



Farmers' Awareness on Climate Change Related Issues at some Irrigable Areas of Batticaloa District, Sri Lanka

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Abstract

The research was conducted at ten irrigation command area of Batticaloa district during the period from January 2011 to May 2011 to assess the socio-economic condition of farmers, awareness on recent change in extreme climatic events such as flood, increasing trend of rainfall and existing adaptation methods against those events. The primary and secondary data were collected among 300 farmers through questionnaire survey, key informant discussion and direct observations. Both quantitative and qualitative research methods were used in the data analysis using SPSS software and MS Excel. The results show that, 70% and 61% of the farmers are aware about the changing pattern and the increasing trend of flood and drought respectively. As far as the adaptation is concerned, 43% of the farmers are adapting new agronomic practices in paddy cultivation such as reuse of drainage water, increase the number of ploughing, shifting the cultivation period and use of tolerant crop variety. It is concluded that the awareness on recent climate change impacts on productivity among the people residing in the study area is inadequate and the agronomical adaptation percentage of the farmers were less compare to the increased trend of climate change. Therefore, conducting awareness programme by the respective authority will create some awareness on climate change and adaptation techniques among those people.

Keywords: Adaptation, climate change, command area, major irrigation scheme.

Introduction

Climate change is not only a major global environmental problem but also a developmental issue of great concern to Sri Lanka¹. Sri Lanka, being an island state is especially vulnerable to all identified impacts of climate change including rise in land and sea surface temperature, changes in amount of precipitation and pattern, increase in extreme climate events and rise in sea level². These 'direct' impacts, in turn trigger a wide variety of secondary effects on water resources, agriculture, livelihoods, health and well being, the economy and nature. Joshi and Tadiparti³ also reported that the Climate change due to global warming is expected to influence crop and livestock production, hydrologic balances, input supplies and other components of agricultural systems following food security and farmers' livelihood⁴. Therefore, enforcement of good adaptation is essential in order to minimize the negative impacts of climate change. Also compatible training and adaptive trials must be carried out with proper survey, planning, design and implementation. It is critically important that these impacts have to be identified, quantified and suitable action is to be initiated to adapt the climate change. In Eastern province, the Batticaloa district produces largest amount of rice, coconut and vegetables. However, recently the climate change would be quite moderate on Batticaloa district's agricultural sector and food security by the extreme flood, drought, tsunami, storms changed rainfall pattern and saline water intrusion. Therefore, the study on the present change in climatic condition, awareness and socio economic status of the people in order to accept the adaptation

strategies are very important in implementing any adaptation practices or projects against climate change to a particular area. Consequently, the present study was carried out to assess the socio-economic condition of farmers, awareness on recent change in extreme climatic events such as flood, increasing trend of rainfall and existing adaptation methods against those events at some irrigable areas of Batticaloa district.

Material and Methods

The study was conducted at irrigable areas of ten representative villages in the Batticaloa district, which are irrigated by three major irrigation schemes such as Navagiri, Unnichchai and Rugam.

The relevant data were collected from primary as well as secondary sources. The primary data were collected from 300 farmers through formal household questionnaire survey, key informant discussion and direct observation. The secondary data were obtained from the Irrigation Department, Department of Agriculture (DOA), Meteorological Department, Agrarian Services Center (ASC), Kachcheri Batticaloa, Central Bank Report (2009), Census and Statistical Report (2009), and published literatures. Questionnaire was pretested by drafted questionnaire and personal interviewing of randomly selected 20 farmers in the study area. Purposive sampling and stratified random sampling techniques were used as the major methods of sampling. The filled questionnaires were checked for completeness, coded and data were analyzed by using SPSS

(Statistical Package for Social Sciences) version 11.5, MS Excel version 2007 soft ware for windows.

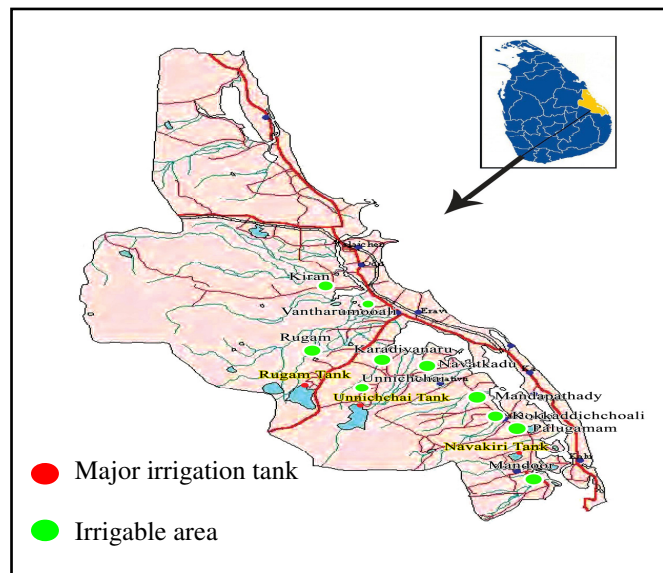


Figure -1
Map of the study area

Results and Discussion

The figure-2 shows, most of the respondents are aware about the recent trend of flood (70%) and drought (61%) as the impact of climate change, more or less similar percentage (10%) of respondents were reported that, increased temperature and decreased water availability at farm pond are also the effects of the climate change. People awareness on the changes in rainfall patterns, cyclone/storm and loss of vegetation were responded as less than 10%. Because, most of the farmers are suffered and directly affected by drought and flood compare to other climate changes.

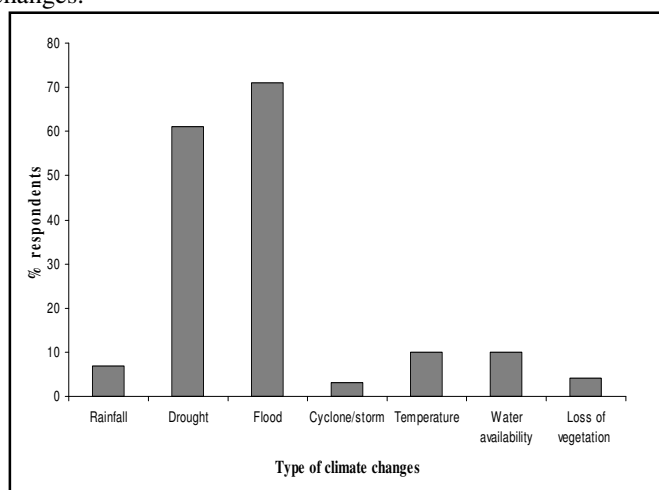


Figure-2
Farmers' Awareness on climate changes

Impacts of climate change on farming: Agriculture is one of the most vulnerable sectors as this primary production activity is highly linked with the natural resources and the environment. Herath and Dharmakeerthi⁵ reported the effect of climate change on agriculture is due to three major impacts, namely temperature rise, rainfall variation and carbon fertilization effects. Similarly, 90% of respondents were reported that climate change was threatening the crop yield. In addition, 18%, 13%, 8%, 3%, 6% and 7% of the respondents in the study area also reported that the climate change affect their livestock production, reduced water availability, increased pest and diseases, changing seasonal timing, salinization of coastal land and fish population respectively. Johnston *et al*⁶ stated, warmer conditions can reduce yields of crops by preventing pollination. For an example, rice yields decrease by 10% for every 1°C increase in minimum temperature during the growing season. Similarly the yield reduction in these study area may also be due to the increased temperature.

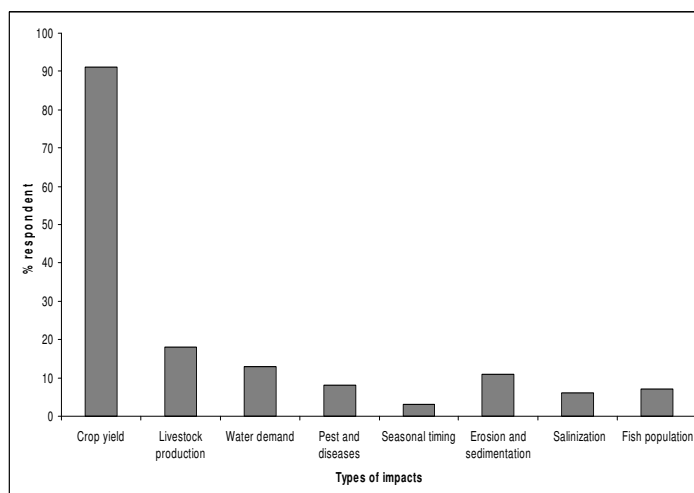


Figure-3
Impacts of climate change on farming at study area

Since the magnitude climate change impact on different resources would be varied and reason for reduced crop yield was obvious that impacts due to changes on rainfall regime, increased ambient temperature, etc. This fact also support by the Punyawardena⁷.

Table - 1
Climate change impact on socio economic Condition of farmers

Type of impacts	Respondents (%)	
	Yes	No
Reduced productivity	38	62
Increased poverty	66	34
Drinking water depletion	13	87
Constrains in fishing	12	88
Epidemic diseases/ health problems	8	92
Loss of cultivable area	4	96

The study on the present change in climatic condition, awareness and socio economic status of the people are very important in order to accept the adaptation strategies in implementing any adaptation practices or projects against climate change to a particular area.

Table-1, shows that, climate change impact is reducing the productivity and highly causing poverty, because the main occupation is agriculture (mostly paddy cultivation) in the study area and thus it is highly susceptible to the climate change impacts like increased drought and flood. However, farmers reported that climate change impact is very less on epidemic disease/health (8%) and loss of cultivatable lands (4%) respectively. Lack of knowledge of the respondents are the main reason for least aware of the impacts namely loss of cultivable area, because, loss of cultivable area become a serious problem in the Eastern province due to the salinization of land. Drop of productivity and reduction of yield leads to increase the poverty level of the farmers. Intense and prolonged flood periods are characterized by mass displacement of population, and water and food shortages. However, the capacity to adapt to change is very closely linked to socio economic factors such as poverty, diversification of income sources, level of education and access to infrastructure and technology.

Improved agronomic practices as adaptation strategies on paddy cultivation: Studies by IPCC⁸ revealed that, though vulnerability differs substantially across regions, the impacts, adaptive capacity and vulnerability would differ even within regions due to varying spatial and temporal situations. Similarly, in these study areas, practices as adaptation strategies varied across the various irrigable places in different periods. About 43% of the farmers were adopted new agronomic practices in paddy cultivation. Nearly 20% of the paddy farmers are reusing the drainage water from major irrigation tanks with assistance of the lift irrigation system for short duration rice varieties (BG 300 and At 307). Since increase the ploughing frequency may lead to reduce weed population and increase soil nutrient condition, some of the respondent (23%) increased the number of plough from 4 times to 6 times before sowing of paddy to improve the yield by improving the rooting and retard the growth of weed.

Most of the farmers are with lack of knowledge and hesitate to adopt new methods and technologies, thus they are not adopting new agronomic practices of paddy cultivation like System of Rice Intensification (SRI). 75% of the Farmers in the study area are only doing paddy cultivation because of the climatic condition, soil type and water availability of this irrigable area. Among them 45% of farmers were reported that they are cultivating lodging resistant varieties (BG 300) to avoid the yield losses by high rainfall intensity during the harvesting periods. In addition, the farmers (21%) choose this BG 300 variety due to the short duration (3 months), thus overcome the inadequate water availability during short growing seasons.

Adaptation strategies to minimize the sudden spreading of pest, diseases and weeds: Figure-4, indicates that, most of the farmers were not adapted to the sudden impacts of pest, disease and weeds caused by the climatic changes during the cultivation. Because of the adverse climatic conditions such as prolong flooding and moisture, the pest disease and weeds spreads / grown in paddy cultivating area. Sudden outbreak of the pest is the most important problem during the adverse climatic condition and adaptation measures were less compare with non-adaptation like traditional pesticide application. However, less numbers of the respondent (30%) were reported the disease spread due to the climate change. Meanwhile most of the sample respondent using the control measures i.e using inorganic pesticide (53%) and chemicals (25%) to control the pest and diseases respectively. However, still some of the farmers using some techniques like organic pesticide application (16%) for pest and manually (40%) controlling the weeds. Majority of the farmers (48%) are facing the problem of the attack of Brown plant hopper (BPH), fungal disease (14%) and water weeds (30%) in paddy cultivation by shifting seasonal timing due to adverse climatic conditions.

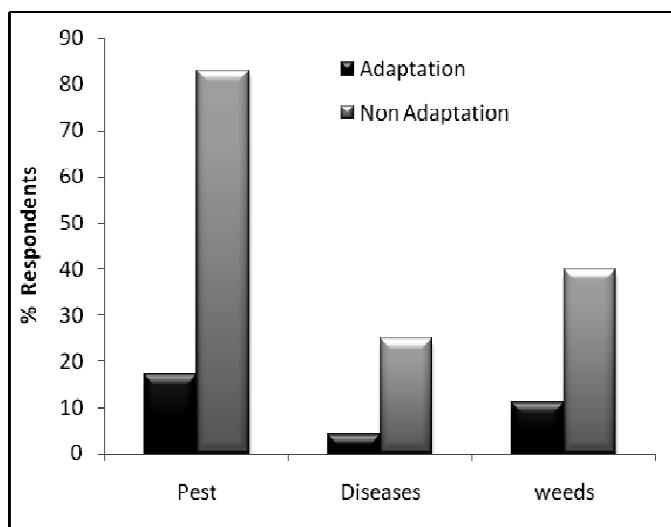


Figure -4
Adaptation against pest, disease and weeds

Effective and efficient use of water resources: Around 75% of crops are rain-fed. In many areas, irrigation is not technically or economically feasible, so improving water management is essential. Implementations of micro irrigation system and moisture conservation techniques are the most important strategies in irrigable areas which were not practiced by the farmers for high land crops in the study area. Most of the farmers were using kerosene water pump and agro well or tube well for the irrigation however, they are not practicing new adaptation methods for increasing water use efficiency such as drip irrigation and sprinkler irrigation (3% of the farmers are using these methods). The reason for less usage of the modern irrigation system may be due to the high initial cost, lack of knowledge and awareness of an appropriate technology to

enhance great water usage efficiency through drip and sprinkler irrigation systems. Many farmers (55%) are irrigating the vegetable crops by the lift irrigation. As far as the paddy cultivation is concerned, the farmers are utilizing rainwater (*Maha*) and bulk water allocations (*Yala*) to irrigate the paddy field. Obviously, it is apparent that, paddy cultivation indicates the lack of adaptation in the effective and efficient water use. Further, the study revealed that, there are three types of rain water harvesting system existing in this irrigable area, named as roof top rain water harvesting, deepening the tank by siltation and small scale pond. However, most of the farmers do not use the water from rainwater harvesting tank/pond to irrigate the crops except runoff harvesting pond in some areas. Because rainwater harvesting method is depends on three main factors: seasonal collection, intensity of rainfall and roof coverage. In most houses the roof coverage for harvesting was not properly maintained, which may affect water collection in dry periods because occasional rains during inter-monsoonal periods do not fill the tank to its capacity. In addition, investment for the rainwater harvesting tanks need high cost⁹.

Conclusion

Drought and rainfall pattern are the major climate changes in these irrigable areas which severely affect the agricultural productivity and increase poverty level of the rural poor farmers. The awareness on recent climate change and its impacts on productivity among the people residing in the study area are inadequate therefore; the awareness has to be created among these farmers to choose the best adaptation techniques to maintain the high yield. Agricultural adaptation like agronomic adaptation and use of new improved crop varieties are practiced by farmers, however the agronomical adaptation percentage of the farmers were less compare to the increasing trend of climate change. It is advisable to use the water efficiently through alternate irrigation methods such as sprinkler and drip for the highland crops that will be an effective and efficient in these areas.

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