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INITIATIVE IN AGRICULTURE IN CHANGING CLIMATE

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Abstract- Agriculture plays a key role in overall economic and social well being of India. Global warming is one of the causes for climate change. Climate change affects agriculture in a number of ways, including changes in average temperatures, rainfall, and climate extremes changes in pests and diseases; changes in atmospheric carbon dioxide and ground-level ozone concentrations; changes in the nutritional quality of some foods. Climate change may have beneficial as well as detrimental consequence for agriculture .Food production will need to increase by 50-70 percent by 2050 to meet the needs of the expanding global population. There is a considerable literature suggesting that the poorest and most vulnerable groups will disproportionately experience the negative effects of 21st century climate change such changes are likely to impact significantly on developing world countries, where natural-resource dependency is high and international conventions increasingly recognise. there are reports on methods of linking climate change scenarios with hydrologic, agricultural, and planning models to study water availability for agriculture under changing climate conditions, to estimate changes in ecosystem services, and to evaluate adaptation strategies for the water resources and agriculture sectors The models are applied to major agricultural regions in Argentina, Brazil, China, Hungary, Romania, and the US, using projections of climate change, agricultural production, and population, technology, and GDP growth. Changes in water demand due to climate change effects on agriculture and increased demand from urban growth will require timely improvements in crop cultivars, irrigation and drainage technology, and water management. One degree increase in temp reduces wheat population by 4-5 million tonnes. Decline crop yield due to prolonged drought unreliable rain fall patterns, flood, hailstorm could leave hundreds of millions without the ability to produce or purchase sufficient food household goods, insecurity, malnutrition and poor health. Methods for evaluating climate change adaptation strategies for small-scale farmers using survey, experimental and modelled data. In order to tackle climate change there are two possible strategies: mitigation and adaptation. The first strategy consists in reducing the effects of climate change by reducing greenhouse gas emissions; the second track consists in facing up to the impacts and consequences of global warming drought, flood, shortage of drinkable water etc by adapting our societies to the new environmental conditions. Both strategies are complementary: mitigation attempts to reduce the impacts to which we will, inevitably, have to adapt. Some strategic steps for coping with climate are alternate livelihood college, skill improvement, awareness programme by media apart from this Farm financial management which involves decision making by producers and includes the use of crop insurance, investment in crop shares and futures, participation in income stabilisation programs, and diversification of household income. Adaption strategies are also closely related to the risk management strategy of farming as underlined by the fact that climate change may have some impact on agricultural like intercropping relay cropping and diversified farming, shifting towards natural resource for power supply like solar pump, water conservation structure etc .Many farmers becoming innovative in changing climate.

Keywords- Climate change, Skill improvement, Awareness programme

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Introduction

Agriculture plays a key role in overall economic and social well being of India. Global warming is one of the causes for climate change. Climate change affects agriculture in a number of ways, including changes in average temperatures, rainfall, and climate extremes changes in pests and diseases; changes in atmospheric carbon dioxide and ground-level ozone concentrations; changes in the nutritional quality of some foods. Climate change may have beneficial as well as detrimental consequence for agriculture But what are the implications of climate change for equity and justice amongst vulnerable groups at local and sub-national levels? We ask this question for three reasons: (a) there is a considerable literature suggesting that the poorest and most vulnerable groups will disproportionately experience the negative effects of 21st century climate change; (b) such changes are likely to impact significantly on developing world countries, where natural-resource dependency is high; and (c) international conventions increasingly recognise the need to centrally engage resource stakeholders in agendas in order to achieve their desired aims, as part of more holistic approaches to sustainable development.

The issues are examined through an evaluation of key criteria relating to climate change scenarios and vulnerability in the developing world, and second through two southern African case studies that explore the ways in which livelihoods are differentially impacted by (i) inequitable natural-resource use policies, (ii) community-based natural-resource management programmes. Finally, we consider the placement of climate change amongst the package of factors affecting equity in natural-resource use, and whether this placement creates a case for considering climate change as 'special' amongst livelihood disturbing factors in the developing world.

The integrated study examines the implications of changes in crop water demand and water availability for the reliability of irrigation, taking into account changes in competing municipal and industrial demands, and explores the effectiveness of adaptation options in maintaining reliability. It reports on methods of linking climate change scenarios with hydrologic, agricultural, and planning models to study water availability for agriculture under changing climate conditions, to estimate changes in ecosystem services, and to evaluate adaptation strategies for the water resources and agriculture sectors. The models are applied to major agricultural regions in Argentina, Brazil, China, Hungary, Romania, and the US, using projections of climate change, agricultural production, population, technology, and GDP growth.

For most of the relatively water-rich areas studied, there appears to be sufficient water for agriculture given the climate change scenarios tested. Northeastern China suffers from the greatest lack of water availability for agriculture and ecosystem services both in the present and in the climate change projections. Projected runoff in the Danube Basin does not change substantially, although climate change causes shifts in environmental stresses within the region. Northern Argentina's occasional problems in water supply for agriculture under the current climate may be exacerbated and may require investments to relieve future tributary stress..In India due to deficit in rain fall this year the small river and ponds have very less water and stress condition many states suffers from drought

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Discussion:

Adaptation tests review imply that only the Brazil case study area can readily accommodate an expansion of irrigated land under climate change, while the other three areas would suffer decreases in system reliability if irrigation areas were to be expanded. Cultivars are available for agricultural adaptation to the projected changes, but their demand for water may be higher than currently adapted varieties. Thus, even in these relatively water-rich areas, changes in water demand due to climate change effects on agriculture and increased demand from urban growth will require timely improvements in crop cultivars, irrigation and drainage technology, and water management [1].

Sub-Saharan Africa is predicted to experience considerable negative impacts of climate change. The IPCC Fourth Assessment emphasizes that adaptation strategies are essential. Addressing adaptation in the context of small-scale, semi-subsistence agriculture raises special challenges. High data demands including site-specific bio-physical and economic data are an important constraint. a new approach to impact assessment, the Trade off Analysis model for Multi-Dimensional Impact Assessment (TOA-MD), which simulates technology adoption and associated economic, environmental and social outcomes in a heterogeneous farm population for a regional impact assessment. The methodology uses the kinds of survey, experimental and modelled data that are typically available in countries where semi-subsistence systems are important, combined with future socio-economic scenarios based on new scenario pathway concepts being developed by the climate change and impact assessment modelling communities. Characteristics of current and future agricultural systems, including land use, output, output price, cost of production, and farm and household size are analyzed and compared for both current and projected future climate (2030), with and without adaptation, and for different socio-economic scenarios. The methodology is applied to two study areas in Kenya. The case studies show the potential of this approach to provide a flexible, generic framework that can use available and modelled data to evaluate climate impact and adaptation strategies under a range of socio-economic scenarios.

Determinants of farmer behavioural change

The environmental management practices in agriculture in general and then specifically the determinants and motivational influences related to climate change mitigation and adaptation. Results are inconclusive as regards which factors consistently determine the adoption of agricultural best management practices. With regard to mitigation practices the key findings from the literature are as follows: (i) main factors influencing the adoption of mitigation management vary with types of techniques, (ii) both financial and non-financial incentives affect farmers' behaviour, (iii) relationship with neighbouring farmers has significant effects on adoption of mitigation practices, and (iv) the attitudes and beliefs of farmers must be taken into account when designing appropriate incentives. Moreover, previous studies have shown that psychological and socioeconomic factors simultaneously influence adaptation decisions, and understanding how farmers actually weigh the qualitative and quantitative aspects when making decisions may assist policy makers to better understand inter-relationships among these factors to aid them in policy design.

Mitigation management

Agriculture contributes to climate change through actions that produce Green house gases, but it can also contribute to the solutions (e.g. carbon sequestration; energy crops that displace fossil fuels; changes in livestock diets). The effectiveness of green house gases mitigation methods depends largely on the farmer or land user's response to any potential economic benefits or penalties and motivation including attitudes towards global climate change issues.

Application of key findings from the literature to the mitigation management

As stated in the Stern review [3], policies to reduce emissions need to be based on the removal of barriers to behavioural change, as well as carbon pricing and technology policies. However, few researchers focus on studies are limited, farm level mitigation management is, similar, and even overlaps, with the conservation management discussion reviewed later in section 3.1. Best practices for reducing GHG emissions are widely known and previous findings can be extended to this context. Representative management for GHG mitigation in crop farming is summarised in. Measures for GHG emission mitigation from crop farming Measure Example Cropland management Agronomy Nutrient management, Tillage/residue management Water management (irrigation, drainage) Rice management Agro-forestry Set-aside, Land-use change Management of organic soils Avoid drainage of wetlands Restoration of degraded lands Erosion control, organic amendments, nutrient amendments Manure/bio-solid management Improved storage and handling Anaerobic digestion More efficient use as nutrient source Bio-energy Energy crops, solid, liquid, biogas, residues *Source*: Adapted from Smith *et al*. (2008) [2]. Other policies are targeted to reduce or increase effort costs. Information provision can facilitate conditions which enable producers to have access to desirable choices. Information provision with easier accessibility could be a significant policy tool for both mitigation and adaptation. Generally, high quality information provision on the risks, vulnerability and threats posed by climate change [5] is important in this respect. Information such as given by scenarios of climate change could be incorporated into land-use planning by farmers. In addition, through the on-farm GHG emission calculator, the cost of seeking information about individual GHG emission declines significantly. However,

There are a broad range of factors related to farm-management decisions that could improve the environment. Drawing on the experiences of many countries, this report identifies policy options that would contribute to a sustainable and resilient agricultural sector in the context of climate change. Farmers have a long record of adapting to climate change. The evolving nature of the present changes, however, could have a significant impact on agriculture that will challenge farmers to adapt even further in terms of how they use the land, commodities produced, and where farms are located. Moreover, given that agriculture is a major source of global greenhouse emissions, representing 10-12% of total global anthropogenic emissions of greenhouse gases (GHGs), In 2013 the European Environment Agency (EEA) announced that Europe had already reduced its greenhouse gas (GHG) emissions by 19% with reference to the 1990 level, but this reduction is largely as a result of the economic crisis. In order to tackle climate change there are two possible strategies: mitigation and adaptation. The first strategy consists in reducing the effects of climate change by reducing greenhouse gas emissions; the second track consists in facing up to the impacts and consequences of global warming (drought, flood, shortage of drinkable water...) by adapting our societies to the new environmental conditions. Both strategies are complementary: mitigation attempts to reduce the impacts to which we will, inevitably, have to adapt.

The strategies attempt to meet the consensus of keeping global warming in 2100 below 2°C as compared with pre-industrial levels. Beyond this level, climate change will most probably be dangerous and irreversible. We introduce here some of the most important strategies of mitigation. The Kyoto Protocol is the basis for the policies concerning mitigation. It was signed in 1997 and became effective in 2005. Currently, the Kyoto Protocol is in its second phase (2013-2020). The next UN Conference on Climate Change (COP21) that taken place in Paris in December 2015 is crucial for the renewal of the Kyoto Protocol. The European commission process, in its last policy framework for climate and energy, a target of reducing emissions by 32% by 2030 relative to emissions in 1990. The main objective is to cut the emissions by 80-95% by 2050 relative to 1990. At the end of each year, the scheme evaluates the volume of emissions effectively produced as compared with the allowances permitted. If emissions are excessive, companies will be fined, but they may keep their spare allowances to cover future needs or

they may simply sell them in order to make some profit.

Farm financial management

Crop insurance, investment in crop share, participation in income stabilization programme and diversification of household income

Adoption strategies

Risk management, intercropping, relay cropping, diversified farming, shifting towards natural resource for power supply like solar pump water conservation

Conclusion

In recent year, with growing recognising of the possibility of global climate an increasing emphasis on world food security in general and its regional impact in particular have come to forefront of the scientist community. Crop growth, development, water use and yield under normal condition are largely determined by weather during growing season. Even with minor deviation from the normal weather the efficiently and extremely applied input and food production is severely impaired

Conflict of Interest: None declared

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