលំដោយសារកម្លាំងខ្យល់ព្យុះ។ ម៉្យាងទៀត ការសិក្សាវាយតម្លៃភាពងាយរងគ្រោះពីបញ្ហាប្រែប្រួលអាកាសធាតុនៅទីក្រុងព្រះសីហនុបានបង្ហាញថា លំនៅឋានបណ្តោះអាសន្នតាមតំបន់ឆ្នេរមានភាពងាយរងគ្រោះពីការប្រែប្រួលអាកាសធាតុដោយសារភាពមិនរឹងមាំនៃគ្រឿងបង្គុំសំណង់។

មានការព្យាករណ៍ថាទាំងទីក្រុងតូច មធ្យមនិងធំនឹងបន្តពង្រីកទំហំរបស់ខ្លួន ដោយភាគច្រើនតាមរយៈការផ្លាស់ប្តូរតំបន់ដីកសិកម្មនិងតំបន់ទេសភាពអេកូឡូស៊ីនិងធនធានធម្មជាតិ ទៅជាតំបន់អភិវឌ្ឍទីក្រុង ដែលនឹងបណ្តាលឱ្យមានចំនួនទឹកជំនន់និងព្យុះកើនឡើង ហើយធ្វើឱ្យការពង្រីកទីក្រុងទាំងនេះត្រូវរងគ្រោះដោយផលប៉ះពាល់ពីអាកាសធាតុដែលប្រែប្រួលមិនប្រក្រតី រួមផ្សំនឹងកង្វះខាតលទ្ធភាពនិងតុល្យភាពនៃការបន្សាំនឹងការប្រែប្រួលអាកាសធាតុផងនោះ។

មួយផ្នែកធំនៃឆ្នេរសមុទ្រកម្ពុជា ក៏ត្រូវបានព្យាករណ៍ថានឹងមានភាពងាយរងគ្រោះដោយការប្រែប្រួលអាកាសធាតុមិនប្រក្រតីនេះផងដែរ។ កំណើននីវ៉ូទឹកសមុទ្រ កំណើនព្យុះសមុទ្រ កំណើនទឹកជំនន់ឬគ្រោះរាំងស្ងួតរយៈពេលវែង ជាកត្តាគំរាមគំហែងយ៉ាងធ្ងន់ធ្ងរដល់ការអភិវឌ្ឍប្រកបដោយចីរភាព ដល់ជីវភាពរស់នៅរបស់ប្រជាជននិងដល់ហេដ្ឋារចនាសម្ព័ន្ធរូបវន្តនានាក្នុងទីក្រុង។

តំបន់សហគមន៍ក្រីក្រមួយចំនួនក្នុងទីប្រជុំជននិងទីក្រុងដែលមានដង់ស៊ីតេប្រជាជនខ្ពស់ គឺជាកន្លែងប្រឈមនឹងហានិភ័យខ្ពស់បំផុតពីការប្រែប្រួលអាកាសធាតុ ដោយសារសហគមន៍ក្រីក្រទាំងនោះភាគច្រើនបានតាំងទីលំនៅក្នុងតំបន់កង្វះខាតហេដ្ឋារចនាសម្ព័ន្ធ និងមានសមត្ថភាពតិចតួចក្នុងស្តារសេដ្ឋកិច្ចឡើងវិញក្រោយគ្រោះធម្មជាតិ។

ផែនការសកម្មភាពឆ្លើយតបនឹងការប្រែប្រួលអាកាសធាតុ ត្រូវបានរៀបចំឡើងនិងត្រូវដាក់បញ្ចូលទៅក្នុងផែនការអភិវឌ្ឍន៍និងសកម្មភាពនានាប្រចាំឆ្នាំរបស់ក្រសួង។ ឯកសារនេះនឹងផ្តល់នូវយុទ្ធសាស្ត្រនិងសកម្មភាពជាក់ស្តែងជាអាទិភាព ឆ្លើយតបនឹងការប្រែប្រួលអាកាសធាតុតាមវិស័យនីមួយៗ។

ស្របតាមសេចក្តីណែនាំស្តីពីការរៀបចំផែនការសកម្មភាពរបស់រាជរដ្ឋាភិបាលកម្ពុជា ឯកសារផែនការសកម្មភាពនេះនឹងដើរតួនាទីគាំទ្រដល់ការអភិវឌ្ឍក្នុងវិស័យរៀបចំដែនដី នគរូបនីយកម្ម និងសំណង់នៃព្រះរាជាណាចក្រកម្ពុជា ដោយបានកំណត់នូវសកម្មភាពអាទិភាពជាគន្លឹះមួយចំនួនដែលអាចយកមករៀបចំបង្កើតជាកម្មវិធីនិងគម្រោងផ្សេងៗប្រកបដោយជោគជ័យ។

ឆ្លៀតក្នុងឱកាសនេះ ខ្ញុំសូមថ្លែងអំណរគុណចំពោះគណៈកម្មាធិការជាតិគ្រប់គ្រងការប្រែប្រួលអាកាសធាតុនិងក្រសួងបរិស្ថាន ដែលបានដើរតួនាទីដ៏ចម្បងលើការងារគ្រប់គ្រងការប្រែប្រួលអាកាសធាតុតាមរយៈការផ្តល់ជំនួយគាំទ្រផ្នែកបច្ចេកទេសនិងហិរញ្ញវត្ថុ ពីកម្មវិធីសម្ព័ន្ធភាពប្រែប្រួលអាកាសធាតុកម្ពុជា។

ភ្នំពេញ ថ្ងៃទី២០ ខែឧសភា ឆ្នាំ២០១៥

ឧបនាយករដ្ឋមន្ត្រី
រដ្ឋមន្ត្រីក្រសួងរៀបចំដែនដី នគរូបនីយកម្ម និងសំណង់

អ៊ឹម ឈុនលឹម

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Contents

List of Abbreviations and Acronyms

ADB	Asian Development Bank
AEC	ASEAN Economic Community
ASEAN	Association of Southeast Asia Nations
CCAP	Climate Change Action Plan
CCD	Climate Change Department (Ministry of Environment)
CCCSP	Cambodia Climate Change Strategic Plan 2014-2023
CCS&AP	Climate Change Strategic and Action Plan
DP	Development Partner
GHG	Greenhouse Gas
GMS	Great Mekong Sub-Region
ICEM	International Center for Environmental Management
IPCC	Intergovernmental Penal of Climate Change
LUCF	Land Use Change and Forestry
MLMUPC	Ministry of Land Management, Urban Planning and Construction
MoE	Ministry of Environment
NCCC	National Committee for Climate Change
NGO	Nongovernmental Organization
NSDP	National Strategic Development Plan
OECD	Organization for Economic Cooperation and Development (OECD)
RGC	Royal Government of Cambodia
SDP	Sector Development Plan
SNC-UNFCCC	Second National Communication for United National Framework for Climate Change Convention (UNFCCC)
UNESA	United Nations for Economic and Social Affair

Executive Summary

Cambodia in recent decades has experienced high rate of economic growth, population growth, and the rapid expansion of urban areas as the result of peace, stability and regional integration. However, these growths are not without threats and challenges. The Second National Communication to UNFCCC reports that climate change is eminent threat to sustainable development in Cambodia.

The level of funding needed for sound urban adaption could exceed the capacities of local and national governments and international agencies. Much of the investment will have to come from individuals and households, communities, and firms through their decision to address adaptation and resilience. These will need an appropriate local government or the ministry to establish appropriate regulatory frameworks and the application of building standards, to ensure that the choices made by individuals, households, and firms support adaptation and prevent maladaptation. Land use planning and management have important roles in ensuring sufficient land for housing that avoids dangerous sites and protects key ecological services and systems.

The Royal Government of Cambodia has prepared necessary policies, strategies and action plans to address climate change. One of policies to hedge against the natural disasters and leverage on the opportunities is the Cambodia Climate Change Strategic Plan (CCCSP) 2014-2023, which is responding to the complexity and many uncertainties of climate change risks and threats to Cambodia's economic growth, livelihoods and ecosystem functions.

The CCCSP allows relevant line ministries to operationalize the strategies into action plans and operate to Sector Development Plan (SDP).

Following the technical supports from Ministry of Environment and outline from the Council of Ministers, the Ministry of Land Management, Urban Planning and Construction has formed a Climate Change Technical Working Group to prepare the Climate Change Action Plan for Ministry of Land Management, Urban Planning and Construction 2015-2018 by adopting the strategies of the CCCSP and to align to the annual work plan of the ministry. Through participatory consultative process, the Ministry of Land Management, Urban Planning and Construction has identified 8 prioritized actions responding to climate change with total budget estimation of **US$9,100,000**for implementing the actions from 2015 to 2018. They are:

1. Prepare spatial planning guideline at all levels for climate change adaptation
2. Integrating climate change response measures to the commune land use planning
3. Conduct vulnerability assessment for major urban and cities (13 towns/cities) to climate change and develop climate safeguard principle
4. Promote the settlement development that adapt to natural disasters at urban and rural
5. Promote proper shelters for low-income households and vulnerable households
6. Formulating and developing green infrastructures and green buildings guideline for existing and on-going city master plan
7. Mainstreaming climate change to the development of building code

8. Enhancing climate change vulnerability assessment and adaptation through regional and provincial spatial planning,master plan and land use planning in coastal areas.

Key indicators for 2015-2018 included:

No	Key actions	Key indicators
1	Prepare spatial planning guideline at all levels for climate change adaptation	• Guideline for national spatial planning with climate change responses • Guideline for provincial spatial planning with climate change responses • Guideline for city, district and khan spatial planning with climate change responses • Updated guideline for commune land use planning with climate change responses.
2	Integrating climate change response measures to the commune land use planning	• Comprehensive review report on current status of CLUP • # of communes, districts, provinces, and national levels obtained training on capacity development for climate change adaptation and mitigation. • # of Maps overlaid with climate hazard for CLUPs • # of climate change adaptation plans for communee
3	Conduct vulnerability assessment for major urban and cities (13 towns/cities) to climate change and develop climate safeguard principle	• # of technical staffs obtained training on climate change and vulnerability and adaptation. • The vulnerability and adaptation assessment reports for 15 towns • Climate mapping and safeguard zoning for 13 towns
4	Promote the settlement development that adapt to natural disasters at urban and rural	• Inventory reports on the urban slums • Low cost housing development design ready for development (Technical guideline for house model that is resilient to the storm in different locations, possibly 20 types, and to flood in different locations, possibly 10 types) • # of consultation with community • # of low cost housing constructed in the piloted areas (500 households in 100 communities receive safety house)
5	Promote proper shelters for low income households and vulnerable households	• Data on the demand and supply of the houses in different urban and cities • Various types of proper house model that is resilient to the climate change and reasonable price • # families with low income and vulnerable group receive proper house for living • # of poor/slum communities receives maintenance and improvement on infrastructure.
6	Formulating and developing green infrastructures and green buildings guideline for existing and on-going city master plan	• # of MLMUPC staffs obtained training on the development of green infrastructure guideline • A guideline for green infrastructure and building developed and approved. • Green label building developed and approved
7	Mainstreaming climate change to the development of building code	• Technical review report on the current status of building construction • # of staff obtained technical training • # of national consultation workshop on the building code

		• # of rules, regulation and building code developed.
8	Enhancing climate change vulnerability assessment and adaptation through spatial plan, master plan and land use planning in coastal provinces	• Spatial planning developed for 2015-2045 (30 years period) • Master plan of each province developed for 2015-2035 (20 years period) • Land use planning and management mechanism developed for 2014-2030 (15 years period). • Climate vulnerability assessment, zoning and climate hotspot adaptation planning and safeguarding developed.

Key impacts

This CCAP will contribute to building resilience of communities and GHG mitigation efforts. The action plan improves the resilience of communities through Commune Land Use Planning and other land use maps. Further, it addresses climate change issues in urban areas.

The indicators in the action plan contribute to the NSDP indicator on climate change, "number of commune vulnerable to climate change" and "Carbon credit earned from clean development mechanism and other mechanisms". The Climate Change Technical Working Group of the Ministry will provide inputs to the General Department of Administration, who will prepare annual and progress report to the Ministry of Economy and Finance.

The Climate Change Technical Working Group for MLMUPC will play a central role in coordinating and implementing this action plan and related actions or projects/ programs with relevant departments within the ministry as well as with other relevant ministries. In the short term, the capacity of the climate change technical working group in coordination and resources mobilization inter- and intra-ministry has to enhance for the successfully implementation of the Action Plan. In the long term, to ensure the climate change responses captured in the future annual work plan and budgeting of the ministry more spontaneously, the role of Climate Change Technical Working Group of the Ministry should enable the participation in the early stage of preparation of annual work plan budgeting as possible. The climate change project management unit may need to establish to smooth the implementation of project on climate change.

Finally, the Climate Change Action Plan for MLMUPC is the first ever action plan of the ministry for responding to the threats and opportunities from the climate change.

1. Background

Rapid urbanization is taking place in South East Asia with cities in the region expanding five times faster than those in member countries of the Organisation for Economic Co-operation and Development (OECD). In the next 50-100 years, urban growth in the Greater Mekong Subregion (GMS) is expected to be experienced primarily in small and medium-sized cities and peri-urban areas along existing and new growth corridors (ICEM 2014).

Large cities, where populations exceed 5 million people, are becoming increasingly common place, whist in 1950 there were only 8 cities in the world with a population greater than 5 million, by 2000 there were 42. In the Mekong region, Bangkok and Ho Chi Minh City have already surpassed 5 million people, with Yangon likely to follow soon (UNESA 2012). In 2011, Phnom Penh, Bangkok, Yangon, Ho Chi Minh City, and Hanoi had estimated populations represent 55 percent, 36 percent, 28 percent, 23 percent, and 11 percent of each country's total urban population respectively. Overall, the Mekong region's estimated total population was 223 million people in 2010, and is expected to reach 229 million people by 2050. At present, 32 percent of the region's population lives in urban areas, this is expected to rise to 40 percent by 2025 (Middleton and Dusita 2014).

The extensive coastline, riverine and wetland areas and seasonal variability make the GMS countries especially vulnerable to storms, floods and drought. ICEM (2014) predicted that climate change is likely to bring more extreme conditions to the region, increasing the frequency and severity of climate and hydrological events. Sea level rise, storm surge, increased flood levels and duration, and more extensive and unpredictable droughts threaten populations and critical infrastructure in urban centres, posing serious challenges to sustainable development across the GMS (Great Mekong Sub-region). Richard and MacClune (2013) also indicates the expansion of urban areas is altering ecological landscapes; the conversion of agricultural land wetland areas creates new risks of flooding, affecting key critical economic assets that located in these flood prone areas.

The build environment in urban areas has to adapt to the range of climate change impacts in order to protect urban populations and economies and protect among society's most valuable assets. Knowledge and innovation are required for adapting existing and new buildings. This will be built on the bedrock of affordable housing appropriate for health and safety, built to climate-resilient standards and with the structural integrity to protect its occupant's long term against extreme weather (Revi et al 2014).

Economic impacts are likely in key sectors such as manufacturing industries and services. Areas of highest poverty density in towns and cities are particularly at risk; these communities are more likely to be situated in areas with poor infrastructure with little economic capacity to recover after natural disasters.

In addition, urbanization is set to intensify with the ASEAN Economic Community (AEC) coming into place in 2015 linking urban, commercial and industrial centers across the GMS (Richard and MacClune

2013). It represents a dramatic shift in ecological landscapes, and in demographics. Urbanization creates dependency on critical systems (food, water, energy) that are often beyond the control of city administrations. Failure in these systems can have enormous implications for people in urban areas, while businesses located in these areas, and those dependent on resources elsewhere are also at risk (MacClune 2013).

GMS countries have initiated efforts to integrate climate change adaptation into national development strategies and policies, but in many cases this has not yet translated into specific agendas for cities and towns.

In Cambodia, the damage and loss of floods in 2013was estimated with US$ 356 million and socially affected 1.8 million people with 168 casualties("Cambodia 2013: Post-Flood Early Recovery Need Assessment Report," 2014). These impacts have prompted the Royal Government of Cambodia to take steps addressing climate change through the development of Climate Change Strategic Plan 2014-2023 (CCCSP) in 2013(RGC, 2013), (RGC, 2014).

The CCCSP provides an overarching framework for climate change responses in Cambodia, allowing line ministries to adapt relevant strategies of CCCSP as their sector climate change strategic plan and operationalize them into action plan as well as Sector Development Plan (SDP).

The Ministry of Land Management, Urban Planning and Construction (MLMUC) has mandates governing three main sectors (land management, urban planning and construction projects) relating to climate change. Land Use Change and Forestry (LUCF) is a key sector in mitigation of greenhouse gas (GHG) emissions(MoE, 2010). GHG emissions from LUCF sector occurs mainly from human activities that are in the form of land-use conversions and deforestation activities.

Cambodia urbanization is growing rapidly in recent year, in particularly in major cities, e.g. Phnom Penh, Siem Reap and Sihanouk Ville with overall 21.5% of Cambodian people are living in the urban area and growing (RGC, 2014). There was estimation that urban shared 70.4% of Cambodian GDP in 2006 (Yuen, Revisitng Urban Planning in East Asia, South-east Asia and the Pacific, 2009).Urban areas both people and infrastructures are vulnerable to major climate change hazards such as heat-island, floods and storms. As the same time, urban areas are major energy consumer and GHG emitters. Thus, urban climate change adaptation and mitigation is vital measure for sustainable development in the cities and bolstering economic competitiveness.

Construction sector is booming in Cambodia to meet demand for new houses. The house construction materials and locationcan be susceptible to climate induced disasters. For example, traditional Cambodian stilt house is vulnerable to storm.The vulnerability assessment of Sihanouk Ville identified informal settlements in the coastal area is vulnerable to climate change because of houses' structures and not rigid (UNHABITAT, 2012).

Enhancing resilient of house buildings for low-income groups will usually be expensive and may face political challenge (Revy et al 2014). However, there are some recognition that strengthening the asset

based of low income households helps increase their resilience to stress and shocks, including those related to climate change. It has become more common for local governments to work with community-based organization's in upgrading their homes and settlements in disaster risk reduction and community based adaptation is building on these experiences and capacities.

Most housing and infrastructure upgrading programs mean that those living in low-income settlements become incorporated into "formal" city and this often means an increased expectation on the state to reduce vulnerability, including long-term and strategic adaptation investments through access to schools, health care, infrastructure, and safety net. Low-income households may require particular assistance because of greater exposure to hazards, lower adaptive capacity, more limited access to infrastructure or insurance, and fewer possibilities to relocate to safer accommodation, compared to wealthier residents (Reviet al 2014).

Overall, there are at least four adaptive capacity faced in urban areas under the context of climate change adaptation. These include: local government capacity, the proportion of residents served with risk-reducing infrastructure and services, the proportion living in housing built to appropriate health and safety standards, and the level of risk from climate change's direct and indirect impacts. Key indicators used to assess urban resilience to climate change include the proportion of the population with water pipes to their homes sewers, drains, health care and emergency services, the quality and capacity of government(Revi et al 2014).

The ministry's Climate Change Action Plan (CCAP)was prepared and integrated into the development plan of the ministry. The strategy provides area of focus for the ministry to address climate change, while action plan defines concrete actions on climate change responses, which are integrated into the annual work plans of the ministry.

The development of Climate Change Action Plan (CCAP) for Ministry of Land Management, Urban Planning and Construction followed the outline from the Council of Ministers, while technical guideline on climate change was the support from Ministry of Environment. The document also provides mechanism for management and financing, and monitoring and evaluation framework.

2. Vision

An integrated land management, urban planning, constructions, housing and cadastre in Cambodia that ensuring sustainable development, liveability, low carbon emission and resilience to climate change.

3. Mission

To create a national and regulatory framework for engaging the public, the private sector, and civil society and development partners through participatory process in an integrated land management, urban planning, which can help 'shape' town zoning plans to build resilience and sustainability through green infrastructure and development controls and safeguards.

4. Goals

Base on national policy on land management in 2011 and current draft of sub-decree on urbanization and city management, the main goal can be summarized below:

- To ensure quality, efficiency, sustainability, and equity of urbanisation
- To protect human right of public and private interest in development, conservation and construction and
- To promote green growth and participating in climate change adaptation and mitigation as well as natural disaster reduction in the country.

5. Strategy Framework

5.1. Strategic Analysis

The sub-decree on Organizing and Functioning of the Ministry of Land Management, Urban Planning and Construction (MLMUC) in 1999[1] designates key missions for ministry in leading and managing the affairs of land management, urban planning, construction, cadastre and geography in the country, except in any areas(s) competency to which the government has been authorized to other institutions. To achieve this mission, the ministry has three major sectoral roles:

1. **Land management**

- Land management is characterized by inter-sectoral and inter-ministerial coordination in development zoning which include economy, industrial, urban areas, rural areas, natural conservation, tourism sites and patrimony protection zones as well locations of socio-economic infrastructure, communications, public administration and other areas fixing by the state.
- Develop proposals and carry out the policy of land management which shall ensure the balance of urban and rural development and distribution of growth.
- Conduct studies and make prospective analysis on land management, make proposals and ensure the implementation of the necessary regulations of land management policy, proposed policy, plan of actions and proper measure which are favourable to the development of the land.
- Monitoring the process of coherence development policy of all sectors and the bound relationship between ministerial and provincial-municipal activities.

2. **Urban planning and construction**

- Conduct research and prepare prospective analysis and compile statistics related to framework of urban planning and construction, raise proposal and ensure the application of necessary regulations in the implementation of the policy of urban planning and construction
- Develop proposals on policy, plan of actions and measure for solving the problem of squatters and house building with respect to landscape, resorts in city and town and protection of environment.

[1]RGC (1999) Sub-decree on Organizing and Functioning of the Ministry of Land Management, Urban Planning and Construction (MLMUC).Ministry of Land Management, Urban Planning and Construction, Phnom Penh.

- Define rules and regulations related Tolland tenure, urbanisation, construction and expropriation, land reserves.
- Issue all kind of license and agreement related to urbanisation and construction.
- Promote housing project development, set out urbanisation, and divide open land into lots/parcels and developing zones.
- Work with key relevant ministries for construction and maintenance of public buildings, protection of patrimony and historic places, sites, protecting and conservation of environment, natural landscape, and ecosystem.
- Land mapping and zoning for infrastructure development such as housing, land use and urban planning.

During the Fifth Legislature (2014-2018), the government will intensify drafting and adopting various policies which include land reforms by focusing on strengthening the management, organization, utilization and distribution of lands that will contribute to reducing poverty, ensuring food security, protecting the environment and natural resources, and socio-economic development, within a market framework and drafting the law on Land Management and Urbanization (RGC, 2014).

Climate Change Projections and Implications

The Cambodia Climate Change Strategic Plan 2014-2023 (RGC, 2013) for readers to understand climate projections and implications on the Cambodia.

Climate Projections

- Temperatures in Cambodia have increased and this trend is projected to continue with mean monthly temperatures increasing between 0.013°C and 0.036°C per year by 2099, depending on location, with higher rates at low latitudes.
- Annual rainfall projection indicates an increase in rainfall for Cambodia. There is an increasing trend in seasonal rainfall between June and August in the northwest, and a decreasing trend in the northeast of the country.
- The 4thAssessment Report of the IPCC indicates sea levels in the region are projected to rise under various scenarios: by 2090 relative to 1980 – 1999, the sea level will rise 0.18 – 0.43m under low emission scenarios (SRES B1), 0.21 – 0.52m under medium emission scenarios (SRES A1B), and 0.23 – 0.56m under high emission scenarios (SRES A2).
- The MOE SNC (2010) projected with 0.56m seas level rise and will cause permanent inundation of about 25,000 ha of coastal Cambodia within 90 years.

Implications

- Increase in temperature is likely to affect agricultural productivity. According to the International Rice Research Institute, rice grain yield will decline by 10% for each 1°C increase in growing-season minimum (night) temperature in the dry season.
- USAID (2014) on The Mekong Adaptation and Resilience to Climate Change (Mekong ARCC) demonstrated that rainfall will get higher in the provinces of higher elevation during the wet

season, but will get drier during the dry season, which could hamper the production of coffee and rubber in Cambodia.

- The 435 km Cambodia coastline is vulnerable to sea-level rises and the severe impacts of more frequent typhoons under future climate projections. This could affect tourism potential and cause coastal erosion, while strong winds could damage settlements in coastal areas.
- The coastal zones would be affected by tropical cyclones from the Pacific, the central plains would experience seasonal flooding caused by increased rainfall.
- In 2000 Cambodia emitted 47.6 million tonnes of CO_2 equivalent, but the forestry sector absorbed 48 million tonnes of CO_2 equivalent. This figure expects to be significant increased with available data update in place, in particular current land use changes.

Climate Change and Land Management

Land management has played both roles: adaptation and mitigation in the context of climate change (TERRAFRICA, 2014). Land Use Change and Forestry (LUCF) is a key sector in mitigation of greenhouse gas (GHG) emissions (MoE, 2010).GHG emissions from LUCF sector occurs mainly from human activities that affect the biosphere's capacity to absorb or release carbon into the atmosphere. The net release or uptake of GHG is a function of two basic biophysical processes:

- Changes in forest/woody carbon stocks due to the net annual bio-mass growth of existing forest and non- forest stands, and possible biomass re-growth in abandoned lands;
- Land-use and forest conversion practices which affect the carbon chemistry of the atmosphere via biomass burning, decay, and soil carbon release or removals. Soil fertility and agricultural production are one of an example of this practice.

Land use change has impact on the carbon balance of ecosystems. Practices that detract from environmental sustainability cannot be promoted. At its simplest, the common planning typology of land use zoning determines land cover types. Land cover types affect energy and water consumption as well as waste and traffic production and GHG emissions (Yuen and Kong 2009).

Climate Change and Urban Planning

In many developing countries, local authorities lack the mandate and human capacity to handle urban planning and its enforcement mechanisms (Yuen and Kong 2009).

It is projected that small, medium as well as large cities are expected to expanded, mostly the conversion of existing ecological landscape and wetland areas. With project of on-going intensity of floods, storms as well as adaptive capacity deficits these urban expansion are vulnerable to climate extreme. For Cambodia, beside Phnom Penh, those medium and small towns are also vulnerable to flood.

Example from Battambang climate change projection
Climate change is projected to be significantly impact on Battambang with combination of current land use change as well as change in hydrological flows from upstream down through the town and

TonleSapLake. The figure below is projected that by 2050 the average rainfall and maximum temperature will expect to be increased as shown in table below:

Projected changes to average rainfall & maximum temperatures by 2050	**Baseline**	**With C.C.**	**Change**
Average annual rainfall:	1300 mm	1365 mm	+5 %
Total rainfall in wet season:	1170 mm	1267 mm	+8.3 %
Total rainfall in dry season (Mar - Aug):	230 mm	224 mm	-2.5 %
Average daily maximum temperature (Annual)	32 °C	34.2 °C	+2.2 °C
Average maximum temperature in wet season:	31 °C	33.6 °C	+2.6 °C
Average maximum temperature in dry season:	32.5 °C	34.4 °C	+1.9 °C

By 2050, Battambang's total rainfall in the wet season would increase by about **8.3%**

- By 2050, Battambang's average daily maximum temperature during the dry season would increase by between **1.8 -1.9°C**

In summary, the expected climate changes in 2050 Battambang are expected to be:

Significantly hotter and wetter in the wet season

Hotter and drier in the dry season

Example of key impact- flooding

Battambang is one of an example that many constructions and city expansion over many part of the wetland and hydrological zone with conversion of upstream watershed degradation. In 2011 (which water level up to 13.95 m) floods affected 31,458 people (7111 households in 31 communes in 9 districts), inundated 52,503 ha, and destroyed 36.266 ha of rice fields. Flood in in 2013 is even more serious as water level is the highest in history that is 14.2 m high along Sangke River (normally 12.5 meters, water start to overflow from river to the town and areas in lowland or wetland).

Flood in late 2013 is considered as the worst case in history of 70 years based on personal interview with water resource official in Batambang in late October 2013. Various sources water from upstream including torrential rain has concentrated through Sangker River including other watershed areas down to river and the province.

Adopting from ICEM (2015): Building climate resilient in cities in GMS

As urban areas developed, changes occur in their landscapesurroundings (EPA, 2014). Buildings, roads, and other infrastructure replace open land and vegetation. Surfaces that were once permeable and moist become impermeable and dry. The modified land surface in cities affects the storage and radiative and turbulent transfers of heat and its partition into sensible and latent components (IPCC, 2007). Although there is no study on urban heat island for Phnom Penh, its people have lamented the hotter weather, especially during the dry season.

The increase of population and economic activities in cities are root cause of rising greenhouse gas emission from urban. For example, the rising demand for electricity in the cities is being met by burning of fossil fuels that pollutes and generates increasing volume of greenhouse gas emission. The rising of transportation activities within the city also contributes significantly to the increasing GHG emission. Thus, Yuen & Kong (2009) suggested that the integrating GHG emission reduction into the city's operation of waste management, land use planning, transport improvement and building retrofits could serve as a promising practice for the city.

Climate Change and Construction

In principle, key assets for most of the urban area involves building: houses, schools, hospitals, shop, workshops, offices, factory and official buildings. It involves servicing: sewage, drainage, roads and traffic control, street lighting, electricity and gas reticulation, public transport, air ports, train stations and bus stands, a massive reconstruction of the fabric of life which, when city populations are growing fast, is never ending, if in itself a major components of economic activity (McKinnon 2011).

Adopting green building principle and green infrastructure development are encouraged to minimize impact on climate change and reducing GHG emission. On the other hand, the buildings can be vulnerable to climate related hazards. For example, traditional Cambodian stilt house is vulnerable to storm. The vulnerability assessments of Sihanouk Ville identified informal settlements in the coastal area are vulnerable to climate change because of houses' structures and not rigid (UNHABITAT, 2012).

Priority Policy

The Ministry of Land Management, Urban Planning and Construction has identified a number of priorities that are relevant to addressing climate change for the fifth governmental mandate, 2014-2018 (RGC, 2014).

Land Management and Urban Planning

- Make and approve the Law on Land Management and Urban Planning, and related legal policy documents for implementing this Law.
- Enhance the effective implementation of Cambodia's coastal zones management and development through the Circular on Coastal Zones Management and Development, and to push for adoption and implementation of integrated strategy for developing Cambodia's costal zones and Preah Sihanouk Master Plan aiming to sustainably maintain the prestige of the most beautiful beach in the world and the green environmental zones of the Cambodian Sea.
- Continue to adopt the National Housing Policy in order to resolve housing problems for poor people so they can live in safety, welfare, and in dignity.
- Continue to provide technical support to the councils of all municipalities, districts, khans, communes, and sangkats in the preparation of master plans and land use plans.

Management Development and Construction

- Coordinate and facilitate the investments in the construction sector by paying attention to the strengthening of partnership with the private sector to boost the country's economy and create employment opportunities for citizens.
- Prepare and adopt the Construction Law, construction standards, sub-decrees, and legal policy documents relating to the construction work for effective implementation. Strengthen mechanism and capacity of technical staff in order to effectively improve the administrative services, and continue to implement the de-concentration policy in the construction sector.
- Continue to widely disseminate to the general public the legal policy documents relating to construction work and the procedures on requesting a permit for building constructions.
- Enhance the capacity of physical persons and legal persons who make professions in the construction sector, and to better uphold the local construction industry to be able to compete, study/implement the construction project, and build mega constructions by ourselves, as well as to provide reliable services with quality and effectiveness both in the country and in the regions.

5.2. Key strategies

The consultation within the Ministry of Land Management, Urban Planning and Construction has identified the strategic objectives and strategies of the CCCSP as the most relevant for the Ministry as following:

1. Promote low-carbon, climate-resilient city development planning and develop city-level coordination mechanisms (e.g. capital and provincial effective mass transport, modernization of wastewater treatment facility and landfill)-development of climate change zoning safeguards;
2. Promote land use planning[2]to prioritize adaptation measures for key regions of Cambodia, such as coastal zones, highlands, rural and urban areas.
3. Promote low-carbon planning and technologies to support sustainable development though building code for buildings and infrastructure development
4. Enhance capacity development for technical staff and awareness raising for rural publics on construction of traditional houses in rural area resilient to extreme climate change such as storms and floods.

6. Action Plan

Ministry of Land Management, Urban Planning and Construction has identified the key action to operationalize the strategies that adopted from the CCCSP. This section details the scope of actions and planning matrix, and describes the implications of expenditure for climate change intervention and benefits from implementations.

6.1. Scope of Action Plan

The climate change action plan for Ministry of Land Management, Urban Planning and Construction sets the timeframe aligning to the planning process of the Ministry. The actions are classified into three categories:

[2] balancing of land use zoning in city and natural landscape development

- 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

The long list of actions (see Annex 1) responding to climate change was proposed by relevant departments of the ministry. The long list of actions was prioritized by using multi-criterial analysis resulting in a shorter list of actions (see Annex 2). The Active Fiche (see Annex 3) provides detail on each actions.

6.2. Action Plan Matrix

The matrix contains estimated budgets; responsible departments and category of actions corresponding to each prioritised action (see Annex 2).

Table 1: Action Planning Matrix

No.	Action	Estimated budget (USD'000) *(note: present costs to the nearest 1000 USD)*				
		2015	*2016*	*2017*	*2018*	*Total*
1.	Prepare spatial planning guideline at all levels for climate change adaptation Estimated relevance for CC finance: 100%	*100*	*100*	*100*	*100*	*400*
2.	Integrating climate change response measures to the commune land use planning Estimated relevance for CC finance: 100%		*200*	*300*	*200*	*720*
3.	Conduct vulnerability assessment for major urban and cities (15 towns/cities) to climate change and develop climate safeguard principle Estimated relevance for CC finance: 100%	*500*	*500*	*500*	*500*	*2000*
4.	Promote the settlement development that adapt to natural disasters at urban and rural Estimated relevance for CC finance: 50%	*500*	*500*	*500*	*500*	*2000*
5.	Promote proper shelters for low income households and vulnerable households Estimated relevance for CC finance: 50%	*250*	*250*	*250*	*250*	*1000*
6.	Formulating and developing green infrastructures and green buildings guideline for existing and on-going city master plan Estimated relevance for CC finance: 20% (energy efficiency)	*100*	*200*	*100*	*100*	*500*
7.	Mainstreaming climate change to the development of building code	*100*	*200*	*100*	*100*	*500*

	Estimated relevance for CC finance: 20%					
8.	Enhancing climate change vulnerability assessment and adaptation through regional and provincial spatial planning, master plan and land use planning in coastal areas. Estimated relevance for CC finance: 100%	*500*	*500*	*500*	*500*	*2000*
Total budget estimation for implementation of all actions		2050	2450	2350	2250	***9,100***
Total relevant budget for CC finance (based on methodology from the Cambodia Climate Change Financing Framework)						***6,800***

6.3. Implication for Expenditure in the Ministry

There is no financial availed during the development this CCAP. But based on annual budget program development (BPD), there was financial available for the ministry allocated from ministry of economic and finance with an estimated 95,097.7 million Riel of which, 90,570.0 million Riel for technical work for the ministry while 71,613.4 million Riel was allocated for overall management, operation and ministry leaders' special mission (overall around US$6-7 million/year).

6.4. Expected Benefits from the Implementation of the Action Plan

The Climate Change Action Plan for the Ministry of Land Management, Urban Planning and Construction will contribute to building resilience of communities and GHG mitigation efforts. The first two actions in the land management enhance the adaptive capacity of the communities through Commune Land Use Planning and other land use planning maps. The actions in the urban planning and housing have three actions, which focusing on increasing the resilience of the cities and energy saving from city level to the household level. The urban planning links to the next actions relating to construction. The final sector of MLMUPC focuses on the green infrastructures and buildings in the cities raising the resilience of the cities by addressing flooding and heat in the cities, and reduces the GHG emission through effective energy consumption.

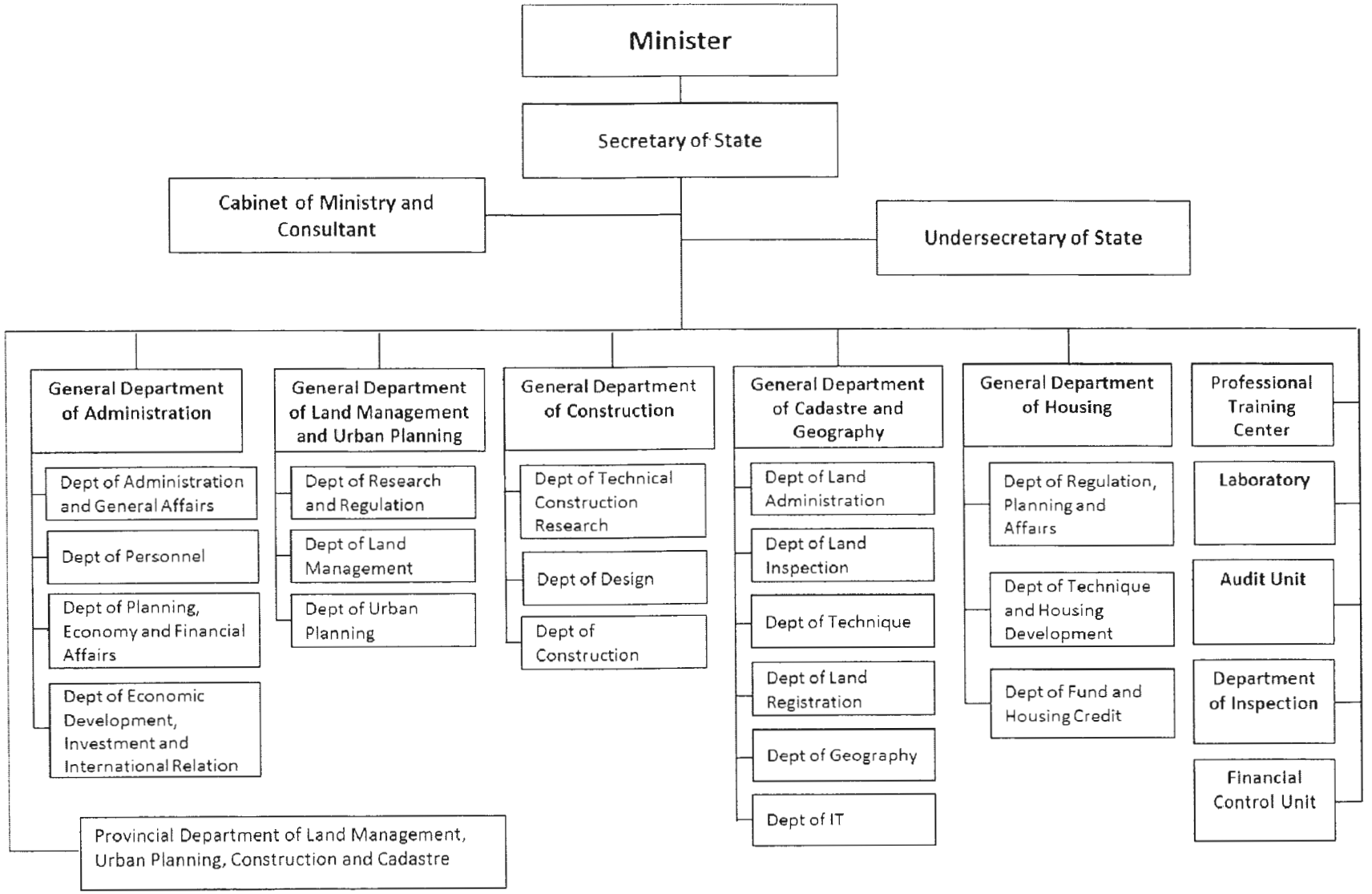
The cost effectiveness of each action is in each action fiche (see Annex 3).

7. Management and Financing Mechanism

7.1. Analysis of existing management and financing mechanism

The Ministry of Land Management, Urban Planning and Construction (MLMUPC) have four technical general departments (General Department of Land Management and Urban Planning, Construction, Cadastre and Geography, and Housing) and General Department of Administration. Each general department has specific departments working various technical aspects in their general department. In addition, there are five units: Professional Training Centre, Laboratory, Audit Unit, Department of Inspection, and Financial Control Unit. At the sub-national level, MLMUPC has Provincial Department of Land Management, Urban Planning, Construction and Cadasterin every province/city.See figure below on management Structure of the Ministry.

Figure 1: Structure of Ministry of Land Management, Urban Planning and Construction.



7.2. Analysis of potential sources and volume of finance for Climate Change actions

Since most of proposed actions are scaled up projects and dedication, there are potential to obtain further support from existing development partners. Furthermore, the rising of climate change fund at national level as well as at the global levels enhances the likelihoods to fund the proposed actions, particularly through national mechanisms. In addition, the millennium development goal (MDGs) will come to an end by 2015. Therefore, new key indicators such as urbanisation and climate change are strongly adopted for the post MDGs gaol. Thus huge financial and technical potential support from either regional and global trends are high. These donors might include ADB as part of GMS town developments, GIZ, CIDA, UN Habitat, bilateral aid such as china and government cooperation with neighbouring countries as well as those countries from developed world.

7.3. Entry points for climate change mainstreaming in management and financing mechanisms

The MLMUC adopts the guideline on project management and Operation Manual from Ministry of Economy and Finance. When implementation of the climate change project, a project management unit will be established, in which the climate change technical team will be part of it to coordinate and provide technical support on climate change.

The proposed actions shall be reflected in the annual Public Investment Programof the MLMUPC to be submitted to MEF. The climate change technical team will continue working with the General Directorate of Administration and Finance to ensure the CCAP captured in the working plan of the Ministry. The current technical working group consist of all general directorates which includes department of planning, finance and administrative are also inside the working group.

8. Monitoring and Evaluation

8.1. Indicators Framework

The NSDP 2014-2018 show MLMUPC is tracking one core indicator and three additional indicators. The core indicator for MLMUPC is "percentage of land little issued to people". The three additional indicators are (1) Indigenous land communities titling, (2) Rate of land dispute resolution by cadastral commission, and (3) Social land concession for poor households.

The indicators of the climate change action plan for MLMUPC will contribute to the National Climate Change Monitoring and Evaluation Framework (being developed) by the Ministry of Environment. Furthermore, they also link to the NSDP indicator on climate change, "number of commune vulnerable to climate change" and "Carbon credit earned from clean development mechanism and other mechanisms".

8.2. Monitoring and Reporting

The General Department of Administration consisting of four departments (Department of Administration and General Affairs, Department of Personnel, Department of Planning, Economy and Financial Affairs, and Department of Economic Development, Investment and International Relation) plays key role in the preparing the annual report and budgeting plan. The Annual Progress report and Budgeting Plan of the Ministry follows the technical guideline from the Ministry of Economy and Finance. The internal audit unit of the ministry has role to operate the internal financial auditing based on the guideline from the Ministry of Economy and Finance.

The Climate Change Technical Working Group of the ministry will provide inputs on the climate change activities to the General Department of Administration for the Annual Progress Report. In the further, when there is climate change project, the Climate Change Technical Working Group will form the project management unit consisting of staffs from technical departments and financial department. The project management unit will report to the cabinet of the general department, then to the Under-Secretary of State of State and Secretary of State, finally to the Cabinet of the Minister (See figure below).

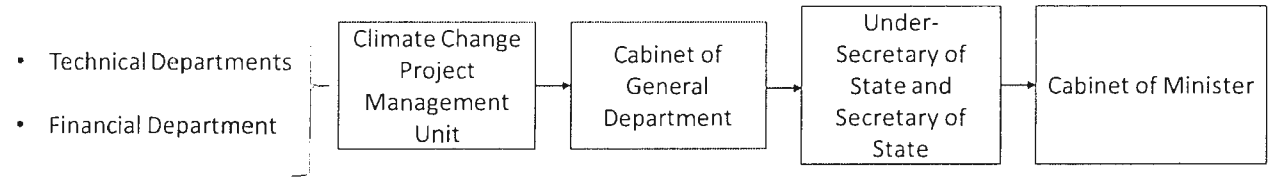


Figure 2: Reporting hierarchy of the climate change project management unit

9. Law and Regulation Drafting Schedule

There is no additional requirement for law to implement the CCAP for Ministry of Land Management, Urban Planning and Construction. The technical guideline and/or ministerial circulation may need to smooth the coordination with other departments and the other ministries.

There is a draft sub-decree on managing urban areas, Krong and city that include building code, guideline for different type of construction as well as the need to enhance green growth in the country. It is best to highlight how all the constructions should be coordinated and managed or an established appropriate regulatory frameworks and the application of building standards, to ensure that the choices made by individuals, households, and firms support adaptation and prevent maladaptation.

In addition, the capacity enhancement of the Climate Change Technical Working Group of the Ministry is needed to ensure conducive environment for effective implementation of the Action Plan. In short term, the capacity improvement is on the effective coordination with line departments and the communication with particularly NCCC secretariat and Ministry of Environment and other line ministries. In the long term, to ensure the climate change responses captured in the future annual work plan and budgeting of the ministry more spontaneously, the role of Climate Change Technical Working Group of the Ministry should enable the participation in the early stage of preparation of annual work plan budgeting as possible. This may require the directive from the Minister or senior officer to allow full participation of Climate Change Technical Working Group in the annual work plan and budgeting.

10. Conclusion

The Climate Change Action Plan for Ministry of Land Management, Urban Planning and Construction is the first ever action plan for the ministry, which was developed to uphold the important role of the ministry to deal with climate change. The climate change is projected to impact negatively on the Cambodia economy, biodiversity and most of all livelihoods of millions living in the vulnerable areas.

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

There is also potential to seek for additional investment from individuals and households, communities, and firms through their decision to address adaptation and resilience. The key process by which the CCAP should influence domestic resource mobilization is by achieving marginal shifts in the budget in favor 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. The screening system could use the action fiches in the CCAP, though modification of the PIP template to take into account climate change would be useful.
- The CCCA, as the multi-donor trust fund coordinating body, will provide overall assistance to the Ministry in identifying potential sources of funding allocation and additional policy and capacity development for officials from the working groups of climate change of the Ministry of Land Management, Urban Planning and Construction.

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Annex 1: The Long List of Actions

Following the consultation workshop on October 09th, 2014 on the development of climate change action plan for Ministry of Land Management, Urban Planning and Construction, a long list of actions for climate change response has been generated with taking into account the actions from public investment plan (PIP) 2013-2015 of the ministry (see table below).

Table 2: Long List of Proposed Climate Change Action for MLMUPC

No.	Proposed Actions	Planned Duration
1.	Updating Law on land management and urban planning with climate change mainstreaming (update)	
2.	Promote and monitor the development of land use map at all levels for climate change adaption	
3.	Promote the sustainable urban and city development plan	
4.	Mainstream climate change to coastal zone management	
5.	Conduct vulnerability assessment for major urban areas and cities to climate change	
6.	Promote the management and development of green infrastructures and green buildings	
7.	Promote the development of building code with mainstreaming climate change	
8.	Promote the settlement development that adapt to natural disasters at urban and rural	
9.	Promote proper shelters for medium and low income households and vulnerable households	
10.	Enhance the state land registration	
11.	Speed up the private land registration	
12.	Mainstreaming climate change response measures to the commune land use planning.	

Annex 2: The Short List of Actions

On the November 12th 2014, the climate change team of the Ministry held consultation meeting to shortening the long list of action (see table below).

Table 3: The Priorities Climate Change Actions for Ministry of Land Management, Urban Planning and Construction

No.	Action	Planned Duration
1.	Prepare spatial planning guideline at all levels for climate change adaptation	2015-2018
2.	Integrating climate change response measures to the commune land use planning.	2016-2018
3.	Conduct vulnerability assessment for major urban areas and cities to climate change and develop climate safeguard principle	2015-2018
4.	Promote the settlement development that adapt to natural disasters at urban and rural	2015-2018
5.	Promote proper shelters for low income households and vulnerable households	2015-2020
6.	Formulating and developing green infrastructures and green buildings guideline for existing and on-going city master plan	2015-2018
7.	Mainstreaming climate change to the development of building code	2015-2018
8.	Enhancing climate change vulnerability assessment and adaptation through regional and provincial spatial planning, master plan and land use planning in coastal areas.	2015-2018

Table 4: Climate Change Action Plan Prioritization Table

Criteria / Action	Effectiveness				Co-benefits			Feasibility		
	Reduced costs of climate risk	Cost per beneficiary	Number beneficiaries	Mitigation cost effectiveness	Economic	Social	Environmental	Political commitment	Capacity	Easy to implement
	-1 – 3	0 – 3	0 – 3	-1 – 2	0 – 2	0 – 2	0 – 2	G/Y/R	G/Y/R	G/Y/R
Prepare spatial planning guideline at all levels for climate change adaptation	2	1	2	0	2	2	2	G	G	Y
Integrating climate change response measures to the commune land use planning.	2	1	3	1	1	1	2	G	G	Y
Conduct vulnerability assessment for major urban areas and cities to climate change and develop	3	2	3	0	1	1	1	G	G	G

Criteria / Action	Effectiveness				Co-benefits			Feasibility		
	Reduced costs of climate risk	Cost per beneficiary	Number beneficiaries	Mitigation cost effectiveness	Economic	Social	Environmental	Political commitment	Capacity	Easy to implement
	-1 – 3	0 – 3	0 – 3	-1 – 2	0 – 2	0 – 2	0 – 2	G/Y/R	G/Y/R	G/Y/R
climate safeguard principle										
Promote the settlement development that adapt to natural disasters at urban and rural	3	3	3	1	2	2	1	G	G	G
Promote proper shelters for low income households and vulnerable households	3	2	2	1	2	2	2	G	G	G
Formulating and developing green infrastructures and green buildings guideline for existing and on-going city master plan	2	1	2	2	1	2	2	G	G	R
Mainstreaming climate change to the development of building code	2	2	2	1	2	1	1	G	G	Y
Enhancing climate change vulnerability assessment and adaptation through regional and provincial spatial planning, master plan and land use planning in coastal areas.	2	2	2	1	2	1	1	G	G	Y

Annex 3: Action Fiche of Actions

Action 1

Action 1	**Prepare spatial planning guideline at all levels for climate change adaptation**
CCCSP and Sector CCSP Strategic Objective	**Strategic objective 1:**Promote low-carbon, climate-resilient city development planning and develop city-level coordination mechanisms (e.g. capital and provincial effective mass transport, modernization of wastewater treatment facility and landfill)-development of climate change zoning safeguards; and **Strategic objective 2:**Promote land use planningto prioritize adaptation measures for key regions of Cambodia, such as coastal zones, highlands, rural and urban areas (balancing of land use zoning in city and natural landscape development).
Rationale	*Links to the sector and national strategies* This proposed action is linked to existing Land Management and Urban Planning, which includes the current draft on law on Land Management and Urban Planning and link to the ministry's on-going commitment in providing technical support to the councils of capital, provinces, cities, districts, khans, communes, and sangkats in the preparation of spatial planning, master planning and land use planning. *What type of climate risk/opportunity or mitigation objective is addressed by this action* • The land use map with climate change adaptation measures is contributing to the sustainability for the communities in the proposed land use maps that are being developed for different purposes. The climate change adaptation measures raise the resilience of the communities.
Category of climate change action	☒Cat 2 – Modified
Type of action	☒Adaptation
Short description of the action and expected results and benefits	*Short description* The MLMUPC has been developing the spatial plan for all levels from municipality/province to commune and village levels. However, the spatial planning has been developed to response to the need of society, economic development and environment, without specific addressing long-term threat of climate change. **Key activities include:** - Review the existing spatial planning (land use maps) for improvement of adaptive capacity for communities in the maps - Prepare guideline for the development of land use map with climate change adaptation measures - Conduct consultation and dissemination the guideline - Piloting the guideline through mainstreaming the CC adaptation measures to the existing land use maps based on the guideline. - Mainstreaming climate change responses to the exiting the Commune Land Use Planning. E.g. develop climate change hazard map *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* - *Improve the resilience of the communities in the proposed land use map.*
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* • *Policy makers, planners, private investment an local communities will have clear guideline that will be used to reduce potential impact on unplanned development and conflicting.*

Preconditions needed for successful implementation	*Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works* • *Political support and commitment as well as financial and technical caordination in place* *Mention any coordination required with actions under the responsibility of other ministries or external stakeholders* • *Need further coordination with ministry of interior, MAFF, MOE and sub-national authority.* *Mention any minimum capacity requirements* • *Ministry and provincial department will need additional capacity development to enhance this work*
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.* - *Guideline for national spatial planning with climate change responses* - *Guideline for provincial spatial planning with climate change responses* - *Guideline for city, district and khan spatial planning with climate change responses* - *Updated guideline for commune land use planning with climate change responses.*
Implementation arrangements	*Responsible department(s)* • General Department of Land Management and Urban Planning *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)* • MAFF, MOWRAM, MOE, others
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *400*
Possible funding sources	*If identified, name the proposed source(s) of funding.* CCCA, *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*
Timeframe	*Indicate the start and end year* 2015-2018

Action 2

Action 2	**Integrating climate change response measures to the commune land use planning**
CCCSP and Sector CCSP Strategic Objective	**Strategic objective 2:**Promote land use planningto prioritize adaptation measures for key regions of Cambodia, such as coastal zones, highlands, rural and urban areas (balancing of land use zoning in city and natural landscape development).
Rationale	*Links to the sector and national strategies* The national priority policy on the development of Commune/District Land Use Map prevails an opportunity to address climate change (enhancing resilience of commune/district and contributing to GHG emission reduction) at local communities. *What type of climate risk/opportunity or mitigation objective is addressed by this action* Reduce climate risk and extreme weather such as floods, droughts and storms through climate hotspot zoning as well as reducing impact to social economic and environmental risk associated with local community and publics.
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* - *Conduct comprehensive review on the existing CLUP (for data validity and reliability)* - *Capacity development on climate change adaptation and mitigation to the national, provincial and communal officials.* - *The revision of the guideline (developed in Action 1) to add element of GHG emission reduction measure.* - *Overlay the climate mapping and zoning on the existing and on-going CLUPs.* - *Development climate change adaptation plan for existing and future CLUPs.* *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* - *The mainstreaming addressing climate change impacts in the CLUP is to enhance the climate resiliency of the commune*
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* • *It is expected around 120 communes benefits from this interventions*
Preconditions needed for successful implementation	*Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works* • Political commitment from national down to commune level to support commune land use planning and climate zoning. • *Credible and reliable based line form exiting Commune Land Use Planning* • *Need further coordination with MAFF, MOE, Local Authorises, Communities, civil society and private sector.* *Mention any minimum capacity requirements* • This action depends on the completion of guideline development for climate change adaptation measure for land use map preparation (Action 1).
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. - *Comprehensive review report an current status of CLUP* - *# of communes, districts, provinces, and national levels obtained training on capacity development for climate change adaptation and mitigatian.* - *# of Maps overlaid with climate hazard for CLUPs* - *# of climate change adaptation plans for commune*
Implementation arrangements	*Responsible department(s)* General Department of Urban Planning and Land Management *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *720*
Possible funding sources	*If identified, name the proposed source(s) of funding.* ADB, *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*
Timeframe	*Indicate the start and end year* 2016-2018

Action 3

Action 3	**Conduct vulnerability assessment to climate change and develop climate safeguard principle for 15 towns/cities**
CCCSP and Sector CCSP Strategic Objective	**Strategic objective 2:**Promote land use planningto prioritize adaptation measures for key regions of Cambodia, such as coastal zones, highlands, rural and urban areas (balancing of land use zoning in city and natural landscape development). **Strategic Objective 4:**Enhance capacity development for technical staff and awareness raising for rural publics on construction of traditional houses in rural area resilient to extreme climate change such as storms and floods.
Rationale	*Links to the sector and national strategies* *At national level, this* action links to Land Management and Urban planning and national strategic plan and development that require inter-ministerial coordination (RGC 2014).In addition, the ministry has drafted many sectoral plans and policies, which include: - Drafting of Master Plan of Land Use and Land Use Plan for Phnom Penh, - Drafting of Master Plan and land Use Planning of 13 towns, which are Kratie, Battambang, Stung Treng, Bavet, Poi Pet, Kompong Cham, Soung, Siem Reap, ChbarMorng, Kemarakphumin, PreahVihear, SerieSophorn, and KompongChhnang. *What type of climate risk/opportunity or mitigation objective is addressed by this action* - *Identifying the climate induced hazards for major cities of Cambodia contributes to the sustainable development of the cities in the face of climate change.* - *Reduce flood and storms on construction and industrial zone* - *Reduce land slide and erosion.* - *Develop seasonal calendar for cropping* - *Contribute to the development of national master plan*
Category of climate change action	☒Cat 3 – Dedicated
Type of action	☒Mitigation and adaptation
Short description of the action and expected results and benefits	*Short description* Based on this Municipal Land Use Master Plan (city or town), the land use plan is a comprehensive and detailed identification of existing and future land-use categories. It is based on a geographically defined zoning with specific regulations (binding to the citizens) of the kinds of activities which will be acceptable on particular lots (such as open spaces, residential, agricultural, commercial or industrial), the densities at which those activities can be performed, the amount of space structures may occupy, etc. Experiences from Battabmang Municipal Land Use Plan provides comprehensive in identifying zones where specific development are allowed and specific rules are applied accordingly: • Residential zone • Residential with agriculture zone • Commercial zones • Mixed-Use (residential & commercial) zones • Existing Administrative zones • Culture zone

	• Industrial zone • Sports and Recreation zone • Public Green Spaces • Transportation zone • Military zone • Agriculture zone *The experience above show the lack of climate zoning as well as extreme events for potential* adaptation and mitigation that need to be translated into specific actions for cities and towns. Proposed key activities for this action include: - *Strengthening the technical staffs on the climate change ond vulnerability and adaptation assessment* - *Extend the training to the provincial departments* - *Conduct climate vulnerability and adaptation assessment for 15 towns (Scoping and baseline impact assessment, vulnerability and adaptation assessment, safeguard)* - *Develop climate mapping and zoning overlay on the proposed master plan and land use planning and zoning of the proposed 15 towns.* - *Develop the safeguard policy and principle for the proposed 15 towns.* *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* - *Technical capacity building on climate change to 40 technical staffs for national level (TOT) and provincial level (15000$ / training, not include the resource person)* - *Extend the training on climate change to provincial departments* - *Conduct climate vulnerability and adaptation assessment for 15 towns (Scoping and baseline impact assessment, vulnerability and adaptation assessment, safeguard)*
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* *Beneficiaries:* - *Local residents, private sectors,* - *Planners, decision makers* - *NGOs*
Preconditions needed for successful implementation	*Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works* - *Land Use planning and urban master plans are available and reliable for this action.* *Mention any minimum capacity requirements* - *Political support for capacity development on climate change for MLMUPC. Supports from relevant line ministries and departments and StakeholdersFinancial and technical supports are in placed*
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.* - *# of technical staffs obtained training on climate change and vulnerability and adaptation.* - *The vulnerability and adaptation assessment reports for 15 towns*

	- *Climate mapping and safeguard zoning for 15 towns*
Implementation arrangements	*Responsible department(s)* General Department of Land Management and urban Planning General Department of Housing Provincial, town and district office (line agency) *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)* - *General department of land management and urban planning* - *Relevant ministries and their departments, e.g. MoE, MAFF, MOWRAM, MPTW, MoI*
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *2 M USD*
Possible funding sources	*If identified, name the proposed source(s) of funding.* *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)* CCCA 2, ADB, GIZ, JICA
Timeframe	*Indicate the start and end year* *2015-2018*

Action 4

Action 4	**Promote the settlement development that adapt to natural disasters at urban and rural**
CCCSP and Sector CCSP Strategic Objective	**Strategic objective 2:**Promote land use planningto prioritize adaptation measures for key regions of Cambodia, such as coastal zones, highlands, rural and urban areas (balancing of land use zoning in city and natural landscape development). **Strategic objective 3:**Promote low-carbon planning and technologies to support sustainable development though building code for buildings and infrastructure development.
Rationale	*Links to the sector and national strategies* *This proposed action is contributing an Objective 1 of the National Social Protection Strategy for the Poor and Vulnerable[3], (The poor and vulnerable receive support, including food, sanitation, water and shelter, etc., to meet their basic needs in times of emergency and crisis.).* *What type of climate risk/opportunity or mitigation objective is addressed by this action* - The damages from climate induced hazards, e.g. storms and flood, on the houses of poor are increasing from year to year. The houses built with traditional ways are vulnerable to storm and flood. Thus, the technical guideline for house construction that is resilient to storm and flood is needed.
Category of climate change action	☐Cat 1 – Re-scaled .☐Cat 2 – Modified☒Cat 3 – Dedicated
Type of action	☒Adaptation

Short description of the action and expected results and benefits	*Short description*
	In urban areas, most urban poor are those not only having low income, employment, and assets, but also they do lack of access to basic services and to local political and bureaucratic system that are unable or unwilling to meet the needs of the urban poor. These people are often located in the vulnerable areas to environmental hazard, flooding, storming, and economic and social disadvantage areas.
	- *Data and information collection on the settlements in the disaster vulnerable zones, i.e. Inventory of city and urban slums at Phnom Penh and Provinces*
	- *Prepare technical guideline (Develop low cost housing design) and construct house model that adapt to storm and flood with low cost construction materials,*
	- *Prepare policy and development for city and urban poor*
	- *Consultation with communities*
	- *Piloting the low cost housing in three urban areas*
	  o *Select sites and construct house model for people in a specific location*
	  o *Train people or house constructors on the technical of natural disaster resilient house construction*
	
	Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries
	- *Reduce vulnerable to urban poor by improving their settlement*
	- *People living in the vulnerable zone have proper house that is resilient to climate change*

[3] RGC 2011, *National Social ProtectionStrategyforthePoorandVulnerable,* Council for Agriculture and Rural Development (CARD)

	- *Local authority and donors find ease in supporting people in the house construction* -
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* *Beneficiaries:* - *Medium and low income people* - *Local residents, private sectors,* - *Planners, decision makers* - *NGOs*
Preconditions needed for successful implementation	Political support for capacity development on climate change for MLMUPC. Supports from relevant line ministries and departments and Stakeholders Support from local authorities Financial and technical supports
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.* - Inventory reports on the urban slums - Low cost housing development design ready for development (Technical guideline for house model that is resilient to the storm in different locations, possibly 20 types, and to flood in different locations, possibly 10 types) - # of consultation with community - # of low cost housing constructed in the piloted areas (500 households in 100 communities receive safety house)
Implementation arrangements	*Responsible department(s)* - General department of Housing - Local authority - NGO, IO - Local community *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *2 Million*
Possible funding sources	*If identified, name the proposed source(s) of funding.* *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)* CCCA 2, UN-Habitat, USAID, UNCEF, Caritas, private sectors
Timeframe	*Indicate the start and end year* *2015-2018*

Action 5

Action 5	**Promote proper shelters for low income households and vulnerable households**
CCCSP and Sector CCSP Strategic Objective	**Strategic objective 2:** Promote land use planning to prioritize adaptation measures for key regions of Cambodia, such as coastal zones, highlands, rural and urban areas (balancing of land use zoning in city and natural landscape development). **Strategic objective 3:** Promote low-carbon planning and technologies to support sustainable development though building code for buildings and infrastructure development.
Rationale	*Links to the sector and national strategies* *House is a valuable economically and socially for the household. Generally, people are saving income to construct a comfortable house. But poor people face difficulty in seeking proper housing. Universal declaration on human rights of the United Nations states that "All human have rights to obtain appropriate living standard to ensure the health and sanitation of individuals and families include foods, clothes and houses..." In the national policy on housing, Cambodia needs additional 1.1 million houses that do not include the current deficit of house. This causes higher demands on land and house and new temporary settlements if there is no responding measure to help low and medium families and vulnerable groups.* *What type of climate risk/opportunity or mitigation objective is addressed by this action* - *Reduce impact on urban slums settlements caused by extreme weather and climate changes.*
Category of climate change action	☐Cat 1 – Re-scaled ☐Cat 2 – Modified☒Cat 3 – Dedicated
Type of action	☒Adaptation
Short description of the action and expected results and benefits	*Short description* - *Conduct the situation analysis on the house structure, demand of house, supply of house, and land use for housing in the present and future* - *Data collection and update on the demand for proper housing for the family with low income and the vulnerable groups* - *Conduct study on the house model with low cost materials (but rigid) and safe to the natural disaster (storm and flood) for low income family and vulnerable group* - *Dessiminating and awareness raising campaign to people on the appropriate ways to receive proper house through financing frameworks to construct or modify the old house* - *improve the necessary infrastructures in the poor community* - *Selection location for construction of house model or modify the old house ir some communities.* *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* - *Low income people and vulnerable groups have ability to obtain a proper house for living. This reduces the temporary settlement on the public land*
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* *Beneficiaries:* - *Low income people and vulnerable group* - *Local residents, private sectors,*

	- *Planners, decision makers* - *NGOs*
Preconditions needed for successful implementation	• Political support for capacity development on climate change for MLMUPC. • Supports from relevant line ministries and departments and • Stakeholders • Support from local authorities • Financial and technical supports
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.* - *Data on the demand and supply of the houses in different urban and cities* - *Various types of proper house model that is resilient to the climate change and reasonable price* - *# families with low income and vulnerable group receive proper house for living* - *# poor communities receive maintenance and improvement on infrastructure*
Implementation arrangements	*Responsible department(s)* - *General department of housing* - *Provincial departments of LMUPC* - *Local authority* - *NGO, IO* - *Local community* *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *1 Million*
Possible funding sources	*If identified, name the proposed source(s) of funding.* *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)* CCCA 2, UN-Habitat, Caritas, private sectors
Timeframe	*Indicate the start and end year* *2015-2020*

Action 6

Action 6	**Formulating and developing green infrastructures and green buildings guideline for existing and on-going city master plan**
CCCSP and Sector CCSP Strategic Objective	*Strategic Objective 3:* Promote low-carbon planning and technologies to support sustainable development though building code for buildings and infrastructure development. Strategic objective 4: Enhance capacity development for technical staff and awareness raising for rural publics on construction of traditional houses in rural area resilient to extreme climate change such as storms and floods.
Rationale	*Links to the sector and national strategies* *This proposed action link to current draft of master plan of town and cities management and development. It is also linked to current sub-decree on urbanisation and city development (drafted on 23 April 2014) with an objective to promote green growth and responsive to climate adaptation, mitigation as well as disaster risk reduction.* *What type of climate risk/opportunity or mitigation objective is addressed by this action* Climate change in Cambodia is projected to be dryer in dry season and wetter in rainy season. The green infrastructures and buildings in the cities raise the resilience of the cities by addressing flooding and heat in the cities, and reduce the GHG emission through effective energy consumption. Green infrastructure and building preserves the biodiversity, mitigate impact from rain storming, safe air and water, and physical health and safety of the citizen (see Jeffrey Sachs 2014).
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	*Short description* *In recent decades, most of the Cambodian cities/towns and urban areas are expanding rapidly, mostly on wetlands and critical ecosystem areas. The introduction of green infrastructure enhance the use of existing natural availability of resources and manmade processes which include the use of vegetation, soils, and natural processes to manage water and create healthier urban environments.* *The current sub-decree on urbanisation and city development (drafted 23.04.2014) has classified different 10 major zones which include residential, commercial, industrial, mixed development zones, transportation zone, tourism zone, administrative and public services, public and green space, culture and religion and other zones of which all of them involved with criteria of green infrastructure requirement.* At the scale of a town, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. If cities have many hard surfaces infrastructure, this will worsen the floods. Proposed key activities include: - Capacity development for ministry officials on green infrastructure and climate change concepts, principles and guideline. - Develop guideline for development of green infrastructure, green space, green building, and - Mainstreaming green infrastructure guideline into existing and on-going master plan of city - Demonstrate and piloting green infrastructure by using public private

	partnership. o Develop a plan for tree plantation in the new proposed cities o Set up the green space, e.g. gardens for public good, in the new proposed cities. o Conduct standard assessment and awarding for green label buildings. *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* - Clean green infrastructure has multiple uses (e.g., water filtration, flood protection, biodiversity, tourism and food) - Cool down the city, addressing heat in the urban areas - Reduce energy use - Increase permeability and slows the flow of storm water, reducing the risk of flooding - Improve water quality, conserves and stores water - Increases community involvement and quality of life - Makes cities more beautiful and healthy and reduces town maintenance costs
Cost effectiveness of the action	*Where possible, an estimate of the benefit cost ratio of adaptation actions and the marginal abatement cast of mitigation actions, along with any notes about key assumptions or sensitivity analysis* • *Nationwide benefit for both town development planners, decision makers, private investor and local communities*
Preconditions needed for successful implementation	*Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works* • *Current national polity to be approved by the government* • *Need further coordination with municipals offices, local authority, donor, private sector and urban slums.* • *The in charge department from the ministry of land management, urban planning and construction will need further capacity support as well as political and financial support.*
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.* - *# of MLMUPC staffs obtained training on the development of green infrastructure guideline* - *A guideline for green infrastructure and building developed and approved* - Green label building developed and approved for outstanding buildings
Implementation arrangements	*Responsible department(s)* General Department of Land Management and Urban Planning and General Department of Construction *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *500*
Possible funding sources	*If identified, name the proposed source(s) of funding.* *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*
Timeframe	*Indicate the start and end year*

	2015-2018

Action 7

Action 7	**Development of building code with mainstreaming climate change**
CCCSP and Sector CCSP Strategic Objective	***Strategic Objective 3:*** Promote low-carbon planning and technologies to support sustainable development though building code for buildings and infrastructure development. ***Strategic objective 4:***Enhance capacity development for technical staff and awareness raising for rural publics on construction of traditional houses in rural area resilient to extreme climate change such as storms and floods.
Rationale	*Links to the sector and national strategies* - *National science and technology initiatives.* - *Strategic National Action Plan (SNAP) for Disaster Risk Reduction* - *Regional initiative of GMS towns on green infrastructure development and sustainable buildings.* *What type of climate risk/opportunity or mitigation objective is addressed by this action* • *Buildings consume much of energy through heating and cooling, and lighting of building. Building code is meant to improve the energy consumption of the building and at the same time improve the resilience, through climate proofing of the buildings.*
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	*Short description* *The national guideline for Building Code is being formatted by the MLMUPC* *Most of building code and city development plan lacks the consideration of climate change proofing and mitigation.* - *Capacity building and training for technical staffs with external assistant* - *Conduct the technical and guideline review on the building construction practices in Cambodia (through technical assistant)* - *National consultation on the building code for resilience to climate change* - *Guideline development on building code for different climate hazards* - *Dissemination to the developers/constructers.* *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* - Pollution Management - Heat, Energy, and Green House Gas Emissions Management - Reduced cooling costs in residential and commercial buildings - *Captures airborne pollutants and filters noxious gases.* - *Insulates buildings and moderates building temperature.* - *Provides wildlife habitat*
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* - *Nationwide which include policy makers, urban planners, private investors*
Preconditions needed for successful	*Are some other actions required for this action to be implemented e.g. legislation or preliminary studies/works*

implementation	*Mention any coordination required with actions under the responsibility of other ministries or external stakeholders* - *Need strong political commitment from RGC and ministry leader (both technical and financial support)* - *Special working group or technical working group should be established* *Mention any minimum capacity requirements* - *The ministry staffs will need further technical support from external agencies such as capacty development, documentation on lesion learned from other ocuntries and developing guideline for the country context.*
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.* - *Technical review report on the current status of building construction* - *# of staff obtained technical training* - *# of national consultation workshop on the building code* - *# of rules, regulation and building code developed.*
Implementation arrangements	*Responsible department(s)* General Department of Construction *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)*
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *500*
Possible funding sources	*If identified, name the proposed source(s) of funding.* *Government, ADB, UN-agencies* *If not, indicate the type of funding source(s) foreseen (Govt, development partners, NGO, private sector)*
Timeframe	*Indicate the start and end year dh* *2015-2018*

Action 8

Action 8	**Enhancing climate change vulnerability assessment and adaptation through regional and provincial spatial planning, master plan and land use planning in coastal areas.**
CCCSP and Sector CCSP Strategic Objective	**Strategic objective 1:**Promote low-carbon, climate-resilient city development planning and develop city-level coordination mechanisms (e.g. capital and provincial effective mass transport, modernization of wastewater treatment facility and landfill)-development of climate change zoning safeguards; **Strategic objective 2:**Promote land use planning to prioritize adaptation measures for key regions of Cambodia, such as coastal zones, highlands, rural and urban areas (balancing of land use zoning in city and natural landscape development).
Rationale	*Links to the sector and national strategies* This action links to current royal decree on the establishment of national committee on coastal management and development with honourable chaired by Prime Minster of Cambodia and interministerial as the members as well as sub-national authorities of the four coastal provinces. It is also link to National Adaptation Program of Action (NAPA) approved by council of minister (MOE 2006) with specifically focusing on coastal vulnerability and adaption to climate change. ***What type of climate risk/opportunity or mitigation objective is addressed by this action*** • Vulnerability assessment and climate change adaptation safeguard for coastal provinces. • Reduce risk of potential impacts on economic, social, environmental and infrastructures with potential caused by climate changes such as extreme events, and non-climate change such as uncontrolled and unregulated economic activities in the coastal provinces. • Balancing development and conservation by enhancing climate smart costal development framework.
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	*Short description* Cambodia's coastal zone covers a land area of about 17,237 km^2 plus an Exclusive Economic Zone (EEZ) of about 55,600 km^2. It includes the provinces of Koh Kong and Kampot, and the municipalities of Sihanoukville and Kep. These provinces contain a diverse and biologically important range of natural habitats including rivers, forests, mangroves, estuaries, beaches and coral reefs. It also supports a range of economic activities on which local communities depend such as agriculture, salt mining, shrimp farming and tourism. Rising sea levels will potentially impact coastal systems in a number of ways including inundation, flood and storm damage, loss of wetlands, erosion, saltwater intrusion, and rising water tables.

	Climate change is likely to bring more extreme conditions to the region, increasing the frequency and severity of climate and hydrological events. Sea level rise, storm surge, increased flood levels and duration, and more extensive and unpredictable droughts threaten populations and critical infrastructure in urban centres (ICEM 2015). IPCC (2014) shows the population and assets exposed to coastal risks as well as human pressures on coastal ecosystems will increase significantly in the coming decades due to population growth, economic development, and urbanization (*high confidence*). The exposure of people and assets to coastal risks has been rapidly growing and this trend is expected to continue. Humans have been the primary drivers of changes in coastal aquifers, lagoons, estuaries, deltas, and wetlands (very high confidence) and are expected to further exacerbate human pressures on coastal ecosystems resulting from excess nutrient input, changes in runoff, and reduced sediment delivery. The Cambodian coastal provinces population are projected to be increased significantly with almost 1 million (960,480) in 2008 to 1,459,510 in 2030. This projection is made by the national committee for coastal zone management and development is a bit unrealistic given low density and less development and less economic activities in 2008 compared with current trend. The coastal provinces have been seen as a strategic location of growth poles given the endowment of rich in natural resources, less population density, accessibility for cross border trade as well as corridor town development and the accessibility to marine trade and natural resources endowment for livelihoods, environment, ecosystem services conservation (Sothirith 2013). Key impact from climate change on human system will include settlements, infrastructure, food production, tourism and health while the impact on natural system will include Rocky coasts, beaches, wetlands and sea grasses, coral reefs, Aquifers, estuaries and lagoons and deltas. ***Key activities include:*** There are some on-going being carried out by the national committee for coastal zone management and development on spatial planning, capacity development for technical staffs on master development plan in coastal zone. However, key additional activities are still required which include: - Capacity building and training for technical staffs with external assistant - Conduct Spatial planning and master plan development for each province - Conduct land use planning and management for each province and selected towns. - Climate vulnerability assessment, zoning and adaptation safeguard developed - Formulating climate change guidelines and safeguard framework into the design of infrastructure, new building codes to protect against strong winds and sea level rise. *Expected results and benefits, including number of beneficiaries and type of impact on beneficiaries* - *Spatial plan, master plan and land use plan to reduce potential impact from climate change and reduce tension and conflicting caused by non-climate change activities such as unregulated development and exploitation of natural resources.* - *The policy makers, investors and local communities are expected to gain from these actions.*

Cost effectiveness of the action	*Where possible, an estimate of the benefit cost rotio of adaptation actions and the marginal abatement cost of mitigation actions, along with any notes obout 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* • There is an established national committee for coastal zone management and development with approved royal decree on this establishment in February 2012. *Mention any coordination required with actians under the responsibility of other ministries or external stakeholders* • The national committee for coastal zone management is being honourable chaired by Prime Minister with minister of the Ministry of Land Management, Urban and Construction is the permanent chair, deputy chairs by Ministry of Environment and Ministry of Tourism. *Mention any minimum capacity requirements* • Capacity of the committee on climate change vulnerability assessment, development safeguard planning, capacity development on spatial planning, master plan development and land use planning which required all level of participation in particular from Ministry of Agriculture, Forestry and Fisheries and Ministry of Environment of which majority of forest land are under these two ministries.
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.* - Spatial planning developed for 2015-2045 (30 years period) - Master plan of each province developed for 2015-2035 (20 years period) - Land use planning and management mechanism developed for 2014-2030 (15 years period). - Climate vulnerability assessment, zoning and climate hotspot adaptation planning and safeguarding.
Implementation arrangements	*Responsible department(s)* • National committee for Coastal Zone Management and Development (MLMUC) *Other Government and external stakeholders involved in implementation (if already identified, mention the name of the partners)* • All line agencies and authorities at sub-national level
Estimated total cost	*USD (in 1000 USD – more detail is not necessary). Costs should include inflation, for long duration actions* *2,000*
Possible funding sources	*If identified, name the proposed source(s) of funding.* *Royal government of Cambodia, ADB's PPCR, JICA, GIZ* *If not, indicate the type of funding source(s) foreseen (Govt, development partners,* *NGO, private sector and special economic zone investment sectors*
Timeframe	*Indicate the start and end year dh* *2015-2018*