

## Farmers' Perceptions Towards Climate Change and Farm Management Practices

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### Introduction

Climate change (CC) may adversely affect the water availability and management problems, thus in turn affecting agricultural production. As the Dry Zone (DZ) of Sri Lanka is a water deficit area, its agriculture is highly vulnerable to CC. The economic disruption, social dislocation and human suffering caused by drought, among DZ communities have often been described in historical chronicles. In the modern time too, almost every year, there have been media reports on rainfall failure in many parts of the country especially in the DZ. Farmers' attitudes and perceptions towards CC and adjustment of farm management practices were examined in this paper. To understand the reality of CC and its impact on the paddy community in the DZ; Kekirawa division (with 03 villages) in the Anuradhapura district was selected for this study. The main objectives of the study are; to examine the present CC and fluctuation of rainfall and temperature since 1960 and to study the responses of paddy farming communities to perceived threats of CC and its consequences. The study revealed that the study area is heavily dependent on the availability of water and timely rainfall and the dry spells are often caused by the failure of Northeast monsoon (NEM) rainfall. Such failure leads to a continuous decline in the availability of water resulting in the reduction of rice production. During the last two decades, rainfall has decreased drastically in the study area. The irrigation system consisted of 07 rain-fed tanks but these small tank systems do not protect the farmers from severe water shortages. Climatic factors have significantly affected paddy production, its extent and yield, particularly under rain-fed conditions in the field area. Due to the uncertainty of timely rainfall, there is an increasing trend on the part of farmers to engage in '*Chena Cultivation*' than in paddy cultivation especially in the 'Yala' season. Farmers have noted a variety of changes in climate affecting their paddy farms: including an increasing general warming of the climate with reduced rainfall and a shift in the seasonal pattern of rainfall.

### Material and methods

To understand the reality of CC and its impact on paddy cultivation in the DZ, a questionnaire survey was carried out with particular reference to farmers' response to CC and its effects on communities and their livelihood systems. Discussions were also held with officers and the village communities. The 03 villages are located close each other, are small in size and have no remarkable differences among them and therefore, were analysed together with a total sample of 99 households. The sample was drawn by using the random sampling method. The field survey was carried out during the *Maha* season (MS) (October to March) 2003-2004. In addition to the questionnaire survey, temperature and rainfall data were collected from the Meteorology Department in Colombo and the trends and fluctuation of rainfall and temperature variation have been analyzed using linear trend analysis.

### Results and discussion

Currently, 07 rain-fed small tanks are functioning in the study area; but invariably there is no water in the YS in all these tanks. Therefore, none of the farmers has been able to cultivate paddy during the YS. Even in the MS, during the period of the field survey, water had dried up in all the tanks due to insufficient rainfall from NEM. Therefore, the *Maha* cultivation was not possible due to inadequate rainfall. The preceding YS cultivation had also failed due to inadequate rainfall. Next to paddy cultivation, *shifting cultivation (Chena slash and burn cultivation)* has been the main source of livelihood for paddy farmers in this area. Due to the uncertainty of timely rainfall, there is an increasing trend for farmers to engage in '*Chena cultivation*' than in paddy cultivation especially in the YS. None of the tanks are linked to any major irrigation schemes and therefore, water availability is vulnerable to local rainfall failure. Although almost all the farmers had cultivated paddy during the MS, the crop was completely damaged due to inadequate rainfall during the NEM. The

farmers' perception of cc is reported to be influenced by a number of factors. The rainfall fluctuations have also affected average yields and consequent adoption by paddy farmers of poor management practices. The poor economic status of the farming families was obviously caused by the failure of crops due to weather changes or disturbances. According to farmers' remarks, during the last two decades, rainfall has decreased drastically. Weather disturbances, warming and heat in summer have also been increasing. All the households indicated that they were very vulnerable to the failure of the rainfall and water scarcity in their agricultural activities. They do not get timely rainfall to undertake paddy cultivation during the MS. Therefore, it affects cultivation of paddy or other seasonal crops during the YS too. The reasons for non-cultivation of large tracts of paddy land during the last MS and YS, were mainly due to the uncertainty of rainfall, both Northeast and Southwest monsoons. Farmers have noted a variety of changes in climate affecting their paddy farms with increasingly erratic weather patterns, general warming of the climate with reduced rainfall and a shift in the seasonal pattern of rainfall. Particular attention should be placed on high drought -resistant crop varieties and the development of irrigation water management practices. No doubt, much of this requires a proactive position of the Government and the district administrations to enable the farming communities to come to terms with the risks involved in their chief occupations and livelihood system.

### **Conclusions**

The livelihood of paddy communities in this area is largely dependent on paddy cultivation,

based on a highly variable rainfall. The increasing temperature conditions in the last two decades were combined with decreasing rainfall during the NEM. According to farmers' views, due to uncertainty of timely rainfall there is an increasing trend to engage in 'Chena cultivation' than for paddy cultivation especially in the YS. None of the tanks are linked to any major irrigation schemes and therefore, vulnerability to local rainfall has increased. Particular attention should be placed on the cultivation of drought resistant crops and the development of irrigation water supply and management practices. The dependence on rice has to be reduced and other crops less susceptible to droughts could be promoted. The elements of such a strategy should include: the development of rice varieties with high yields which are drought resistant and use less water, agricultural practices which use less water, cultivation of alternative crops and various cropping patterns. In the long term the introduction of agricultural systems which are less dependent upon the monsoon cycle may be necessary. There is also a need to promote rain-fed farming and the efficient utilization and conservation of water through the development of an integrated farming system by taking account of climate change. Finally, there is the need to create community awareness by means of farmers' educational programmes on climate change and its possible hazards. A wide variety of adaptive actions may be taken to overcome adverse effects of climate change on agriculture at the level of farms adjustments. There is a need for revising existing agricultural policy by taking into account the impacts of climate change.