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Phon, Sophat

Faculty of Economics, Thammasat University, Cambodia  
Econometric Association, Cambodia

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# **The impact of investment on climate change: The case study of Cambodia**

**Mr. PHON SOPHAT  
Faculty of Economics  
Thammasat University, Thailand.**

## **1. INTRODUCTION**

Climate change is tremendously constrain with all issues happened to the world. The growth with sustainable trend would be mentioned as harmonization on the earth and some adopted policies to foster the economic growth without emission so much. Recent estimations suggest that, even if emissions peak in the next decade or two and then fall sharply, the impact on global temperatures will still be very large. The UN Framework Convention on Climate Change and the Kyoto Protocol provide a valuable basis for developing an international response but the time horizons for agreed action are short (2012) and thus the scale necessarily limited. The United Nations, together with various development, business and non-governmental organizations, is urging a 'Green New Deal' (Jackson, 2009; UNEP, 2009). Cambodia's Gross Domestic Product (GDP) is USD 10354 million per annum and the country's economy relies primarily on agriculture (33% of GDP and employing 57% of the country's labor force), industry (predominantly garments - 21% of GDP and employing 15.9% of the country's labor force), and services (42% of GDP and employing 26% of the country's labor force). Annual GDP growth rate has fluctuated widely from 5 to 13% in the 2000s. In 2008, GDP grew by 6.5%, with agriculture, fisheries and forestry accounting for 32.4 % of GDP, industry for 22.8 %, and services for 38.8%. The contribution of industry to GDP has doubled since 1993, but a substantial proportion of the population is still dependent on the farming and fisheries sectors. Cambodia is vulnerable to floods and droughts, mostly due to reliance on agriculture and fisheries (world bank, 2011).

The inclusive and pro-poor growth remains the central objective of development policy. As climate resilience emerges as an equally important development concern, it is worth asking to what extent existing growth policies are compatible with the adaptation needs of developing countries. Low-income countries are much more vulnerable to climate change than richer nations (World Bank 2010a). The three features were included as higher physical exposure in many areas like proximity to temperature thresholds, a higher economic sensitivity to climate events like heavier reliance on agriculture and a lower adaptive capacity as a lower ability to deal with climate stress. Furthermore, the developing countries consist both the fastest-growing and slowest-growing economies in the world. When one ranks countries by 1990 per capita gross domestic product (GDP) and look at subsequent growth rates, one research found that all rich-country growth rates are in a tight band between 1% and 3%, whereas poor-country growth rates vary from highly negative up to China's spectacular 7% per annum. The world is humming with determined talk about investments that might both mitigate global warming and put business back on its feet (Ban Ki Moon and Gore, 2009; Stern, 2009). Key policy instruments shaping incentives include taxes, trading based on the allocations of property rights, and regulation, where aggregate emissions targets are used (Stern, 2009). Like Cambodia is developing country in ASEAN too, Cambodia economy has been boosted by some pillars as well as garment sector and other four main components as tourism, agriculture and construction too. Moreover, Cambodia economy's growth has been sustainable level as in average around 7% per annum too. Several studies have analyzed trends in the exports of major garment-exporting countries in terms of macroeconomic indicators such as exports, investment and employment for major garment-exporting countries; Beresford 2009, for Cambodia).

## **2. LITERATURE REVIEW**

About \$2 billion in annual exports, Cambodia's garment industry provides over 80% of its legal exports and over 12% of its GDP. Under the UCTA Cambodia became perhaps the most dependent country in the world on this highly competitive industry with its high rate of bankruptcies and rapidly changing consumer markets. The United States alone accounts for 71% of Cambodia's garment exports. The developmental advantages of this kind of dependency are

mixed. Moreover, most factories are owned by foreigners from Taiwan, Hong Kong, Korea, Singapore, and Malaysia who tend to employ home country managerial and technical personnel. The Economics of Climate Change by Nicholas Stern mentioned that 1% of global GDP is required to be invested (in GHG emission reduction) in order to mitigate the effects of climate of climate change and that failure to do so could risk a recession worth recession worth up to 20% of global GDP. Key measures: emission trading, technology trading, cooperation, reducing deforestation, adaptation .Furthermore, Cambodia supports Japanese Program on Cool Earth Partnership in amount of \$10 Billions. In 2014 the global economy still struggled to make real gains. The global growth was projected to expand by 7 percent in 2016, which was the same pace as last year. The lethargic pace of growth was demonstrated that civilized countries are still coping with the lingering effects of the global financial crisis and climate change while their development has been burst simultaneously, and emerging economies are less dynamic than expected. Yet, a familiar trend where developed countries, like the United States, became once again the leader of the global growth and contributing more to global economic output than developing countries. However, Cambodia was one of the few excepted to withstand a globally turbulent economic environment with steady and robust economic growth (at 7 percent), outpacing global and regional players (NBC, 2016). The Environment and Climate Change Assessment (ECCA) Report provides analysis and recommendations to orient the 2013 – 2018 COSOP to better address those needs. Cambodia’s economic development is heavily dependent on the country’s rich natural resource base, with agriculture representing approximately one-third of Gross Domestic Product (GDP). Economic growth and poverty reduction are consequently reliant on sustainable management of natural resources, which are currently threatened by a range of factors, including over utilization, contamination and inappropriate development. This is further exacerbated by rising temperature, erratic rainfall and unreliable water availability, sea level rise and increased incidences of drought and floods associated with climate change. The rural poor in Cambodia subsist on a combination of different strategies that are largely dependent on natural resources, including agriculture, fisheries and forestry. As such, they bear a disproportionate burden of the impact of climate change as each of these sectors is experiencing the affects of climate change. Furthermore, the poorest and marginalized within rural communities also have the least adaptive capacity to

contend with, and manage, climate risks. The cause of the majority of the country's greenhouse gas emissions, with land use change and forestry (LUCF) and agriculture accounting for 79% and 18% of total emissions respectively (MoE, 2002), yet understanding that Cambodia's emissions are insignificant on a global scale in 1994, the country was a net sink.

An odd alliance of forest conservationists, economists, traders and investment banks said it is mobilizing to demand that hundreds of billions of dollars be put into ventures that protect carbon reservoirs in trees (Lang, 2008). And Many proposed climate investments are aimed at fostering unlimited growth in consumption, which is almost certainly incompatible with the declining material throughput required to avoid crisis (Jackson, 2009). Many investments would probably make global warming considerably worse than it is already. Some might make money for some sectors for a time but then lead to another economic crash. Others might sound good in isolation but would undercut each other. Still others would benefit only a small minority, harming many others or endangering the earth. The carbon locked away in underground coal, oil and gas is more than double the unstable carbon contained in living and dead biomass combined (Falkowski et al.,2000). It is estimated that the assets of the fossil fuel businesses currently supported by the financial markets, if burned, would already push atmospheric levels of carbon dioxide beyond 500 parts per million. It will also mean eliminating indirect public investment in fossil fuels such as tax breaks for oil companies, the US\$ 300 billion that goes annually to fossil fuels in straightforward subsidies (Ban Ki Moon and Gore, 2009), and the bankrolling of fossil fuel projects by international development banks such as the World Bank, which doubled its loans for fossil fuel development between 2007 and 2008 (Redman, 2008).

Bassey concludes: 'Leaving the oil underground does not translate to losses but saving. . . . By this simple act, Nigeria would keep the equivalent tonnes of greenhouse gases out of the atmosphere. This is a foolproof step [to curb global warming] that requires no technology transfer and does not require any international treaty or partnership' (Bassey, 2009). Investing in carbon sequestration and storage (CCS) (IPCC, 2006; Restructuring today, 2009; Socolow, 2005) is no answer to these concerns. Furthermore, The investment in other land-intensive schemes for compensating for fossil fuel use is another dead strategy. but Investment in nuclear and thermonuclear energy is a long dead corpse and any attempt to revive it would be a disastrous waste of money. Nuclear and thermonuclear energy are no more capable of attaining their main

purpose replacing fossil fuels than are agro fuels, although the reasons are different (Larry Lohmann, 2009).

According to investors to move out of agro fuels cannot approach quickly enough for those whose farm lands, forests, health and livelihoods are threatened by them in countries from Indonesia, Malaysia and Papua New Guinea to Cambodia, Cameroon, Uganda, Cote d'Ivoire and Ecuador. To ask contemporary ecosystems to provide, year on year, a significant supplement to such a highly concentrated, accumulated source of energy places an insupportable burden on agricultural and forest lands and societies. In this sense, policies promoting investment in industrial agro fuels perpetuate the same confusion between below-ground and above-ground carbon pools that is exemplified in policies that assume that transfer from the one to the other can continue indefinitely (Larry Lohmann, 2009 ). Thus elite alliances forming around the concept of REDD 'Reducing Emissions from Deforestation and Degradation' are proposing that billions of dollars be invested in acquiring and preserving carbon in the world's native forests.

To make a dent in the fossil fuel issue, biochar, as agrofuels, would involve altering land use practices over millions of hectares in untried ways (Bio fuel watch, 2008). While biochar would use fairly low-tech methods of cooking agricultural wastes, schemes are also afoot to use synthetic biology to produce oil out of biomass, providing means for transforming the widest possible range of biomass on the planet into fossil fuel 'equivalents' capable of serving a petroleum using or coal using technology infrastructure. That could bring additional millions of hectares into service in the quest to make current fossil fuel infrastructure safe for the climate. The specialized high energy technology required to trigger harnessable thermonuclear reactions, involving temperatures of millions of degrees, is not even close to being developed. Some of the reasons why investments involving technology transfer as currently understood is also a defunct strategy. Technologies that are needed to overcome fossil fuel dominance tend to be neglected or suppressed. An excellent example is the World Bank's Clean Technology Fund, advertised as dealing with climate change, which promotes coal power in the South through transfer of 'clean coal' technologies (which are defined as those that emit no more than a standard coal fired power station in the North) (Brahic, 2009b). The 'Greenhouse Development

Rights’ framework, with its tacit endorsement of a long-discredited concept of ‘development’ that condescendingly sees ‘resilience’ as ‘far beyond the grasp of the billions of people that are still mired in poverty and singles out for special climate blame ‘subsistence farming, fuel Wood harvesting, grazing, and timber extraction’ by ‘poor communities’ awaiting Northern tutelage in capital flows, social networking, carbon trading and methods for holding policymakers accountable (Baer et al., 2008). Similarly, thinking about climate investment by the United Nations Framework Convention on Climate Change (UNFCCC) and the European Community which envisages a scaled-up carbon market, including a trade in REDD program.

### **3. CLIMATE CHANGE AND INVESTMENT IN CAMBODIA**

The climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use ( MOE , 2016). Cambodia has been ranked as the country second most affected by extreme-weather events in 2011, with a GDP loss of 3.1 per cent by one estimate ( Harmeling, 2012). Over the 2009–2011 period, an estimated 86 per cent of climate-related expenditures were funded from external sources; 60 per cent of all climate-related expenditures were in the form of traditional sector projects; 27 per cent came from dedicated climate change contributions of bilateral and regional donors; only 13 per cent came through global climate funds, such as the Climate Investment Funds (MOE, 2013). Cambodia completed its Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) in 2002. In addition to providing an inventory of Cambodia’s greenhouse gas emissions, the document represents the first comprehensive analysis of climate change CAMBODIA Environmental and Climate Change Assessment 11 impacts in Cambodia, focusing on the impacts on agriculture, forestry, human health and the coastal zone. For each of these sectors, adaptation options are recommended, however the target groups, modalities for implementation and coordination of efforts by different ministries are not elaborated (MoE, 2002). Several U.S. government initiatives help Cambodia’s farmers adapt to challenges caused by changing weather patterns. Cambodia HARVEST, an integrated food security and climate change program, is helping thousands of farmers increase their

income, improve food security, and adapt to the consequences of climate change. As part of its work with rice farmers, HARVEST introduced flood- and drought-tolerant seed varieties that allow farmers to delay or accelerate planting according to unpredictable weather conditions (USA, 2016). Cambodia is trying to solve with the effects of climate change as some of the coolest and hottest temperatures in Cambodia. However, in the different part of the country will bring large amounts of dust and dry temperatures. Along with having an impact on our individual sense of comfort and clothing preferences, these changes have a noticeable effect on Cambodia's most important resources and to investment in Cambodia. But the MOEYS is one of the key state agencies involved in the implementation of the Climate hanged Education and Awareness strategy - largely based on formal and non-formal education channeling. The MOEYS is planning to include Climate Change and Environmental Education in its Life Skills program, by integrating key CC learning tools in the curriculum, and by developing vocational research and training on Climate Change (MOE, 2016). The changing climate is induced to the Southeast Asia region as a whole from a suite of GCMs used by the Intergovernmental Panel on Climate Change as following:

- ✚ Mean annual temperatures are projected to increase across Cambodia by 0.7-2.7°C by the 2060s, and 1.4-4.3°C by the 2090s and
- ✚ All projections indicate substantial increases in the frequency of days and nights that are considered “ hot ” in current climate, with hot days increasing by 14-49% and hot nights increasing by 24-68% by 2060
- ✚ All projections indicate decreases in the frequency of days and nights that are considered ‘cold,’ with these events becoming exceedingly rare.
- ✚ As yet it is not possible to get a clear picture for precipitation change, due to large model uncertainties, however increases in rainfall appear to be likely during the monsoon season for Cambodia ( world bank, 2011).

Many other aspects of globalization influence population health, including the accelerated emergence of new infectious diseases, the near-ubiquitous rise in the rates of obesity and associated non communicable diseases as daily bodily energy budgets (food energy input vs. physical energy output) shift into surplus, the spread of cigarette marketing, the effects of climate change, increases in resistance to antimicrobial agents, and health risks in the workplace

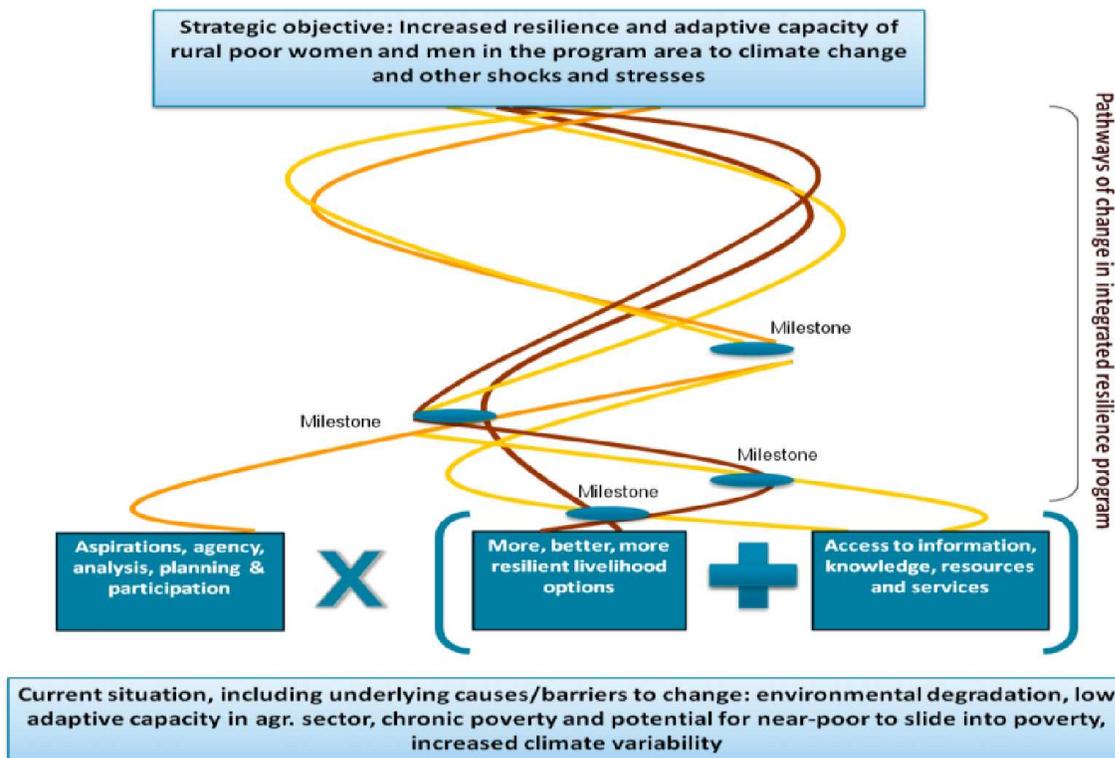
due to the deregulation of international labor markets. The country's National Adaptation Program of Action (NAPA), completed in 2006, identified 20 high priority adaptation projects, with a combined budget of USD 130 million. The Second National Communication (SNC) Team's revised vulnerability analysis and adaptation plan are being used to update the NAPA.

### **3.1 Project Investment constraints in climate change of Cambodia**

In 2012, A Climate Public Expenditure and Institutional Review conducted through it identified a range of climate expenditures, which were seen to have grown from 14 per cent in 2009 to nearly 17 per cent in 2011. The figures include both on budget and off-budget funding. Total relevant expenditure on climate in 2011 was estimated at US\$769 million. The Ministries of Public Works and Transport, Water Resources and Meteorology, with support from various donors, Cambodia has implemented a number of projects to address climate change mainly through the NAPA and disaster management projects. The SPCR (now managed by the Asian Development Bank) focuses on mainstreaming climate resilience at national and sub-national levels and on the preparation of a Strategic Program for Climate Resilience to be launched during 2013–2014, with a package of seven investment programmes in agriculture, water and infrastructure, and technical assistance for climate change mainstreaming. The total financial envelope is US\$ 390 million (of which US\$91 million will come from SPCR/CIF), including both grants and loans. The government has funded several projects that are relevant to climate change adaptation, such as:

- ✚ Land management
- ✚ Multiple cropping.
- ✚ Biogas

Figure1: Environmental and Climate Change Assessment of Cambodia



*Source:* worldbank (2002).

### 3.2 Climate change agency and implications

To avoid future health risks associated with climate change, adaptation efforts in Cambodia's health sector should include:

- ✚ Implementation of community-based health education programs to increase awareness and improve personal hygiene and environmental health management;
- ✚ Introduction of a malaria surveillance system, coupled with improved methods for vector control for health workers and communities;
- ✚ Providing training programs to build the manpower capacity to improve the provision of health extension services at local levels; supporting health research and community health services.

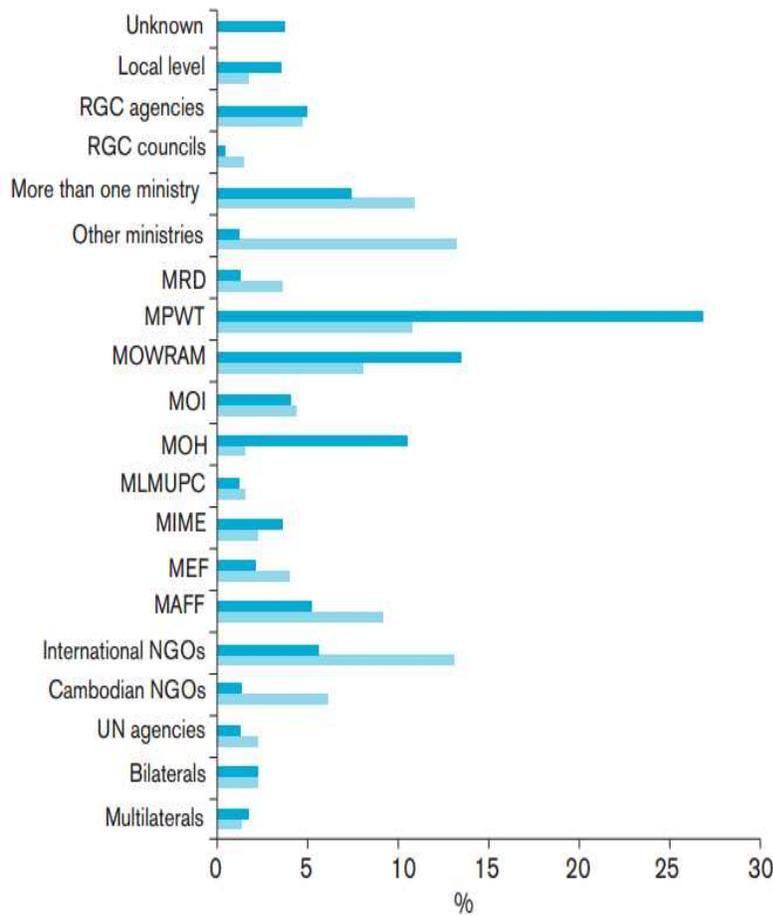
But much remains unknown regarding water resources across Cambodia, the NAPA has identified several key activities and research streams to make the water sector more resilient to a changing and more variable climate. These include:

- ✚ Conducting water resources assessment studies, including an inventory of water quality and quantity of both surface and underground water in time and space, to develop proper use of available water resources;
- ✚ Introducing improved methods of water conservation, storage and use, including the construction of small check dams and rainwater harvesting schemes to supplement domestic and irrigation supplies;
- ✚ Establishing community-based, participatory watershed management and conservation programs aimed at restoring degraded watersheds;
- ✚ Introducing methods for flood protection, disaster prevention, and maintenance of flood control structures;
- ✚ Improving provincial water transportation arteries (reducing silt, dredging), particularly along upper Mekong waterways in the provinces of Svay Rieng, Prey Veng, Pursat, and Koh Kong.

The impacts of a changing climate on crop yields under various management scenarios, adaptation options for Cambodia's agriculture sector include:

- ✚ Increased support for and reach of existing agricultural research and extension services;
- ✚ Implementation of improved water use (water harvesting, small-scale irrigation, etc.) in drought-prone areas to alleviate rain shortages that cause crop failure. Improving farmers' knowledge and access to weather information in carrying out agricultural activities;
- ✚ Livelihood diversification to mitigate the reliance on agriculture as the sole livelihood source;
- ✚ Restoring and rehabilitating flood protection infrastructures, such as dikes;
- ✚ Establishing grain banks to sustain communities during periods of drought.

Figure 2: climate relevant expenditure by implementing agency



Source: CPEIR, 2012

#### 4. Public R & D in Cambodia

In 2001 donors accounted for around 68% of public funding for health care (Ensor 2002). Cambodia has a highly centralized system of public finances. Public funding of the health sector is dominated by external sources. The provincial share of expenditures financed from the government's own revenues in 1996 was only about 22 percent. Almost 97 percent of provincial budget expenditures were of current Xspending. Thus, the provinces have scarcely any role in building physical infrastructure. As they lack the powers to raise revenues or vary the level and composition of expenditures, the provinces have neither the incentives nor the accountability to provide public services efficiently to match the preferences and requirements of different

regions. (However, the government recently approved the Provincial Budget Management Law, which devolves certain limited revenue and expenditure powers to provinces.)

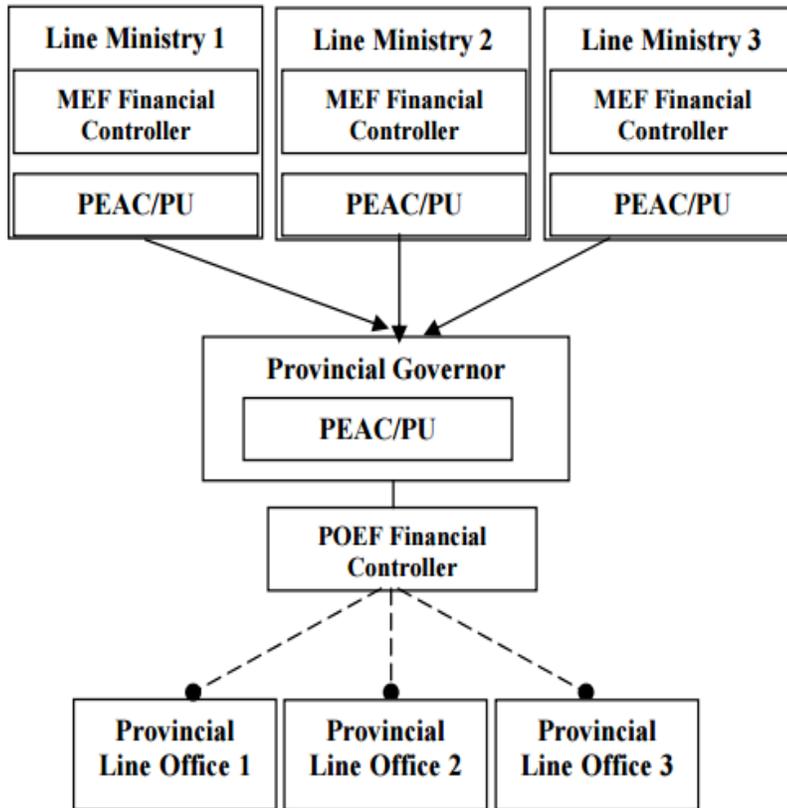
Budget Indecators	2014		2015	2016p
	Rule	Treatment	Rule	Plan
Internal Revenue % of GDP)	15.53	17.05	15.76	17.53
Current Revenue (% of GDP)	15.18	16.78	15.59	17.37
Total public expenditures(% of GDP)	20.91	21.55	20.95	22.32
Current Expenditures (% of GDP)	12.87	12.72	13.09	14.43
Current Surplus(% of GDP)	2.31	4.06	2.50	2.93
Current Deficit (% of GDP)	-5.39	-4.50	-5.19	-4.79

Owing to substantial over-employment, salary expenditures in 1996 constituted about 43 percent of current expenditures despite the low salary levels of government employees. Low salary levels tend to reduce productivity levels in the public sector. Low salary levels also encourage a high degree of absenteeism on the one hand and rent seeking on the other. In this regard, effective implementation of public sector reform including civil service reform, which has been stalled owing to lack of consensus and political uncertainty, will be critical. While there may not be much scope for expenditure reduction, the scope for rationalizing expenditures to make them effective, efficient, and productive is immense. In order to achieve this medium term objective, the following actions need to be taken over the next several months: (i) strictly limit new hiring and reduce the number of civil servants through eliminating ghost workers and also through normal attrition; (ii) carry out a civil service census to provide a record of numbers and grades, education attainments, experience, and skills which will facilitate personnel planning; and (iii) prepare options for the appropriate role of government, the appropriate structures for that role, the needed skills mix for the reformed government, and the pay, training, and recruitment policies to support that mix Expenditures for civilian non-wage operations and maintenance have been squeezed to the bare minimum in the course of budget implementation (an average of 23 percent shortfall as compared with the budgeted allocation during 1994-97) because of revenue shortfalls and overruns in defense non-wage O&M. This has resulted in underuse, or inefficient use, of capital investment and ineffective service delivery. It is of the utmost priority to secure an adequate amount of non wage O&M to ensure the efficiency of capital investment and the quality of service delivery.

The spending by the aid agencies is concentrated in the better off regions, particularly Phnom Penh. In 1996, for example, Phnom Penh, which has only 7.5 percent of the total population, received a predominant share of 51 percent of the total donor assistance (excluding nationwide programs). This could be explained by the fact that the bilateral and multilateral donors tend to dispense funds in areas which are more accessible, have facilities, and can be monitored more effectively. Although more balanced than the donor-financed expenditures, the regional distribution of the government's budgetary expenditure also seems to favor the relatively better off provinces. The consequence of these two factors has been the concentration of expenditures in Phnom Penh: total expenditure on public services per capita in Phnom Penh was ten times higher than that in the other provinces together in 1996. Since poverty is heavily concentrated in rural areas, this pattern does not serve the equity objectives of the government well.

According to Sub-decree 81 and 82, in order to spend the approved Chapter 11 budget, the PEO needs approval from the POEF and the Governor, who acts as the delegated manager on behalf of the Minister of MOEYS. Usually, the PEO is required to prepare a set of documents including the description of the proposed purchases and their estimated market prices using a pro-forma invoice or requisition. The proposal will first go to the POEF, which would then check if the spending subject is in compliance with the approved budget and the spending program sent from the MEF, if the cost is reasonable, and if other aspects of the formalities of the proposals are acceptable. The principal initial document is the "commitment visa." If approved, the commitment is forwarded to the Governor. In practice, the importance of the Governor's role varies from one province to another; in some cases, the Governor is even bypassed at this stage, whereas in others, the approval of the Governor is necessary

Figure3: Expenditures authorization at the Provincial and national levels



*Source:* Worldbank(2005).

## 5. CONCLUSION

Climate change concern has been mentioned as priority issues which government should solve it with carefulness and suitability. The mainstreaming climate change might be converted into sub-national planning scale identified. This include of the Strategic Framework for both centralization and decentralisation under the National Programme for Sub National Democratic Development, So the development of a guideline for mainstreaming climate change into sub-national planning being improved via the capacity building process. Importantly, policymakers have access to initial information on the costs of climate change. Currently Programme based approaches and community level interventions are conducted through multiple funds and supports but it's still limited.

In early 2016, The climate change in Cambodia has been serious step by step via weather changed and drought in some places as in rural areas too and some animals, forests were passed away too, While government should foster to expend with climate change projects especially NAPA and disaster project management and make up more public investments on infrastructures in some critical areas in order to help the agriculture system and health with harmonization zone by elimination of climate change impacts to their areas. This National Programme for Sub National Democratic Development will be helpful to Climate Change Technical Team (CCTT) to his framework and conducted better in sub National democratic development norm.

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