

Use Of Traditional Knowledge By Paddy Farming Communities Of *Mahaulpatha* In *Polonnaruwa* District In Sri Lanka

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Abstract:

Traditional Knowledge (TK) also referred to as indigenous knowledge (IK) or local knowledge. During the ancient times, farmers practiced environment-friendly cultivation methods using their TK. In the past when the technology was not developed, TK was used effectively for agricultural activities in Sri Lanka. They acquired the TK by observing the natural phenomena, through their experiences and inheritance. The main objective of this study was to examine the use of traditional knowledge by paddy farming communities. How they used their traditional knowledge for land preparation, cultivation and harvesting? How they observed the weather and climate phenomena for their paddy cultivation, preparation, and harvesting? The primary and secondary data were used for this study. A questionnaire survey, interviews, observations and photographing are used to obtain data and information. Mahaulpatha GN division is selected from Dimbulagala Division as the study area and 40 elderly paddy families have been selected for the survey. Data analysis has been done through various techniques. Sample survey revealed that 57% of the paddy farmers have been using the straw manures before planting but after sowing paddy seed, 100% of the farmers are used chemical fertilizers to get high productivity. 87% of the farmers use machinery system to prepare the paddy land because machinery is most efficient, and minimize the time allocation and labor cost. 26% farmers do their land preparation and harvesting activities trusting the prevailing rainfall patterns. Observing wind direction and behavior of plants and animals also added to their experiences. The IK which has been brought down from generation to generation has gradually been vanishing in the study area. Even though the chemical approach to pest control is only a short term solution, farmers know that the modern chemicals are not eco-friendly or favorable to them and their abiotic environment. Application of chemical pesticides gives immediate results for increasing their farm production. Based on the field experiences the small leaflet (Local language) was prepared and distributed among the paddy farmers to make aware the importance of the TK with the combination of modern technology. Even though the modern technology is more advanced when both the traditional knowledge and modern technology are combined the more benefits can be acquired to the paddy farming community.

Key words: Modern technology, Paddy farming community, Traditional knowledge, Indigenous knowledge, Eco-friendly

I. INTRODUCTION

People and communities have developed their coping mechanisms over time which is reflected in the form of Indigenous Knowledge (IK). Rajib et al. (2009) explained that people use local knowledge and skills and materials based on their local ecology. During the ancient times, farmers practiced eco-friendly cultivation methods using their traditional knowledge. Traditional Knowledge (TK) also referred to as Indigenous Knowledge (IK) or Local Knowledge (LK). In the past when the technology was not developed, TK was used effectively in agricultural activities in Sri Lanka. They acquired the TK observing the natural phenomena for a long time, through their experiences and inheritance. Farmers attempted to manipulate those experiences for their needs and necessities. Local communities are closely related to – and dependent upon their local environment for survival (Julie, 2007). The traditional knowledge is transmitted orally from generation to generation (Convention on Biological Diversity, 2006). Berkes (1999) has explained that the local knowledge held by indigenous people and local knowledge are unique to a given culture or society. Traditional knowledge refers to the knowledge, innovations and practices of indigenous and local communities around the world, developed from experience gained over the centuries and adapted to the local culture and environment.

The paddy communities of Sri Lanka mostly living in the dry zone areas have been practicing their local knowledge to cultivate paddy. Since long time period, they had well practiced hydraulic system, land use practices, local weather forecasting knowledge, land tenure system, various cropping patterns and well-distributed cropping calendars, animal husbandry, food storage system and etc. All these systems and activities are tightly attached to their culture, religion with lots of rituals. Tank cascade system (i.e. man-made lakes known locally as tanks which harvest rain water especially for paddy cultivation) basically based on the paddy cultivation and undoubtedly improved the food security of the rural paddy communities. Land ownerships of the paddy lands is distributed among paddy farmers in a manner that each farmer could have similar access and right to irrigate water from the tanks for their paddy lands (Rekha and Dharmasena, 2009). These knowledge-based farming practices have gradually vanished with the existence of economic, demographic, and social changes (Madduma Bandara, 2008)

People's observations, identifications and monitoring of the local environment were more prominent among the ancient paddy farming communities in Sri Lanka. Knowledge of the paddy cultivation and harvesting time, duration, forecasting of the rainfall pattern, frequency, and intensity are also known by their local knowledge. Interpretational knowledge of changes in animal behaviors and local weather forecast are well aware and reflected. Still the paddy communities of some remote areas have been applying their local knowledge for paddy cultivation, harvesting, and storing. In many instances, knowledge is subject to change or modification with time due to changes in the influencing factors in the environment and society. Even though the modern technology is more advanced when both the traditional knowledge and modern technology are combined the more benefits can be acquired to the farming community. The combination of traditional and modern knowledge can reduce the environmental issues as well as increase the quality production to paddy farmers.

II. OBJECTIVES OF THE STUDY

The primary objective of this study was to examine the use of traditional knowledge by paddy farming communities in the study area in Polonnaruwa district. The main research question of this study was whether the farmers in the study sites (Mahaulpatha) are used the traditional knowledge for their paddy cultivation? This study wanted to find the answer to whether the farmers in Mahaulpatha have been using the traditional knowledge of their farming activities? How they use the traditional methods of land preparation, cultivation, and harvesting of the paddy? How they observe the weather and climate observation and use those experiences for their paddy cultivation i.e. land preparation, cultivating seeds and harvesting? Based on the study results a small leaflet is prepared to distribute to the paddy farming community in order to protect the tradition knowledge for the future generation.

III. METHODOLOGY

The primary and secondary data have been used for this study. A questionnaire survey, interviews, observations and photographing are used as primary sources. Mahaulpatha GN division is selected from Dimbulagala division of Polonnaruwa district as the study area. For questionnaire survey, about 40 elderly paddy farmers have selected the study site. The discussion has been conducted with various people who know about the paddy cultivation in this area. The majority of the respondents are male farmers. This village is not the traditional ancient paddy village but farmers are living here for a considerable long period of time. Data has been analyzed through excel software and simple graphical methods are used to present the results of this study. The first-hand information was collected from the respondents by interview method using questionnaires. Focused group interviews were also conducted with various respondents to get the information regarding the particular research.

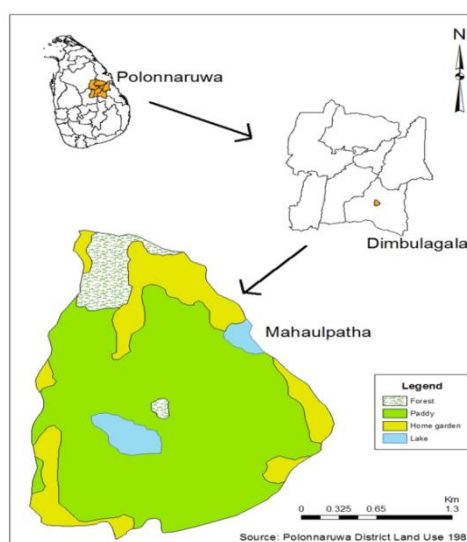
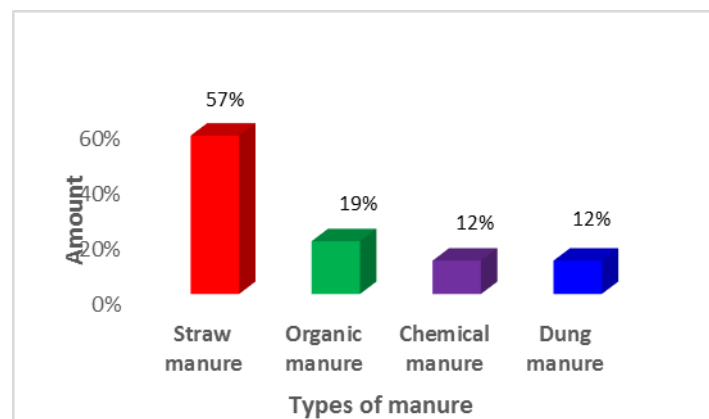


Fig.1. Study Area

IV. RESULT AND DISCUSSION

A. Use of traditional methods

Different types of manure are used for the paddy cultivation. Sample survey revealed that 57% of the farmers have been using the straw manures before planting the paddy. It helps to improve the soil fertility condition of the rice field because the organic manure improves the soil structure and water retention capacity of the soil in the paddy fields. 19% of the farmers use organic manure and 12% use chemical manures in the study area. Dung (cow) manure (12%) is also used by some farmers who have more accessibility to the cattle husbandry.



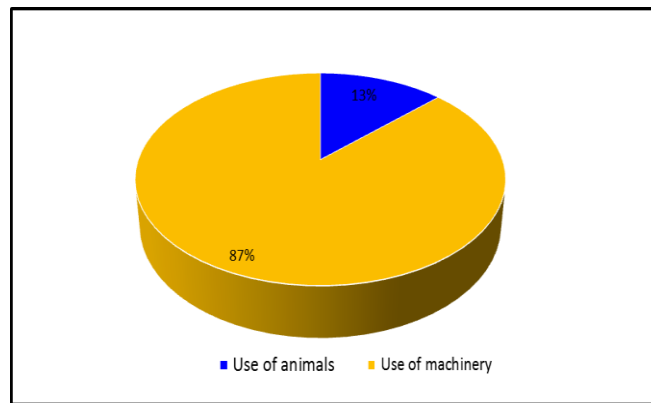
Graph 1. Use of manure before the paddy cultivation

Source: Field survey, 2015

The uses of manures have been changed after sowing of the paddy seeds. 100% of the farmers have been used only the chemical fertilizers because they used it to get high productivity and high income from selling paddy. Another reason is that the farmers can easily use the chemical fertilizer than organic compost. Preparing organic fertilizers are difficult task and farmers are also having believed that the organic fertilizers are not giving the high productivity of the paddy.

b. Preparing the paddy land

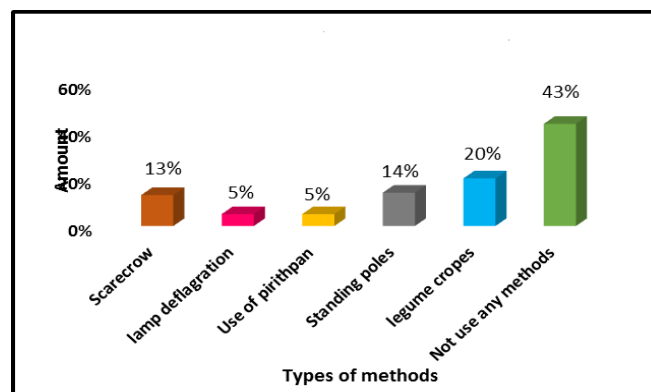
When farmers prepare the paddy land 87% of the farmers use machinery system. Farmers understand that the machinery is most efficient, and minimize the time allocation and labor cost. Use of animals (buffaloes) for this purpose is 13% only due to the time waste and high labor cost. 50% of the farmers used machinery instead of human labor for the paddy cultivation. Tractors, harvesters, combine harvesters are popular machinery system in this area. They gain many advantages and better income due to this new technology. This is the help to save their time and to expect the high efficiency. The traditional helping system of “*Aththama*” (exchange the labor for different activities by village community members) is gradually diminishing due to less number of family members and high demand of labor cost. Use of family labor has been decreasing (7%) due to the various reasons of their lifestyle.



Graph 2. Preparing the paddy land
Field Survey, 2015

C. Use of traditional methods for preserve the paddy land

Farmers of this village use different traditional methods for preserving the paddy lands from various catastrophes. A scarecrow is a shape of a simulated human figure. It is usually dressed in old clothes and placed in open paddy fields to discourage birds (such as crows or sparrows) incoming into the paddy fields. They usually disturb and destroy the recently sown paddy seeds and growing paddy seeds.



Graph 3. Use of traditional methods for preserve the paddy land
Source: Field survey, 2015

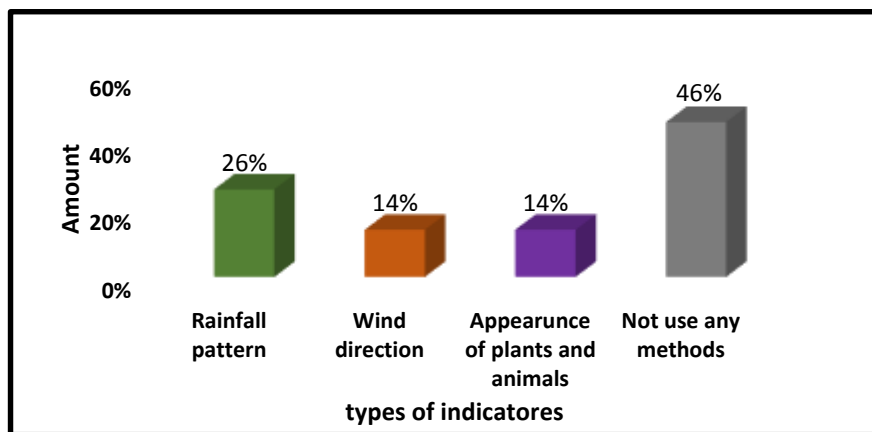
Paddy farmers of the study area use scarecrow 13% methods to protect their paddy from various birds. 5% of them use the lamp deflagration, 5% use of “Pirithpan” (blessing water prepared by Buddhist monks) and 14% use standing poles, and about 43% farmers have not used any methods.

Many farmers choose to use chemicals to kill the weeds and pests in their paddy lands and to add more nutrients to the soil. They use pesticides, herbicides, and different brands of insecticide. All three of these pesticides are used to kill different kinds of pests that can be found in the paddy fields. The study revealed that 100% farmers used the chemicals and they said that it is poison to many species and farmers are adopted to use those chemicals without any hesitancy. They have involved to the above methods because

those are easy to use, attractive marketing advertising and easy to obtain adequately. Scarecrow and standing poles use to preserve the paddy lands from birds and different kind of worms. Legume crops are used for pest control, to improve the soil fertilizer and to increase the alternative incomes. Use of good days and auspicious time for the exceptional situation in paddy cultivation (plowing, sowing, harvesting and storing) are celebrated. 53% farmers use auspicious days for paddy cultivation activities, 33% farmers concern the eclipse time, 14% does not rely on any particular auspicious time for their paddy cultivation.

d. Use of traditional weather and climate knowledge

Paddy farmers of the Sri Lanka utilized their traditional knowledge to understanding some weather pattern i.e. rainfall and wind patterns. They have some forecasting/prediction knowledge gained by long-term experiences. 26% farmers do their land preparation and harvesting activities believing the prevailing rainfall patterns. Observing wind direction and behavior of plants and animals (14%) also added to their experiences.



Graph 4. Use of different traditional indicators

Source: Field survey, 2015

According to the farmer’s view, the development of young leaves of the trees and starting the blossoming are indicated the summer is coming soon. Dropping of leaves, dropping of fruits before maturity and immature fruits drying on the trees are indicates very dry season are reaching soon. Wind direction (14%) Northeast wind brings rain and it is called as “Maha season” and southwest wind bring dry season, and it is called as “Yala season”. 43% farmers have not used any type of methods. Based on the questionnaire survey, the different weather periods are used by the farmers for their paddy cultivation. Paddy cultivation has the good relationship with the rainfall patterns. Year round activities could have been noticed with changing patterns of rainfall or based on the availability of the water. According to the weather patterns, their activities have also been changing. Rainfall is the most important and dependable weather parameter for the paddy cultivation in the study area. Farmers of the dry zone are well aware of the rainfall behavior by experiences.

TABLE 1. INDIGENOUS KNOWLEDGE ABOUT THE RAINFALL

Climate pattern	Period	Related activities and stage of rice cultivation
“Yala idoraya”	July to the end of October	Release cattle into the harvested rise field for feed
Slight rain	End of July to early August	Apply recycled straw
Slight rain	End of September to early October	First plowing
No rain	Early October to mid-October	Second plowing, the third plowing is performed at one week after the second plowing and then sowing
Start the Northern-east monsoon	End of October to end of December	Apply manure and chemicals
Low- temperature	January to February	Panicle initiation
Dry period	End of February to April	Harvesting

Source: Field survey, 2015

e. Observation of the natural phenomena and weather predictions

Farmers of the study area have been using their traditional knowledge for the local weather forecast for their paddy cultivation practices. They are well aware of the two monsoon rainfall and their characteristics. When winds come from the Northeastern side they know the rainy season is near future and it is normally called as Maha season for cultivation. Meteorologically this climatic season is called as Northeastern monsoon (December to February). In contrast, when wind blowing from the Southwest side, the study area gets the dry season (to the Dry zone) and it is called as Yala season. Meteorologically this season is called as Southwestern monsoon (May to September). Farmers say that when the clouds appear as dark the strong winds and also heavy rain can be expected. No clouds or with blue color indicate the clear sky and rain is already passed or finished. If the moon arises under the clear sky specify the dry season is coming. But the moon appears under the unclear merge sky indicate the rainfall is coming soon. When the stars arise under the clear sky with the bright environment will indicate the ending of rainfall. Plants dropping of leaves and fruits before maturity stage make dry climate. Plants giving the immature fruits and drying on the trees indicate drought period might come near future. Plants blossoming before the regular period in certain trees indicate the summer climate is coming. Farmers say that the development of young leaves demonstrates the summer climate is reaching. Animal’s behavior like Baya (*Ploceus philippinus*) weaver (bird) makes their nest on the top of the branches of the trees giving the sign of heavy rain is coming. When Baya weaver makes their nest on below branches of the trees indicate the very dry season is arriving. Movement of birds in the sky shows good sing of rainfall. The appearance of black ant and rapidly increasing size of ant hovel

predicate the good rains to their area. But flying the Eagles in the lower sky hope the drought period is coming soon.

V. CONCLUSION

The traditional methods of pest control are eco-friendly but now they are less effective in controlling the pest problem in modern farming. The indigenous knowledge which has been brought down from generation to generation has now gradually vanished and withdrawn. Even though the chemical approach to pest control is only a short term solution farmers know that the modern chemicals are not eco-friendly or favorable to their environment. Only the benefits are that the application of chemical pesticides gives immediate results for increasing their farm production. In the long term, it is ineffective because the target pests biologically get adapted to the existing pesticides. Hence chemical control is not a sustainable solution to the pest problem. Chemical pesticides bring about the ill environment and health issues. It is adverse effects on the productivity of the natural resources such as soil, water, air and living organisms. Introduce new courses in governmental and other educational institutes by the government. Awareness programs should be implemented village level in order to improve the traditional knowledge about the paddy cultivation. It is necessary to encourage farmers to use their traditional knowledge where necessary. Implementation the training programs about the use of traditional methods. Implement awareness programs to people about the environmental and social problems with current agriculture technology. Understanding the weather pattern is local level are very useful. Farmers know the weather changes by experiences. Some weather changes and predictions are more confidence to realize the existing situation of their environment. Based on the field experiences the small leaflet is prepared to distribute among the farmers to highlight the importance of the tradition knowledge with the combination of modern technology.



Fig 2. Leaflet: Importance of the traditional knowledge of paddy cultivation
 Source: Field survey, 2015

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