

INDIA

Climate Change and Its Impact on the Economic Sectors in the Rural Areas of Karnataka -Need for Multi-pronged approach

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Globally, half of the world's population i.e., approximately 3.3 billion people live in rural areas and 90% of those people reside in developing countries. With the advent of global warming and climate change, the entire world is affected and much of the impact is felt by developing countries as they basically depend on agriculture for the livelihood and economy. The major climate change impacts in rural area globally can be broadly divided into two categories viz., effect on the rural infrastructure and the impact on agriculture and other ecosystems. The effect on rural infrastructure originates due to natural calamities like floods, storms, landslides etc. whereas, the impact on agriculture and other ecosystems i.e., on forestry, fishery, wild life etc. is very slow, but have its impacts till the extinction of the species.

Climate change in developing Asian countries affect many sectors like agriculture, water resources, ecosystems, coastal zones etc. Scientists opine that a rise in global temperature (ranging between 1 to 5.8 degree globally) may melt the glaciers in the Himalayas leading to enhancement of flooding and landslides as a short term risk while, melting of glaciers may have a profound impact on the Asian populace relying on the Himalaya fed river systems (UNFCCC, 2007). Throughout Asia one billion people could face water shortage leading to drought and land degradation by 2050 (Christensen, et al, 2007; Cruz, et al, 2007). The melting of glaciers may also lead to coastal submergence with the migration of about 130 million people in low-elevation coastal zones in Bangladesh, India, and Pakistan, by the end of the century in worst-case scenario. Thus, the hydrological regime in Asia will be disturbed with erratic rainfall leading to more and more floods. According to a report by the Asian Development Bank (ADB) and the Potsdam Institute for Climate Impact Research, Southern India may witness a decline in rice yields by five

per cent in 2030s, 14.5 per cent in the 2050s and 17 per cent in the 2080s and the report also projects a yield reduction of wheat by 8 per cent in India.

India has a total rural population of 68.84% (as per 2011 census) and agriculture is contributing about 18% for the country's gross domestic product (GDP). Thus, climate change has a profound effect on the Indian economy as droughts are prevailing periodically along with secondary problems like water scarcity, reduced crop yield etc. The best example for this is the drought in the year 2015 which affected many of the leading crop production in States like Punjab, Uttar Pradesh and Maharashtra etc. with an overall reduction of crop yield by 5%. As a consequence, India is slowly drifting towards urbanization leading to abandoning of villages.

Karnataka, being the 7th largest State in India with a rural population of about 37.5 million accounting to 61.43% of the total State's population is the second least rain-fed region in India. As in other states, recurring droughts and less crop productivity is prevalent in Karnataka and incidences of farmers committing suicide is also high. This signals towards one major cause – the climate change. The State of Karnataka is divided into 4 regions viz., South interior, North interior, Malnad and Coastal regions. The annual rainfall varies both spatially and temporally with highest rainfall of about 4747mm in coastal region followed by Malnad region with 3500 mm to as low as 477mm in south interior Karnataka. In the past 16 years (2000 – 2016), the state has faced drought for 13 years. In the year 2016, the State had declared 139 taluks out of 176 as drought hit and sought (from Central Govt.) Rs. 4,702 crores for the loss of crops due to severe drought. It has been observed that this drought was the worst in the past 40 years. The Inter-Ministerial Central Team (IMCT) which visited the State approved a budget of 1782.44 crore as the National Disaster Relief Fund for the state. Prior to 2016, the State had experienced severe drought conditions consecutively during 2011, 2012, 2013, 2014 and 2015. Many parts of the State, including Malnad and Coastal districts received deficit rainfall due to monsoon failure during successive years. 22 taluks of 7 districts were subjected to drought successively during the last 5 years. The drought conditions have severely affected agricultural activities in 123 taluks during 2011, 157 taluks during 2012, 125 taluks during 2013, 35 taluks during 2014 and 136 taluks during 2015.

Thus, India being a welfare State and with almost 22% of the population being below poverty line, obviously demand strategic planning and management for the sustainability as enormous chunk of economy is being drained off to meet the impacts caused by climate change. The global assessment report (GAR, 2015) produced by the UN office for Disaster Risk reduction (UNISDR) reports that India's average annual economic loss due to disasters is estimated to be \$9.8 billion and has urged all the Asian countries to treat this as a wakeup call and make adequate investment in disaster risk reduction (DRR) or it will hinder the development process of the countries.

With the advent of climate change, erratic rainfall pattern severely affecting agrarian sector and with the uncontrolled increase in population, it is time for India for strategic planning and management with long term goals for combating droughts and in turn water scarcity. Interlinking of rivers and diversion of rivers is being looked as one possible option. But when the rains fail for long periods, we should have developed plans and infrastructure to tap water from oceans through desalination. Currently, more than 7500 desalination plants are operating around the world accounting for a worldwide water production of 65.2 million m³/year (0.6% of global water supply). India with 3/4th of its land bordering with sea can meet all the water requirements through desalination, if we can make establish elaborate infrastructure like in Israel. Though at the initial stages, the budget of desalination projects looks colossal, the advantages are many. The major component of expenditure is for the energy consumed for the process. India, situated in tropical zone, enjoys abundant sun-shine which can be harnessed by establishing solar panels in feasible areas to tap solar energy to use it for desalination. Though laying pipes to transport desalinated sea water to needy areas is a challenging task, it will be greatly rewarded when drought hit areas are assured of at least drinking water. What is required is prioritizing the National/State budgets to achieve such challenging tasks. Such ideas and implementation could yield far-reaching benefits on humans, live-stock, food production, social security and environment especially in rural areas which bear most of the brunt of climate change and consequent droughts. It also lessens frequent spending on relief measures, which are but temporary and hardly help in the alleviation of poverty and providing conditions for better living.