



**THE USE OF INDIGENOUS KNOWLEDGE SYSTEM FOR
FORECASTING SHORT AND LONG TERM CLIMATIC VARIATION
THROUGH FEATURES OF TREE: A STUDY BASED ON THE
VILLAGE OF RALAPANA WAGAMA IN ANURADHAPURA DISTRICT,
SRI LANKA**

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ABSTRACT

Climate change is a natural phenomena that people are not able to control . But there is a possibility of mitigating it's impacts adapting suitable strategies. In mitigating impacts modern techniques are too much problematic, and inappropriate. It is obvious that Sri Lanka experiences remarkable climatic variations under global climate change. The greater impact of climatic variation is on agriculture, water recourses and the people who involve in the agricultural activities. Agricultural land use agricultural production and survival of the peasant community will be the focal point of concern in the future agricultural development efforts. There are so many research undertaken on climate variation and impact on agriculture but the adaptations has been out of concerns. Most adaptations are modern technologies that are problematic in many ways. Sri Lankan peasant community have so many traditional views, attitude, concepts , knowledge and customs related to agricultural activities. Their scientific significant and effectiveness have not been adequately subject to study. This study attempts to fill this research gaps.

Key words: Mitigating, Climatic Variation, Adaptation.

1. Introduction

Present scenario of climate change most of the modern technical solutions taken to minimize issues arisen from current climate changes have been failed to follow sustainable initiatives. It has created more social and environmental complexities. For example, new plant varieties can sustain with less water and a solution to water scarcity created by climate change. But in long term, new varieties have many problems. Similarly although the modern technology is capable of create an artificial agriculture environment in greenhouses by altering the original agricultural environment, the issues created by it is high. Chemical fertilizers used for cultivation is ever increasing. The modern society faced with many issues created by it. As a side effect of this number of people in the dry zone in Sri Lanka are suffering from various illnesses due to high consumption of chemical fertilizers. In addition to Sri Lanka, other third world countries as well as developed countries too are experiencing dangerous consequences of modern technology. Drought, floods and insect epidemics that can not to controlled by farmers have created problems in a new form. Accordingly, current technical initiatives have paved the way for questionable situations.

On the other hand, the other issue faced by today's farmers is the inability of proper agrometeorological forecasting. Sri Lanka does not have facilities and expertise to forecast agrometeorological status in agro-ecological zones. Also, it is an issue how practical is it to catch rapidly changing environment conditions in these areas. Capturing changes is not an easy task since Sri Lanka is a tropical country with many agricultural zones.

The traditional knowledge is thing that farmers practiced through years of experience, living with the nature. It is not harmful to the nature. The prime aim of it is to enhance the feasibility of win over the nature while live in harmony with the changes in the environment. However, today the traditional knowledge is overpowered with modern scientific knowledge. There is lack of interest among the young generation to take forward the traditional know-how due to the popularity of modern technology.

Sri Lanka had so many traditional adaptations applied in the agricultural activities . However, most of them are not popular or not have been given attention of the future planners. Therefore under present day climatic variation these indigenous methods have a significance that should be taken into consideration, when future planning of agriculture development

strategies are made. But in the Sri Lankan context, indigenous methods used by people in this field have been focused less attention. Instead mega projects and modern techniques are used. On the other hand the scientific relevance of indigenous adaptation is needed to be emphasized when such strategies are formulated. In this context it is very important to identify three aspects one, what are the traditional adaptations assist in relation to climatic variation in the Agricultural sector in relevant area, two how their scientific relevance and three, the fact that whether there is a possibility of developing such adaptive techniques in the field of Agro climatology

2. Theoretical Framework

The influence of a climate in agriculture sector is altered by a change in the climate state and has indicate impacts on physical and social systems. The outcomes can be complex, resulting from direct and indirect effects of several climate and non-climate factors. The level of impact is modulated by the adaptation strategies. Here is more valuable Indigenous adaptation strategies, most of their adaptation result of interrelationship with environment. Indigenous Adaptation to Climatic Variation in Relation to Agriculture Activity is a function of the their knowledge, experiences, degree of exposure environmental indicators, sensitivity of the system, and the capacity for adaptation(Figure 01).

3. Methodology

3.1 Study area

The study area is Anuradapura district. In Anuradhapura *Ralapanawagama* village (8⁰ 05' 30.72" N, 80⁰ 08' 05.07" E) was selected in the Dry zone. This village climate is typical of that of the Dry zone of Sri Lanka which receives less than 1400 mm average rainfall during whole of the year (Figure 02)

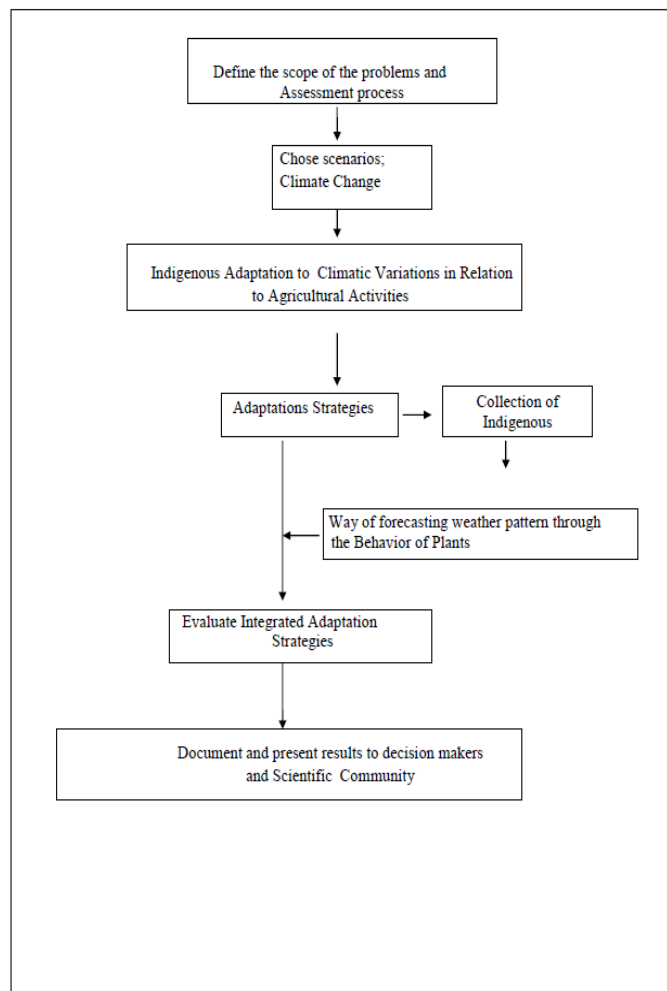


Figure 01. Conceptual framework

3.2 Objective

In this research main objective is to prepare indigenous adaptation methods use by the farmers to identify Climate Variation in Anuradhapura and Monaragala districts.

3.3 Hypothesis

In accordance with the research objectives following hypothesis are formulated to be tested.

I. Indigenous knowledge and customs practiced in agricultural systems of Dry Zone of Sri Lanka have a significant reality.

II. Indigenous knowledge and customs practiced in agricultural systems of Dry Zone of Sri Lanka have not significant reality.

III. Such practices can be develop as future agricultural strategies.

IV. Such practices can not be develop as future agricultural strategies.

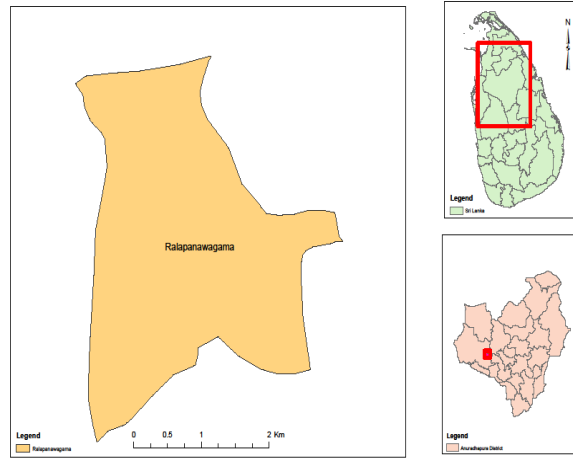


Figure 02- Study Area in Anuradhapura District

3.4. Selection of Sample

According to snow balling method, firstly, visited the field and met the Grama Niladhari of the area and explained to him about this aim of this study. Then met people in the area who are with experience and can understand weather patterns based on the changes in the environment. In the exercise according to the sample method, information was taken from each person and with the guidance of the Grama Niladhari 50 people were selected in respectively both villages. Priority was given to the elders with many years of experience.

3.5 Analysis of Data

Four methods were used to analysis data. Based in the data collected on the field how they adapt to the changes in the climate were directly noted while preparing a document categorizing the factors that helps to forecast the weather as through the behavior of animals, changes in the trees and plans and changes in the physical environment. A quality initiative was built for the data analysis through sketches according to the information given by them adaptation according to the changes in the environment. Secondly, to analysis qualitative data mainly consist event history of the farmer's in the study areas. Thirdly according to farmer's view, to measure the scientific relative of indigenous adaptation, basically their adaptation strategies were compare with the annual meteorological station data where they are so closed and instant of that the historical newspaper article found to prove the statement according the historical experiences

4. Results

How to forecast weather patterns according to the features of trees in Anuradhapura district

Farmers in the case study area have an incredible knowledge about this. Though they are scientifically not aware that plants and trees survive by adapting to the nature, they are aware changes in trees such as, twigs growing, roots expanding, flowers blooming occur during a certain period of time. Rain is essential for the growth of a tree and they have carefully studied about trees which are sensitive to rain.

Katupila (Flueggea Leucopyrus)

Katupila grows as a shrub and according to the people living in the area this plant helps to accurately forecast about the rain. Then people can make adaptations and plan their activities accordingly. If this tree has more flowers then rain will be high in the coming season (Figure 03 (a)). If the flower growth is normal (Figure 03 (b)) or less than normal (Figure 03 (c)), then it means there will be a normal rainfall or less rainfall.



Figure 03(a)



Figure 03 (b)



Figure 03(c)

Mora (Adenanthera Agaosperma)

Mora is a significant tree in the dry zone. It is a very tasty fruit and according to the growth of it farmers can forecast about the weather in coming days. According to their belief fruit harvest is high once in every seven years. If the growth of Mora fruit is high it is an indication of more rain (Figure 04(a)). If the growth is extremely low then a long drought is coming (Figure 04(b)).



Figure 04(a)



Figure 04(b).

Na Tree (Mesua Nagassarium)

Na tree can be seen in both wet and dry zones and it has a religious importance too. Na tree responds well to the changes in the climate. Especially the growth of its tender leaves give a sign about the weather in the upcoming days. If there is a large volume of tender leaves then heavy rainfall can be expected. Similarly, farmers believe if the tree bear lot of flowers and fruits, food will be plentiful (Figure 05). That also means harvest is high due to timely rain.



Figure 05

Kumbuk (Terminalia Arjuna)

Kumbuk is a heritable plant in the dry zone. This plant is sensitive to water and especially grow near water resources. According to farmers in the area, they forecast about the weather by the volume of fruits, flowers and leaves of the tree. If fruits, flowers and leaves are high in Kumbuk tree then the rain will high (Figure 06 (a)) .If fruits, flowers and leaves are low in Kumbuk tree then the weather will be dry (Figure 06(b)). When scientifically proving,

Kumbuk tree grows near water sources and it grows near water because there is a high transpiration through its leaves. Leaves fall during the dry season to minimize the transpiration. Through this the tree retains water. Leaves and fruits of this tree grow well during the wet season because there is enough water.

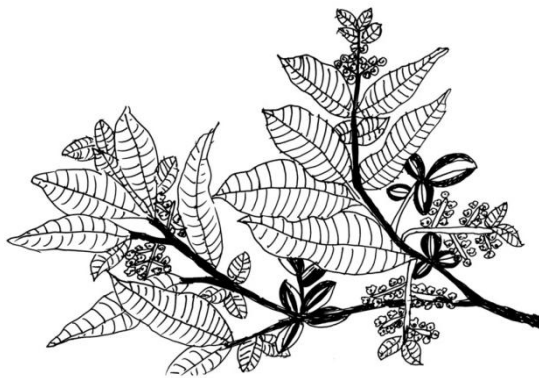


Figure 06(a)



Figure 06(b)

Torch wood/Yellow Silk Cotton (*Cochlospermum religiosum*) and Maila (*Bauhinia racemosa*)

Elder farmers in the area believe **Torch Wood (*Cochlospermum Religiosum*)** and Maila (***Bauhinia Racemosa***) (Figure 07) trees show signs of underground water resources. During a drought by finding a place where these trees grow and digging deep under one can find water.

Bael fruit tree (*Aegle Marmelos*) and Cluster Fig/ Red river fig(*Ficus racemosa*)

If a Bael fruit tree (*Aegle Marmelos*) or a Cluster Fig/ Red river fig is grown in a place naturally, then there will be a source of water close by (Figure 08).

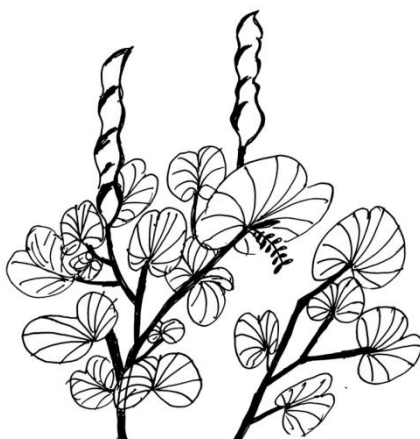


Figure 07

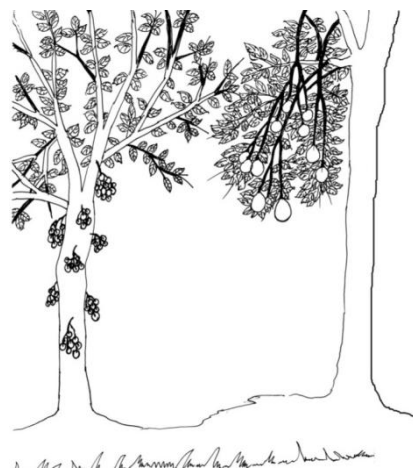


Figure 08

Cane (*Calamus ovoideus*)

As farmers in the area say they take steps to find water by studying the changes in the environment when wells, streams and river go dry during a long drought. One such incident can be elaborated as follow. If there is a place where a cane (*Calamus Ovoideus*) shrub is grown will be water since there 15 meters to the West if you dig the earth 9 inched deep (Figure 09).

Mora tree (*Adenanthera aglaosperma*)

Mr. Hennaniwala Sadiris further explaining how water can be found through these environmental indicators said if a *Mora* tree (*Adenanthera Aglaosperma*) is seen to the Northeast and if a ant hill is also can be seen, then water can be found if dig similar to the height of fourfold of a human (Figure 10). If grass can be seen in a grass-less field? Similarly, if there is no grass can be seen normally where grass grows, then there is definitely water in the land.



Figure 09

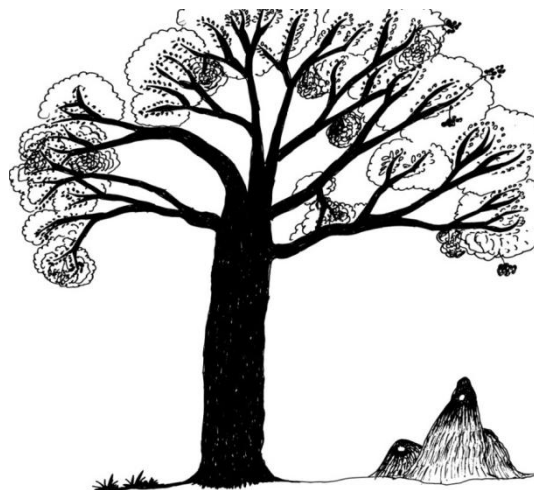


Figure 10

5. Conclusion

Most of indigenous adaptations strategies depend on last generation of community in Anuradhapura and Monaragala districts when end of this generation the wide range of indigenous knowledge will comes to end. Most of adaptation strategies had been changed as results of change natural environment. Monaragala and Anuradhapura districts has some similarities and changers of adaptations strategies through forecasting weather pattern with

behavior of animals. Indigenous knowledge has to powerful advantages over outside knowledge it has little or no cost and it is readily available. There are situations in which modern science is not appropriate, and use of simpler technologies and procedures are required to solve problems. Thus, indigenous knowledge provides basis for problem solving strategies in local communities, especially the poor.

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