

Panel (CC): Coping creatively with Climate Change

Papers: 6

Chair:

Gurdeep Singh

Vice Chancellor, Vinoba Bhave University

Co-Chair:

Lillian Machivenyika

Director CADS

Time: 14:00-15:30

Venue: Class Room- RJMCEI

1.

CADS' Experience in promoting agro-biodiversity in the face of climate change in Zimbabwe

Lillian Machivenyika, Nhamo Dapi and Tsitsi Nyamupingidza

Climatic change characterized by increased frequency of droughts and other risks faced by farmers that include rapidly changing markets, socio-political disruption, pest problems and the unpredictable availability of agro-chemicals are a threat to farmer livelihoods. Agro-biodiversity has played an important role in improving resilience in the wake of these risks. However, consumer preference for the traditional crop varieties has not kept pace with the supply of these crops resulting in an erosion of agro-biodiversity and associated knowledge systems. To counter this, CADS has promoted the production and mass marketing of traditional varieties, conducted conferences and workshops and promoted research into the nutritional values of traditional crops including amaranth, sorghum and millet.

CADS have successfully worked on an initiative of value-addition of traditional crop varieties. CADS have developed products such as puddings and yoghurts out of crops such as amaranth, and biscuits out of millet and sorghum. These products taste as good as or better as current products on the market, based on consumer assessments. Consumption and demand for value-added traditional and organic products is increasing, thus farmers are now willing to grow traditional varieties thus leading to improved agro-biodiversity. CADS have gone a step further by linking farmers with markets for their different traditional crop varieties resulting in increased incomes for rural farmers. CADS have developed recipes of different foods which can be made out of the diverse range of traditional crop varieties. This has resulted in an increase in the consumption of traditional foods as evidenced by an increase in the sales of traditional crop products. In addition, resource materials have been developed by CADS to promote diversified production of traditional foods and consumer perception and acceptance of these. Mass media awareness on the ecological, social, nutritional, medicinal and

economic benefits of traditional foods has resulted in consumers being sensitized to the many benefits of these crops and foods. Different forms of media particularly the use of social media and the Web have ensured swift flow of information to a wide audience. The integrated farming approach that CADS has promoted has also resulted in crop production systems supporting livestock production. This has resulted in an increase in the number of crops grown by the farmers either for fodder production or for food consumption. Natural pest management using crop residues has also been promoted by CADS resulting in increased number of diverse crop systems. CADS has worked with farmers for many years to create resilient agro-diverse farming systems and communities and promoted increased consumption and therefore demand for traditional crops by both consumers in the farming communities and urban communities. This is reversing the erosion of agro-biodiversity and the associated knowledge systems. The success stories of the work done by CADS in promoting the production and consumption of traditional crops and the tools used to achieve this will be presented in this paper.

2.

Innovation and experimentation by farmers in the Kumaon and Garhwal Himalayas in the state of Uttarakhand in north India for climate change adaptation in agriculture

Sonali Bisht

Climate change is a reality and is having an adverse impact on the livelihoods of vulnerable people, especially smallholder farmers with little risk taking capacity. Climate change adaptation responses need to be specific to the location, its microclimate and available livelihood assets. Adaptive mechanisms are being created by farmers locally to deal with the situation. By recognising these adaptive mechanisms, building on them and disseminating them, farmers across similar landscapes can be helped with low cost and affordable responses creating greater capacity to deal with climate change

Identification and recognition of farmer innovations, dissemination for validation by other farmers, documentation, upscaling and outscaling become important to spread the knowledge and ability to cope with climate change situations. Beside farmer innovation and participatory innovation development, agriculture research organisations are also aware of the problems and engaged in their own research which needs dissemination and validation by farmers through joint and comparative experiments which gives farmers knowledge and choice. The discoveries and processes on the ground need to reach policymakers at local, national and international levels to enable better decisions to be made for both process and content.

Men and women farmers in the Kumaon and Garhwal mountain villages in the state of Uttarakhand in India are facing the impact of climate change. Dependent on subsistence agriculture for their livelihood and food security, many instances of innovation to deal with climate change and secure a decent harvest can be found. The innovativeness of these farmers needs to be recognised and fostered. Validated innovations when disseminated widely bring relief to other farmers and also help build innovative adaptive communities.

3.

NEXUS OF CLIMATE CHANGE AND FOOD INSECURITY TOWARDS EFFECTIVE MITIGATION MEASURES USING UNDERUTILIZED CROPS

¹Aladejebi, O. J.[†], ²Olaodeji, S. O. and ²Edewor, S. E.

¹Department of Agricultural Economics and Extension, Federal University, Oye Ekiti, Ekiti State, Nigeria

²Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria

This review is presented on a nexus of climate change and food insecurity towards effective mitigation measures using underutilized crops. Despite the fact that Nigeria is blessed with a large land mass and a large population, we are still plagued with a serious problem of food insecurity due to subsistent system of farming by majority of the farmers, inability of the country to modernize its agriculture and the presence of the adverse effect of climate change. In order to achieve the millennium development goals, effort will have to be made to resolve the issue of poverty and food insecurity. This review shows the very important role that underutilized crops plays in the food security due to the benefits derived from them such as high calorific value, presence of essential micro nutrient and provision of dietary supplements to other staple foods, source of income for the rural families, requires low input and are tolerant to poor soils and seasonal drought. These crops can be categorized as: cereals, root crops, legumes and fruit crops and most of these crops are more adapted to the extreme climatic conditions prevalent in Sub Saharan Africa. The major problem associated with the productivity of these crops is small scale production. Certain environmental factors such as drought, soil salinity and acidity, pests and weeds and diseases also contribute to large losses in their yield. Therefore, there is a need for an in-depth research on these crops so as to boost food production and ultimately provide for the ever increasing population in Nigeria and Africa as a whole.

4.

Perceived Climatic Variability and Agricultural Adaptations by Material Resource Poor Farmers: Mainstreaming Informal Knowledge with Formal Knowledge Systems

Ranjay K Singh, Central Soil Salinity Research Institute, Karnal-132001, Haryana, India

Angchuk Dorje, Defense Institute of High Altitude Research, Ladakh, India

Rajesh Khedi, Grassroots Innovator of Climate Resilient and Ecologically Sustainable Innovations, Khedi, Kaithal, Haryana

Surjit Singh, Grassroots Innovator of Rice Variety Resilient to Compounded Vulnerability, Baras, Karnal, Haryana

It is well recognized that climate is changing and it has adverse implications on Indian agriculture, livelihoods and ecosystems (O'Brien and Leichenko 2003; O'Brien et al 2004; Agrawal 2008). The IPCC advocates for the searching local solutions for adaptations; and after about a decade of wait recently recognized the potential of centuries-tested community knowledge (CK) and location specific grassroots creativity (GC) available with material resource-poor (MRP) farmers (IPCC 2014). These communities have been using CK & GC with flexibility as an integral component in their adaptation strategies against weather anomalies and climate variability. Now the climate change policy of India has recognized CK and GC as part of adaptive practices, and enhancing location specific agricultural sustainability. But there are three major issues: (i) neither communities alone nor external agencies and governments have ready

and promising solutions for combating all levels of climatic variability, (ii) how best GC& CK can be used with formal knowledge to adapt with climatic variability, and (iii) what should be framework to mainstream CK &GC with climate variability and adaptation programmes in agriculture?. Therefore, these issues create an opportunity to have a synergy between GC and CK, and formal knowledge systems to fill in this gap and adapt climate change in agriculture. There could be a reciprocal learning between CK and GC, and formal systems. Both the systems can be integrated to enhance local strategies for sustainable adaptation agriculture.

Vulnerability caused by extreme weather and climatic variability, and sensitivity of MRP farmers to various levels of environmental risks has compelled them to evolve location specific CK & GC to sustain their livelihoods. The MRP farmers do not just wait until they receive technological solution and external resources from formal institutions, instead they devise location specific grassroots strategies. However, the knowledge and creativity of MRP farmers has not been much recognized until the recent climate change policy of India (NAPCC, 2008). Based on the questions raised earlier and arguments made, the following objectives are proposed with this workshop proposal: (i) To present and discuss perception of MRP farmers about climatic variability and vulnerability in sustaining agricultural resources and livelihood in varied environments of India, (ii) To discuss the identified adaptive strategies and practices, based on CK and GC, employed by MRP farmers that enhances sustainability of agricultural resources and livelihood security, and (iii) To identify indicators for framework and mainstreaming GC and CK-led adaptive practices with research and polycentric policies for enhancing agricultural sustainability.

5.

Farmers' creativity in coping with climate risks: a study of paddy farmers in eastern Uttar Pradesh

Anamika Dey

Climate variability, food insecurity and loss of agro-biodiversity are likely to stay with us for a long time unless policies are designed to counteract them based on the analysis of current coping strategies at community and farm level. As the number of extreme climatic events like floods and droughts are increasing, these pose newer challenges to community resilience. But some farmers in the rain-fed regions tend to sense the writings on the wall much earlier and pick the warning signals much ahead of others owing to their high degree of dependence on climate. They experiment in order to survive and in the process invent/develop coping strategies, which are then interwoven into varieties, institutions and traditions. Their strategies of survival are often a result of well-informed and deliberated volition rather than just by chance. In agricultural systems, farmers need to be seen as not only solution receivers but also as solution providers and implementers whereas the formal science acts a facilitator and partner in co-creation. The study of coping strategies of these farmers in terms of a) practices they follow b) decisions taken at different stages of the crop and intensity and level of extreme events c) indicators and heuristics that they use to decipher nature, market and society would help us to devise long-term adaptation policies. These are likely to be more acceptable and adoptable, ensuring food security for future.

6.

Assessing Vulnerability: An Adaptation Strategy to Cope with the Changing Climate for Sustainable Future

MTR Khan and MD Omprakash

The world has been witnessing frequent variations in the climate with impacts on the natural resources and ecosystem environments. The developing nations are largely dependent on the local precipitations and soil moisture for their livelihood generations. As the Himalayan ecology is being degraded faster than expected, its consequence is in magnifying the problems that climate change brings to the nature and its environment. This applies to the poor who are mostly dependent on natural resources for their livelihood. The extended summer, change in the rainfall pattern (intensity and duration) and variations of onset and departure of seasons are directly impacting the cultivation, status of natural vegetation and surface and sub-surface water in a watershed area. Local ecology has been degrading due to over exploitation and injudicious use of natural resources. This highlights the necessity for the governments, development organisations and finance institutions to integrate management into climate change adaptation strategies. Among the more recent efforts in combating the impacts of climate change in a community, watershed management has shown a more effective at micro levels since intervention is more site-specific that it can address the local requirements of the area. The vulnerability of climatic variations is mainly due to the water stress, degradation of vegetations, deterioration in health and hygienic conditions, gender biasness in decision making process and poor information communication technology. The present article highlights the vulnerability in the Himalayan region due to the variations in the climatic conditions and identifies the impacts through watershed development programmes. The study on the Jusho-Bakro micro watershed treated by the TERI under the programme DROP has produced positive impacts at the micro-watershed level to withstand the changing climate and its severity on the natural resources and livelihood of the community, especially to the women and children who are more vulnerable in terms of health, gender biasness and economic dependencies. This paper will look into a cost effective strategy for management and climate adaptation that will make benefits to the poverty reduction, livelihood improvement and biodiversity conservation as a strategic solution of sustainable development in adapting the climate change impacts and its severities.

Key words: Climate change, adaptation, vulnerability, ecosystem, forest, GIS and remote sensing