

# A Study of Traditional Pest and Diseases Control Methods for Sustainable Rice Cultivation in Sri Lanka

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**Abstract:** There is growing interest traditional farming practices that have merged during the 20th century in Sri Lanka. Traditional agricultural practices have used as the success method to pest and diseases management of the paddy cultivation in the country. This study aim to identify the traditional pest and diseases control methods and their impact on sustainable development of rice cultivation. The research utilized by case study and observation in Ulpotha Traditional Village, Galgamuwa and Hettipola area in Kurunagella district of Sri Lanka. Information gathered through conducting interviews with total of 100 farmers in both areas. Comparative analysis used to identify the success of traditional pest and diseases control in rice cultivation. The study rival that the rice cultivation areas which used the traditional methods for pest and diseases control have been successes than used of modern methods for rice cultivation. Traditional pest and diseases control method has identified for the high yield, low production cost, increased rice harvest, profitability etc. In addition, demand of production which come though the traditional agricultural practices have increased during last two decades in the local and international markets.

**Keywords:** Pest and disease, Traditional agriculture, Rice cultivation,

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## I. Introduction

Sri Lanka being a developing country, the agriculture sector is the main sector to achieve development and bring prosperity to its people. The agriculture sector is cornerstone the Sri Lanka's economy with the more than 70% of the population living in rural areas depending on agriculture for their live hood. Currently agriculture sector contributes to about 18 present of the GDP and 30% of the total employment in Sri Lanka. Rice is main food as well as paddy cultivation is the major agriculture cultivation in the country. Currently, around 807,763 hectares of land cultivated in Sri Lanka for paddy, 64% is cultivated in Mahaseason while 35% is cultivated in Yala season Department of Agriculture is expecting a paddy harvest of 2.7 million MT in the Yalaseason. However Sri Lanka exports some quantity of rice every year. Modern agriculture came about with the *Green Revolution* which took place soon after World War II, because of the food crisis. The green revolution supported by agricultural policies such as fertilizer subsidies, placed Sri Lanka on the fast track to becoming a production economy. With subsidized fertilizer and the establishment of irrigation schemes, farmers were given the motivation to be more production oriented. (Wiggins and Brooks, 2010) These heavy production agricultural methods in the paddy sector were supported by the new and improved high yielding varieties, machineries, Pesticides and weedicides, Inorganic fertilizer. It was revealed that these modern paddy farming methods are prone to issues. Several problems were associated with modern rice cultivation such as crop suffering from micronutrient deficiencies such as whitening, yellowing and retardation of growth. Further, these crops were more susceptible to pest and disease attacks and were not resilient towards climate change impacts.

## II. Problem Statement

It was revealed that these modern paddy farming methods are prone to issues. Several problems were associated with modern rice cultivation such as crop suffering from micronutrient deficiencies such as *whitening, yellowing and retardation of growth*. Further, these crops were more susceptible to pest and disease attacks and were not resilient towards climate change impacts(Darmasena,P.B). Accordingly, the traditional agriculture and method has been identified as an appropriate method to solve some inherent problems created by modern agricultural practices. Base on the problem statement research question as follows,What are the impact of traditional pest and diseases control methods for solving the problems were associated with modern rice cultivation?

## III. Objectives Of The Study

### General Objective

- Identify the *traditional pest and disease control methods* used in paddy cultivation;

### Specific Objectives

- Identify the new trends to use traditional pest and disease control methods to modern paddy cultivation process.

- Identify the traditional pest and disease control methods on sustainable rice cultivation

#### IV. Research Methodology

The research utilized by case study and observation in Ulpotha Traditional Village, Galgamuwa and Hettipola area in Kurunagella district of Sri Lanka. Information gathered through conducting interviews with total of 100 farmers in both areas. Comparative analysis used to identify the success of traditional pest and diseases control in rice cultivation

#### V. Discussion

##### Traditional pest and disease control methods in Sri Lanka

The research revealed that there is a growing interest to using traditional pest and control methods in Ulpotha traditional village. There are many traditional pest and disease methods used protect crops and harvest, such as rituals, trees, leaves, physical elements, sounds etc.

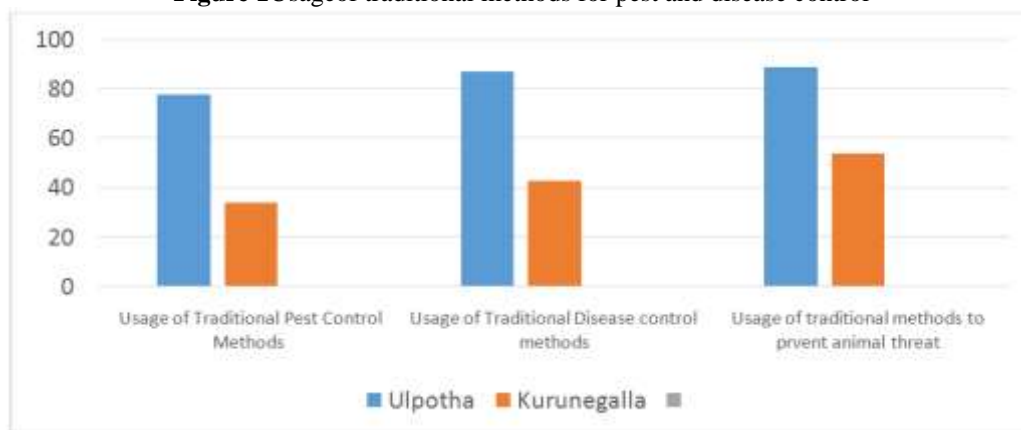
Biological control is a one of significant method which have being using in the paddy field, it is controlling or destroying a species by using another living species. It has identified as successful methods which is less damage to the environment than the destroyed of pest by the use of modern chemical pesticides. The winnow method is a one of other popular traditional method applied to control insect. The Mucilage (Koholle) from jack fruits is applied on the back of the winnowing baskets which is used to winnow rice and it slowly dragged across maturing paddy. Trees and leaves have being using for pest and insect control in the rice cultivation. Mee (Maduchalongifolia) is the one of popular tree for controlling pest, insect and improving the yield. Farmers grew Mee tree in the paddy fields and border of the paddy to control insect. The smell from Mee flowers help to attract birds and its help to control insect. Madu leaves have opposite repulsive smell to insect, farmers grew Madu tree for keep the pest away from paddy field. Juices obtained blending up Kohomba (Margosa), Kalawel (Derris scandals) thiththawel (*Lypersionesculebtium*) and Daluk (*Eupholsiaantignomum*) and leaves from the pineapple plant were mixed with water and sprinkled all over the field for pest and insect control [Udawaththa A]

The warm is damage to paddy crop at the earlier stage. Farmers used the Cinnomon and Kappetiya (Croton lexifenio) when preparing paddy field to protect seeds from warm. Water manage for pest controlling is the successful method which have being using in the rice cultivation areas in Sri Lanka. In this methods, water is allowed to remain in the beds prepared for paddy for 5-6 days, pest and other insect dies in the stagnation water. This practice is use as a successful method to control pest and harmful organism before seeding.

Charming sand and water is the one of traditional methods to for protection against pests. The charming has to be done by a devout person who leads a pious and righteous life. They are familiar with traditional religious practices. Many traditional farmers in the villages obtain the services of these persons to protect their crops against pests and diseases. Many of farmers have mentioned that these traditional religions practices have proved to be more effective than modern chemical pesticides.

#### VI. Data Analysis

Figure 1 Usage of traditional methods for pest and disease control



The research revealed that Ulpotha traditional village is the one of unique place for identifying the traditional farming methods. Farmers mainly cultivating traditional rice varieties for family consumption and aiming target groups. According to figure 1, farmers of Ulpotha traditional village utilized the traditional pest and disease control methods than modern industrial paddy cultivation areas. There are three categories of traditional practices which used for pest, disease and insect control.

Figure:2 Comparison of cost and benefits

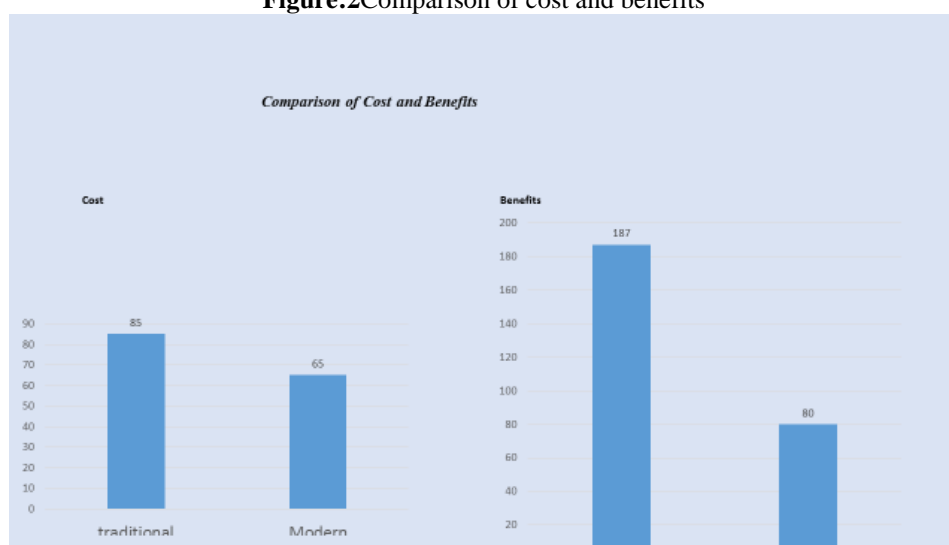


Figure 2 indicates the cost and benefits of cultivation one kilo of rice using traditional methods and modern industrial methods. Farmers who used traditional pest and disease control methods 85 rupees spend to gain one kilo of rice while modern industrial farmers spend 65 rupees. Traditional cultivation cost is high due to traditional methods are labor intensive. However 187 Rupees can be earned from market price to traditional varieties while 80 rupees earn from new hybrid varieties. The research revealed that rice which cultivated using traditional farming methods can obtain high benefits than modern hybrid varieties.

Table:1 Comparison of usage of traditional pest and disease control methods in both farming areas

Traditional Sector	Modern industrial Sector
<ul style="list-style-type: none"> <li>Totally cultivate the traditional varieties</li> <li>Crops are protected from bugs and pests using traditional and biological methods</li> <li>Highly used to age-old bio-dynamic formulas, traditional rituals, and bio-diversity are used to ensure a healthy harvest</li> <li>Natural trees and leaves used to pest and disease control</li> <li>Mainly cultivating for family consumption and target groups</li> </ul>	<ul style="list-style-type: none"> <li>Using new and improved high yielding crop varieties of grains to increase food production</li> <li>Highly used chemicals and pesticides for control pest and diseases</li> <li>There is some growing interest to cultivate small area with traditional rice varieties to family consumption using traditional pest and disease control methods</li> </ul>

The table 1 presents the comparison of usage of traditional pest and disease control methods in both Modern and traditional farming sector. Farmers in Ulpotha traditional village naturally not used inorganic pesticides on the land. They highly used to age-old bio-dynamic formulas, traditional rituals, and bio-diversity are used to ensure a healthy harvest. (Kumari, J.A.P,2016). There is a growing interest of traditional farming methods in modern industrial farming areas for family consumption.

## VII. Conclusion

Modern industrial farmers in Sri Lanka highly utilize modern agricultural methods to fulfill the demand of local and international market. Traditional farming is a labor intensive farming method than modern farming methods. However. The study identified that benefit is higher than production cost of traditional rice cultivation. Currently, modern industrial farmers also understand the importance of traditional method as an ecofriendly farming method. There is some growing interest to cultivate small area with traditional rice varieties while adopting industrial modern rice farming too.

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