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Kerala Agro Industries Corporation - Role in the promotion of Agricultural Production

The Report

Evaluation Division
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Disclaimer

This report has been prepared by Shri. Sudesh T.P, Research Officer, Evaluation Division, Kerala State Planning Board. The facts and figures in this report are based on primary data collected by the author from the sample beneficiaries of KAIC by using questionnaire and secondary data, and do not reflect the views or policies of Kerala State Planning Board.

Sd/-

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Abbreviations

KAIC	Kerala Agro Industries Corporation Limited
TVM	Thiruvananthapuram
KLM	Kollam
PTA	Pathanamthitta
ALLP	Alappuzha
KTYM	Kottayam
IDK	Idukki
EKM	Ernakulam
TCR	Thrissur
PLKD	Palakkad
MLP	Malappuram
CLT	Kozhikode
WYND	Wayanad
KNR	Kannur
KSGD	Kasaragod

Abstract

The study is an attempt to examine the role of the 'Kerala Agro Industries Corporation Limited' in the promotion of agriculture in Kerala. It was a premier organization in the agriculture sector with the object of promoting agro based industries for the production of farm equipments, machinery and implements required for the development of agriculture. To get a clear picture about the role of KAIC in the field of agriculture, we select three different districts for the study purpose. These are Thiruvananthapuram from southern region, Ernakulam from central region and Kozhikode from northern region of Kerala. From the study we could understand that the machineries like tractor and power tiller were very much useful in the agricultural field to improve the agricultural production and to overcome the shortage of skilled agricultural labour. From the study we knew that the youngsters in the selected districts are not directly participated in agricultural activities. Major crops in the study area were rice, banana, coconut, rubber, tapioca and vegetables.

CHAPTER 1

Introduction

First chapter includes some descriptions about the agriculture sector and its importance in India and Kerala economy and an outline about the Kerala Agro Industries Corporation. This chapter also deals with the review of literature about the topic, significance and scope of the study, methodology, objectives and limitations of the study.

Agriculture is an important sector of the Indian economy, accounting for 17 percent of the nation's GDP in 2013-14, about 11 percent of its exports. According to the occupational structure in 2011 census, about 50 percent of the population still relies on agriculture as its principal source of income and it is a source of raw material for a large number of industries. Accelerating the growth of agriculture production is therefore necessary not only to achieve an overall GDP target of 8 percent during the 12^{th} plan and meet the rising demand for food, but also to increase incomes of those dependent on agriculture to ensure inclusiveness.

Agriculture sector is vital for the food and nutritional security of the nation. The sector remains the major source of livelihood for more than 58 percent of the population though

its contribution to the national GDP has declined to 14.2 percent in 2014.

Agriculture and allied sectors are the most important sectors of Kerala economy as they provide livelihood to about 2/3rd of the population and contribute nearly 9 percent of the GSDP 2013-14 as per the quick estimate, Directorate of Economics and Statistics. The agriculture sector in Kerala has undergone significant structural changes in the form of decline in the share of GSDP, indicating a shift from agrarian economy towards service sector dominated economy. The contribution of agriculture in the GSDP of the state has been steadily declining from 36.88 percent in 1988-81 to 8.95 in 2013-14.

The agricultural system in Kerala is unique and distinct from other states in terms of land utilization and cropping pattern. The agricultural production is usually seasonal and cyclical in nature and is vulnerable to natural phenomena such as drought and diseases. All these factors make agricultural production risky and highly dependent on the existence of good infrastructure, robust input supply and price signals apart from technology. Agriculture in Kerala has undergone significant structural changes; Kerala is no

exception where the contribution of agriculture and allied services to the overall Gross State Domestic Product (GSDP) has fallen from about 30 percent in 1990−91 to 10.6 percent in 2010−11. Improvement in productivity of the agriculture to match international standards is the critical goal in the future years. Increased adoption of technology, investments in physical infrastructure, improved marketing techniques are a vicious - circle that Kerala can benefit from and indeed show the rest of India the path to attaining a developed economy status.

In the sense we discuss the performance of agriculture sector and the major concerns as well as the initiatives taken by the Government to mitigate them. Such an initiative by the central and state Government is the ***'Kerala Agro Industries Corporation Limited'.***

The Kerala Agro Industries Corporation started its operations in 1968 in a modest way with its Head Office at Thiruvananthapuram. The corporation developed infrastructure facilities at all the revenue districts of the State on a phased manner. During the course of its operations, the corporation has promoted two subsidiary companies, Kerala Agro Machinery Corporation Ltd. (KAMCO) in 1972,

engaged in production and marketing of agricultural machinery, especially Power Tillers, Reapers etc., and Meat Products of India Limited (MPI) in 1973 engaged in production and marketing of meat and meat products. Subsequently during 1987 as per the decision of the Government of Kerala, the subsidiary status of these two companies has been withdrawn and made them independent companies. Now these two companies are working on profitable lines as independent companies.

The authorized share capital of the corporation is Rs.5.00 crore. The paid up capital of the corporation was Rs.4.74 crore at the end of 1997-98. The Central Government's share in the paid up capital is Rs.1.696 crore *i.e.* about 35.77 percent of the total paid capital of the corporation. The corporation is having 14 districts offices, one each in all the revenue districts of the State, apart from its Central Marketing Office at Ernakulam, the industrial capital of the State, carrying on its activities through these district offices. The activities are concentrated mainly in rural areas with need based operation in urban area also.

Review of literature

The present study is about the Kerala Agro Industries Corporation and its role in the promotion of agriculture. For this purpose some review of literature about the subject is essential. The major intervention of KAIC in agriculture is to introduce mechanization in the field of agriculture. Some important review of literature about the mechanization in the field of agricultural sector is pointed out here.

The market for farm equipments in India is on a growth phase, post a decline period that lasted during period 1999 to 2002. The reasons behind the revival include easy availability of finance schemes and reduction in interest rates. The Government focus on building and improving infrastructure also had a positive effect on the overall performance of the farm equipment sector. Contract farming, which is being encouraged by the Government since 2005, will also have a favourable impact on the farm equipment demand. Farmers will now be hedge their crop risks through technical advice provided to them by the corporate organizations, besides assurance of upfront prices and market

outlets would increase the farmer affinity for mechanized agriculture technologies.[1]

Efficient machinery helps in increasing agriculture productivity and which enabling the farmers to raise a second crop making agriculture attractive. Development and introduction of high capacity, precision, reliable and energy efficient equipment is the need for judicious use of inputs.

The technological improvements in Indian agriculture since mid sixties have brought about revolutionary increase in agricultural production. Interestingly, the growth rate of food grain production particularly in case of wheat and rice was much higher than the growth rate of population. The country was facing acute food shortages till eighties has now become not only self sufficient but also a net exporter of food grains. This has been made possible due to evolution of high yielding crop varieties, increased use of chemical fertilizers, development of irrigation facilities and plant protection measures accompanied by effective price support programmes of farm products. The increased use of purchased inputs in agriculture necessitated to raise their use efficiencies though mechanization. The increase in the use of

[1] *https://www.nabard.org/english/farmmechanisation.asx*

human and bullock labour and rising wage rates and cost of up-keep of bullock further made the case of farm mechanization still stronger. Farm mechanization has been helpful to bring about a significant improvement in agricultural productivity.

Mechanized agriculture is the process of using agriculture machinery to mechanize the work of agriculture, greatly increasing farm worker productivity mechanization involves the use of an intermediate device between the power source and the work. Mechanization was one of the factors responsible for urbanization. Besides improving production efficiency, mechanization encourages large scale production and improves the quality of farm produce.

Even though farm mechanization shows an increasing trend, there are wide ranging disparities in the levels of mechanization across states. Northern States such as Punjab, Haryana, Uttar Pradesh (particularly Western and Tarai belt) have achieved a faster growth in mechanization over various Plans - The sale of other implements and machines like combine harvesters, threshers and other power - operated equipment have been increasing almost throughout the country. The pace of mechanization in North - Eastern states has not been satisfactory due to constraints such as hilly

topography, socio - economic conditions, high cost of transport, lack of institutional financing and lack of farm machinery manufacturing industries. Mechanization in Western and Southern states of the country viz., Gujarat, Maharashtra, Rajasthan and certain areas of Tamil Nadu, Andhra Pradesh etc., has increased with the increase in area under irrigation and also with the growing awareness among farmers.

Agriculture mechanization, one of the greatest achievements of the 20^{th} century (NAE, 2000), was enabled by technologies that created value in agricultural production practices, through the more efficient use of labour. Historically, affordable machinery, which increased capability and standardization and measurably improved productivity, was a key enabler of agricultural mechanization.

Mechanization is defined as the art of using machineries to hasten production, accomplish task and reduce fatigue and human labour in order to produce better quality goods and services.

Agricultural mechanization is the process whereby equipments, machineries are utilized to boost agricultural and

food production. It is the application of machineries equipments implements in the day today farm activities to increase marginal output in food production and poverty eradication.

Mechanization is clearly the answer to key performance parameter at every stage of cropping cycle. When compared to the other countries in the world in India the mechanization is very low, which is shown in the table.

Table 1.1 Comparison of mechanization with other countries

Sl No	Country	No. of Tractors/1000 Ha.	No. of combine harvesters /1000 Ha
1	Japan	461.22	236.98
2	Italy	211.08	4.71
3	UK	88.34	8.3
4	France	68.5	4.93
5	Pakistan	16.47	0.08
6	***India***	15.75	0.026
7	Brazil	13.66	0.915
8	China	6.98	2.53

Source: FAO Year Book 2003

Farm mechanization improves utilization efficiency of inputs such as seeds, chemical fertilizers and energy. It ensures timeliness of farm operations leading to higher productivity and cropping intensity and also reduces cost of

production and increase the agricultural income. Farm mechanization reduces drudgery and improves safety in operations of farm machinery and helps in conserving natural resources for example, water.

Farm Power consisting of manual labour, agricultural tools, animals, tractors, implements, equipment, and machinery is an essential farm input. In almost many agricultural production system the annual expenditure on farm power, whether on labour, animals or fuel and depreciation of machines, largely exceeds the costs of other inputs such as agro-chemicals and seeds. In many developing countries, agricultural production and food security are adversely affected because of insufficient use of farm power, low labor productivity and or labor scarcity. The need to improve agricultural labour productivity is increasingly recognized. In the case such as pump sets for irrigation, the need for machinery is undisputed. Rather than agricultural mechanization, it would be preferable to use the term farm power or Labour Productivity Enhancing Technology (LPET), to recognize not only the importance of manual labour and hand tools, draft animals, and mechanical power,

but also other issues related to labor scarcity, such as cropping and farming systems.[2]

Agriculture machinery and implements are important factor in agriculture production and productivity enhancement. There are direct as well as indirect effects of agriculture machinery and implements on productivity through better use of other inputs, more efficient and timely completion of agricultural operations and increase in cropping intensity (Venugopal, 2004). But the adoption of machines is the result of many factors at the farm level like size of land holding, irrigation, labour, credit and risk orientation and socio economic profile of the farmer. Still level of mechanization of agriculture in India remains low, except a few states like Panjab, Haryana, Uttar Pradesh, Rajasthan and Tamil Nadu. The area under five crops being filled with tractors is low and that too is largely with hired tractor. Though it is not necessary for each farmer to own a tractor, but hired use also shows that there is scope for higher penetration of tractors provided their viable use can be made possible.

[2] http://www.fao.org/agriculture/crops/thematicsitemap/theme/spi/agriculturalmechanization/agriculturalmechanizationhome/ en/

The term mechanization is unfortunately often very narrowly perceived while its real purpose, namely, enhancing productivity of land and labour is often not well understood. In fact an agricultural mechanization strategy ought to be part of an agricultural technology strategy, which is to be part of an overall agricultural development strategy. In this context, three principal purposes of mechanization may be summarized as follows:

• **Increase in labour productivity -** The introduction of machinery to substitute for labour is a common phenomenon associated with the release of labor for employment in other sectors of the economy or to facilitate cultivation of a larger area with the same labor force.

• **Increase in land productivity -** The purpose of mechanization is here to produce more from the existing land. Machinery is a complementary input, required to achieve higher land productivity, for example, through the introduction of pump sets, or faster turn-around-times to achieve higher cropping intensity. In labor surplus economies, net labor displacement or replacement should be avoided.

• **Decrease in cost of Production -** Introduction of a machine may lower production costs or offset increased costs of draft

animals or labor. Usually, in various degrees, a combination of the three objectives will be achieved. Additional benefits to the user may be associated with a reduction in the drudgery of farm work, greater leisure, or reduction of risk. These are subjective benefits and difficult to translate into cash. Frequently mechanization increases an individual's workload, can be hazardous to health and may reduce the social interactions associated with farm work.

Farm mechanization is a crucial input for improving agricultural production. Without farm power and the appropriate tools, implements and machines that can support the production of marketable surpluses, farmers would struggle to emerge from subsistence farming.

Over the last few years there has been considerable progress in agricultural mechanization. It is generally believed that the benefits of modern technologies have been restricted to farmers with large land holdings. Yet, the fact remains that even small farmers are adopting and utilizing selected farm equipments for efficient farm management through custom hiring. Mechanical equipments like

tillage,sowing, irrigation, plant protection and threshing etc. are generally being used by the farming community.[3]

Moreover, reliance on animate power for day to day management of farm operations is showing a continuous decline owing to higher gains in form of improved land and labour productivity resulting from use of mechanical power. Improved implements such as plough, puddler, disc harrow, peg tooth harrow, spring line harrow being more efficient have been adopted. Further, use of sowing or planting devices is also registering a higher growth due to their impact on seed and fertiliser use. The number of draught animals has also shown a decline as a consequence of farm mechanization.

Agriculture still forms the backbone of Kerala economy, as approximately $1/4^{th}$ of the work force is in the primary sector, directly depended on agriculture and allied

[3] *Joginder Singh - Scope, progress and constraints of farm mechanization in India, Department of Economics, Panjab Agricultural University, Ludhiana.*

services it also forms the resource base for a number of agro based industries and agro services.[4]

Labour shortage is one of the main reasons for the slow pace of agricultural production, which increase labour cost and cost of cultivation. Considerable reduction in labour requirement can be achieved through selective mechanization with appropriate farm machinery systems to change rice production as economically viable. At present, tillage operations in rice cultivation are mechanized to a greater extent with the help of tractor and power tillers. However other labour intensive operations such as transplanting & harvesting are performed manually. Commercial rice farming machines like mechanical rice transplanter, reaper and thresher are yet to be adopted widely in the farms in Malappuram district mainly due to their high investment cost and sophisticated technology for operation & maintenance. Large scale adoption of this kind of machines in rice farming is possible only through government support to cooperative

[4] *Moving from agri-culture to knowledge driven agri-business-chapter.5*

groups of farmers to make them economically viable and to enable the farmers to meet local requirements.[5]

Malappuram district lying in the mid region of the state has witnessed an increase in productivity of paddy due to introduction of improved varieties and use of scientific technologies. High labour cost, migration, rapid growth of real estate sector are the factors results in the shortage of farm labourers, which increase the labour cost and increase in cost of cultivation. Considerable reduction in labour requirement can be achieved through selective mechanization with appropriate farm machinery systems to change rice production as economically viable. Commercial paddy farming machines like mechanical paddy transplanter, reaper and thresher are yet to be adopted widely in the farms in Malappuram district mainly due to their high investment cost and sophisticated technology for operation and maintenance. Large scale adoption of this kind of machines in paddy

[5] *'Promotion of farm mechanization in Malappuram district through women empowerment' - S. Sajeena, P.V. Habeeburrahman, J. Deepa and Bena Pathrose, KVK Malappuram, Kerala.*

farming is possible only through government, support to co-operative groups of farmers to make them economically viable and to enable the farmers to meet local requirements.[6]

The small size of farm holdings constituted a large segment of the arable land in Kerala and the small farmers have little access to appropriate farm equipments, especially power machines. The report has identified the following constraints: economic and socio cultural limitations, lack of foreign exchange to import equipment, low quality of locally manufactured equipment, shortage of rural artisans to supply tools and implements and unsuitability of imported machines to the resource endowments of the state.[7]

According to Prakash (1989) the constraints in Kerala on farm mechanization are the following;[8]

a) small farm size

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[6] *Constraints on Diffusion and Adoption of Agro - mechanical technology in rice cultivation in Kerala. Balachandran Pilllai G, Discussion Paper 59, KRPLLD, C.DS. Thiruvananthapuram.*

[7] *Report of the Project Planning and Monitoring Cell of the Government of Kerala (1986).*

[8] *Prakash, R. (1989)-Sequential analysis of constraints in increasing production of rice and coconut in Kerala - Ph.D. Thesis (unpb.). College of Agriculture, Vellayani, Trivandrum.*

b) fragmentation of holdings

c) non-availability of suitable equipment

d) lack of facilities to train operators

e) insufficiency of private and public hire services

f) lack of freedom given to farmers to select farm equipment of their choice while granting hire purchase facility and

g) inadequacy of repair and service facilities.

Mechanization, the outstanding feature of agriculture in the late 19th and 20th century has relieved much the work of the farmer. Even more significantly, mechanization has increased efficiency and productivity of farms. Adequate mechanization is the main engine of productivity and competitiveness in agriculture and agro - industries. It allows the transition from subsistence farming to commercial farming and market access. The level and appropriate choice of agricultural mechanization has direct effects on land and labor productivity, farm income, environment and the quality of life of small - scale farmers.

Significance of the Study

The significance of the present study is that, it helps the farmers and the public to aware the activities of the 'Kerala Agro Industries Corporation Limited' and it helps to aware

the public about KAIC's diversified activities and value added services like Agro Super Bazar, Fruit Processing Unit, Agrimall , Rice mill etc.

The tools and implements used by the farmers in the state are primitive, crude and antiquated, as compared to the most up-to-date form of machinery used by the farmers of other developed countries. The changing scenario in the field of agriculture with focus on increased productivity and modern methodology, the relevance of KAIC has become more significant. The role of Kerala Agro Industries Corporation Limited is more crucial to get adequate tools and machineries to farmers with low cost.

Scope of the Study

The study enables the public to modernize their agricultural operations and out look through KAIC and thereby to increase the production and productivity. The mechanization of agriculture has also brought about reduction in the cost of cultivation.

But the mechanization activities has been slow to pick up due to constraints faced in the form of small farm holdings and inability of individual farmers in making huge investment on machinery in the state. In this circumstance,

KAIC made significant efforts to mechanize the agriculture sector by set up the hiring centers. KAIC's intervention has helped in curtailing the hiring charges to some extend and thus solved the problem of shortage of farm labourers.

Objectives

1. To examine the functions of the 'Kerala Agro Industries Corporation Limited'.

2. To evaluate the performance of KAIC in enhancing agricultural production.

3. To create awareness among farmers about the functions of KAIC.

Methodology

Food security is one of the major concerns in our policy making, and the import of agricultural product is enormously large. Kerala depends other states for vegetables and even for rice. The reason is due to the withdrawal from agriculture. Agriculture became costlier, mainly because of high labour cost and lack of agricultural labourers. In such a situation the institutions like KAIC has deserves much attention because as it made many attempts to improve the agriculture and agricultural production by introducing new

machineries to overcome the problem of shortage and high cost of agriculture labourers and marketing mechanisms.

In the beginning to get some relevant data for the present study the investigator regularly visited the KAIC office at East Fort, Thiruvananthapuram and had collected many useful details about the activities and structure of KAIC and the list of beneficiary farmers in Thiruvananthapuram district.

The report is based on both primary and secondary data. Primary data were taken from the beneficiaries of the KAIC, from the three selected districts, Thiruvananthapuram, Ernakulam and Kozhikode.

To understand the role of KAIC in the improvement of agricultural production in Kerala, there are three districts were selected for the study. Each district selected by a random selection from south, north and from the central region they are; Thiruvananthapuram, Kozhikode and Ernakulam respectively.

Out of 20 beneficiary farmers from all the three districts (Thiruvananthapuram, Ernakulam and Kozhikode), we randomly selected 5 respondents each from all the three

districts and collected the data by personal interview and through structured questionnaire. The questions included to understand the working of the machineries, working cost of the machineries and to evaluate the performance of machineries to improve the agricultural production.

Secondary data were taken from both published and unpublished documents and the reports of various government departments like economics and statistics, state planning board, agricultural department. Also details about the functioning of KAIC were collected from the head office of KAIC. Secondary data were taken from various newspapers and even from the internet resources.

In this report some statistical methods and tools like arithmetic averages, simple bar diagrams were also used to summarise the findings.

Chapterisation

In this chapter we had explained objectives and the methodology of the study and also given some review of literature, which closely connected to the present study. The findings of the study are given in the second chapter.

Limitations of the study

There are some limitations to the present study. As the study is about agriculture sector, it is not easy to get reliable data from the respondents. They had no proper records about their agricultural products and even their income stream.

CHAPTER 2

The findings of the study with respect to all the three objectives are examined in this chapter.

An attempt has been made in the study to analyze the role of the 'Kerala Agro Industries Corporation' in the promotion of agriculture development in Kerala. For the study purpose three districts were selected for the primary data collection. These are Thiruvananthapuram from southern region Ernakulum from central region and Kozhikode from northern region of Kerala.

KAIC a review

The present study is about the 'Kerala Agro Industries Corporation Limited' and its role on agriculture production and productivity. The Kerala Agro Industries Corporation Limited (KAIC), a premier organization in the agriculture sector, was incorporated in the year 1968 jointly by the Government of India and Government of Kerala with the object of promoting agro based industries in the state of Kerala for the production of farm equipments, machinery and implements required for the development of agriculture and to cater to the needs of the farming community.

Agro Industries Corporation was established in different states in India in 1960's and 70's with a view to mechanize the agricultural operations and to improve the agricultural production with modern equipments. Its main objective is to produce farm equipments and machineries like tractor, tiller, power reaper etc.

The corporation has won the first National Productivity Council during 2006-07 among the state agro industries corporations. The corporation is at present moving on a positive trend inspite of all odd faced during the past years.

Now a day the activities of agro industries corporations in these districts viz; Andra Pradesh, Assam, Gujarat, Kerala, Orissa, West Bengal, Maharashtra, Haryana, Tamil Nadu, Panjab, Madya Pradesh, Himachal Pradesh, Uttar Pradesh are going on very successfully.

Machines from KAIC

KAIC supplies different types of machines that are very much useful to agricultural operations and these machines helps to overcome the problem of shortage of agricultural labour. Some important machines are;

Tiller

KAMCO Power Tiller is a versatile machine primarily used for preparation of land for farming operations. With suitably designed accessories the machine can be used for a large number of specific operations like tilling, ploughing, weeding, pumping, puddling, leveling, hulling, ridging etc.

Power Reaper

KAMCO Power Reaper is ideally suited for harvesting of paddy, wheat and similar crops. It harvests and makes windrows at the rate of 3 - 4 hours per ha. Since the fuel used is kerosene, cost of operation is the lowest and it helps the farmer to harvest his field at the lowest ever cost.

Garden Tiller

KAMCO Barlieri B/30 is an easy- to- handle garden tiller with Italian technology and design. The powerful HONDA petrol engine ensures efficiency, reduced vibration and noise, low emission levels and low maintenance. Overall it is an economy model that offers a safe and comfortable operation.

Major Applications

- Tilling
- Ridging/Furrowing
- Soil preparation for Vegetable cultivation and in orchards & sugarcane fields
- Spade work in coconut groves.

Other Products from KAIC

Tractor and implements, trailers, paddy threshers, winnowers, reapers and combine harvesters, pretty and para for paddy fields, pump sets and accessories, pipes and fittings, water tanks, driers for coconut areca nut and spices, copra moisture meter, coconut palm climbing device, sprinkler and drip irrigation systems, various types of sprayers, waste management - equipments and machinery etc.

KAIC helps to improve farm mechanization by introducing new machineries, which helps to overcome the shortage of agriculture labour and improves the efficiency. Farm mechanization improves the utilization efficiency of inputs such as seeds, chemicals, fertilizers, and energy and it ensures timeliness of farm operations leading to higher

productivity and reduces the cost of production, which increases the agricultural income.

District wise details of machineries supplied by KAIC

The below table (2.1) shows that the machineries supplied by the Kerala Agro Industries Corporation to each districts for the last five years.

Table 2.1 Details of machineries supplied by KAIC

Districts	Name & no. of machines														
	2010-11			2011-12			2012-13			2013-14			2014-15		
	Tractor	Tiller	Reaper	Tractor	Tiller	Reaper	Tractor	Tiller	Reaper	Tractor	Tiller	Reaper	Tractor	Tiller	Reaper
TVM	3	4	0	2	3	0	5	2	0	2	2	0	0	0	0
KLM	0	1	0	0	1	0	2	0	0	1	1	0	1	1	0
PTA	0	0	0	1	1	0	0	3	0	0	2	0	1	2	0
ALLP	2	1	1	1	3	0	0	5	0	0	0	0	1	3	1
KTYM	2	2	0	1	0	0	1	2	0	1	1	0	0	1	0
IDK	0	0	0	0	1	0	2	0	0	1	1	0	1	2	0
EKM	2	4	1	1	2	1	3	7	1	1	4	0	0	1	0
TCR	4	3	2	2	3	0	9	14	11	1	7	0	3	8	2
PLKD	2	2	1	0	1	0	1	2	0	0	1	0	2	1	0
MLP	1	2	0	0	1	1	4	1	1	0	1	0	0	0	0
CLT	0	0	0	1	2	0	3	3	1	1	3	0	6	5	0
WYND	0	1	0	1	1	0	0	2	0	0	4	1	0	5	0
KNR	1	3	1	0	6	1	0	10	0	2	0	1	5	5	1
KSGD	1	2	0	0	1	0	0	5	0	0	2	0	0	1	1
TOTAL	**16**	**25**	**6**	**10**	**26**	**3**	**30**	**56**	**4**	**10**	**29**	**2**	**20**	**35**	**5**

Source: Annual report from KAIC, Thiruvananthapuram

From the table we can understand the detailed picture of the machineries supplied by the Kerala Agro Industries Corporation to each district. The total number of Tractor supplied in the last five years from 2010 to 2015 were 16, 10, 30, 10 and 20 respectively and the number of Power tillers in these period were 25, 26, 56, 29, 35 and the number of power reapers were 6, 3, 14, 2, 5 respectively.

Now we can analyze the primary data we collected from all the three selected districts.

Profile of the respondent

Table 2.2 Details of study area and respondents

Name of the KAIC centre	**Krishibhavan**	**No. of respondents**
KAIC Thiruvananthapuram	Vattiyoorkavu	1
	Vamanapuram	1
	Nagaroor	1
	Andoorkonam	2
KAIC Ernakulum	Kuzhur	1
	Piravom	2
	Adat	1
	Chazhur	1
KAIC Kozhikode	Nadapuram	1
	Kottur	1
	Mepayoor	1
	Atholi	1
	Naduvannur	1
Total		15

Source: Primary data

Out of 30 beneficiaries of KAIC in each selected districts, we randomly selected 5 respondents each of them for the study purpose. Their respective Krishibhavan and the number of respondents from each Krishibhavan are also noted in the table (Table 2.2) given above. These are Vattiyoorkavu, Vamanapuram, Nagaroor and Andoorkonam from Thiruvananthapuram district. Piravom, Kuzhur, Adat and Chazhur from Ernakulam district, Nadapuram, Kottur, Mepayoor, Atholi and Naduvannur from Kozhikode district.

Age

Table 2.3 Respondents' age

SL No	Age group	No.of respondents	No.of respondents	No.of respondents	Percentage from each age group		
		TVM	EKM	CLT	TVM	EKM	CLT
1	31-40	1	0	0	20	0	0
2	41-50	0	3	2	0	60	40
3	51-60	1	2	0	20	40	0
4	61-70	3	0	3	60	0	60
Total	-	5	5	5	100	100	100

Source: Primary data

Age of the respondents are given in the table (2.3) which shows that young stairs are not much participated

directly in the agricultural activity even though the farm operations became mechanized.

From the table we could understand that the average age of the respondent 58.8, 51.8 and 55.8 respectively. From this we can reach a conclusion that in all the three districts young stairs are not directly engaged in any agricultural activity even it is became mechanized.

Sex-wise details

From the table (2.4) we can understand that all the respondents from the three selected region were male. There are no female members owned the agriculture machines among the respondents.

Table 2.4 Sex-wise details of respondents

District	Sex	
	Male	Female
Thiruvananthapuram	5	0
Ernakulam	5	0
Kozhikode	5	0
Total	15	0

Source: primary survey

Marital status

Marital status here referred as the marital status of the selected respondents for the study purpose. The table given below shows the marital status of the respondents. The table

shows that all the selected respondents from each selected regions were married.

Table.2.5 Marital status of the respondents

Sl No	Respondents	Married	Unmarried
1	TVM	5	0
2	EKM	5	0
3	CLT	5	0
4	Total	15	0

Source: primary survey

Literacy

All the respondents from each district are literate, among the 15 respondents from all the three selected districts, one of them is post graduate and another two are retired teacher. Thus we can say there is 100 percent of literacy among the respondents.

Table 2.6 Literacy among the respondents

Sl No	Respondents	Literate	Illiterate
1	TVC	5	0
2	EKM	5	0
3	CLT	5	0
4	Total	15	0

Source: primary survey

Locality

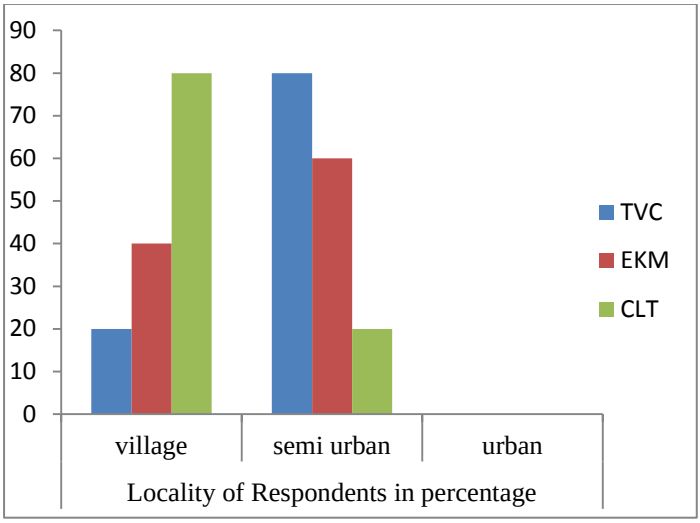
Table 2.7 Locality of the respondents

Sl No	District	No. of respondents			Percentage			
		Village	Semi urban	Urban	Village	Semi urban	Urban	Total
1	TVC	1	4	0	20	80	0	5 (100)
2	EKM	2	3	0	40	60	0	5 (100)
3	CLT	4	1	0	80	20	0	5 (100)

Source: primary survey(Figures shown in brackets are percentage)

From the table we can analyze that 80 percent respondents from Thiruvananthapuram and 60 percent respondents from Ernakulam are living in semi urban area and the rest of them are living in villages. 80 percent of the respondents from Kozhikode are living in villages and the 20 percent are living in semi urban area.

Figure 2.1 Localities of respondents



Religion

Table 2.8 Religion wise details of the respondents

Religion	Hindu	Muslim	Christian	Others	Total
TVM	4	1	-	-	5
EKM	3	1	1	-	5
CLT	5	-	-	-	5

Source: Primary Survey

Religion wise details of the respondents in each selected districts are given in the table 4. From the table we can understand that 4 out of 5 respondents in Thiruvananthapuram district are Hind and 1 out of 5 is Muslim. In Ernakulam district 3 respondents out of 5 being in

Hindu community and 1 each from Muslim and Christian community. In Kozhikode district all of the 5 respondents are in Hindu community.

Total holding of Land

Table 2.9 Total holding of land

(In Acre)

Sl No	Districts	Land holding					
		1-1.99	2-2.99	3-3.99	4-4.99	5 or more	Total
1	TVM	2	2	1	-	-	5
2	EKM	1	-	1	-	3	5
3	CLT	1	2	1	1	-	5

Source: Primary Survey

The table (2.9) shows that the total land holding of the respondents which includes both their own land and the land taken as lease for agricultural purposes. The table shows that, there are 4 respondents hold 1 to 1.99 acres of land, another 4 have 2 to 2.99 acres of land, 3 of the respondent having 3 to 3.99 acres of land, 1 respondent have 4 to 4.99 acres of land and 3 respondents hold 5 or more acres of land for agricultural activities.

Findings of the study

The first objective of the present study is to find out the functions of the Kerala Agro Industries Corporation in the promotion of agricultural production, which is stated below;

Functions of KAIC

(i) Manufacture and distribution of agricultural machinery, improved implements and tools.

(ii) Enabling persons engaged in agricultural and allied pursuits to own the means of modernizing their operations or alternatively making available necessary custom services for this purpose.

(iii) Undertaking and assisting in the efficient distribution of inputs for agriculture.

(iv) Promotion and execution of industries having a bearing on production, preservation and supply of food; and

(v) Providing technical guidance to farmers and persons concerned with agro - industries with a view to enabling efficient conduct of their enterprises.

Major activities of the Corporation

- Farm machanisation
- Production
- Consumer needs
- Environment friendly and innovative ideas
- Trading in agricultural implements including tractors, tillers, pump sets, plant protection equipments, poultry equipments, incubators, brooders, fisheries equipments, cold storage equipments, etc either on hire purchase or on payment basis.
- Organize, conduct and manage engineering or repair workshop of all or any of the above
- Promote agricultural production and engage in distribution of agricultural produce and inputs required for the above.
- Assist or finance all or any of the above objectives.

One of the main reasons of farmers withdrawing from agriculture and the low productivity and loss is the labour shortage and high cost of production. Mechanization in the field of agriculture is the only solution to overcome these

impediments. Thus the role of KAIC is very important in the current scenario.

Types of land

The land type shows whether the respondents are doing agricultural activities in their own land, lease land or both their own land and lease or own land and the land of their relatives.

Table 2.10 Types of land cultivated by farmers from each selected district.

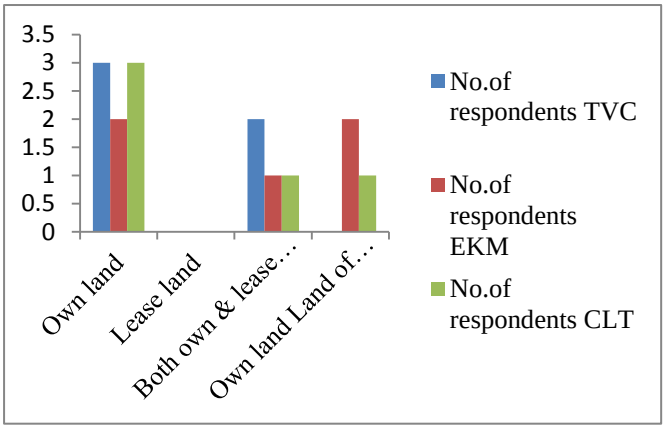
Sl No	Types of land	No.of respondents			Percentage		
		TVC	EKM	CLT	TVC	EKM	CLT
1	Own land	3	2	3	60	40	60
2	Lease land	0	0	0	0	0	0
3	Both own & lease land	2	1	1	40	20	20
4	Own land, Land of relatives	0	2	1	0	40	20
5	Total	5	5	5	100	100	100

Source: Primary survey

The table (2.10) shows that 60 percent of the respondents use their own land for agricultural activities in Thiruvananthapuram district and 40 percent in Ernakulam district and 60 percent in Kozhikode district. No respondents from the selected districts doing agriculture activities by taking the land as lease only. 40 percent of the respondents from Thiruvananthapuram and 20 percent respondents each

from Ernakulam and Kozhikode doing agricultural activities not only in their own land but also in the land taken for lease. 40 percent of the respondents from Ernakulam district and 20 percent of the respondents from Kozhikode district use their land and their relatives' land for agriculture. The figure 4.4 shows the number of respondents from each selected districts and their respective land use pattern.

Figure 2.2 Types of land



Type of agriculture

Table 2.11 Major crops

SL No	Item	No.of respondents			Percentage		
		TVC	EKM	CLT	TVC	EKM	CLT
1	Rice	3	5	3	60	100	60
2	Banana	3	4	5	60	80	100
3	Coconut	5	5	5	100	100	100
4	Rubber	3	0	0	60	0	0
5	Tapioca	2	3	2	40	60	40
6	Areca nut	0	1	3	0	20	60
6	vegetables	5	5	5	100	100	100

Source: Primary survey

The table (2.11) shows that rice, banana and rubber are cultivated by 60 percent of the respondents, tapioca cultivated by only 40 percent of the respondents where as vegetables and coconut is cultivated by all the respondents. Only 20 percent of the respondents from Ernakulam and 60 percent of the respondents from Kozhikode are cultivated arecanut. But the matter is that among them major chunk of the respondents who have the used coconut only for their consumption and not sufficient numbers for marketing. The same case is also in the vegetable cultivation.

Main occupation of the respondents

Table No.2.12 Main occupation of the respondents

Occupation	Districts		
	TVM	EKM	CLT
Agriculture	4	4	5
Others	1	1	0
Total	5	5	5

Source: primary survey

From the study we could understand that 80 percent of the respondents from Thiruvananthapuram, Ernakulam were considered as agriculture is their main occupation. All the respondents from Kozhikode district consider agriculture is their main occupation.

Types of machines and its uses

Table 2.13 Machines used by the farmers

SL No	Machine	Use of the machine
1	Tractor	For preparing soil for seeding or planting
2	Power tiller	Tilling the land for agricultural purposes
3	Wheel barrow	To move agricultural products and materials from one field to another
4	Pump set	For irrigation facility

Source: Primary survey

The table 2.13 depicts the machineries that are commonly used by the farmers in each selected district ie; Thiruvananthapuram, Eranakulam and Kozhikode and its uses. From this we can understand that the machineries are

very helpful not only to overcome the labour shortage but also high wage rate.

Labour

Labour, here refers the labour force employed to operate the machines. The below table (2.14) shows that the labour force used by the land owners to operate the machines.

Table 2.14 Labour force used in agriculture

Sl No	Labour employed or not	No. of respondents			Percentage		
		TVM	EKM	CLT	TVM	EKM	CLT
1	yes	2	1	0	40	20	0
2	No	3	4	5	60	80	100

Source: primary survey

From the table we can analyse that in Thiruvananthapuram district 60 percent farmers did not employ labour from outside to operate the machines. Only 20 percent respondents from Ernakulam district employ labour from outside to operate the machines and in the case of Kozhikode district not even a single respondent employ labour from outside to operate the machines. From the primary survey we could understand that in all the three selected districts, average wage to the employee per day is about 600 - 700/ half day.

Cost of the machine

The unit cost of the machine supplied by the Kerala Agro Industries Corporation is cited below. The farmers will get 50 percent subsidy to any of these machines supplied by KAIC from their respective Krishibhavan.

Table 2.15 Prices of the machines supplied by KAIC

Sl No	Name of the machine	Price of the machine	Subsidy in percentage
1	Tractor	4,50000	50
2	Power Tiller	145000	50
3	Wheel barrow	10500	50
4	Pump set	5000	50

Source: Primary survey

Power tiller is generally used by the farmers from Thiruvananthapuram, Ernakulam and Kozhikode. All machines will get subsidy at the existing rate normally now (at the time of the study) at 50 percent. The subsidy will get through their respective Krishibhavan.

Servicing of the machine

The table shows the details of proper servicing of the machineries. From the table we could understand that 40 percent of the respondents from Thiruvananthapuaram district, 60 percent respondents from Ernakulam and 80 percent of the respondents from Kozhikode said that they get

proper servicing to their agriculture machineries. 40 percent respondents from Thiruvananthapuaram 20 percent respondents each from Ernakulam and Kozhikode districts service their machineries by themselves.

Table 2.16 Details of proper servicing

Servicing	TVM	EKM	CLT	Percentage		
				TVM	EKM	CLT
Yes	2	3	4	40	60	80
No / delay	1	1	-	20	20	-
Self	2	1	1	40	20	20
Total	5	5	5	100	100	100

Source: primary survey

Income from agriculture

The major crops in Thiruvananthapuram, Ernakulam and Kozhikode are rice, banana, vegetables, rubber, coconut and areca nut. From the primary survey we could understand that all these crops cultivated by these farmers are not marketed completely. Some of them cultivated rice and vegetables only for their consumption. To calculate average income of the farmers are not an easy way, because agriculture is a seasonal activity. From the survey we could understand that their income around 75000 to 1lakh rupees per year according to the weather condition and marketing facilities existing in the specific season.

Wage/salary to the employees

From the study we could understand that the wages given to agricultural labourers is very high. The table shows that among the three selected districts Thiruvananthapuram shows the high rate of wage in agricultural sector and Kozhikode shows much lower rate of wage in this sector.

Table No. 2.17 Wages to the employees

Districts	Wages/day (in Rupees)
TVM	500-700
EKM	500-750
CLT	400-700

Source: Primary survey

Working cost of the machineries

From the study we could understand that the total working cost of the machineries of KAIC. The working cost of the Tractor per hour is Rs. 400-600 and the working cost of the power tiller is Rs. 100-150. The table given below shows that the total working cost of the tractor per hour is Rs. 400-600 per hour and the working cost of the power tiller is Rs.100-150 per hour and the use of wheel barrow includes the working cost of Rs.25-40 per hour in all the selected regions.

Table No.2.18 Working cost of machines

Name of the machine	Total working cost/ hour (in Rs.)
Tractor	400-600
Power tiller	100-150
Wheel barrow	25-40

Source: primary survey

Supplementary income sources

From the survey investigator could understand that the respondents from Thiruvananthapuram only 40 percent have some other source of income and 60 percent of the respondents' income source is agriculture itself. In the case of Ernakulam and Kozhikode only 20 percent of the respondents have some other source of income. Table 4.10 shows the supplementary income source of the respondents in Thiruvananthapuram district.

Table 2.19 Supplementary Income source of the respondents

Sl No	**Income source**	**No. of respondents**			**Percentage**		
		TVC	**EKM**	**CLT**	**TVC**	**EKM**	**CLT**
1	Business	1	1	0	20	20	0
2	Retd. Teacher	1	0	1	20	0	20
3	Dairying	5	4	4	60	80	80
4	Agriculture itself	0	-	-	-	-	-

Source: Primary survey

Details of live stock

The table (2.20) given below shows the detailed description about the live stock of the respondents from each selected districts.

Table 2.20 Details of live stock

Districts	No.of cows						Total
	0	1	2	3	4	5 or more	
TVM	-	1	3	-	-	1	5
EKM	1	-	1	-	-	3	5
CLT	1	2	-	1	1	-	5

Source: Primary survey

From the table we could understand that 80 per cent respondents have at least one cow and 20 per cent of the respondents have more than 4 cows. In Ernakulam and Kozhikode 80 per cent of the respondents have a supplementary source of income from dairying and 20 per cent have no supplementary income from dairying. They give their agricultural waste to their cattle and they use cow dung for agricultural purposes as fertilizer and some of them have gobar gas plant.

Milk production

Below table shows the milk production of the respondent. All of them sell milk in the local milk society and some of them used it for self consumption.

Table 2.21 Milk production of the respondents

(in percentage)

(in litre)

Districts	5-9	10-14	15-19	20-24	25-or more
TVM	20	20	20	20	20
EKM	-	20	20	-	40
CLT	20	40	20	-	-

Source: Primary survey

From the table we could understand that the each 20 percent respondents from Thiruvananthapuram have the milk production in various quantities. 80 percent respondents from Ernakulam and Kozhikode also have the milk production in various quantities.

Details of price per litre

The following table shows the price of milk per litre from the local societies. 40 percent of the respondents from Thiruvananthapuram and Ernakulam districts and 20 percent respondents from Kozhikode get rupees 28 per litre, 20 percent respondents each from Thiruvananthapuram and

Ernakulam and 40 percent respondents from Kozhikode gets rupees 30 per litre and 20 percent respondents from Ernakulam get rupees 50 per litre.

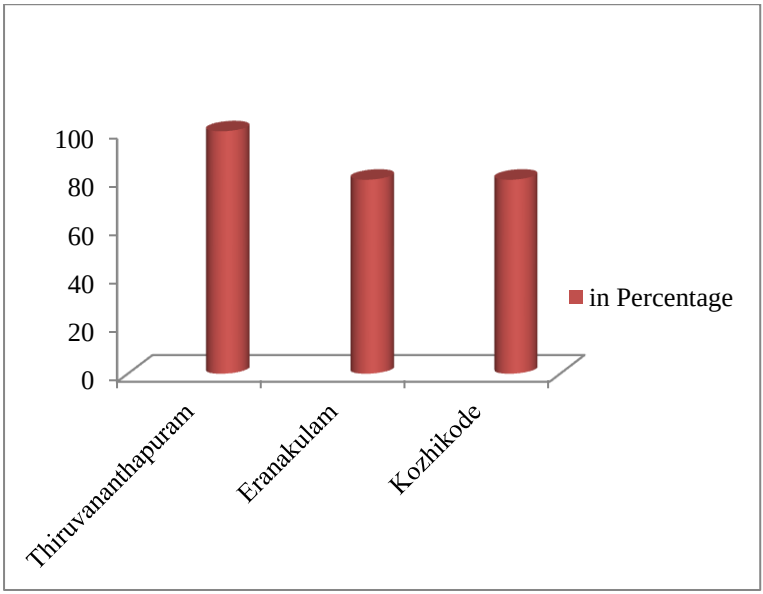
Table 2.22 Price of milk

Price/ litre (in Rs)	Percentage		
	TVM	EKM	CLT
28	40	40	20
30	20	20	40
32	40	-	20
50	-	20	-

Source: Primary survey

Income from dairying

Figure 2.3 Supplementary incomes from dairying



From the study we could understand that the role of The Kerala Agro Industries Corporation is very much helpful to overcome the problem of high wage rate and lack of skilled labourers. Thus we can say the performance of KAIC is very crucial in enhancing the agriculture production and productivity. The machines like power tiller are very much useful and easy to operate by the farmers itself by a low operating cost. This will ultimately improve the production and productivity.

The third objective of the present study is to create awareness among the respondents about the functions of KAIC, for this purpose we arranged meetings with each respondent in the presence of each agricultural officer and discussed about the activities of Agro Industries Corporation and the machineries supplied by them and gave them the notice and pamphlets regarding the activities of KAIC.

Summary of findings

Here we summarise the major findings of the study

- The Kerala Agro Industries Corporation Limited was incorporated in the year 1968 jointly by the Government of India and Government of Kerala.
- 100 percent of the respondents say that the most useful machines to improve the agriculture production and productivity are Tractor¸ Power Tiller, Reaper etc.
- 80 percent of the respondents from Thiruvananthapuram, 60 percent of the respondents from Ernakulam and 100 percent of the respondents from Kozhikode operate the power tiller by themselves.
- The average age of the farmers (respondents) from Thiruvananthapuram, Ernakulam and Kozhikode are 58.8, 51.8 and 55.8 respectively.
- In all the three selected districts youngsters are not directly participated in the agricultural activities even though agriculture became mechanized.

- All the respondents in the three selected districts are literate, which shows 100 percent literacy among the respondents.
- 60 percent respondents from Thiruvananthapuram and Ernakulam are living in semi urban area and the rest of them are living in villages.
- 80 percent of the respondents from Kozhikode are living in villages and the 20 percent are living in semi urban area.
- Not even a single respondent from the three selected districts cultivated in lease land itself.
- 60 percent of the respondents from Thiruvananthapuram and Kozhikode and 40 percent from Ernakulam used their own land for agricultural activities.
- 40 percent of the respondents from Thiruvananthapuram and 20 percent respondents each from Ernakulam and Kozhikode doing agricultural activities not only in their own land but also in the land taken for lease.
- Major crops of the respondents are rice, banana, coconut, rubber, tapioca, areca nut and vegetables.

- From the study we could find that all the respondents irrespective of their district cultivated coconut and vegetables.
- The machines that are used by the respondents are tractor, power tiller, pump set etc.
- Total working cost of the tractor per hour is about Rs.500 - 550 and total working cost of power tiller per hour is about Rs.100 -150.
- 60 percent of the respondents from Thiruvananthapuram district 80 percent respondents each from Ernakulam and Kozhikode districts get supplementary income source from dairying.
- Respondents get Rs. 28 to Rs.32 per liter milk from the society.

Appendix

Questionnaire

State Planning Board, Thiruvananthapuram

'Kerala Agro Industries Corporation – Role in the promotion of Agricultural Production'

1. Name and address of the beneficiary :

   Mobile :

2. Completed age at the time of survey :

3. Sex : Male/female

4. Marital status : Single/married

5. Education : Illiterate/litterate

6. Locality : Urban/semi-urban/rural

7. Religion : Hindu/Christian/Muslim

8. Land type : Own land / lease / both own land& land of relatives

9. Total holding of land : 25 cent/50 cent/1acre/2 acre /5 acre/more than 5 acre

10. Type of agriculture : Rice/banana/vegetables/ rubber/coconut/arecanut

11. Any other supplementary income source : Yes / no, if yes; specify

12. Name of the machine / machines :

13. Use of the machinery :

14. Unit cost of the machine :

15. Do you employ any labourer to operate the machines : Yes / no

16. Average wages/salary to the employee per month :

17. Total cost of the machine working in an hour :

18. Average maintenance cost of the machine / year :

19. Do you get any subsidy to buy machine if yes, mention the type of subsidy : Yes / no

20. How much amount of subsidy :

21. Do you get any bank loan to by machines : Yes / no

22. Do you get any proper servicing to the machines :

23. Cost of servicing per year :

24. Average income from agriculture :

25. Can you reduce your labour cost by using the machine : Yes / no

26. Do you have any live stock if yes, specify :

27. How much income do you get from the live stock per year :