

# Impact of Ill health Conditions on Productivity of Farmers Case Study in Galenbindunuwewa, Sri Lanka

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**Abstract:** *The agriculture sector is one of the key area in Sri Lanka's economy with more than 70% of the population living in rural areas depending on agriculture for their livelihoods. Currently this sector contributes to about 7.1% of the GDP and 30% of the employment. (Central Bank of Sri Lanka, 2016). Even though Agriculture plays a main role, poor health directly affects agricultural production. Illnesses affects the farmer's ability to innovate, experiment, and implement changes, and to acquire technical information available through many ways. The ultimate impact of ill health is a decline in household income and possible food insecurity that is, a severe deterioration in household livelihood. Long-term incapacitation, households may resort to so many difficulties. Aim of this research was to Understand prominent health issues through primary data sources such as informal and formal discussions with respective persons in Galenbindunuwewa DS Division, Sri Lanka and assess loss of productivity of Unhealthy farmers using pretested structured type questionnaires. Both quantitative and qualitative data were used to assess the impact of farmers' ill health on productivity. Objectives of the study were to find out most prominent health impediments of farmers, assessing the impact of health on their productivity and making recommendation to reduce the impact of health impediments. The study was carried out in Upuldeniya; Mailagaswewa and Himbatugollawa villages in the Galenbindunuwewa DS Division, Anuradhapura District and the sample of 70 households were selected from each village based on Stratified Random Sampling Technique. The data were analyzed with Pearson correlation, two sample T Test and chi square test. According to the results, it can be concluded those CKD and Occupational injuries were most prominent health issues of farmers in Galenbindunuwewa and also CKD was major threat for farmer economy and their health condition. Ill health condition of the farmers severely affected to crop production and other agricultural Occupations and non-agricultural Occupations. Based on findings, it can be recommended, Government should take action immediately to minimize health impact of CKD of poor remote villagers in Anuradhapura District.*

**Keywords:** Ill-health, Productivity

## 1. Introduction

In the 21st century, agriculture remains fundamental to economic growth, poverty alleviation, improvement in rural livelihood, and environmental sustainability (World Bank 2007). Three-quarters of the world's poor live in rural areas, particularly in Asia and Africa (Sangraula et al 2007), and depend on agriculture as their primary source of livelihood. An estimated 1.3 billion workers are engaged in agricultural production worldwide. According to the International Labor Organization (ILO), the agricultural sector is one of the most hazardous to health worldwide. Agricultural occupation face situation that are risky for health; exposure to the weather, close contact with animals and plants, extensive use of chemical and biological products, difficult working postures and lengthy hours, and use of hazardous agricultural tools and machinery.

Illness ceases the farmer's ability to innovate, experiment, and implement changes, and to acquire technical information available through extension activities, absenteeism from work due to morbidity (and eventual death); family time diverted to caring for the sick. Healthcare expenses may consume resources that otherwise might be used to purchase improved seed, fertilizer, equipment, or other inputs. Households with sick members are less able to adopt labor-intensive techniques.

In Sri Lankan context also this has proven that the ultimate

impact of ill health is a decline in household income and food insecurity that is, a severe deterioration in household livelihood. Long-term incapacitation, households may persuade to withdrawing savings, selling important assets (such as jewelry, breeding animals, farm equipment, and land), withdrawing children from school, or reducing the nutritional value of their food consumption. Low labor productivity is a prominent characteristic of developing-country agriculture. Labor productivity (measured in terms of agriculture value-added per worker) is quite low in low income or developing countries like Sri Lanka, as compared to high- and middle-income countries, which rely more on farm machinery than labor. (Kwadwo et al 2011)[5]

This paper examines prominent health issues in Galenbindunuwewa DS Division, Sri Lanka and assess loss of productivity of Unhealthy farmers under three objectives namely to find out most prominent health impediments of farmers, assessing the impact of health on their productivity and making recommendation to reduce the impact of health impediments.

## 2. Literature Review

Agricultural work involves multiple tasks and multiple locations, both on a daily and seasonal basis the fact that most of the tasks are carried out in the open air, exposing the workers to climatic conditions; the seasonal nature of the

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work and the urgency of certain tasks in specific periods; the variety of tasks to be performed by the same person; the type of working postures and the length of the tasks performed; the contact with animals and plants, thus exposing workers to bites, poisoning, infections, parasitic diseases, allergies and other health problems; the use of chemicals and biological products; the considerable distances between workers' living quarters and workplaces. (International Labor Organization, 2000)

The Most prominent hazards in agriculture are machinery such as tractors, trucks and harvesters, and cutting and piercing tools; hazardous chemicals: pesticides, fertilizers, antibiotics and other veterinarian products; toxic or allergenic agents: plants, flowers, dusts, animal waste, gloves (chrome), oils; carcinogenic substances or agents: certain pesticides such as arsenicals and phenoxy-acetic herbicides, UV radiations, parasitic diseases such as bilharziasis and fascioliasis; transmissible animal diseases: brucellosis, bovine tuberculosis, hydatid disease, tularemia, rabies, Lyme disease, tinea, listeriosis; other infectious and parasitic diseases: leishmaniosis, bilharziasis, fascioliasis, malaria, tetanus, mycosis; confined spaces such as silos, pits, cellars and tanks; noise and vibration; ergonomic hazards: use of inadequate equipment and tools, unnatural body position or prolonged static postures, carrying of heavy loads, repetitive work, excessive long hours; extreme temperatures due to weather conditions; contact with wild and poisonous animals: insects, spiders, scorpions, snakes, certain wild mammals (International Labor Organization, 2000) [2]

The diseases that have had the most severe impact on livelihoods in the developing world are HIV/AIDS, malaria, and tuberculosis. In addition, there are chronic effects from diseases more closely related to agriculture: soil- and water-borne diseases, mycotoxins, and zoonotic diseases. Cardiovascular diseases also represent a growing health threat. Finally, the impact of malnutrition may have effects on productivity as well as on health (WHO, 2009) [8]

Poor health will result in a loss of days worked or in reduced worker capacity, which, when family and hired labor are not perfect substitutes or when there are liquidity constraints, is likely to reduce output. For example, prolonged exposure to pesticides could cause cardiopulmonary problems, neurological and hematological symptoms, and adverse dermal effects, which could significantly hamper farmers' work capacity in the field and reduce their management and supervision abilities (Karunagoda K., 2004) [4]

Some results suggest that farmers' efficiency is significantly affected by the number of days lost to sickness. Although the magnitude of the effect is small, it is highly significant. It may be that farmers have accumulated some technical and managerial skills that are not easily substitutable through either labor market or family and other social connection; their inability to perform agricultural activities because of sickness therefore has a significant negative impact on overall efficiency. (Ulimwengu, 2009) [7]

### 3. Methodology

#### 3.1 Operationalization

Aim of this research was to understand prominent health issues through Hospitals records, medical officer of health office records and informal discussion with doctors and public health inspectors in Galenbindunuwewa DS Division and Asses loss of productivity of ill health farmers using pretested structured type questionnaires. Both quantitative and qualitative data were used to assess the impact of farmers' ill health on productivity.

#### 3.2 Study Location

Galenbindunuwewa DS Division is significant for this research because of the proposed area one of the 21 Divisional Secretarial Divisions in the district of Anuradhapura. The entire DS division covers an extent of 23,160 hectares in the eastern part of the district.

Many traditional farmers abandoned farming, moved out of the area. Out of the 300 tanks, only 136 are presently being used. Thunder – showers are experienced during two seasons; mid-March to mid-May and mid-September to end of December. The mean annual rainfall is 1,000mm.

Main income Source of farmer's is based on paddy cultivation, whilst corn, cowpea, gingerly (an oil seed), black gram and chilies are also grown. Vegetables such as squash, pumpkin, okra, eggplant, tomato, and fruit such as banana and mangoes are also grown. Irrigation facilities extend to 13,884 hectares. Currently the water storage capacity in each tank has declined and inefficient water management has become a cause of social disputes.

#### 3.3 Population and Sample

The target population consists of all farmers who got sick in Galenbindunuwewa DS Division. There was not sampling frame of illness of farmers so sampling frame was created using Hospital records, Medical officer's Health records in Galenbindunuwewa & Chronic Kidney Diseases (CKD) Unit in Anuradhapura Regional Director office records. Then Sample frame was divided into Grama Niladhari (GN) Divisions with no of recorded cases. Accordingly 3 GN Divisions which recorded highest no of cases were selected. 30 health hazardous cases and also 30 normal household were selected randomly within selected GN Divisions namely Upuldeniya, Milagaswewa, Himbatugollawa.

#### 3.4 Data Collection Method

##### 3.4.1 Primary Data

Informal discussion with doctors and public health inspectors in Galenbindunuwewa DS Division structured type questionnaires for 70 farmers representatively were used. And also stratified random sampling method was used to get a sample from population.

### 3.4.2 Secondary Data

Secondary information were gathered from the annual reports, books, journals, Thesis, & web and magazines.

### 3.5 Data Analysis

The data were analyzed with Pearson correlation, two sample T Test and chi square test.

## 4. Results and Discussion

### 4.1 Demographic Information of Farmers

All Selected farmers from 3 GN divisions were in Agriculture permanently. Maize and paddy cultivation was main income source of them. Some farmers cultivate chili, other dry zone vegetables and some are work as hired labors in other lands to get income as other agricultural income source. And also Bricks formation & self-employment were done by some farmers as a non-agriculture income source.

**Table 1:** Distribution & Number of Respondents according to health condition

Name of GN Division	No of Ill health farmers	No of Normal health farmers	Farmers represent % in the Village
Upuldeniya	15	12	38.57
Milagaswewa	9	10	27.14
Himbatugollawa	11	13	34.28

Considering the age distribution of the farmers throughout the sample, majority age category was 41-50 it is represent 40% from sample.

The majority (45%) of respondent's family size was four. However the families who have three member were in considerable position (40%) when compare with majority of respondent's family size.

The majority of farmer's education level (60%) was up to grade 6 – 11 (GCE ordinary level). The education level of 0 – grade 5(20%) was less than half of the majority.

The majority of farmer's total land area category was 2.5ac – 4.5ac. However the land area category of 5ac – 6ac was in considerable position when compare with rest land categories in the sample.

Selected Farmer's paddy land area (40%) was 1.5ac-2.5ac and maize land size (45%) was 1.5ac – 2.5ac. in the sample. The categories of the paddy land such as 0.5ac-1ac and 3ac-4ac were in responsible position when compare with rest land categories.

32% of farmers have invested from Rs 1501.00 to Rs. 4000.00 for hired labour for their cultivations and also 25% of the sample have not used any hired labour.

Between Rs 5100.00-8000.00, Rs. 2501.00-5000.00, 2600.00-5000.00 investment have used for fertilizer and pesticides and machineries respectively, by 34% of farmers,

36% of farmers and 46% of farmers from the sample respectively.

30% of the sample's income from main Agricultural crops is less than Rs. 5000 and 50% of the sample income from other agricultural activities is below Rs. 2500.

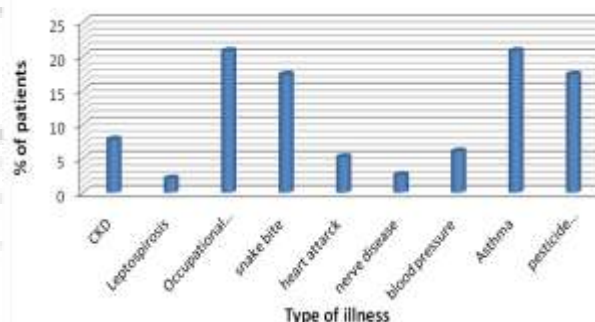
When considering the indebtedness of the farmers, majority (30%) of farmer's loan category was Rs 31000.00-75000.00 and other categories such as Rs 16000-3000 and less than Rs 15000.00 were in considerable position when compare with the majority.the mean value of the sample was Rs 31157.14 and standerd deviation was 31132.55.

### 4.2 Prominent Health Impediments of Farmers

Farmer involves multiple tasks and multiple locations, both on a daily and seasonal basis. Most of the tasks are carried out in the open air, exposing the workers to extreme climatic conditions. Therefore they are subject many health impediments such as Occupational injury (trauma), Communicable diseases (Leptospirosis, viral fever) and Chronic illness (Chronic Kidney Disease).

#### 4.2.1 Illnesses of Farmers

As shown figure 1, the main health impediments of Galenbindunuwewa DS Division were Occupational injuries, Snake bite, Asthma, Pesticide poisoning. Others were not prominent than above mentioned health impediments.



**Figure 1:** Main health impediments in Galenbindunuwewa DS Division

According to selected sample from total population, the most common condition of Farmers suffered was CKD (25%) in Galenbindunuwewa DS Division. Cancer, pressure, paralyzes such illness Record as a lower no of illness in that area. CKD has highest no of farmers, because of CKD is the very popular disease in dry zone like Anuradhapura. Leptospirosis was a main Communicable disease and Occupational disease in that area. Most of farmers did not much concern about illness until it become very serious.

#### 4.2.2 Illness pattern of the farmers according to age

CKD was most prominent health impediment in 51- 60 age category. The farmers of that age range suffered long period from that illness. As shown table 2, Age category of 51-60years has highest number of diseases with higher % of farmers Such as CKD, Occupational injuries, many surgeries and leptospirosis. The farmers belong to between 51-60 Age categories, they did not much concern about health condition until they cannot work properly. Majority (8%) of farmers

belong to >60years age category were Suffer from CKD and most farmers of them who suffer CKD they were retire from Agriculture due to CKD attacked Severely. Other illnesses were not prominent in Age category of more than 60years. Leptospirosis, Occupational injuries and Nerve disease were prominent health issues in 41-50 age categories. There was not prominent health issue in 30-40years age category. Snake bite and Leptospirosis were common illness in that age category but there were not higher number of cases.

**Table 2:** Age category and suffered illness of the farmers

Type of illness	Age category(years)			
	30-40	41-50	51-60	>60
CKD		2.8%	17.1%	8.57%
Leptospirosis	2.8%	8.5%	2.8%	
Occupational injuries		5.7%	5.7%	2.8%
Snake bite	2.8%			2.8%
Surgery		2.8%		
Heart attacks	2.8%		5.7%	
Nerve disorders		5.7%		
Cancer				2.8%
Paralyses				2.8%
Eye disorders			2.8%	

#### 4.2.3 Relationship between farmers' age and illness

**Table 2:** Number of farmers according to the age category

Age category (years)	Healthy farmers		Unhealthy farmers	
	No of farmers	%	No of farmers	%
30-40	16	45.7	9	25.7
50-60	16	45.7	13	37.1
>60	3	8.5	13	37.1

There was not relationship between farmer age and illness of the farmers. The result was chi square – 0.333, degree of freedom was 1 and significant value was 0.564.

#### 4.2.4 Working days lost due to main health impediments

Considering the number of lost working days due to prominent health impediments. When compare to CKD, Leptospirosis, Snake bite, Injuries, for injuries and CKD, there are more number of lost working days with compared to other two. Because CKD and Injuries are getting more time to cure or they cause much damage to farmers. Especially CKD is a popular disease in dry zone. When consider Leptospirosis and Snake bite, though they cause harmful damage, their effects are fast reactions.

### 4.3 The impact of illness for production

#### 4.3.1 The relationship between paddy yield and age of the farmer

There was a positive relationship between Age of the healthy farmers and paddy yield. Because of when farmer become older, increase paddy yield gradually. The farmers get experience with times of years who engage in agriculture. Therefore increase yield of paddy of farmers. The correlation test was done between age of healthy farmers and yield. The correlation was 0.195 and significant was 0.262. There was negative relationship between the age of the unhealthy farmers and yield. Because of when farmer become Unhealthy, deteriorate farmer physical and mental

fitness therefore reduce the yield of paddy drastically. Correlation was -0.147 and significant value was 0.399.

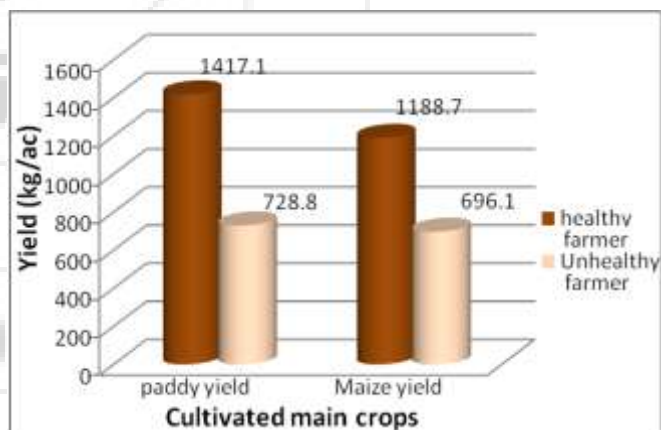
#### 4.3.2 Production of Paddy and Maize

There is a gradual increment of paddy yield and maize yield of healthy farmers. But when consider Unhealthy farmers, there is a gradual decline the yield. Because of when farmers become unhealthy, deteriorate their physical and mental fitness and reduce the farmer concentration for paddy land such as timely Fertilizer application, timely pesticide application and timely water control. Therefore there is a distinct difference of paddy yield between farmers who normal health condition vs. ill health condition. Because of that the illnesses is a main issue for production. When farmers become ill, Medical expenditure also increases. Therefore number of times and required amount of inputs have reduced. Finally it is declined production of paddy and maize.

#### 4.3.3 Average paddy & Maize yield with the health condition of farmers

As shown figure 2 the average paddy yield was 1417.1Kg/Ac and 728.85 kg/Ac under normal health condition vs. ill health condition of farmers. Therefore there was a significant yield gap between healthy vs. unhealthy farmers. According to the t test significant 0.000, df 34 and t – 8.593.

The average Maize yield was 1188.7Kg/Ac and 696.1633kg/Ac under normal health conditions vs. ill health conditions. Therefore there was a significant yield gap between healthy and unhealthy farmers. According to the t test, significant 0.000, df 34 and t – 5.967.



**Figure 2:** Average paddy and maize yields with health condition of farmer

### 4.4 Cost of Production

Considering the cost of production of maize and paddy separately, farmers had to spend more money during their ill-health condition period compared to healthy period.

#### 4.4.1 Cost of production for major crops

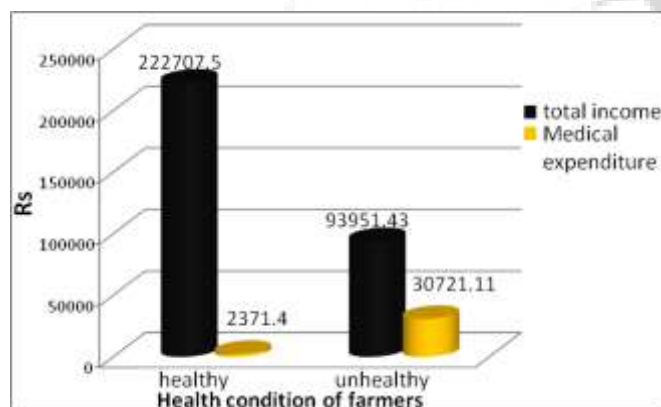
Paddy and maize cultivation is composed different tasks in different times. Therefore farmers use much labor to do tasks Such as land preparation, seeding, cultural practices, Harvesting. Farmers cultivate with family labors and few number of hired labors. But when farmer becomes unhealthy, he has to spend more money for additional labors due to less

physical fitness of farmer. According to the results, there is low value of labor per ac because of farmers use tenant farming system in that area. There was a significant difference the number of hired labor when farmers healthy and unhealthy. According to the t test significant 0.000, df 34 and  $t = 6.596$  for paddy and t test significant 0.026, df 34 and  $t = 2.323$  for maize.

When cultivate whatever crops farmers have to use other inputs such as fertilizers and pesticides. Under unhealthy condition of farmers have to spend additional money for other inputs to protect their paddy land from pest attack, diseases and deficiencies due to less attention of unhealthy farmers. According to the t test significant 0.037, df 34 and  $t = 2.165$  for paddy and t test significant 0.252, df 34 and  $t = 1.165$  for maize.

#### 4.4.2 Total income vs Medical Expenditure

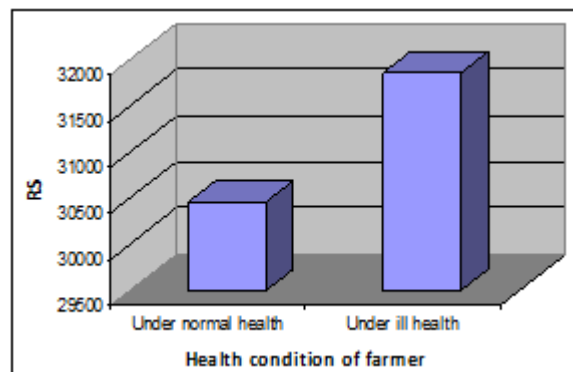
Figure 3 shows medical expenditure of healthy farmers Vs ill healthy farmers who diagnosed by a medical officer. Under ill health condition, medical expenditure was 32.69% from farmer's total agriculture income. But under healthy condition of farmer, the medical expenditure was 1.06% from farmer's total agriculture income. Because of under normal health, the farmer's are used traditional medicine some times ayurvedic medicine also used. When illness become serious farmers have to get treatment immediately so they have to bear additional cost.



**Figure 3:** Income and expenditure difference of farmers

#### 4.5 Farmers' indebtedness under normal health condition and under ill health condition

Farmers in rural areas like in Anuradhapura don't have accumulated money/income and they earn money especially from agriculture while using their own physical power very hugely for the commencement and the operations during the cropping time. Since they don't have accumulated money, they try to get loans and become indebtedness. Under normal health condition this indebtedness are low value with compared to under ill health condition, they can't use their own service to the operations. All the works should do other member of farmer's family or hired labor. Therefore cost is high as the result of this they go for higher indebtedness. T test was applied to indebtedness of farmer both health conditions. According to that test there was a significant difference (P value 0.018) between indebtedness under healthy and ill health conditions of farmers.



**Figure 4:** Farmer indebtedness under normal health condition and under ill health condition

## 5. Conclusion

The results of the study show that the prominent health impediments are CKD and occupational injuries in Galenbindunuwewa due to highest number of working days lost and medical expenditure. There is a relationship between age and illness of the farmers. Farmers subject to illness with higher possibility when farmers gradually become older.

Ill health condition of the farmers severely affect to crop production. There is a significant yield difference (Maize and paddy) between healthy and unhealthy farmers.

Labor costs increase significantly in maize and paddy production with ill health condition. Unhealthy farmers spend 32.69% from their total income for the medical expenditure while healthy farmers spend only 1.06% from their total income. There is a considerable total income loss of healthy and Unhealthy farmers. Yield loss due to other reasons (pest and diseases etc.) is increase considerably when farmer become unhealthy. A significant income and yield loss occur due to underutilizing of resources such as land, irrigations by Unhealthy farmers.

## 6. Recommendations

Government should take action immediately to minimize health impact of CKD of poor remote villagers in Anuradhapura. Such as giving subsidies for agricultural purposes especially to compensate to the ill health, giving credit facilities under low interest rate and providing moral support to manage the ill health and increase the productions.

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