SRI LANKA

Impact of Extreme Climate on Crop Production and Management Techniques in Batticaloa District, Sri Lanka: Review on Flood and Drought

A. Narmilan[1]*, B.G.N. Sewwandi[1], S. Puvanitha[2]

[1]Department of Biosystems Technology, Faculty of Technology, South Eastern University of Sri Lanka

[2]Department of Biosystems Technology, Faculty of Technology, Eastern University, Sri Lanka
***E-mail**: narmilan@seu.ac.lk*

Extreme climate is one of the most widely researched and discussed topical problems affecting the most of the sectors specially agriculture. Sri Lanka's economy is heavily dependent on agriculture which employs a large percentage of the population. Extreme climate may be due to natural internal processes or external forcing or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Availability of research data on issues of extreme climate in Batticaloa District is limited. Lack of such information is also known to be an obstacle for strategic planning, policy development and priority setting in Sri Lanka. Therefore, the objectives of this review is to identify the climate change hazards and possible disaster management projects in Batticaloa and to establish the broad agreement of the Batticaloa scientific community on critical issues related to the climate change hazards. Agriculture, especially crop production, is highly sensitive to both short and long-term changes in climate. Temperature increases will reduce the durations of most cereal crops by hastening their phonological development. Rice is highly influenced by variations in temperature and rainfall. Grain development of rice is highly sensitive to temperature during its reproductive stage, with significant increases in grain sterility occurring when temperature increases beyond 34 ^{o}C even for a few hours.

The Dry and Intermediate zones are the most vulnerable to drought, with the districts of Jaffna, Killinochchi, Batticaloa, Polonnaruwa, Anuradhapura and Kurunegala having the highest probability of experiencing drought. Paddy irrigation requirements are predicted to increase on average across Sri Lanka by 23 %. The highest proportional increase is predicted to occur in Batticaloa,

by 45%. This increase is mainly due to the decreased rainfall during January and February months. Flood Situation Report reported that, 124,071 families affected due flood in Batticaloa district in 2017, 3,361 houses fully damaged and 6,736 houses partially damaged due to flood in 2014. The highest number of persons (>3,604,769 people) affected by disaster is recorded in the Batticaloa district during the period of 1974-2006. The range between 8000 – 90550 people affected due to drought in the Batticaloa district in period of 1974-2006. More than 2,394,704 people affected due to flood in the Batticaloa district in period of 1974-2006. The range between from 343 to 3530 ha of agricultural land are affected due to drought in the Batticaloa district in period of 1974-2006. The range between from 21,019 to 36,583 ha of agricultural land affected due to flood in the Batticaloa district in period of 1974-2008. Disaster Profile of Sri Lanka reported that cost of agricultural damages and losses is 15,070 LKR million in Batticaloa, Polonnaruwa, Anuradhapura, and Ampara districts due to flood in 2011.

Climate Resilient Action Plans of Coastal Areas of Sri Lanka (CCSL) implemented awareness program with the school heads and teachers in Batticaloa district. Following themes have been discussed at the awareness program such as; Post disaster health hazards; Using trees/plants for climate change adaptation; Preparation for disaster; Safe home/school for disasters and Save energy at home/school. Disaster Management Centre (DMC) is implemented following measures to reduce negative impact of any disaster; Risk awareness and assessment; Knowledge development; Application of measures and Early warning systems. Project team of CCSL developed a project to provide recommendations to Sri Lankan cities to develop action plans to build disaster resilient cities based on the lessons learnt in the implementation of different project activities. The four Climate Resilient Adaptation Strategies and Supporting Action Plans (CRASSAPs) under this project are; Water resource management; A multi-purpose green belt; GIS-based Rapid Response and Disaster resilient; energy efficient; low-cost shelter adaptation training.

Based on this review, adverse weather and climatic changes, capital shortages, high cost of inputs, access to credit difficulties and poor quality of output are affecting agricultural productivity and eventually impact on the incomes of the farmers in Batticaloa district. However, adequate and relevant information

about impact of climate change in Batticaloa district is generally lacking. Therefore, management practices and cultivars will probably have to be adjusted to maintain agricultural crop production under a changing climate. The advancement in Information Technology in the form of Internet, GIS, Remote Sensing, Satellite communication, etc. can help a great deal in planning and implementation of hazards reduction. In conclusion, climate change will decrease crop yields in the long-term, unless one slows climate change and/or adapts new management practices and improved cultivars.