

**IMPACT OF 'GREEN ARMY LABOUR BANK'
ON THE WELFARE OF AGRICULTURAL
LABOURERS**

By

SACHU ZACHARIAH JOHN

(2013-11-205)

THESIS

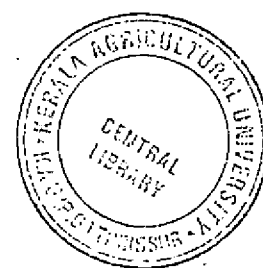
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DECLARATION

I hereby declare that the thesis entitled “**Impact of ‘Green Army Labour Bank’ on the welfare of agricultural labourers**” is a bonafide record of research work done by me during the course of research and the thesis has not been previously formed the basis for the award to me any degree, diploma, fellowship or other similar title, of any other University or Society.

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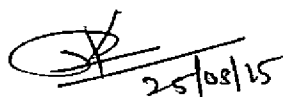
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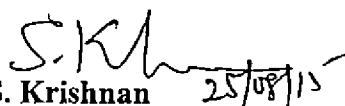
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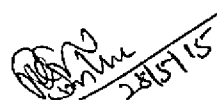
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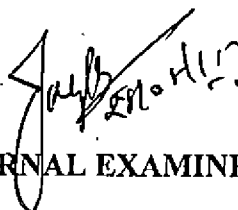
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EXTERNAL EXAMINER

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INTRODUCTION

I. INTRODUCTION

Kerala economy is characterized by a general stagnation in agriculture, as evidenced by the fall in the share of agriculture and allied activities in the State Domestic Product (SDP) from around 22 per cent in 1999-2000 to a mere 8.83 per cent in 2013-14. As per National Sample Survey Organisation surveys on Employment and Unemployment, the share of agriculture and allied sectors in employment declined from 57.40 per cent in 1983 to 29.50 per cent in 2009-10 in the state. There has been a substantial decline in the area and production of food crops since mid 1970s. The area under rice, the staple food crop, has shown a consistent fall from 8.81 lakh ha in 1974-75 to 1.93 lakh ha in 2013-14 and the corresponding decline in production was 13.30 lakh tons to 5.68 lakh tons (GoK, 2014). The fading interest in farming may be related to the structural changes in the state economy and a host of socio- economic reasons.

Farmers are seen abandoning farming and younger generations are not attracted towards rice farming mainly due to lack of life security, drudgery in farming operation and lack of social accreditation to farming job and lack of social security (Jayakumaran, 2012). Though many factors like unfavourable benefit-cost ratio, unstable prices of farm produce, conversion of agricultural land to non-agricultural purposes, uncontrollable growth of real estate sector are instrumental for the waning interest in farming, the root cause seems to be labour scarcity and its high cost. Even though mechanization has evolved as the remedial measure, lack of skilled and trained personnel, insufficiency of public and private hiring services and lack of repair facilities operate against its widespread adoption. Moreover, the less intensive use of paddies (reduced cropping intensity and less scope for intercropping or alternate crops) and absence or dilution of enforcement of land utilization acts have put a curb on the surplus generation and investment in rice farming.

On the supply side, though wages increased over time, the gross income of labourers is observed to have declined as the labour days fell faster than the rise in wages. Consequent to the decline in rice area, conventional crop specific labourers switched over to non-farm activities, creating further seasonal shortage of labourers. All these together formed a vicious circle for farmers and labourers. A strategy integrating the protection of interests of farmers as well as labourers is needed to reverse the present declining trend in rice area and production. Though it might appear to be contradictory elsewhere, in the Kerala context, it is complementary (Issac, 1999). The materialization of this multipronged strategy can be ensured by augmenting the productivity of land to offset the effect of escalation in cost of production while increasing employment days of agricultural labourers through possible intensive as well as extensive use of land. Alongside the problem of seasonal shortage of labourers has to be resolved by making labourers available to the farmers at short notice (Mohanakumar and Girishkumar, 2000). The primary objective of this strategy should be enhancing the net income of rural labourers by providing more days of employment and to increase the net income of the farmers by curtailing the cost of production.

The factors of production viz., land, labour, capital and management when combined in proper proportion and then used wisely can help to achieve higher level of efficiency in farming. Land is a scarce commodity in Kerala which has only 1.10 per cent of land supporting 3.30 per cent of the people in India (GoI, 2011). Harilal and Eswaran (2015) observed that large tracts of agricultural land in Kerala are remaining unused or under-used in its capacity as means of production. At the same time, the land value may increase several fold if it is used for commercial purposes other than agriculture. Land filling for urbanization and allied activities, alternate use of land for establishing industries and other infrastructural facilities, promotion of tourism activities, unparalleled real estate booms have reduced agricultural area, particularly the rice area in Kerala.

Inflow of remittance to the state's economy from the West Asian countries since mid-seventies and subsequent boom in construction activities has resulted in higher demand for labour in relation to its supply leading to high wage rate (Krishnan, 1991; Kannan, 1999). Alongside, the sudden spurt of human development activities in Kerala and consequent increase in per capita consumer expenditure in the state and the cost of living of individuals pushed upward the subsistence cost of agricultural labourers (Mohanakumar and Gireeshkumar, 2000). However, the price of rice being regulated by the State and was predominantly produced in low wage rate parts of the country, did not rise in proportion to the escalation in wage rate of agricultural labourers. As a result, the price ratio fell from 1.38 in 1975-76 to 0.84 in 1995-96 and the rice farmers were left with no option to opt for crops with higher relative profitability and less labour intensity (Kannan, 1999), irrespective of the fact that rice farming is the major labour provider with 160 days per crop (Leenakumari, 2011). Farming of highly labour intensive crop like rice could be sustained for long only if twin problems of shortage of adequate labourers in peak season and exorbitant escalation in production cost are addressed and arrested.

Lack of access to capital has been projected as another reason for collapse of rice farming (Georges, 2004). Status of various forms of capital involved in agriculture viz., farm machineries, farm animals, housing for animals and storage structures, depreciation of machinery affect rice farming. Lack of finance to create adequate capital has emerged as a deterrent for rice farmers. Chigbo (2014) emphasized management ideas/ knowledge as a capital in farming which offers insight in suggestions to policy makers and to those who manage people and organizations.

In order to counteract the labour scarcity, high labour cost and drudgery in human labour, partial to complete mechanization in rice farming is welcomed. However, various factors like inadequate access to the finance to purchase the

implements/ machinery, lack of skilled and trained personnel for repair, maintenance and working of agricultural machinery, insufficiency of public and private hiring services, lack of repair facilities, lack of suitable machinery for varying geography of rice fields operate against its widespread adoption. Kerala People's Plan initiated during ninth plan has placed agriculture mechanization as a prime issue to be taken up for socio economic uplift of rural people. The enthusiastic response of the people to the concept of local level planning also resulted in the birth of many local level institutions. One among them was the labour bank, the first organization materialized in the Kunnathukal Panchayat in Thiruvananthapuram District as early in 1998.

An initiative taken up by Kerala Agricultural University through Food Security Army (FSA) has conceptualized the need for an efficient work force for the state for achieving food security and was able to form various Labour Bank/Labour Army in different parts of the state. Green Army Labour Bank is such an organization formed as a self-sustaining group of skilled labour force fostered by the local body of Wadakkanchery block in Thrissur district in 2008 equipped with modern farm techniques and interventions, and farm machineries. By infusing modern methods into conventional farming, the Green Army has become a role model in the state in a short span. The interventions to organize, train and assure steady supply of labour and credit support to the farmers is presumed to ensure better living conditions both to farmers and farm labourers. Understanding the benefits of labour banks operated in several parts of the state, Kerala Government has recently established *Karshika Karma Sena* (Agricultural Labour Army) in selected *Krishibhavans* of Kerala.

With this background a systematic study has been taken up to assess the impact of Green Army Labour Bank of Wadakkanchery, Thrissur district on the welfare of its major stake holders. The findings of the study could help to form the basis for policy recommendations for increasing rice production in Kerala.

Specific objectives of the study

1. To study the institutional structure and capital investment of GALB
2. To assess the impact of Green Army on the welfare of Green Army members
3. To assess the impact of the programme on the welfare of the farmers who avail the services of GALB

Limitations of the study

The Green Army is aimed to operate in Wadakkanchery block, and hence the study results may not be generalized for wider geographic area. The results of the study are based on the data collected from labourers, farmers and implementing officials through pretested interview schedules. Since the farmers and labourers have shared the information from their memory rather than any register and may be subjected to recall bias. However, careful and rigorous procedures have been adopted in carrying out the research, to make it as accurate as possible. In spite of the individual bias made by the respondents in furnishing the necessary information it is believed that the findings and conclusion drawn in the present study may help to modify the working of labour banks in Kerala.

Plan of thesis

The thesis is presented in five sections. The first chapter 'introduction' contains the background of the topic and research problem, objectives, scope and limitations. The second chapter 'review of literature' deals with the concepts and previous reviews of the related research works. The third chapter 'methodology' describes the study area, sampling, data collection procedure, empirical measures used and statistical tools used in the conduct of the study. In the fourth chapter the results in relation to the objectives are presented with appropriate interpretation of the findings. In the fifth chapter the highlights and the salient findings are presented followed by the references, abstract and appendices which contain the interview

schedules for Green Army members, user farmers, the labourers who have not registered as Green Army members and the implementing officials.

REVIEW OF LITERATURE

II. REVIEW OF LITERATURE

Present study aims at bringing out the impact of the Green Army Labour bank on the economic welfare of the agricultural labourers and beneficiary farmers in Wadakkanchery block of Thrissur and its impact on rice production of that area. A brief review of studies conducted on the related topics and background issues are reviewed and presented in this chapter under the following subheadings.

1. Agricultural labour market and labour institutions in agriculture
2. Rice economy of Kerala
3. Initiatives to improve rice production

2.1. Agricultural labour market and evolution of labour institutions

Labour markets functions through the interaction of workers and employers and look at the supplies and services (workers) and the demand for labour services (employers) and attempts to understand the resulting pattern of wages, employment and income (https://en.wikipedia.org/wiki/Labour_economics)

2.1.1. Agricultural labour market

Papola and Misra (1980) after an analysis about labour supply and wage determination have reported that the extent of surplus labour directly depressed the wage rate from supply side. The supply of labour to agricultural sector in rural areas would tend to be reduced when employment opportunities outside agriculture is increased. Vaidyanathan (1994) reported that there has been a consistent decline in the proportion of family labour (self-employment) compared to wage employment in the agricultural sector. Wage employment as a proportion of total rural employment is less than 10 per cent in Rajasthan while it is more than 40 per cent in Kerala.

Harrison *et al.*, (1997) while studying the economic growth and change of African countries observed that in developing countries no clear cut policies are existing to tackle the problem of underemployment and unemployment, and stated that informal labour markets with lower wages and worst working conditions are common. They also studied the effect of labour market regulation by the state and found that such interventions can often lead to distortion in labour market.

Jha (1997) reported that over the past few decades growth rate of agricultural labour force has been increasing at a higher rate than rural population growth rate in India and suggested creation of rural employment opportunities through rural industrialization and non-farm employment opportunities.

Baby (1997) analyzed the trends in money wages and real wages of agricultural labourers in Kerala and reported that even though the money wages of them have shown a continuously rising trend, it has failed to convert to a substantial increase in the standard of living due to stagnant real wage rate and decline in number of working days. The decline in number of working days is more in southern Kerala which has shifted from labour intensive rice crop to other less labour intensive crops. The steering committee for ninth five year plan (GoI, 1998) also pointed out that though there is an increase in money wages the increase in real terms is very meager and this can have serious repercussions in Kerala where agricultural labour force is high. The committee suggested increasing the area under food crops in Kerala to generate more employment opportunities.

Namboodiri (1997) analyzed the factors which influence the demand for labour and suggested that the prevailing situation in a Kerala village with regard to land ownership, cropping pattern, family labour availability, occupational pattern, income and education of persons of the household etc. is conducive to generate considerable demand for hired labour. He observed a complex system of rural market characterized chiefly by high wage rate and the paradox of labour scarcity amidst

labour surplus. He opined that the trade unions have a role in shaping the labour market. He also revealed that rural labour market is segmented by space and skills. There is very little inter-village mobility, particularly for unskilled labour. While certain types of jobs are skill intensive and hence entry is restricted, the possession of land and other assets by labour household acts as a disincentive for migration even for unskilled jobs.

Nair (1999) observed that though Kerala labourers enjoy one of the highest wage rates in India, the average number of working days has declined over years. He highlighted the existence of high transaction cost for rural labour into various imperfections and segmentation of rural labour markets and the need to remove these imperfections to tap the potential man power in rural areas.

Kannan (2011) opined that Kerala is unique among the Indian states, in that labour has acquired a dominant position both in development discourse and in development process, due to its historical role in national as well as radical political movements and subsequent organizations in terms of trade unions.

Prabhakar *et al.*, (2011) have noted that proportion of agricultural workers to the total workers has been declining over the years since 2001 while the corresponding ratio of the secondary and tertiary sector is on the rise while analyzing the rural situations in Tamil Nadu.

Result of a study by Manikandan (2011) on the impact of MGNREGS on the labour market with special reference to wage rate and productivity of rice in Kasaragod district of Kerala indicated that since the inception of MGNREGS the wage rates of labourers for rice cultivation especially that of unskilled women labourers have increased.

2.1.2. Evolution of labour institutions

As per the first National Commission on Labour of 1969, an agricultural labour is one who is basically unskilled and unorganized and has little for his livelihood other than personal labour. National Commission on Rural Labour (GoI, 1991) noted that neglect of human resources development and basic needs were the major deficiency of Five Year Plan. The commission noted the need for enhancing bargaining power of agricultural labourers and opined that the rural poor can't afford to send their children to schools unless employment opportunities are increased.

Kannan (1993) using Rodgers classification of labour unions, classified labour institutions in India with a view to identify their origin and vintage in the Indian context. According to him modern labour institution may be identified on the basis of their formal character in terms of their organizational structure and their explicit nature of functioning.

Parthasarathy (1993) studied the controversy over the impact of labour institutions on labour market and stressed the need for labour institution as these institutions can provide insurance against adverse market outcomes. He observed that the existence of minimum wage cause detrimental effects in economy only when it is used aggressively as a policy tool, also argued that the experience in advanced developing countries show that less labour unionism does not mean more growth but they are not immediate to economic growth.

Jha (1997) noted the per capita availability of agricultural employment being well below the optimum in all the Indian states. He advocated locality specific approach to tackle the problems created in agricultural sector by a variety of regional and sub-regional politico-economic pattern and predicted the emergence of new types of labour union which can take direct action to solve the problem.

Kannan (2000) opined that, capital, compared to other factors of production is less powerful in Kerala than rest of India. He pointed out three major development dilemmas closely related to rural labour, such as the increase in wage rate but simultaneous decrease in employment availability, the mismatch between labour supply and labour demand and the failure of the state to promote investment in agriculture. He suggested appropriate intervention by state and labour organizations for reducing both seasonal and structural unemployment.

Franke and Chasin (2000) noticed that the Kerala's decentralization process and the people's plan programme have given impetus for development of organizations like Labour Bank. They highlighted several advantages of local institutions and organisations like reduction in corruption, better efficiency, more women participation, better conflict management and need based approach.

Girishkumar and Mohanakumar (2000) proposed 'Kunnathukal Labour Army' model for utilizing locally available agricultural labour to enhance agricultural productivity and production. The sticking-on of the labourers in farming jobs was ensured by enhancing the net income of rural labourers. Two distinct phases were identified for the Kunnathukal labour model. Phase I consisted of the recruitment of labourers to the institutional set up at a wage rate lower than the market rate which attracted farmers to the frame work, and the reduction in the wage rate for labourers is compensated by labour army package. At this phase, the marginal productivity of labour is higher than the average rate fixed by the Labour Army but lower than the prevailing wage rate, therefore the profit or surplus accrued to the farmers under Labour Army is increased. In the second phase, the difference between the market rate and labour army rate is narrowed and the entire labour force in the rural sector is institutionalized to supply required number of labourers to the farmers, the down turn in the agricultural production is reversed and attained outward shift in productivity.

Verma (1991) after studying the surplus manpower in agriculture and development of suitable employment policies reported that most of the state sponsored employment programmes were of ad-hoc nature and they neither ensured continuity of employment nor income. He observed most of the schemes benefitted rural better-off people than weaker section. He advocated institutional changes to ensure equitable distribution of benefits and incorporation of skill development in employees.

Everett and Minkler (1993) from studies on varying kinds of organizations in Britain concluded that labour owned labour institutions results in higher productivity of labour, less conflicts among labourers and increased efficiency through mutual monitoring. Evolution of such labour institutions weeds out weak and inefficient institutional forms.

Sodhi (1993) revealed that the organizations which labourers themselves manage yielded better output. The empowerment of members through democratic administrative set up produce better results.

Pasetta (1993) while studying the role of labour institutions in market economy in Britain reported that self-managed labour organizational structure helps the organization to exploit an extensive system of complementarities leading to rise in economic efficiency.

Pessach (1993) compared capitalistic and co-operative firms in Britain and pointed out that when the nature of work is such that it is hard to monitor, co-operative organizations tend to be more effective. In most of the co-operative organization unlike in capitalist firms, workers are paid according to the value added by them.

Reghuram (2000) pointed out that local institutions are found to have more social responsibility to address the local issues and are better suited to perform

function, while highlighting the importance of Kerala's democratic decentralization programme.

Faizi (2000) suggested labour bank like organization to answer to Kerala's unemployment problem. He proposed labour bank as a viable option to mobilise surplus manpower, to tap potential of unused natural resources and increase in area of cultivation.

Kumar (2000) while studying the impact of decentralized planning in the socio-economic developments in Kerala opined that Kerala's developmental problems sprung from accumulated underutilization of natural resources, industrial potential and more significantly its manpower.

Babu (2000) registered a significant reduction in cost of cultivation of different crops after implementation of Labour Army in Kunnathukal gramapanchayat in Thiruvananthapuram. He revealed that the practice of fixing labour norms and wages by a panchayat level committee was more acceptable to both cultivators and labourers.

Mohanakumar (2000) observed significant increase in area under cultivation in Kunnathukal panchayat, Thiruvananthapuram due to operation of Labour Bank. Unlike the withdrawal of labourers from agriculture to industry, the labour bank surpassed the stagnation in agriculture by making strong interventions through mobilization of labourers and farmers.

Issac (2001) identified major characters of rural agriculture as unwillingness to lease out land, large number of small and marginal farmers, lack of income from small sized own land and high degree of unionization among agricultural labourers while studying the existing agrarian relations in rural Kerala in the context of development of Kunnathukal Labour Bank in Thiruvananthapuram district.

Initiation taken up by Kerala Agricultural University through Food Security Army (FSA) has conceptualized the need for an efficient work force for the state for achieving food security. Devi *et al.*, (2010) while studying the impact of Food Security Army reported one and a half times increase in the annual income of the food security army members.

Sajeena *et al.*, (2011) observed more than 60 per cent improvement in the income earned by the members of '*Krishisahayi*'- a group formed for the empowerment of women under *Krishi Vigyan Kendra* (KVK) Malappuram. Alex (2012) reported that Green Army in Wadakkanchery block, Thrissur, Kerala has provided sustainable livelihood options to women, small and marginal farmers and revived rice production system.

2.1.3. Labour welfare

Welfare is the availability of resources and conditions required for reasonably comfortable, healthy and secure living. While reviewing theories of social progress, Kleene (1918) reported that according to Arthur James Todd, Labour welfare means anything done for the comfort and improvement, intellectual and social, of the employees over and above the wages paid which is not a necessity of the industry.

Income and consumption are two monetary dimensions of welfare or wellbeing and may have a choice between using the two as indicator of wellbeing, while estimating monetary measure of poverty. Most analysts argue that consumption will be a better indicator for poverty measurements than income (Hentschel and Lanjouw, 1996; Martin, 1998; Woden, 1999; Deaton and Zaidi, 2002 and Dong, 2007). They argued that consumption is a better outcome indicator than income since actual consumption is more closely related to a person's wellbeing in the sense of having enough to meet the current basic needs. Income is only one of the elements which will allow consumption of goods, others include questions of access,

availability etc. They also argued for consumption, as it is better measured than income. They argued that consumption expenditures reflect not only the goods and services that a household can command based on current income, but also whether that household can access credit markets or household savings at times when current income is low or negative.

Grootaert (1999) while studying the relationship between social capital, household welfare and poverty in Indonesia reported that poor households are participating actively in local associations. At low income the returns to social capitals are higher than returns to human capitals. At higher income the reverse is true. It is also reported that household with higher social capital spend more per capita, they also have more access, more savings and better access to credit.

2.2. Rice economy of Kerala

Despite of rice being the staple food, Kerala is a deficient state in rice production. While the estimated requirement of rice for the state is 35 lakhs tons per year it produces less than one fifth of its requirement.

2.2.1. Status of rice cultivation

In 1975 the rice production in Kerala was over 50 per cent of her consumption requirement, by 2010 the consumption- production gap increased to 84 per cent (Leenakumari, 2011). The area and production of rice in Kerala has shown a consistent fall from 8.81 lakh ha and 13.30 lakh t in 1974-75 to 1.93 lakh ha and 5.68 lakh t in 2013-14 (GoK, 2014).

The net area under cultivation and the cropping intensity of the state has maintained without much change, respectively with 21.85 lakh ha and 136.18 per cent in 1975-76, 22.06 lakh ha and 136.97 per cent in 2000-2001 and 20.40 lakh ha and 130.47 per cent in 2011-12 indicating a shift in the cropping pattern of the state (Thomas,

2002; GoK,2013). The conversion of paddy fields into industrial and commercial plots has been going on in a rapid phase in Kerala since 1980s.

The high density of population, inflow of remittance income from migrant workers and fast growth of service sectors has created a high demand of land in the state. Land prices have gone up and land has become a speculative asset (Jayan, 2011). However, between 2007-08 and 2009-10 the area and production has increased by 5000 ha and 69300 t and the productivity from 2218 to 2557 kg/ha. (GoK, 2008; GoK, 2010). Given the steady decline in rice cultivation in Kerala through 1990 and 2000s a reversal of that trend however small is in itself a remarkable feat (Jayan, 2011).

2.2.2. Constraints of rice production

Prakash and Nair (1992) identified the production constraints in lowland rice farming in *kuttanadu*, *pokkali* and *kole* regions as floods, high input costs and low profitability.

Padmanabhan *et al.* (2001) reported high cost of cultivation due to high input costs, diminishing return and acute shortage of labourers as main constraints of production while discussing about the economic viability of an integrated and sustainable resource model for *kuttanadu*.

Reddy *et al.* (2001) low profitability due to high cost of labour and other inputs as the main constraints for paddy production. Thomas (2002) reported non-availability of labour during peak season, declining profitability, militant trade unionism, slow pace of mechanization, lack of easy credit, lack of marketing facilities, recurring crop failures and uneconomic size of holdings as major constraints that farmers face in *Kuttanadu*. Ravikumar and Sudeesh (2013) reported shortage of labour, high wage rate, low price of produce, natural calamities and lack of irrigation facilities as major constraints for rice farming Palakkad region.

2.2.3. Labour utilization in rice cultivation

Several studies have reported about the uneconomic level of human labour use which has been estimated to be the single item of highest expenditure in rice farming (Muraleedharan, 1982; Parayil, 2010; Susha *et al.*, 2011). When taken as a separate variable, investment on labour has shown inefficient level as the Marginal Value Product (MVP) and Marginal Factor Cost (MFC) have been observed to be less than one in most of the studies in Kerala agriculture (Balakrishnan, 2000; Sreela, 2005).

Rice cultivation requires very high labour input as much as 1000-1200 man hour/ha in Kerala compared to 800 man hours per ha in other states in India (Pillai, 2004). Devi *et al.*(2010) while studying the impact of Food Security Army has observed that paddy is a labour intensive crop and the average labour use has been estimated at 203.63 man days per ha per year. Thomas (2002) has reported that the requirement of human labour for rice cultivation is high in Kerala and compared to other crops paddy cultivation is more labour intensive. He further reported that around 145 man days/ha is needed for rice cultivation which amounts to 60 per cent of the total cost in *Kuttanadu*.

A study on the decennial changes in the structure of cost of cultivation/ha of rice in *Kuttanadu*, the rice bowl of Kerala showed that between 1988 and 1998, share of human labour increased substantially from 41 to 61 per cent (Thomas 2002) . He further reported that in *Kuttanadu* more than 45 per cent of total human cost is accounted for harvesting and threshing. Payment was given in kind at 15.63 per cent of the total harvest. Twenty per cent of the total cost was for field preparation and 22 per cent for transplanting.

Natarajan (1982) reported 150 man days per ha of labour requirement for rice cultivation in Palakkad while Vijaya (1998) has estimated 162 mandays per ha per season in *Kuttanadu* and 97 mandays in *Pokkali* rice farming.

2.2.4. Mechanization in rice farming

Rice cultivation requires very high labour input as much as 1000-1200 man hour/ha in Kerala compared to 800 man hours per ha in other states in India (Pillai, 2004). He opined that considerable reduction in labour requirement can be achieved through selective mechanization with appropriate machinery to make rice production economically viable. He has listed 23 farm implements and machinery from iron plough to combine harvester that can be used in rice cultivation and nine operations from ploughing land to drying of seeds which can be mechanically done saving human labour. He has also identified seventeen constraints for adoption of farm mechanization from small farm size to lack of awareness of the farmers for no adoption of mechanization.

Das (2009) has opined that mechanization of small holdings is needed to increase rice production. Since holdings are small and fragmented custom hiring service of costly machinery and easy availability of credit are required for small and marginal farmers to adopt mechanisation. Steps have to be taken at Block and Gramapanchayat level to procure and maintain machineries.

Parayil (2010) from a study on the pattern of labour engagement in rice farming has suggested labour substitution with techniques like use of farm machineries and herbicidal weed control.

From the analysis for a period of 28 years from 1980-81 on the labour use pattern of Kerala, Devi (2012) reported declining number of hired labour in the *Virippu* (autumn) season, 90 in 1980-1990, 82 in 1991-2000 and 65 in 2001-2008

possibly by the increasing substitution of hired labour with mechanization which increasingly happened over the years.

The annual income of the Food Security Army member has increased by one and half times after joining the army. Sajeena *et al.*(2011) observed more than 60 per cent improvement in the income earned by the members of *Krishisahayi*, which is a group formed for the empowerment of women under *Krishi Vigyan Kendra* (KVK), Malappuram for popularization of farm mechanization..

Manimekalai *et al.* (2012) studied the reasons for adoption of machineries in rice cultivation in Thiruvallur district of Tamil Nadu and reported that non availability of agricultural labour and high labour wages along with less time consumption, ability to complete the work in time, perfection and more efficiency while using machinery were the reasons attributed by farmers for adoption of farm machineries.

Department of Agriculture and Cooperation, Government of India, reported that 40 per cent of land preparation process, 29 per cent of seeding production, 34 per cent of plant protection, 37 per cent of irrigation and 60 to 70 per cent of harvesting operations are mechanised. Mechanisation is in high level in Punjab, Haryana and Western U.P., moderate level in South India, low level in U.P. except Western U.P. and Bihar, and very much low in Bengal, Orissa and Northern states (GoI, 2013).

It was revealed that, there was 37.57 per cent decrease in family labour, 20.73 per cent decrease in permanent labour, 4.42 per cent decrease in casual labour averaging 22.87 per cent decrease in the total labour use due to mechanisation from 1985-86 to 2006-07 in Punjab in spite of increase in yield. During this period, barring transplantation of paddy, almost all other operations for wheat and paddy have been completely mechanised. The increase in use of the combine harvester in

wheat and rice during this period was 1189 per cent and 355 per cent, respectively (PAU, 2013).

Srinivasan (2012) reported that 65 per cent of the total cost of cultivation of rice in *kole* lands of Kerala is towards labour. He has suggested mechanization for rice transplanting and harvesting in order to make rice cropping in *kole* lands economically viable.

Federation of Indian Chamber of Commerce and Industry has suggested improving the architecture and suitability of crops through seed technology and suitability of machinery being used through indigenisation to promote farm mechanisation and reduction of crop wastage (FICCI, 2014)

Menon (1983) grouped the constraints for rice mechanization into economic, extension and organizational constraints. Mechanization in rice farming in Kerala is constrained due to lack of appropriate machinery systems suited for varying situation of the state (Pillai, 2004). Economic analysis of machinery use in consonance with specific agro ecological situation is essential for planning and implementing an agricultural mechanization strategy (James *et al.*, 2006).

Regina *et al.* (2013) identified small size of holdings, lack of unity among farmers to adopt group mechanization as socio economic constraints, non-availability of machines and lack of trained operators and lack of initiative and responsibility in upkeep of the machines as technological constraints while studying the constraints for adoption of mechanization in rice culture.

2.3. Initiatives to improve rice production

Intensive Agricultural Development Programme (IADP) of 1960-61, Intensive Paddy Development Programme (IPD) of 1971-72, Operational Research Project in Integrated Rice Pest Control 1975-1995, Group Farming Programme 1989-90,

Integrated Programme for Rice Development (IPRD) of 1994-95 were designed exclusively for the development of the states paddy sector (Thomas, 2002). He further reported that in Kerala over the last four decades there has been a steady decline in the number of people available or willing to work in the field with nearly 12 lakh workers having left the agrarian sector. The primary reasons were the migration of younger generation away from the state and agricultural sector due to strenuous nature of the work. Migrant workers from other states are available but their wages are exorbitant as it varied with employment opportunities in other more lucrative sectors.

In order to promote intensification of rice farming in scientific lines efforts have been taken by the Government and the farmer groups in several rice growing tracts in Kerala during 1980s. Group farming is a collective activity introduced by Kerala Government in 1989 which is an integrated endeavor to combine resources, technology and management of inputs to overcome economic, technological and institutional constraints of low productivity in rice cultivation through empowerment of farmers.

Bradley *et al.*, (1999) defined empowerment as a collective undertaking involving both individual and collective action. There are two vital processes in the empowerment. Social mobilization and collective action are embedded in group farming.

Report from KVK, Palakkad (2004) described institutional approach with the formation of *Karshaka Sahayak Samiti* (Farmers Discussion Forum) by *Paruthikkavu Nellupadaka Padashekhara Samithi* (Paruthikkavu Paddy grower's forum) in 1980 with ten rice farmers which grew to 110 farmers and 169 acres. The group could facilitate the scientific methods of raising community nurseries, and machine planting at the same time with single variety and adoption of all scientific methods in the entire *padashekharam* (field collective). It bagged the first

'*Nelkathir*' award of Government of Kerala in 1993. The group farming resulted in a threefold increase in rice production and hundred per cent reduction in cost of cultivation.

GALASA (Group Approach for Locally Adapted Sustainable Agriculture) was practiced as a joint venture of KAU, Palakkad District panchayat, State Department of Agriculture and Centre for Environment and Development, Trivandrum, which increased the yield to 7 tons/ha. Sendilkumar (2012) reported significant economic empowerment of rice farmers of GALASA due to increased income, saving of money, improvement in investment, input purchase and availing crop insurance. The major reason for knowledge empowerment is the participation in training programme (Ashokan, 2006). The freedom for work with group members was significantly increased in group farming/ GALASA (Karpagam, 2009).

The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) can be better utilized to resolve labour shortage in rice culture (Jayan, 2011). Seenath (2013) while studying the impact of MGNREGS on agricultural labour market in Kerala observed that MGNREGS has further intensified labour shortage due to sharing of available labour between MGNREGS and farming. She suggested that the labour available under MGNREGS need to be utilized for agriculture and concluded that convergence of the schemes under MGNREGS and agricultural sector will result in overall rural development.

Kudumbasree, the women oriented, community based, poverty alleviation project of Kerala has intervened in rice farming in leased fallow lands and cultivated 2240 ha in Palakkad in 2008, raising capital from commercial banks by forming joint liability groups (Prabhakaran, 2008). The members were trained on rice mechanization by Food Security Army of Kerala Agricultural University (Hindu, 2014). In 2011 on the basis of *Kudumbasree*'s experience with collective farming, the *MahilaKisan Sashakthikaran Pariyojana* (MKSP) was conceived as a

subcomponent of the National Rural Livelihood Mission for promotion of farming by women across the country (Anand and Maskara, 2014). The impact assessment conducted by them revealed that there was considerable increase in fallow land cultivation, production and productivity of rice, and income of *Kudumbasree* members.

Several Labour Armies/ Labour Banks were established in different areas of the state to facilitate rice farming such as Kunnathukal Labour Bank of Trivandrum district and Green Army of Wadakkanchery block which are considered as models. Lijo and Siddayya (2011) after conducting a SWOT analysis of Labour Bank in Kunnathukal gramapanchayat in Thiruvananthapuram district of Kerala suggested that the participatory approach in the design, organization and operation of the labour bank can be a powerful institutional intervention for mitigating some of the imperfections in agricultural labour market.

Anoop *et al.* (2014) studied the institutional interventions in the form of labour banks to address the scarcity of farm labour in Kerala. In a comparative study made in two paddy growing blocks of Thrissur such as Puzhakkal where there is no intervention of labour banks, and Wadakkanchery where labour bank operates, they reported an yield increase of 0.92 t/ha in Wadakkanchery block with an additional profit of Rs.11,448 per ha. Added returns to users was attributed to the increased productivity obtained through timely availability of skilled labourers and farm machinery. The reduction in cost was attributed to the use of mat nurseries and transplanters, and low cost of seed. He observed a total 194 working days per year out of which 137 were obtained through labour banks, for the members of the labour bank. However, the non-members got 207 working days per year, working outside labour banks and from non-farm and off farm works.

A Farmer's Society "Malabar Kaipad Farmer's Society" was formed in 2010 to improve rice farming sector of *Kaipad*, Kannur in terms of area, productivity and

in turn total production and marketing as organic rice. The Malabar Kaipad Farmer's Society has formed Food Security Army to counteract the lack of availability of skilled labourers and existing high wage rate of labourers (Radhika, 2014).

Government of Kerala has established, *Karshika Karma Sena* (Agricultural Labour Army) in the selected *Gramapanchayats* under the *Krishibhavans* to facilitate skilled labour supply for mechanical rice farming and improvement of rice farming sector in Kerala under the annual plan 2014-15. The *Karshika Karma Sena* will serve not only as a labour bank which provide well trained disciplined labour force, but also as a service bank of technicians comprising of mechanics, electricians, plumbers etc. for agricultural purposes on call or demand at reasonable rates and as a land bank to provide facilities for the farmers to lease land for crop production based on fixed terms and conditions (DoA, 2014).

METHODOLOGY

III. METHODOLOGY

The methodology used for studying the impact of Green Army Labour Bank on the welfare of its members, the beneficiary farmers who availed its service, the ordinary labourers who are not its members and analysing the response of officials associated with the functioning of Green Army Labour Bank (GALB) are presented in this chapter. The description of the study area, sampling design and procedure, collection of data, definitions of terms and concepts adopted in the study, and analytical tools used are briefly described.

3.1. Description of the area of study

3.1.1. Thrissur District

Thrissur is the third most urbanized among 14 districts of Kerala (PLS 2013). It has 20.79 per cent area and 10.70 per cent population of the state. The total geographical area of the district is 3029.19 sq.km and lie between 10^o 31' North latitude and 76^o 13' East longitude at the altitude of -1.5 to 375 m above MSL. The district is having only one revenue division, but 16 blocks viz., Chavakkad, Talikkulam, Mullasserri, Chowannur, Wadakkanchery, Pazhayannur, Iukkara, Puzhackal, Cherpu, Anthikkad, Mathilakam, Mala, Irinjalakkuda, Vellangallur, Kodakara, and Chalakkudi.

Thrissur is an agriculturally important district. The Gross Domestic Product (GDP) of agriculture and allied sectors of Thrissur is Rs.2,01,532 lakhs out of Rs.39,49,901 lakhs of Kerala at current price and Rs.76,853 lakhs for Thrissur out of Rs.15,06,261 lakhs at constant price taking the base year 2004-05 (PLS 2013). Ninety per cent of *Kole padavu*, which is considered as one among three rice bowls of Kerala is located in Thrissur district. The land utilisation pattern of the district presented in Table 3.1 shows that 42 per cent of the geographical area is under cultivation with a cropping intensity of 125.75 per cent.

Fig. 1. Map showing the study area

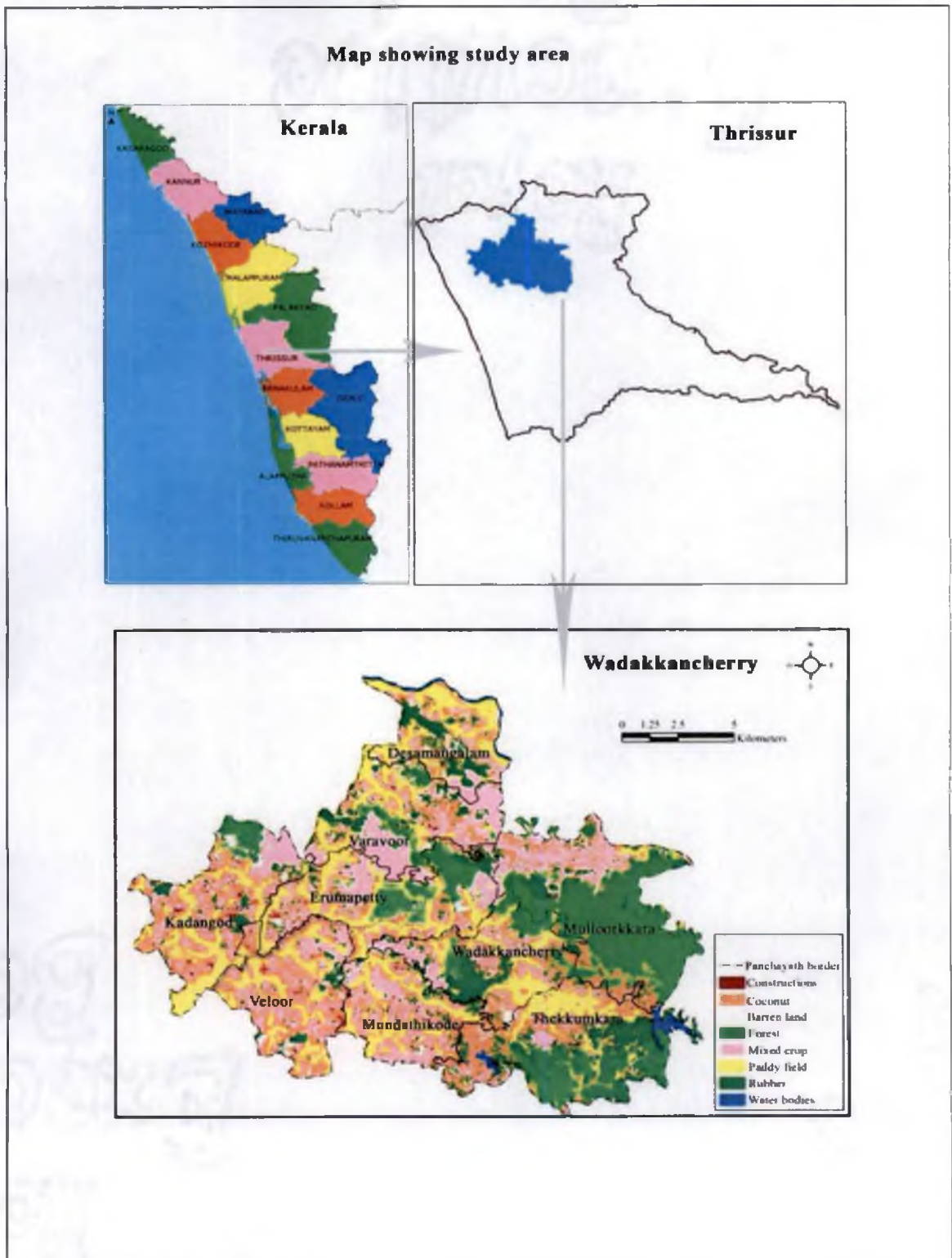


Table 3.1. Land utilization pattern of Thrissur District

Sl.no	Particulars	Area(ha)
1.	Total geographical area	302919
2.	Forest	103619
3.	Land put to agricultural use	36707
4.	Barren and uncultivated land	247
5.	Cultivable waste	6766
6.	Fallow other than current fallow	6364
7.	Current fallow	13139
8.	Still water	8082
9.	Net area sown	127185
10.	Area sown more than once	34041
11.	Total cropped area	161216

Source : PLS, 2013

3.1.2. Geographical Features

About 90 per cent of Thrissur District is coming under the physiographical classification of coastal area and midland and rest under highland. The district has got a coastal length of 54 km. The altitude ranges between -1.5 m in *kole* lands and 395 m in Peechi forest. The midland occupies plain lands and valleys.

The soil is mainly classified as laterite which is moderate in fertility. Virgin forest soil is in the highland region which is also laterite in origin. The *kole* region and valleys are having clay to clay loam soils where rice is the main crop. The district enjoys a hot humid climate. The mean daily maximum temperature is 33°C and the minimum is 22°C. The annual rain fall is 3200 mm of which 70 per cent of it

is obtained in the SW monsoon, 21 per cent in NE monsoon and the rest as summer showers.

Four major rivers, viz. *Bharathapuzha, Kecheripuzha, Manalipuzha and Chaalakkudi puzha* are flowing through the district. There are 8 reservoirs covering an area of 25.06 hectares. There are 280 ponds and tanks and out of which 76 are panchayat ponds for public use.

3.1.3. Demographic Features

As per census 2011 the population of Thrissur District is 3121200 with a rural population of 1020794. The population density is 1030 per sq.km. The sex ratio of the district is 1096 which is in agreement with the unique pattern of the state.

Average literacy rate of the district is 95.32 per cent with a female literacy rate of 93.85 per cent and male literacy rate of 96.98 per cent. The district has a total work force of 92956 persons accounting approximately 29.78 per cent of the total population. Rural work force accounts for 33.67 per cent of the total working people. There are 54538 agricultural labourers out of which 32181 are rural.

3.1.4. Wadakkanchery Block

The present study is conducted in the Wadakkanchery block of Thrissur. There are nine gramapanchayats viz, Wadakkanchery, Kadangode, Velur, Mundathicode, Thekkumkara, Erumapetty, Varavoor, Desamangalam and Mullurkkara in the block. The block is having an area of 206.90 sq.km, and the female and male population is 106148 and 97126, respectively. The population density is 685 per sq.km. Total number of land holdings accounts to 10415 among which 1279 are SC/ST.

3.1.5. Cropping pattern of Wadakkanchery block panchayat

The cropping pattern of Wadakkanchery block during 2010-11 is presented in the Table 3.2. Coconut is having the highest area of 6420 ha followed by rice with 3074.80 ha. Rice was grown in area of 307.67 ha during *Virippu*, 2700.46 ha during *Mundakan* and 66.69 ha during *Puncha*.

Table 3.2. Area under important crops in Wadakkanchery block

Crops	Area (ha)	Percentage
Coconut	6420.00	41.53
Rice	3074.80	19.85
Arecanut	801.74	5.19
Pepper	367.21	2.38
Mango	749.57	4.85
Jack	507.47	3.28
Nendran banana	288.89	1.87
Plantain	474.10	3.07
Cashew	374.20	2.42
Tapioca	103.78	0.67
Vegetables	260.00	1.68
Rubber	919.00	5.95
Tamarind	173.90	1.13
Other crops	948.27	6.13
Total	15456.95	100.00

Source : PLS, 2013

It is an agriculturally important block of Thrissur District with 15457 ha of land under different crops. The block is rich with a livestock population of 10252 comprising of 6394 exotic cattle, 3723 indigenous cattle, 124 buffalos, 281 pigs and 62 rabbits in the block.

3.1.6. Social Indicators

Wadakkanchery block has an overall literacy rate of 86.34 per cent, with a male literacy rate of 90.41 per cent and female literacy rate of 82.71 per cent. There are 45 LP schools, 25 UP schools, 14 High schools, 1 Special school, 8 Higher Secondary schools, 2 Vocational Higher Secondary schools, 2 ITI and 1 ITC which operate for developing literacy and special skills in the people of Wadakkanchery.

The block panchayat is having very good facilities to provide medical care and maintain health of its people. It has 3 hospitals, 10 dispensaries under Allopathy, 2 hospitals and 6 dispensaries under Ayurveda and 6 dispensaries under Homeo and 21 family welfare centres in the panchayat.

There are two ST colonies with 17 families and 194 SC colonies with 5168 families in Wadakkanchery block. 21027 job cards were issued under MGNREGS out of 15 were SC, 3598 were ST and 17414 under other categories. A total of 298949 mandays of works were generated during 2010-11. There are 1682 neighbourhood groups under *Kudumbasree* with 25455 members.

There are 1372 pensioners under unemployment pension scheme, 4619 pensioners under Agricultural labourers pension scheme, 1586 pensioners under handicapped people pension scheme, 4951 people under widow pension scheme, 1026 people under old age pension scheme and 847 numbers under unmarried women pension scheme.

There are 20 commercial banks, 2 district Co-operative banks, 4 Co-operative societies, 8 service co-operative banks, 2 employment credit societies and one Kerala State Agricultural and Rural Development Bank in Wadakkanchery block panchayat.

The cultural pattern of the block is almost similar to that of state. The block has a long standing history of commercial harmony. There are 36 small and large temples, 31 Christian churches and 13 Muslim mosques and 33 public libraries with open access to all. There are 171 *anganvadies*, 6 *balavadies*, 1 rural education centre, 136 community halls, 73 sports and arts club and 2 cinema theatres which reflect the cultural strength of the block panchayat.

3.2. Sampling frame

3.2.1. Selection of the location

The Green Army Labour Bank (GALB) is a project operational in Wadakkanchery Block of Thrissur District. Hence, Wadakkanchery block has been purposively selected for the study. At present, there are 290 members enrolled in GA comprising of 164 women and 126 men.

3.2.2. Sampling Design

Respondents from four groups associated with GALB were randomly selected.

1. 40 Green Army members (GA members).
2. 40 rice farmers who have availed the service of GALB for the last two consecutive seasons.
3. 40 agricultural labourers who are not the members of GALB from the location where the Green Army operates.
4. 20 representatives comprising of officials of Agricultural Department, members of local bodies, and officials of co-operative bank in Wadakkanchery Block.

3.3. Collection of data

3.3.1. Organizational structure

The information on the organizational structure of the GALB to meet the first objective was collected from the office of the GALB at Athani, Wadakkanchery and training centre of the GALB at Aryampadam, Wadakkanchery.

For fulfilment of other objectives of the study, primary data were collected through personal interview method using suitably designed interview schedule which were pretested in pilot survey and finalized for each group, given as Appendices iii to vi.

The data for the year 2007-08 (before Green Army) and 2013-14 (after Green Army) pertaining to socioeconomic features of GA members, ordinary agricultural labourers (OAL) and beneficiary farmers were collected. The cropping pattern, details on cultivated area, cost of cultivation, wages, assets, family consumption expenditure, number of days employed, skills acquired, attitudinal changes, subsidies, insurances, trainings attended, credits availed, constraints, suggestions for improvement etc. were elicited. Opinion of the officers on the working of GALB and the suggestions for improvement, if any, also were collected.

Secondary data on population, land holding characteristics, land use, cropping pattern, social indicators etc. were collected from the statistical data published by Panchayat Level Statistics, 2011 of the Directorate of Economics and Statistics and published or unpublished documents and records of agricultural offices, *Krishibhavans*, Green Army office and other authentic sources.

3.4. Definitions, Terms and Concepts

The concepts and the operational definitions used in this study are described here. As far as possible, standard concepts and definitions have been adopted for the present study.

3.4.1. Organization

It is an entity comprising of multiple people such as an institution or association that has collective goal and is linked to external environment.

3.4.2. Organizational Structure

It is typically hierarchical arrangement of lines of authority, communication, rights and duties of an organization. It defines how activities such as task allocation, co-ordination and supervision are directed towards achievement of organizational aim (source:- www.businessdictionary.com/definition/Organizational-structure.html). In this study, the terms organisational structure and institutional structure have been used to depict similar meaning.

3.4.3. Capital

Capital is defined as that part of the person's wealth, other than land, which aids in the production of further wealth. It consists of fixed capital and working capital. Fixed capitals are the durable-use producer goods like machinery, tools, buildings etc. Working capital is the single use producer goods like raw materials (Dewett and Varma, 2004). In this study, working capital is operationalized as the service charges and contribution.

3.4.4. Agricultural labourer

It is defined as any person who worked on another person's land only as labourer, without exercising any supervision in cultivation, for wage in cash or share such as share of produce (GoI, 2001).

3.4.5. Wage

It is the reward for human exertion whether paid by hour, day, month or year and paid in cash, kind, or both.(Dewett and Varma, 2004).

3.4.6. Welfare

It is the availability of resources and conditions required for reasonably comfortable, healthy and secure living (Dong, 2007).

For the purpose of the present study welfare has been operationally defined as economic welfare and is measured in terms of per capita household consumption expenditure at constant currency value (Jacobs and Slavus, 2010).

3.4.7. Household

According to National Council of Applied Economic Research, a household is one which consists of a group of persons living together for not less than six months and taking principal meals from a common kitchen.

3.4.8. Income

Income of a household consist of (a) farm income which includes the value of crop and livestock products, receipts from the sale of farm assets; custom hire services and rent from leased out land, (b) non-farm income which includes the earning by services, business, trade, sale of non-farm assets and current borrowings received during the reference period (Prema, 1996) .

3.4.9. Family consumption expenditure

Consumption expenditure is conceived as current consumer expenditure on food, clothing, fuel and light, education, recreation, stimulants, social ceremonies etc. (SPB, 1981).

3.4.10. Savings

Saving means the excess of income over consumption expenditure or the difference between income and expenditure on consumer goods (Prema,1996). Here savings of a house hold was estimated as the difference between total income (farm+off farm) and the working expenditure on farms and consumption expenditure (Bhati et al., 1972).

3.4.11. Cost concepts

The cost concepts used in this study are

1. Variable costs

The variable costs included cost on seeds, organic manures, fertilizers, growth hormones, chemical pesticides and wages of human labour, bullock labour and machine labour.

2. Fixed cost

It includes interest on fixed capital, land revenue and rental value of land.

3.4.12. ABC cost

ABC cost concept was used to work out the cost of cultivation. The Estimation Committee on Cost of Cultivation (Government of India, 1981) has categorized farm costs into six groups viz., Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁ and Cost C₂. Cost C₃ has been added later in 1991 to account for the management

input of the farmer (Acharya and Agarwal, 2006). The various components of the above costs are outlined below.

(i) Cost A_1

Cost A_1 approximates all actual expenses in cash and kind incurred in production by the farmer. It includes the following items.

- a) Value of hired human labour and machine labour
- b) Value of material inputs
- c) Interest on working capital
- d) Land Revenue
- e) Depreciation on farm implements/machinery

(ii) Cost A_2

Cost A_1 plus rent paid for leased in land

(iii) Cost B_1

Cost A_1 plus interest on own fixed capital, including iron and wood implements, own machinery such as motors, pump sets, sheds etc.

(iv) Cost B_2

Cost B_1 plus rental value of own land plus rent paid for leased in land .

(v) Cost C_1

Cost B_1 plus imputed value of family labour

(vi) Cost C_2

Cost B_2 plus imputed value of family labour gives Cost C_2

(v) Cost C_3

Cost C_2 plus 10 per cent of Cost C_2 to account for the value of management input of the farmer.

3.4.13. Cost of material inputs

Expenditure on all material inputs like seeds and planting materials, manures, fertilizers, plant protection chemicals and soil ameliorants was estimated on the basis of actual prices paid by the sample farmers.

3.4.14. Value of human labour

Human labour was measured in terms of prevailing wage rate. In the case of ordinary agricultural labour, both hired and family labour is valued at the prevailing wage rates in the locality. For GA members their salary paid by GALB is considered.

3.4.15. Livestock maintenance

On the basis of cost of maintenance, which includes cost of green and dry fodder and concentrates, depreciation on animal and cattle shed upkeep labour charges and other expenses.

3.4.16. Interest on owned fixed capital

Interest on present value of fixed assets charged at the rate of 10 per cent per annum.

3.4.17. Interest on working capital

Interest is charged at the rate of 7 per cent per annum for the working capital of the period of crops being the interest rate charged by Peringandoor Service Co-Operative Bank for crop loan.

3.4.18. Land revenue

Land revenue was taken at the rates levied by the government.

3.4.19. Rent of own land

Estimated on the basis of prevailing rents in the village for identical type of land or as reported by the sample farmers subject to the ceiling of fair rents given in the land legislation of the State.

3.4.20. Depreciation

Depreciation was worked out by the straight-line method at the rate of 15 per cent for buildings and 10 per cent for machinery.

3.5. Analytical tools employed

Statistical tools used for the analysis of data collected are given below.

3.5.1. Tabular analysis

Collected data were presented in tabular form for easy comparison. The socio-economic characteristics of the members of Green Army, beneficiary farmers of Green Army and ordinary agricultural labourers who were randomly selected, physical and financial analysis of the implementation of Green Army were analyzed and compared using averages and percentages.

3.5.2. Paired 't' test

To study the impact of Green Army on income, consumption expenditure and labour use pattern before and after operation of Green Army paired 't' test was used.

$$t = \frac{\sum d}{\sqrt{\frac{n(\sum d^2) - (\sum d)^2}{n-1}}}$$

Where, d = difference between the observations
 n = number of paired observations

3.5.3. Deflator factor

The data on expenditure and income were analyzed at the current price and constant price by taking account the deflation factor which is the ratio of Consumer Price Index (CPI) of the base year 2005 and the respective years.

The CPI for Thrissur District is as follows

Table 3.3. Consumer Price Index of relevant years

Year	CPI
2005	120
2008	144
2014	239

Source: <http://www.ecostat.kerala.gov.in/index.php/cp-index.html>

$$\text{deflator factor} = \frac{\text{CPI base year}}{\text{CPI reporting year}}$$

Deflator factor₂₀₀₈ (Before GA) = 0.833

Deflator factor₂₀₁₄(After GA) = 0.502

3.5.4. Analysis of Micro-determinants of household welfare

The methodology of Wodon (1999) was adopted to measure the change in household welfare of the GA members. The determinants of household welfare was established through the multiple regression,

$$\log Y_i = \beta_i X_i + u_i$$

where $\log(Y_i)$ is the logarithm of real expenditure per household; and X_i 's are categorical variables representing characteristics of household which likely affect the expenditure per household.

The variables are,

Y = Total monthly consumption expenditure

X_1 = Gender {Male = 1; Female = 2}

X_2 = Economic category {BPL =1; APL = 2}

X_3 = Social Category {SC =1; ST = 2; OBC = 3; GEN = 4}

X_4 = Education {Illiterate = 1; Primary = 2; Upper Primary = 3; High School = 4; Higher Secondary = 5}

X_5 = Age of the GA members

X_6 = Family size of the GA members

X_7 = Wages/month received by the GA members

X_8 = Number of trainings attended by GA members

X_9 = per month contribution to outstanding loan

X_{10} = Empowerment*

X_{11} = Number of employment days per month

X_{12} = Savings per month

X_{13} = Dummy variable denoting the status as 'before GA(0) and after GA(1)'.

*Empowerment of GA member is captured as the sum of five statements such as improvement in self-confidence, thrift habit, social consciousness, general awareness about development programmes, and team work constructed for the purpose and assigning equal weights to them as $\sum_{i=1}^5 \frac{1}{5} A_i$.

Where, A_i are the attributes of empowerment

3.5.5. Attitude towards Green Army

Change in attitude as perceived by the farmers towards Green Army and mechanization was measured using a scale adapted from Likert Summated rating method (Likert, 1932). Thirteen major dimensions that reflected the perceived disposition of user-farmer towards Green Army and its activities were selected. The selection was based on review and delineated through expert rating. These included 2 negative statements and 11 positive statements. The scoring was done on a five point continuum ranging from 1-5 (Strongly disagree, Disagree, Undecided, Agree, Strongly agree) for positive statements and the rating was reversed for negative statements (5-1). Cumulative score of each respondent for all the statements was constructed from the attitudinal scale, assigning equal weightage. The respondents were classified as low, medium and high category based on their attitude towards Green Army, as the deviation from the mean.

The analysis of the Likert scores classifies the respondents into three different groups. Low: Respondents whose total score falls below Mean total score – Standard Deviation of the total score. Medium: Respondents whose total score falls between Mean total score \pm Standard Deviation of the total score. High: Respondents whose total score falls above Mean total score + Standard Deviation of the total score

3.5.6. Garret ranking technique

Henry Garret ranking technique (Garrett, 1924) was employed to prioritise and rank the constraints faced by Green Army and the suggestions for improvement. In this technique, the respondents were asked to rank the given attribute according to the magnitude of the problem. The orders of the merit given by the respondents were converted into ranks by using the following formula.

$$\text{Percentage position} = \frac{100(R_{ij}-0.5)}{N_j} \quad \text{where, } R_{ij} = \text{Rank given for } i^{\text{th}} \text{ item } j^{\text{th}} \text{ individual}$$

$$N_j = \text{Number of items ranked by } j^{\text{th}} \text{ individual}$$

The percentage position of each rank obtained was converted into scores by referring to the table given by Henry Garrett. Then for each factor the scores of individual respondents were added together and divided by the total number of respondents for whom the scores were added. The mean scores for all the factors were arranged in the order of their ranks and inferences were drawn.

3.5.7. Kendall's coefficient of concordance (Siegel, 1992)

Kendall's co-efficient of concordance is a measure of agreement among raters.

$$\text{Kendall's } W = \frac{12S}{M^2(k^3 - k)}$$

Where W = Coefficient of Concordance

$$S = \sum R^2 - (\sum R)^2 / k$$

M = Number of respondents

R = Sum of ranks

K = Number of factors

RESULTS AND DISCUSSION

IV. RESULTS AND DISCUSSION

The data collected through the survey were subjected to statistical analysis and the results are presented under various subheadings pertaining to the institutional structure and the impact of Green Army Wadakkanchery Block Labour Bank (GALB) on labourers, farmers and rice farming.

The first session deals with the organization of GALB and its structure. In the second session the impact of GALB on the welfare of members and their socio-economic profile are dealt with. A profile of rice farming in the study area and the impact of GALB activities on the welfare of farmers and rice farming in general are discussed in the third and fourth session respectively. The fifth session deals with the responses of implementing officials and their suggestions for scaling up the activities of GALB.

The findings of study are presented under various headings.

- 4.1 Institutional Structure of Green Army
- 4.2 Impact of GALB on welfare of Green Army members
- 4.3 Impact of Green Army on the welfare of beneficiary farmers
- 4.4 Impact of Green Army on rice farming in Wadakkanchery Block Thrissur
- 4.5 Impact of Green Army on agricultural labourers who are not members of Green Army
- 4.6 Response and suggestions of the officers for improvement of GALB activities

4.1. Institutional structure and Capital Investment of Green Army Wadakkanchery Block Labour Bank (GALB)

4.1.1 Formation of Green Army

Green Army Wadakkanchery Block Labour Bank (GALB) was formed as a skilled labour bank with the intention of improving agricultural production and productivity by reducing the constraints faced both by farmers and agricultural labourers in Wadakkanchery Block of Thrissur District by facilitating the linkage among labourers, farmers and development agencies. GALB started functioning as per the order number 1379/08 dt.15-09-2008 of Government of Kerala and registered under the Travancore Cochin Literary, Scientific and Charitable Societies Act, 1955 in 2010.

The membership of GALB is opened to the marginal farmers and agricultural labourers aged more than 18 years residing in the jurisdiction of Wadakkanchery block panchayat. After intensive training to the members by Food Security Army (FSA) of Kerala Agricultural University (KAU), groups were formed, leaders were identified and key staffs were appointed.

For the promotion of developmental activities and transfer of knowledge to the farmers and labourers, involvement of the three tier panchayat system, Maithri- a professional NGO in Palakkad and KAU were sought. Wadakkanchery Block panchayat has taken the lead role in implementation; Maithri was engaged in planning processes and KAU in giving training to Green Army members.

Active involvement of various agencies such as Department of Agriculture for sharing expertise and to facilitate supply of seed, fertilizers, bonus etc. to the farmers, Dept. of Rural Development to facilitate association of MGNREGS with GALB, Irrigation department to facilitate irrigation development in the area, Civil Supplies department to facilitate procurement of rice, Co-operative Banks for

financing and procurement of rice and Public media for promotion of the activities were ensured.

The GA members were trained and equipped to handle machinery such as tractor, tiller, transplanter, cono-weeder, reaper, combine harvester, winnower and bailer. At present there are 290 members enrolled in GA comprising of 164 women and 126 men.

4.1.2. Logo of GALB

Fig. 2. Logo of Green Army Labour Bank



The logo depicts the role and importance of men and women labourers and farmers in enhancing agricultural productivity and production in Wadakkanchery block panchayat.

4.1.3. Objectives of Green Army Labour Bank

As per the bylaw GALB is bound to operate to achieve the objectives depicted in the order no. 1379/08 dated 15.09.2008 Government of Kerala to improve the agriculture production and productivity. The main objectives are,

1. To take up the schemes with similar objectives of Central State and local Governments

2. To initiate and implement programs to improve agricultural productivity and production in the Block Panchayat
3. To act as a skilled bank in order to solve labour problems in the farming sector
4. To conduct awareness programs among the members to improve sincerity and dedication with the cooperation of the three tier Panchayats and Krishibhavans
5. To conduct trainings on the working and maintenance of agricultural machineries so that the farmers may get greater labour output in farming operations
6. To form labour bank to provide agricultural labourers to the farmers as per the instructions and restrictions of the block level high power committee
7. To implement programs to attract younger generations to agriculture
8. To engage in volunteer work in the developmental programs of the Panchayat
9. To help the farmers to make farming profitable in all ways
10. To strengthen the farmer-labourer relations and make a permanent solution to resolve dispute among them
11. To depute GA members to neighbouring Panchayats and institutions to provide farm labour

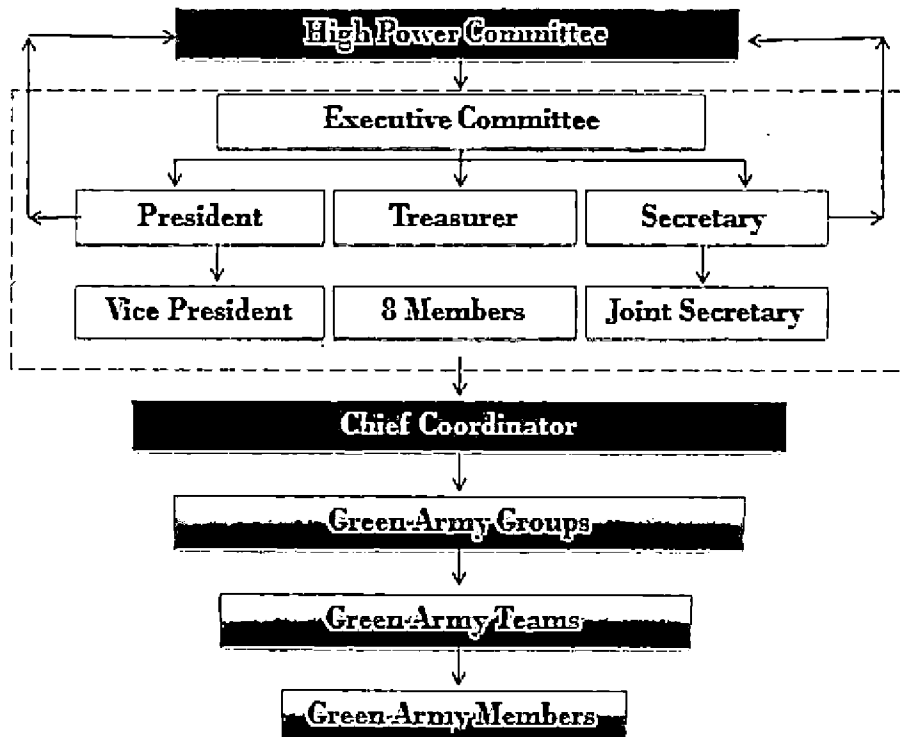
4.1.4. Organizational structure

GALB is functioning on a six level hierarchy system in the order of High power committee, Executive Committee, Chief coordinator, Green Army Group, Green Army Team and Green Army Members. The schematic presentation of the organizational structure is given in Fig 3.

4.1.4.1. High power committee

The high power committee consists of 10 members, viz. current president and vice president, ex-president and ex-vice president of Wadakkanchery block panchayat, Assistant Director of Agriculture of the Block, President of Peringandoor Service Co-operative (PSC) Bank, elected President and Secretary of GALB and two experts. At present the experts are Dr. U. Jayakumaran, Professor and Head, ARS, Mannuthy, KAU and Sri. Vinod Kumar K. Director, Maithri (NGO), Palakkad. The committee fixes up the guidelines and labour norms for the successful working of the GALB from time to time.

Fig. 3. Organizational structure of Green Army Labour Bank, Wadakkanchery



4.1.4.2. Executive committee

The Executive Committee consists of 13 members; the elected President, Vice President, Secretary, Joint Secretary, Treasurer and 8 members of GA. The term of the committee will be one year and need to have a committee meeting once in a month.

4.1.4.3. Chief Coordinator

Chief Coordinator oversees the activities of GALB and effectively coordinates the works through the administrative staff. Shri. Anoop Kishore President, Peringandoor Service Co-operative bank is the present Chief Coordinator elected by the Green Army members.

4.1.4.4. Green Army Group

One group consists of five teams. The group leader is the link between the GA leadership and farmers through Green Army Team. He is responsible for getting issued and giving back the machinery and implements in good condition. Allotment of teams to different farmers/fields as required, maintenance of attendance, distribution of salary to team members, overall supervision, appropriate intervention to finish work in time and achieving the target to the satisfaction of the farmers are also coming under his purview.

4.1.4.5. Green Army team

A team consists of five Green Army members with a team leader, deputy leader and three helpers which is the basic unit of operation in the rice field. The number of teams operating in one field may vary depending up on the field size. One team should finish the mechanical transplanting at a rate of 2.5 acres per day.

4.1.4.6. Green Army Members

Individual Green Army Member is the basic unit, which form the team. Leaders at different levels are selected by the leadership from the members based on their skill, caliber and performance. There are 164 female and 126 male members in the green army.

4.1.5. Capital Structure

The capital structure is how a firm finances its overall operations and growth by using different sources of funds.

4.1.5.1. Sources of funds of GALB

The GALB being a non-profit organization which is funded mainly by local self-government organizations capital involves no external borrowings or debts. The two components of the capital involved in the organizational financial structure is as follows.

4.1.5.2. Fixed capital

The GALB does not own any land or building but have three functional units taken on monthly rent, an office, a garage for machinery and a training centre with 5 acres of land accessible for conducting practical and farm activities. They do not own machineries, but are only the custodian of machinery.

The ownership of the assets of GALB is entrusted with the Executive Committee. New assets created will be in the joint ownership of the President and Secretary under the period of effect. In any case if GALB cease to function, the assets left will be gone to the Government or Block Panchayat and members will cease to have claim on the asset.

The total value of the machinery worked out to Rs.152 lakhs. The fixed capital sources are given below.

- (i) Of the machinery 52 transplanters, combine harvesters and bailers were supplied by village, block and district panchayats using State Plan Fund and fund from RKVY (Rashtriya Krishi Vikas Yojana), and 15 transplanters were supplied by Peringandoor Service Co-operative Bank.
- (ii) The membership fee at the rate of Rs.1,000 per member also forms a part of the fixed capital which is deposited in the bank.

Table 4.1. Machinery and Equipment

SI No	Item	No. of units	Cost (lakh Rs)
1	Trans planter	67	97.15
2	Combine harvester	2	48.00
3	Bailer	2	4.00
4	Computer	3	1.00
5	Xerox machine	1	1.00
6	Furniture and accessories	-	0.85
Total			152.00

4.1.5.3. Working Capital

The sources of working capital are

1. Annual subscription of Rs.120 each and Rs.5 each as contribution for those days he/she works.
2. Service charge for machinery from farmers: The present rate of service charge of mechanical transplanting is Rs.3,500 and Rs.4,000 per ha

respectively, within Wadakkanchery Block and outside the Block and Rs.2,000 per hour for combine harvester.

3. Earnings from sponsored trainings conducted by GALB.
4. Grants, subsidies, loans and financial aids from Central, State and local governments.

4.1.6. Expenditure and income of GALB

Working capital of GALB is mainly used for paying the salary of GA members, maintenance of machinery and other official expenses. The data collected from the latest Income Statement of GALB (year ending 31.03.2014) shows the summary of expenses and income (Tables 4.2 and 4.3).

Table 4.2. Income received during the financial year ending 30.03.2014

SI No	Income	Amount (Rs.)	Percentage
1	Service charges from farmers	95,37,921	85.50
2	Income from filling grow bags	2,74,236	2.46
3	Insurance premium	1,09,520	0.98
4	Interest on deposit/investment	80,133	0.72
5	Vegetable sale	6,37,935	5.72
6	Trainings	4,44,347	3.98
7	Subscription	67,893	0.61
8	Scholarship	3,600	0.03
Total		1,11,55,585	100.00

Table 4.2 shows that 85.50 per cent of the total income for the financial year 2013-'14 was from service charges for transplanting and harvesting obtained from farmers. The other sources of income are sale of vegetables produced by GA

members, income from trainings sponsored by Coconut Development Board (CDB) and *Mahila Kisan Sashaktikaran Pariyojana* (MKSP), and rewards for filling grow bags for the Department of Agriculture which contributed 5.72 per cent, 3.98 per cent and 2.46 per cent, respectively.

Table 4.3 shows that the total expenditure incurred during the financial year 2013-'14 was Rs.1,10,62,865. Out of this 72.06 per cent was spent on wages and incentives to the GA members. The other main items of the expenditure included expenses towards staff welfare fund contribution, fuel and rent, office salary, establishment expenses, program expenses, and repairs and maintenance which were 7.80 per cent, 5.49 per cent, 5.12 per cent, 3.55 per cent, 2.65 per cent and 2.50 per cent, respectively, of the total expenditure made. The excess of income over expenditure was Rs.92,720.

Table 4.3. Expenditure of GALB during the financial year ending 31.03.2014

SI No	Expenditure	Amount (Rs.)	Percentage
1	Office salary	5,66,500	5.12
2	Establishment expenses including printing expenses, electricity charges, postage etc.	3,92,209	3.55
3	Programme expenses	2,93,180	2.65
4	Staff welfare fund contribution	8,62,595	7.80
5	Wages and incentives	79,71,637	72.06
6	Interest on deposit loan	33,599	0.30
7	Medical expenses	58,840	0.53
8	Repairs and maintenance	2,76,709	2.50
9	Fuel expenses and rent	6,07,596	5.49
Total		1,10,62,865	100.00

4.1.7. Benefits to the rice farming sector and farmers

1. Formation of a calendar for Agricultural operations

Preparation of a cropping calendar for *Virippu*, *Mundakan* and *Puncha* seasons and for different operations like land preparation, irrigation, transplanting, harvest on scientific basis has helped farmers to avail the benefit of irrigation system scientifically, distribution of farm activities and ultimately to improve the productivity.

2. Supply of finance

Rs. 50,000 will be given as revolving fund to each field collective of the block from the Plan Fund of the block panchayat through the joint account of the Agricultural officer and the Secretary of the Field Collectives' Committee. The amount will be used for the initial common cultivation activities (ploughing, cost of seed etc). The additional amount needed for such common activities will be given by the Peringandoor Service Co-operative bank as interest free loans to the field collectives.

After the harvest the produce is usually disposed by selling it to the Civil Supplies Corporation at the procurement price declared by the State Government (Rs.19/kg). Normally the payment will be delayed. At that instance the farmers can pledge the receipt to the Peringandoor Service Co-operative bank and get 80 per cent of the amount. The balance 20 per cent will be given when the Civil Service Corporation clears the sale by giving the amount. The farmers need not give any amount to the advance payment by the bank.

3. Increase in area under rice farming

A drastic reduction in the area under rice cultivation was recorded in Wadakkanchery block over the last decade. The area under rice has reduced from 4172 hectares in 1996 to almost 2500 hectares in 2005. The intervention of GALB was having a major role in creasing the rice area. The area has gradually increased to 3160 hectares in 2009-'10 and 4559 hectares 2010-'11. Another important observation is that an additional area of 320 hectares have been brought under cultivation in *puncha* season in 2010-'11(Table 4.4)

Table 4.4. Rice area of Wadakkanchery block after GA interventions

Panchayat	2009-2010 (area in ha)				2010-2011 (area in ha)			
	<i>Viri ppu</i>	<i>Mund akan</i>	<i>Pun cha</i>	<i>Tot al</i>	<i>Viri ppu</i>	<i>Mund akan</i>	<i>Pun cha</i>	<i>Tot al</i>
Veloor	127	320	0	447	177	396	0	573
Varavoor	86	220	0	306	144	323	0	467
Thekkumkara	124	306	0	430	150	400	240	790
Mundathicode	97	295	0	392	246	412	0	658
Mulloorkkara	65	122	0	187	121	168	0	289
Kadangode	109	280	0	389	122	320	0	442
Erumapetty	103	315	0	418	160	403	0	563
Desamangalam	84	205	0	289	109	260	25	394
Wadakkanchery	93	210	0	303	65	263	55	383
Total	888	2273	0	3161	1294	2945	320	4559

(Source: GALB office records)

An analysis of the situation in the Wadakkanchery block showed that leasing of rice, land which was not cultivated in the earlier seasons, has also been started and a new Coleus – Rice system is wide spreading in Wadakkanchery block, particularly in Ambalapuram region (Sachu, 2015). An area of about 300 acres is being cultivated with Coleus in *Virippu* season in the leased-in fallow lands. This is also

due to the intervention of GA in rice farming which made rice farming easier and out of risk factors.

4.1.8. Other associated benefits

Farming operations in the peak seasons of labour requirement such as transplanting and harvesting is taken care of by the mechanical means provided by the GA members, so that the risk factor of labour unavailability can be minimized. All the benefits expected in the Group farming and GALASA (Group Approach for Locally Adaptable Sustainable Agriculture) such as planting in time, community nursery, same variety, revolving fund facility etc. are materialized by the GALB for the benefit of farmers. Farming in time, uniformity of planting and other scientific interventions has resulted in an average increase of 2500-3000 kg/ha which is a bonus to the farmers.

4.1.9. Basic requirements to be a GA Member

1. The member should be a card holder of MGNREGS, which ensures that the benefit of membership given to a proven agricultural labourer.
2. He/she should have completed 18 years age and an inhabitant of the Wadakkanchery Block Panchayat.
3. The member should undergo training in mechanization provided by appropriate agencies such as Kerala Agricultural University.
4. Every member should give Rs.1,000/- as registration fee and Rs.120/- as annual subscription fee.
5. Every member should remit Rs.5/- per those days he/she does work.

4.1.10. Skill development of GA members

It is mandatory that all the GA members should undergo compulsory training on mechanical rice transplanting. During initial years (2008, 2009, 2010) Food Security Army (FSA) training of 21 days offered by KAU was given to the members. Selected members were given advanced trainings on repair and maintenance of agricultural machineries and master trainings which made the members to become trainers. Now GA has developed its own training facilities where the members are given trainings.

4.1.11. Appraisal of performance of GA members

Regular appraisal of the performance of GA members is made by evaluating the response of farmers after completion of farm operations by the GA members. A copy of the performance appraisal form is given in the appendix - ii.

4.1.12. Salary structure

The structuring of pay and benefits is planned to ensure the welfare of the family of the Green Army Member.

Table 4.5. Salary structure of GALB Wadakkanchery

Sl.No.	Incumbent	Salary/month (Rs.)
1	GA members	7600
2	Deputy leader	9600
3	Team leader	12000
4	Group leader	13600

Table 4.5 shows the salary structure of GA members in different strata. A minimum of 16 working days are required for availing one month salary. In case of more than 16 working days in a particular month, the excess will be transferred to the next month's account, which may help the members to avail salary in the lean season also. If a member does job for 192 days (ie.16 days x 12 months) in an year he/she will get salary for whole year.

Table 4.6. Salary and Welfare fund disbursed by GALB (Rs. lakhs)

Particulars	2010-11	2011-12	2012-13	2013-14
Salary	43.45	77.97	71.95	79.72
Member benefit fund	4.65	2.46	1.78	8.63
Accident insurance	-	1.63	2.47	4.67
Medical expense	0.19	0.32	0.20	0.59

4.1.13. Administration

The day to day affairs of GA is monitored and facilitated by a team comprising of 7 members which include an Agricultural Officer, Accounts Officer, Co-ordinator I, Co-ordinator II, Office Assistant, Clerk I, Clerk II. The work scheduling and preparation of calendar of activities are the responsibility of the Agricultural Officer.

4.1.14. Benefits other than salary

The GALB take care of other benefits than salary for the welfare of its members. One of the features of GALB is the welfare package offered to members other than salary. They include

1. Pension

A Green Army member is eligible for pension of Rs.1,500/- month if he/she works for a minimum period of 1000 days in the Green Army. The scheme is

working on a contributory pension mode, for every working day Rs.40/- will be deducted toward pension fund; an equal amount will be credited to this fund by GALB.

2. Welfare fund

A welfare fund is also operated in Green Army on contributory mode for the purpose of availing loan by Green Army members, to be given back with interest at pre-fixed installments. For this Rs.5/- per working day will be deducted and an equal amount will be credited by GALB. The amount will be given back with interest at the time of retirement of the workers.

3. Insurance

Two types of insurance policies of LIC of India are compulsorily operated for every member on contributory basis at a premium of Rs.1,050/- per year per member on equal share basis; Rs.525/- by member and Rs.525/- by GALB.

On the event of the death of a member, his/her nominee will get Rs.50,000/- as claim. In the case of accidents, the member gets Rs.1 lakh per each organ loss and Rs.65,000 as hospital charges limited to a maximum of Rs.2 lakhs.

4. Bonus

Special schemes are operating to provide bonus based on the work output of the members and income earned by GALB. For each unit of work (*padasekharam*), if the expense is less than 60 per cent of the income (ie, amount given by the farmers as the cost for the work) 5 per cent of the income is given as bonus. If the expense is between 60 and 65 per cent, 3 per cent of income and if it is between 65 and 70 per cent, 2 per cent of the income is given as bonus to every member of the team.

5. Special fund

a. For cases not covered by insurance:

Special funds will be raised for helping GA members on an equal contribution basis by the GA members and GALB for needy members in case of hospitalization and other emergencies.

b. Educational aid for children

c. Provisions are made for distribution of scholarships or financial helps will be given for the deserved children of the members of the GALB.

6. Travelling and daily allowance

A total of Rs.100 (Rs.40 as travel expense and Rs.60 for food) is given as TA & DA to every member who is sent for work in farmers' fields.

7. Communication allowance

Team leader will be given a communication allowance of Rs.2,000 per season and a Group leader will be given Rs.100 per month for 3 months.

8. Gifts at special occasions

Rs.1,000 as *vishukkaineettam* and a *saree* for woman member and a *kodimundu* for male member at Onam is presented every year.

4.1.15. Income

1. Service charge of transplanting using transplanter
2. Service charge of operating harvesters
3. Service charge of using conoweeders and other implements
4. Earnings from bank interest
5. Earnings from annual subscriptions

6. Earnings from conducting trainings (Trainings are conducted by GALB for members of *Mahila Kisan Sashaktikaran Pariyojana* (MKSP) sponsored scheme under NRLM (National Rural Livelihood Mission), on ‘coconut climbing’ sponsored by Coconut Development Board and on ‘Bio-products to farmers’ sponsored by the Department of Agriculture.

The income of GALB for the years 2010 to 2014 is presented in Table 4.7.

Table 4.7. Income particulars of GALB

Sl no	Year	Income (Rs)
1	2010-11	66,78,781
2	2011-12	1,06,67,571
3	2012-13	1,11,64,505
4	2013-14	1,11,55,585

4.1.16. Operational Cost of GA

1. Salaries to members and administrative staff
2. Contribution to PF, welfare fund, insurance, TA/DA of members and office staff and other beneficiary funds
3. Rent paid for buildings
4. Expenses towards medical claim
5. Expenses towards printing and stationaries
6. Expenses towards telephone and postage
7. Expenses towards trainings
8. Expenses towards food, refreshments and fuel charges
9. Expenses towards repair and maintenance of machines
10. Expenses towards boards and exhibits and uniforms

11. Five per cent of the profit to block panchayat

12. Depreciation

4.1.17. Intervention of GA in rice farming

A steady increase is observed in the activities of GA over the years. The number of field collectives where GA extended its service increased from 52 in 2010-'11 to 125 in 2013-'14. The area where mechanical transplanting was done increased from 2897 ha to 4837 ha from 2010-'11 to 2012-'13, showing a 67 per cent increase. The amount earned as income increased from Rs. 66.79 lakhs to 111.64 lakhs (Table 4.8) during this period.

Table 4.8. Intervention of GA in rice farming

Year	Field collectives	Area (hectares)	Income(lakhs)
2010-11	52	2897	66.79
2011-12	97	4218	106.67
2012-13	117	4837	111.64
2013-14	125	2898	111.56

(Source: GALB office records)

4.2. Impact of Green Army Labour Bank on welfare of Green Army members

To assess the impact of GALB on the welfare of its members, forty members were randomly selected and interviewed. The socio-economic parameters of the members, their income, expenditure and savings pattern, and the constraints faced by them were collected and analyzed. The results obtained are furnished below.

4.2.2. Socio-economic profile of GALB members

The socio-economic characters of the GA members are presented in Table 4.9. Out of the 40 respondents randomly selected, 80 per cent were females. Though

discrimination between male and female agricultural labourers were reported, study conducted by Devi (2012) on the gender discrimination in wage structure and employment has revealed narrowing disparities due to social and technological interventions.

Table 4.9. Socio-economic characteristics of GA members

SI No	Particulars	Number	Percentage
1. Distribution of respondents based on age			
1	<30 Yrs	0	0.00
2	30-39 Yrs	9	22.50
3	40-49 Yrs	19	50.00
4	50-59 Yrs	6	15.00
5	>60	5	12.50
	Total	40	100.00
2. Classification of respondents based on gender			
1	Male	8	20.00
2	Female	32	80.00
	Total	40	100.00
3. Distribution of respondents based on caste			
1	SC/ST	5	12.50
2	OBC	26	65.00
3	General	9	22.50
	Total	40	100.00
4. Distribution of respondents based on education status			
1	No schooling	0	0.00
2	Up to 4 th	4	10.00
3	Up to 7 th	8	20.00
4	Up to 9 th	4	10.00
5	SSLC and above	24	60.00
	Total	40	100.00
5. Classification of respondents based on economic category			
1	APL	18	45.00
2	BPL	22	55.00
	Total	40	100.00

6. Classification of respondents based on family size			
1	Small	10	25.00
2	Medium	28	70.00
3	Large	2	5.00
	Total	40	100.00
7. Classification of respondents based on house price (lakh Rs.)			
1	<2.5	16	40.00
2	2.5-5	17	42.50
3	5-7.5	5	12.50
4	>7.5	2	5.00
	Total	40	100.00

Sixty five per cent of the GALB members belonged to OBC and 12.5 per cent belong to SC and the rest under general categories. Their age varied from 33 to 67. No GA member was below 30 years and 50 per cent of the respondents belonged to the age group of 40 to 49 years. Though the members have to work with machineries like transplanter, 12.5 per cent of the total members were above 60 years old. Twenty two and a half per cent of the beneficiaries were between 30 and 39 years old, a trend normally not seen in labour situations in Kerala.

All members were found to have school education and 60 per cent were having education at SSLC level or more. Devi (2012) reported that the members of Food Security Army are giving membership to educated youth. However, Seenath (2013), while studying the impact of MGNREGS on the agricultural labour market in Palakkad, reported that only 12.5 per cent of the MGNREGS beneficiaries had education above SSLC and 25 per cent were illiterate.

The size of house ranged from 400 to 1450 sq. ft. Only 22.5 per cent members were having house of size less than 600 sq.ft. Forty per cent of them had relatively large houses having area more than 800 sq. ft. The present market value of their houses ranged from 0.9 to 10 lakh rupees. The house size was moderately large

for 62.50 per cent which ranged from 600 to 1000 sq. ft. The houses owned by 62.5 per cent of the GA members were concrete while the rest were tiled.

Only 5 per cent people were having house costing more than Rs.7.5 lakhs and 40 per cent were having house costing less than Rs.2.5 lakhs. There was more or less equal distribution of green army in APL and BPL categories.

4.2.2.1. Occupational profile of GA members

Table 4.10 Details of GA members going for other jobs

Sl.no	Work	Number	Percentage (out of 40)
1.	Agricultural works	26	65.00
2	MGNREGS	24	60.00
3	Own Farming	5	12.50
4	Household works	4	10.00
5	Quari works	2	5.00
6	Masonry works	3	7.50

A detailed analysis of the data elicited from GA members (Table 4.10) revealed that 65 per cent of the members are also going for agricultural works, 60 per cent for MGNREGS, 12.5 per cent for own farming, 10 per cent for household works, 5 per cent for work in quarries and 2.5 per cent each for Ferro cement, masonry and slab works to earn wages apart from salary from GA.

4.2.2.2. Pattern of employment of GA members

One of the objectives of formation of GA was ensuring the provision of maximum number of labour days with reasonable wage and working condition in

addition to the works available to the labourers in Wadakkanchery block. Insistence of job card in the MGNREGS for GA membership was with the intention of giving the membership only for a genuine agricultural labourer.

Table 4.11. Pattern of employment of GA members

Sl. No.	Particulars	Number of employment days		Percent change
		Before GA	After GA	
1	Farm-working outside GALB	78	58	-25.64
2	Farm-working through GALB	0	76	-
3	MGNREGS	65	60	-7.69
4	Others	61	31	-49.18
	Total	203	225	10.84

Table 4.11 shows that average number of working days of 203 per year before joining GA was significantly increased to 225 after joining GA which might significantly increase the annual wages/income of the members.

There was a decrease of 25.64 per cent in agricultural works other than those obtained through GALB, 7.69 per cent in MGNREGS works and 49.18 in other works mainly related to construction in the employment days of GA members.

4.2.2.3. Annual income of the GA members

The wages the GA members realized from various works such as agricultural works, construction works, MGNREGS works and GA works constituted his/her annual income.

Table 4.12. Distribution of GA members in different income groups

Income groups	Before GA		After GA	
	Number	Percentage	Number	Percentage
<50000	23	57.50	5	12.50
50001-100000	10	25.00	21	52.50
100001-200000	6	15.00	12	30.00
200001-300000	1	2.50	1	2.50
>300000	0	0.00	1	2.50
Total	40	100.00	40	100.00

The distribution of GA members based on their annual income is shown in the Table 4.12. More than 80 per cent of the GA members were having an annual income between Rs.50,000 and Rs.2,00,000. Only 5 out of 40 members were having an annual income less than Rs.50,000 and two were having more than Rs.2,00,000.

Table 4.13. Annual income of GA members

Period	At current price		At constant price		CV(%)
	Income (Rs.per year)	Per cent change	Income (Rs.per year)	per cent change	
Before GA	59993	58.19	49974	-4.67	73.87
After GA	94903		47641		56.13

Out of 40 GA members, two have not earned any income as wages for employment before the advent of GA since they had not gone for any work (Appendix I, Table 1). Thirty eight members have earned income as wages from various works such as agricultural, MGNREGS, construction works, other skilled or unskilled works in the range from Rs.12,500 to Rs.2,25,000 (Appendix I- Table 1) with a mean of Rs.59,993 (Table 4.13) at current price.

The average annual income as wages has increased significantly at one per cent level of significance to Rs.94,903 at current price which showed a per cent increase of 58.19 (Table 4.13) in the range of Rs.30,000 to Rs.3,05,000 (Appendix I- Table 1) after becoming GA members. However, at constant price level there was a decrease of 4.90 per cent.

4.2.2.4. Annual family income of green army members

Twelve and a half percent of GA members were having income less than Rs.50000 per year before joining GA. However, all GA members were having annual family income more than Rs.50,000 after joining GA (Table 4.14).

Table 4.14. Distribution of GAM in different income groups based on family income

Amount (Rs.) at current price	Before joining GA		After joining GA	
	Number	Percentage	Number	Percentage
<50000	5	12.50	0	0.00
50001-100000	8	20.00	6	15.00
100001-200000	18	45.00	14	35.00
200001-300000	9	22.50	16	40.00
>300000	0	0.00	4	10.00
Total	40	100.00	40	100.00

Seventy five per cent of the GA members were having a family income between Rs.1,00,000 and Rs.3,00,000. 15 per cent of GA members were having family income between Rs.50,000 and Rs.1,00,000 and 10 per cent of GA members were having family income higher than Rs.3,00,000.

The comparison of the annual family income of labourers before and after joining GA brought out the fact the significant improvement of the family income after joining GA on current price basis could not be observed when the increase is taken at the constant price.

Table 4.15. Average Annual Family Income of GAM at constant and current prices

Period	At current price		At constant price		CV(%)
	Rs. per year	% change	Rs. per year	% change	
Before GA	139843	40.51	116489	-18.10	46.21
After GA	196490		98638		41.74

The range of annual family income of GA members before and after joining GA was Rs. 41,000 - 2,94,000 and Rs.63,000 - 3,92,000 respectively (Appendix I, Table 2). Constant price takes into account the general price level differences and is a more representative of changes. Though there was an increase of Rs.56,647 in the average annual family income on current price basis, the overall annual family income of GA members was found to decrease by 18.10 per cent in real terms (Table 4.15). This indicates that having a member in the GALB has not contributed significantly to maintain the standard of living in accordance with the hike in general price level.

4.2.2.5. Monthly family expenditure of GA members

Various items included in the family monthly expenditure were food, fuel, health, education, travel and entertainment, communication and other expenses which do not come under the above list.

Table 4.16. Distribution of GA members in different expenditure group at current price

Monthly Expenditure (Rs.)	Before joining GA		After joining GA	
	Number	Percentage	Number	Percentage
1750-3500	11	27.50	1	2.50
3501-6000	21	52.50	8	20.00
6001-8000	8	20.00	15	37.50
8001-10000	0	0.00	16	40.00
Total	40	100.00	40	100.00

The minimum and maximum monthly family expenditure of GA members before joining GA was Rs.1,750 and Rs.7,900 and after GA was Rs.3,150 and Rs.10,000 (Appendix I, Table 3). 40 per cent of the GA members were having a monthly expenditure of Rs.8,000 to Rs.10,000 while 37.50 per cent were having a monthly expenditure of Rs.6,000 to Rs.8,000 (Table 4.16). Majority of the GA members were having a higher monthly family expenditure when compared to the ordinary agricultural labourers (Refer Table 4.3).

Item wise total monthly family consumption expenditure of the GA members is presented in Table 4.17. The total expenditure for living of a GA member was increased by 54.81 per cent after joining GALB. The increase was more pronounced in the case of communication (128 per cent) followed by fuel.

Table 4.17. Monthly consumption expenditure of GA members at current price

Sl.no.	Particulars	Before GA (Rs.)	After GA (Rs.)	Per cent change
1	Food	2540	3545	39.56
2	Fuel	262	462	76.34
3	Health	244	421	72.54
4	Education	526	745	41.63
5	Travel & Entertainment	253	461	82.22
6	Communication	218	498	128.44
7	Others (Clothes, Electricity etc.)	613	1073	75.04
	Total (at current price)	4654	7205	54.81
	Total (at constant price)	3877	3617	-7.19
	Coefficient of variation(CV) %	37.35	25.37	

An average increase of 54.81 per cent of monthly family expenditure of GA members was observed after joining GALB compared to the expenditure incurred before joining GALB and it was found to be highly significant at the current price. When the expenses were expressed in constant price level, there was decrease of 7.19 per cent after GA. The results were comparable with the annual income of the GA members. When the income was reduced, the expenditure also reduced so that they could balance out their expenses to the income earned.

Monthly per capita consumption expenditure (MPCE) of the GA member is worked out to be Rs.1,164 and Rs.1,801 at current price before and after GA, respectively. According to NSSO (2008) and NSSO (2015), corresponding MPCE for households in Kerala is Rs.1,383 and Rs.3,044.

4.2.2.6. Loans availed by GA members

Out of 40 GA members, 50 per cent were having loan from commercial or co-operative banks, or SHG's like *kudumbasree* even before becoming GA members. After joining GALB also members continued to avail loans and 62.50 per cent of the members have taken loans (Table 4.18).

Table 4.18. Details of loan availed by GA members

Period	Members availed loan		Members with outstanding loan	
	No.	per cent	No.	per cent
Before GA	20	50.00	7/20	35.00
After GA	25	62.50	23/25	92.00

It's also seen that the loans were outstanding for 35 per cent of the members who have availed loans before joining GA. But after joining 92 per cent of the members who have availed loans, the loan amount was outstanding. The mean outstanding loan amount of the selected GA members was Rs.19,725 and Rs.44,925 before and after joining GA respectively.

4.2.2.7. Savings by GA members

The details of the savings by GA members are presented in the Table 4.19. Savings have been deduced from the average income and consumption expenditure of the respondents, since in most cases the savings if asked directly will be understated. Only five members out of 40 (12.5 per cent) who had any savings before joining GA. However, it has increased to 22.5 per cent after joining GA.

Table 4.19. Nominal savings of GA member

Period	Average savings
Before GA	7000
After GA	9169
Percent change	30.98

There was an increase of 30.98 per cent in the savings at current price for the members after joining GA.

4.2.3. Land ownership of GA members

Details of land owned by the GA members are presented in Table 4.20. All the GA members owned garden land. Among them 23 people were having garden land below 10 cents. Only one member was having garden land of 225 cents.

Table 4.20. Land ownership of GA members

Garden land (cents)			Wetland (cents)		
Particulars	Number	per cent	Particulars	Number	per cent
<10	23	57.50	20-30	1	8.33
10-19	9	22.50	31-40	3	25.00
20-29	2	5.00	41-59	3	25.00
30-60	5	12.50	60-69	3	25.00
>60	1	2.50	>70	2	16.67
Total	40	100.00	Total	12	100.00

Out of 40, only 12 members owned wetland, eight of them were having area more than 40 cents. One member each was having area 200 and 300 cents. The average size of garden land owned by GAM was 20.59 cents. 12 members were

having own wetlands and the average area is 79.58 cents. Out of the 40 respondent GA members, three had taken wet land on lease for rice farming after joining GALB, the average area being 1.23 acres.

4.2.4. Micro-determinants of household welfare

To study the change in household welfare of GA members before and after joining GALB, the model developed by Dong (2007), adapted from Wodon (1999) was used. Expenditure is chosen as proxy for household welfare because expenditure is a good proxy for permanent income and thus also for long-term average well-being (Balisacan et al., 2003). Moreover, data on expenditure are less difficult to gather than those on income, as individuals are reluctant to provide their income correctly. Hence in this study, per capita household expenditure is employed as an approximation for household welfare. Total household expenditure presented itself as the most important parameter to measure the household welfare dependent on various categorical variables.

Total consumption expenditure (Y) of the household (at constant price) included the expenditure on food and nonfood items, estimated value of goods owned by the household, rental value of the household, and assets owned by the household. Twelve dependent categorical variables viz. Gender, Economic category, Social category, Education, Age, Family size, wages per month received, number of trainings attended per month, contribution to outstanding loan, empowerment, number of days of employment per month, savings per month and a dummy variable denoting the status as 'before GA (0) and after GA (1)' were used.

The regression equations presented below for depicting the relationship between total monthly consumption expenditure and influencing factors showed the

significant influence of selected variables on the expenditure and consequently on the family welfare of the GA members.

The regression equation obtained is

$$\ln Y = 5.820 + 0.210X_1 + 0.255X_2^{**} - 0.026X_3 + 0.185X_4^{**} + 0.014X_5^* \\ + 0.279X_6^{***} + 0.000X_7^{**} - 0.049X_8 - 0.00003X_9^{***} + 0.153X_{10}^{**} \\ - 0.027X_{11}^* - 0.000006X_{12} - 0.654X_{13}$$

$$R^2 = 0.551$$

* - significant at 10 %, ** - significant at 5%, *** - significant at 1 per cent level

Where,

Y = Total monthly consumption expenditure

X₁ = Gender

X₂ = Economic category

X₃ = Social Category

X₄ = Education

X₅ = Age

X₆ = Family size of the GA members

X₇ = Wages per month received by the GA members

X₈ = Number of trainings attended by GA members

X₉ = per month contribution to outstanding loan

X₁₀ = Empowerment

X₁₁ = Number of employment days per month

X₁₂ = Savings per month

X₁₃ = Dummy variable denoting the status as 'before GA(0) and after GA(1)'.

The results of regression analysis showed the value of R^2 to be 0.551, denoting that 55.10 per cent improvement in welfare of the GA members could be explained by the variables included in the model, with significant contribution from economic category (APL/BPL), education, age, family size, wages per month received by the members, per month contribution to outstanding loan, empowerment and number of employment days per month. Out of these variables except 'per month contribution to outstanding loan' and 'number of employment days per month' were positively correlated to the total monthly consumption expenditure.

Anoop *et al.* (2014) who studied the impact of Labour Bank membership on the living standards of farm labourers using consumption expenditure as proxy, got the result that on an average consumption expenditure per month was higher for the members vis-a- vis non-members, which indirectly indicated that their standard of living has improved.

4.2.5. Empowerment of GA members

The empowerment of GA members was measured on five different factors which are self-confidence, thrift habit, social consciousness, general awareness about development programme and team work. The respondents were asked to rate each factor represented as Likert items using a 5 point scale indicating the degree of empowerment with score 0 being a numerical representation of very low empowerment, 1 – Moderately low, 2 - low, 3– moderately high, 4 – high and 5 – very high.

The empowerment attained by the GA members due to their association with GALB and its activities is assessed based on the perceptions of the members regarding some crucial attributes that may help in empowering them. Based on the total score, the members were categorized as having low, medium and high level of empowerment. The results are presented in Table 4.21.

Table 4.21. Distribution of respondents into different groups based on total empowerment score

Group	Number of Respondents	Percentage
Low	7	17.50
Medium	22	55.00
High	11	27.50
Total	40	100.00

Mean=19.05

SD=3.59

From the Table 4.21, it can be inferred that the membership in GA has resulted in general empowerment of the members. Fifty five per cent of the members have got moderately high (medium) empowerment and 27.50 per cent got highly empowered. Among the 40 respondents who fall in Group 2, 55 per cent had a total empowerment score more than the mean value. It can be concluded that the advent of GA has empowered the agricultural labourers generally. However, 17.5 per cent of the members were having a low empowerment.

4.2.6. Constraints faced by GA members

A total of 102 constraints were reported by 40 respondents of the GA members during the survey and after careful examination these were grouped under 12 items and is given in Table 4.22.

Rigidity with time norms was rated as the greatest constraint by the GA members, followed by drudgery in using machineries and their maintenance. As they have to travel to distant places in connection with the GALB farming activities and training, the members expressed difficulties in managing household work along with the GA activities

Table 4.22. Constraints faced by GA members

Sl.no.	Constraints	Garret score	Rank
1	Inconvenient time norms	30.43	1
2	Drudgery due to unfriendly machineries	23.15	2
3	Machinery failures while working	20.10	3
4	No continuous work opportunities	20.10	3
5	Work at faraway places from home	16.93	4
6	Improper planting due to water stagnation	15.85	5
7	Difficulty in managing household works	8.70	6
8	Difficulties due to over maturing of nurseries	4.58	7
9	Reduced group synergism	3.60	8
10	Difficulty in farming of own area	3.23	9
11	Farmers defective approach	1.40	10
12	Labour competition from migrant labourers	1.40	10

Among the constraints identified by the respondents, 6 common constraints were raised by 11 to 18 members out of the total 40 interviewed. Other constraints though suggested by lesser percentage of respondents are also felt important which may affect the success of GALB in protecting the interest of both its members and beneficiary farmers.

4.2.7. Suggestions for improvement from GA members

In order to overcome the constraints, suggestions were sought from the respondents. All together 69 suggestions were given by the respondents which are arranged under 9 groups as given in Table 4.23.

Table 4.23. Ranking of suggestions for improvement by GA members

Sl.no.	Suggestions	Garret score	Rank
1	Diversification of activities	49.48	1
2	Land leasing and farming	20.03	2
3	Rectification of mechanization related problems	14.68	3
4	Providing continuous regular job	9.50	4
5	Conduct regular refresher trainings to GA members	7.68	5
6	Strengthen group synergy of GA members	3.65	6
7	Conduct awareness programs to beneficiary farmers	3.23	7
8	Maintenance of work quality	1.10	8
9	Change working mode of GA to contract basis	1.10	8

Thirty members accounting for 75 per cent of the total respondents suggested diversification of activities in order to have continuous employment opportunities. The results revealed that even the prime objective, ie. providing at least 100 employment days for all its employees, is seen not met. By diversification of activities the members meant that the GALB to change as a labour bank, service bank and land bank instead of doing only rice farming operations. They expect the labour bank to extent the labour support for coconut, arecanut and other crops.

More than 30 per cent of the respondents suggested that the GALB should start lease farming in different seasons so that there will be continuous work for the members and higher earning of income. Procurement of women friendly implements and more efficient combine harvesters, powered cono-weeders can improve the work efficiency and reduce the drudgery.

They have also suggested strengthening of group synergy of the GA members, conduct of regular refresher trainings, and maintenance of work quality to have more acceptance from the farmers.

4.3. Impact of Green Army on the welfare of beneficiary farmers

4.3.2. Socio-economic characteristics of GALB beneficiary farmers

4.3.2.1. Personal and social characteristics

The personal profile on age, education status, caste, family size, economic and gender status of the beneficiary farmers are presented in Table 4.24.

Table 4.24. Socio-economic characteristics of user farmers

SI No.	Particulars	Number	Percentage
1. Distribution of respondents based on age			
1	<30 Yrs	1	2.50
2	30-39 Yrs	3	7.50
3	40-49 Yrs	4	10.00
4	50-59 Yrs	14	35.00
5	>60	18	45.00
	Total	40	100.00
2. Classification of respondents based on gender			
1	Male	38	95.00
2	Female	2	5.00
	Total	40	100.00
3. Distribution of respondents based on caste			
1	SC/ST	0	0.00
2	OBC	14	35.00
3	General	26	65.00
	Total	40	100.00
4. Distribution of respondents based on education status			
1	Up to 4 th	2	5.00
2	Up to 7 th	4	10.00
3	Up to 9 th	4	10.00
4	SSLC and above	30	75.00
	Total	40	100.00

5. Classification of respondents based on economic category			
1	APL	40	100.00
2	BPL	0	0.00
	Total	40	100.00
6. Classification of respondents based on family size			
1	Small (<4 members)	4	10.00
2	Medium(4-5 members)	29	72.50
3	Large(>5 members)	7	17.50
	Total	40	100.00

Eighty per cent of the beneficiary farmers were above 50 years, 56.25 per cent out of this are more than 60 years. A fact in agreement with general situation in Kerala; only less than 2.5 per cent of the farmers come in the less than 30 years which can be called as young farmers.

Seventy five per cent of them had education more than SSLC. There were no beneficiary farmers belonging to SC/ST, 65 per cent of them belonged to the general category and 35 per cent belonged to OBC. The family size was medium with 4-5 members for more than 70 per cent of the farmers. No selected farmers came under the BPL category. The head of the family was male in 95 per cent of the families.

4.3.2.2. Economic characteristics

1. Annual Income of user farmers

The annual income of the farmers at current price is presented in Table 4.2

Rigidity with time norms was rated as the greatest constraint by the GA members, followed by drudgery in using machineries and their maintenance. As they have to travel to distant places in connection with the GALB farming activities and training, the members expressed difficulties in managing household work along with the GA activities

Table 4.25 Distribution of user farmers in different income groups

Annual income at current price	Number	Percentage
<50000	0	0.00
50001-200000	12	30.00
200001-300000	12	30.00
300001-400000	8	20.00
>400000	8	20.00
Total	40	100.00
CV(%)	52.37	

Thirty per cent each of the farmers came in the categories having Rs.50,000 to 2 lakhs and Rs.2 to 3 lakhs annual income. Twenty per cent each came in the categories having annual income between 3 to 4 lakhs and more than 4 lakhs.

The annual income of the farmers ranges from Rs.75,000 to Rs.7,00,000 during the survey period (Appendix I- Table 4). Thus the distribution of farmers in various income groups shows that eighty per cent of the farmers earn an income less than Rs.4 lakh per annum (Table 4.25) and out of which 75 per cent of them are having annual income higher than Rs.1,50,000 (Appendix I- Table 5). The mean annual income of farmers was estimated to be Rs.2,73,550 at current price level and Rs.1,37,322 at constant price level.

2. Monthly family expenditure of user farmers

Table 4.26. Distribution of user farmers in different expenditure groups

Monthly expenditure at current price	Before GA		After GA	
	Number	Percentage	Number	Percentage
<3500	1	2.50	0	0.00
3501-6000	23	57.50	4	10.00
6001-8000	15	37.50	10	25.00
8001-10000	1	2.50	22	55.00
>10000	0	0.00	4	10.00
Total	40	100.00	40	100.00

The minimum and maximum monthly family expenditure of farmers before and after GA was Rs.3,200 and Rs.8,150 and after GA was Rs.4,850 and Rs.11,050 respectively (Appendix I, Table 6). Table 4.26 shows the distribution of farmers in the different monthly expenditure group. 95 per cent of the farmers were in the group spending Rs.3,500 to 8,000 per month before GA and 80 per cent were in the group spending 6,000 to 10,000 after GA.

Table 4.27. Average monthly family expenditure for GALB beneficiary farmers

Period	At current price		At constant price		CV(%)
	Rs.per Month	% change	Rs.per month	% change	
Before GA	5741	42.10	4782	-16.78	16.99
After GA	8158		4095		17.04

The mean monthly expenditure before GA was Rs.5,741 and it significantly increased to Rs.8,158 after GA at current price (Table 4.27). However, this significant increase at current price level, when compared at constant price level became significant decrease by 16.78 per cent.

Monthly per capita consumption expenditure (MPCE) of the user farmer is worked out to be Rs.1,255 and Rs.1,783 at current price before and after GA, respectively. According to NSSO (2008) and NSSO (2015), corresponding MPCE for households in Kerala is Rs.1,383 and Rs.3,044.

4.3.2.3. Land ownership

Table 4.28 contain the data on land ownership by the beneficiary farmers shows that 57.50 percentage of them were having garden land less than one acre, 37.50 per cent farmers owned garden land between one and five acres. Only 5 per cent of the farmers owned more than five acres.

Table 4.28. Details on land ownership of beneficiary farmers

Garden land (cents)			Wetland (cents)		
Area	No.	percentage	Area	No.	percentage
Landless	0	0.00	Landless	1	2.50
10-19	3	7.50	<50	5	12.50
20-49	8	20.00	50-99	13	32.50
50-99	12	30.00	100-199	15	37.50
100-199	8	20.00	200-299	3	7.50
200-500	7	17.50	300-400	3	7.50
>500	2	5.00	>400	0	0.00
Total	40	100.00	Total	40	100.00

Forty five percentage of the farmers owned less than 1 acre of wet land, 37.5 percentage between 1 and 2 acres and the rest 15 percentage owned wetland between 2 and 4 acres. There was one farmer (2.50 percent) who does not own any wet land, but having 5 acres of rice farming in leased in land.50 per cent of the farmers had

leased in land out of which 20 per cent had area between 4-6 acres and 25 per cent had area between 1 to 3 acres. Only 5 per cent farmers had less than 50 cents leased land. Large scale leasing of wet land started only after the advent of GA (Appendix I Table 10).

4.3.3. Attitude of farmers towards GA Members and mechanization

Table 4.29. Factors to measure attitude of farmers towards GA members

SI No	Factors
1	GA members are more sincere
2	GA members are strictly following time norms
3	GA members are showing good group synergy
4	GA members are keeping their promise/coming on days as promised
5	GA members are having good knowledge about cultivation practices
6	There is involvement of people from all sectors in farming after Green Army
7	GA members take initiative in crop protection and after cultivation activities
8	Farmers cultivation activities should be supported with Green Army
9	Farmers prefer Green Army to farming as Green Army has more reputation
10	Green Army works should be extended to other crops
11	There is a good scope of mechanization of fields
12	Farming is easier with machines than manual practices
13	Machine operations are more remunerative

The attitude of farmers towards GA members was measured mainly on 13 characters, 10 of them are related directly to GA members and others on mechanization in which the GA members are very much involved (Table 4.29).

The respondents were asked to score the parameters from 1 to 5 indicating the degree of agreement with score 1 being a numerical representation of strong disagreement, 2 – disagreement, 3 - undecided, 4 – agreement, 5 – strong agreement. Based on the scores obtained, the respondents were classified as low, medium and high categories based on their level of attitude towards the GA members and mechanization.

The analysis of the responses shows that (Table 4.30), while considering all the factors collectively to measure the attitude of the farmers toward GA members there is an almost equal distribution of respondents in both Low and High; and majority, 62.50 per cent of the respondents, falls in Medium. It shows that the sample of farmers under study had a mixed feeling towards GA members, without any significant skew towards any side, i.e., positive or negative.

Table 4.30. Distribution of respondents based on attitude towards GA members

Attitude level	Number of Respondents	Percentage
Low	8	20.00
Medium	25	62.50
High	7	17.50
Total	40	100.00

Mean- 52.25 SD- 3.82

There was a cent per cent agreement from the farmers' side to that, the GA members works should be extended to other crops. Also, majority of farmers (95 per cent) agreed that they prefer GA for farming operations since GA is having higher reputation. There was a complete agreement from the farmers towards mechanization on the point that farming is easier with machines than manual practices, machine operations are more remunerative and hence there is good scope for mechanization of field operations.

4.3.4. Suggestions for improvement from beneficiary farmers

The beneficiary farmers have given 122 suggestions out of their experience with GA members and those were categorized under 17 groups and evaluated by Garret Scoring Technique (Table 4.31).

The top ranked suggestion given by 57.50 per cent of farmers was acquiring and maintenance of suitable machinery, that included paddy transplanters which can plant more number of rows, and with mechanism to adjust spacing between plants and rows to keep optimum spacing suitable for different varieties and seasons, and combine harvesters which have facilities to harvest in more width and to operate under different field conditions such as water stagnation, more clay soils etc.

The second ranked suggestion was that the GA members should take up all the cultural operations in rice against the ones at present doing. Apart from transplanting and harvesting the farmers wanted the GA members to do weed control, plant protection etc. There are remarkable benefits if other works are also taken up. The operations will be more scientific and timely enhancing productivity.

Suggestion for involving more youngsters on GA members came in the third position with 27.50 per cent members presenting it, which is the need of the present, to sustain agricultural production. Farming sector in Kerala is characterized by having both aged farmers and labourers which may not result in healthy sustainable agriculture.

Diversification of activities to other crops apart from rice, contract farming, procurement and processing of rice etc. were the next suggestions proposed by a more or less similar percentage of farmers. At present only *mundakan* rice is taken by the farmers, leaving the main rice growing season *virippu* as fallow, mainly because of the difficulty in selling the grain harvested in the rainy days. If the procurement and processing of rice is done centrally by an agency, it is probable that

majority of the farmers go for *Virippu* cultivation, enhancing the cropping intensity and total production.

Table 4.31. Ranking of suggestions for improvement

Sl.no.	Suggestions	Score	Rank
1	Improved machinery should be used and maintained	36.75	1
2	All cultural operation of rice should be addressed	28.50	2
3	Involve younger people	16.13	3
4	Diversification of activities	15.88	4
5	Additional trainings should be given	12.13	5
6	More interaction of members with farmer groups	8.75	6
7	Betterment of work done	8.63	7
8	Service charge reduction and given in installments	6.50	8
9	Hierarchy should be maintained	4.00	9
10	Full payment after completion of work	3.38	10
11	Proper administration	2.25	11
12	Transportation facilities should be there	2.25	11
13	Equal responsibility and sincerity	1.88	12
14	Target should be achieved by members	1.88	12
15	Proper planning of activities	1.50	13
16	Should optimize work scheduling of GA members	1.50	13
17	Recruit new members and retain existing members	1.25	14

Some other suggestions proposed by 10 to 12.5 per cent of farmers were the need for additional training to the members, having more interaction with farmers, improvement of quality of work and reduction in service charge levied from the farmers towards the cost of mechanical transplanting and harvesting.

There were other suggestions also as shown in the Table 4.31 raised by a few members or individual farmer, all expressed with the intention of further helping Green army to improve production and productivity of rice farming, and welfare of farmers.

4.4. Economics of rice farming

4.4.2. Cost of cultivation

The cost of cultivation of rice before and after GA intervention both at current and constant price is presented in Table 4.32 and 4.33, respectively.

Against a normally anticipated decrease in the total input cost due to GA's intervention at current level, the cost increased considerably from Rs.33,440 to Rs.50,736 (51.72 per cent increase) on current price level. On the contrary Anoop *et al.*, (2014) reported a decrease in the cost of cultivation due to intervention of labour bank due to the use of mat nurseries, mechanical transplanters and reduced seed cost. However, total input cost incurred decreased from Rs.27,857 to Rs.25,470, i.e. 8.57 per cent decrease at constant price level (Table 4.33).

Table 4.32 Cost of cultivation after GA intervention at current price (Rs./ha)

Sl.no.	Particulars	Before GA	Per cent	After GA	Per cent
1	Land Preparation	5258	15.67	9185	18.03
2	Seed	1517	4.52	2360	4.63
3	Nursery Preparation	319	0.95	689	1.35
4	Transplanting/sowing	3421	10.20	8000	15.71
5	Weeding	4954	14.77	2378	4.67
6	Organic manure	1294	3.86	1556	3.05
7	Lime, fertilizer application	5058	15.08	9996	19.62
8	Water Management	1685	5.02	2339	4.59
9	Plant protection	2176	6.49	3033	5.95
10	Harvesting	6372	19.00	4633	9.10
11	Post-harvest operations	1112	3.31	1246	2.45
12	Straw collection (baling)	274	0.82	5321	10.45
	Total	33440		50736	
13	Land Cess	105	0.31	200	0.39
14	Interest on WC	2348	-	3564	-
	Cost A1	35893	-	54500	-
	Cost C3	62639	-	84288	-

Since cost of labour constitute the major portion of total costs in rice farming, and GA's main intervention was in enhancing labour output through mechanization, the economic analysis become important. The increase in the cultivation cost at current price level is mainly brought in by costs involved in land preparation, transplanting/ sowing, lime and fertilizer application and straw baling as revealed by the per cent change in costs over the ones in rice cultivated before the formation of Green Army.

Table 4.33. Cost of cultivation after GA intervention (Rs/ha) at constant price

Sl.no.	Particulars	Before GA	After GA	Per cent change
1	Land Preparation	4380	4611	2.36
2	Seed	1264	1185	0.11
3	Nursery Preparation	266	346	0.40
4	Transplanting/sowing	2850	4016	5.51
5	Weeding	4127	1194	-10.10
6	Organic manure	1078	781	-0.81
7	Lime, fertilizer application	4213	5018	4.54
8	Water Management	1404	1174	-0.43
9	Plant protection	1813	1523	-0.54
10	Harvesting	5308	2326	-9.90
11	Post-harvest operations	926	625	-0.86
12	Straw collection (baling)	228	2671	9.63
	Total	27857	25470	-
13	Land Cess	87	100	0.08
14	Interest on working capital	1956	1789	-
	Cost A1	29900	27359	-
	Cost C3	52178	42313	-

Two types of works are involved in land preparation. One is clearing, strengthening and plastering of bunds, digging corners and sides of the fields, and the other is ploughing, puddling and leveling of fields. The latter is done mechanically by tractor even before the GA interventions. Mechanical transplanting warrants

thorough land preparation and perfect leveling and a 2.36 per cent more cost is incurred for this item. Small increase in the nursery cost is due to the added cost of polythene sheet required for mat nursery.

There was a 5.51 increase in the transplanting/ sowing cost which can be explained by data given in Table 4.34.

Table 4.34. Type of seeding adopted by beneficiary farmers

Type of seeding	Before GA		After GA	
	Number	Percentage	Number	Percentage
Manual Transplanting	18	45.00	0	0.00
Mechanical Transplanting	0	0.00	38	95.00
Direct sowing	21	52.50	2	5.00
No Cropping	1	2.50	0	0.00
Total	40	100.00	40	100.00

Out of 40 beneficiary farmers, one had no rice cultivation before GA intervention. From the remaining 39 farmers, 18 had gone for manual transplanting which incurred a minimum of Rs.10,000/ha and 21 farmers had gone for direct sowing which incurred only Rs.800/ha. After GA intervention 38 farmers had gone for mechanical transplanting and two farmers had gone for manual transplanting. If manual transplanting and mechanical transplanting are compared, it will cost a minimum of Rs.10,000/ha for manual and a maximum of Rs.8,750/ha for mechanical transplanting. Weed control cost was reduced by 10.10 per cent when it changed to chemical weed control after GA intervention. The fertilizer application cost was increased by 4.54 per cent since the good crop after GA intervention warranted high fertilizer dose. A 9.90 per cent decrease in harvesting cost was resulted due to

mechanical harvesting under GA. However, a 9.63 per cent additional cost was incurred for straw bailing after GA intervention.

4.4.3. Income at various cost concepts

Gross income from rice farming included the value of grain and value of straw. Before the formation of green army the price of 1 kg rice was Rs.12/kg (2 farmers sold grain at Rs.14/kg. to private agencies) and after GA formation it was Rs.19/kg as per the rate fixed by the Government to buy the rice from farmers by the Department of Civil Supplies. Before GA since no bailers were available and the drying and collection of straw was a difficult and costly operation it was being sold in the field itself at very low price. After the formation of Green Army bailers are used to gather and make bundle at a rate 25-35 per bundle and sold at Rs.60-85 per bundle and the straw yield ranged from 180-250 bundles per ha. The average gross income per ha realized by the farmers before green army was Rs.57,286 at current price level. The estimation of income at current and constant price level is presented in table 4.35.

The yield of grain and straw and their value at current and constant price, before and after operation of green army is presented in Table 4.35. The grain yield was increased by 2432 kg/ha due to the intervention of Green Army in rice farming operations. The increase in value of grain was Rs.74,372 per ha at current price basis and Rs.20,332 per ha at constant price basis. This increase is resulted by both an increase in grain yield and increase in price per kg of rice existed before and after the formation of green army as already discussed. An increase of Rs.9,524/- has been there in this increase in the value of straw, at current price basis. The increase in gross income per ha was Rs.83,896 at current price basis and Rs.23,154/- at constant price basis after GA intervention.

Table 4.35. Economic analysis of rice cultivation

Particulars	Before GA		After GA	
	Current Price	Constant Price	Current Price	Constant Price
Grain Yield (kg per ha)	4249		6681	
Value of Grain(Rs.per ha)	51369	42790	125741	63122
Value of Straw(Rs. per ha)	5917	4929	15441	7751
Gross income(Rs. Per ha)	57286	47719	141182	70873
Cost A1 (Rs perha)	35893	29900	54500	27359
Cost C3 (Rs per ha)	62639	52178	84288	42313
BCR at Cost A1	1.60		2.59	
BCR at Cost C3	0.92		1.68	

The BC ratio of rice farming by the beneficiary farmers before and after GA intervention is presented both in the Table 4.35 estimated for different costs. B:C ratio at Cost A₁ was only 1.60 before the advent of GA which increased to 2.59 with an increase of 61.88 per cent after GA. At Cost C₃, which took account of the costs involved towards rent on land, either own or leased or both and imputed value of family labour and management cost, the B:C ratio was only 0.92. However after GA intervention this has increased to 1.68, a 82.61 per cent increase which shows that rice farming has elevated to an agri-business rather than a way of living after the intervention of GA.

The observed BC ratio of 1.60 at cost A₁ is in agreement with the BC ratios reported for rice in different regions and situations. Seenath (2013) has reported an increasing BC ratio over years in Palakkad region of Kerala, 1.44 during 2005-06 and 1.69 in 2011-12. Sarvar *et al* (2013) reported BC ratio of 1.39 for aerobic rice

which increased to 1.89 for flooded rice in Fasiabad. Radhika (2014) has observed BC ratio of 1.14 for traditional rice against 1.26 for high yielding rice in *Kaippad* cultivation.

4.4.4. Human labour utilization in paddy cultivation

Notable difference in labour utilization was observed between before and after GA intervention in rice farming in Wadakkanchery block. The total labour days which include both hired and family labour was 195 for various cultural operations in rice before GA against 87 after GA which showed a 55.38 percentage decrease in the total labour requirement per season (Table 4.36).

Table 4.36 Operation wise labour requirement in paddy

Cultural operation	Labour used before GA					Labour used after GA				
	(labour days/ha)					(labour days/ha)				
	Hired		Family		Total	Hired		Family		Total
	M	F	M	F		M	F	M	F	
Land Preparation	6	3	11	2	22	6	3	11	2	22
Organic manure	1	4	3	2	10	1	4	3	3	11
Seed	0	0	1	0	1	0	0	1	0	1
Nursery Preparation	2	2	2	1	7	1	2	2	1	6
Transplanting/sowing	1	33	2	1	37	0	0	1	1	2
Weeding	1	31	4	5	41	2	3	2	4	11
Lime and fertilizers	2	1	2	0	5	2	0	2	0	4
Water Management	6	1	7	0	14	6	0	7	0	13
Plant protection	1	0	2	0	3	2	0	2	0	4
Harvesting	1	35	2	2	40	1	0	1	0	2
Straw bailing	1	2	2	2	7	1	1	1	1	4
Post-har. operation	2	2	2	2	8	2	2	2	1	7
Total	24	114	40	17	195	24	15	35	13	87

labour saving has been taken place during GA intervention. Further analysis of the Table 4.36 will show that the hired labour has been reduced from 138 in the before GA and to simply 39, while the family labour remaining without much variation at 57 and 48 before and after GA intervention.

4.5. Impact of Green Army on agricultural labourers who are not GA members

4.5.1. Socio-economic characteristics of Ordinary Agricultural labourers

4.5.1.1. Land Ownership

Eighty two per cent of the ordinary agricultural labourers(OAL) were having garden lands less than 20 cents, almost half of them having only less than 10 cents (Table 4.37).

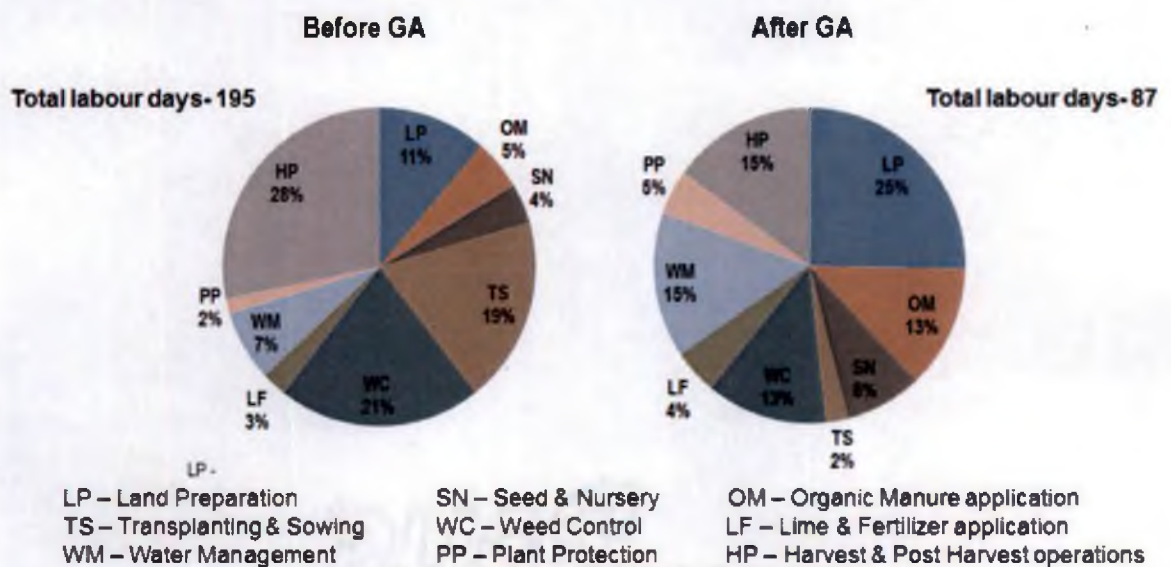
Table 4.37. Details on land ownership of ordinary agricultural labourers

Garden land (cents)			Wetland (cents)		
Particulars	No	per cent	Particulars	No	per cent
0	1	2.50	0	39	97.50
1-9	16	40.00	1-9	0	0.00
10-19	17	42.50	20-39	0	0.00
20-29	2	5.00	40-70	1	2.50
30-60	4	10.00	>70	0	0.00
Total	40	100.00	Total	40	100.00

One OAL was having no garden land, who is having a house in *purambok*. Only 15 per cent of OAL was having land between 20 and 60 cents. Only one

Before GA the human labour requirement was highest for weed control with 21.02 percentage of the total followed by harvesting with 20.51 percentage, transplanting 18.97 percentage and land preparation except ploughing, puddling and leveling 11.28 percentage. Only in land preparation similar labour requirement was observed before and after GA intervention.

Fig.4. Percentage of labour involved in different rice farming operations



4.4.5. Labour saving

Total human labour requirement for transplanting has been reduced to two from 37, which was required before GA intervention due to mechanical transplanting. Similarly 40 man day requirement has been reduced from 40 to 2 due to the use of combine harvester by GA. Apart from the service of mechanization, GA members are advocating improved cultivation practices such as chemical weed control and the beneficiary farmers have massively changed to chemical weed control from hand weeding further replacing 41 man days/ha with a mean number of 11 man days after GA intervention. Ploughing, puddling and leveling of rice fields were already been done mechanically with tractor and altogether considerable human

labour saving has been taken place during GA intervention. Further analysis of the Table 4.36 will show that the hired labour has been reduced from 138 in the before GA and to simply 39, while the family labour remaining without much variation at 57 and 48 before and after GA intervention.

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Particulars	No	per cent	Particulars	No	per cent
0	1	2.50	0	39	97.50
1-9	16	40.00	1-9	0	0.00
10-19	17	42.50	20-39	0	0.00
20-29	2	5.00	40-70	1	2.50
30-60	4	10.00	>70	0	0.00
Total	40	100.00	Total	40	100.00

One OAL was having no garden land, who is having a house in *purambok*. Only 15 per cent of OAL was having land between 20 and 60 cents. Only one

labourer was having 70 cents of wetlands and one OAL was cultivating rice in leased wetland of five acres (Table 4.38).

Table 4.38. Ordinary agricultural labourers having leased in land (cents)

Wetland – leased in	Number	per cent
0	39	97.50
500	1	2.50
Total	40	100.00

4.5.1.2. Personal and social characteristics

Personal details of ordinary OAL selected for the study are presented in Table 4.39

Sixty five per cent of the OAL were in the age group of 40 to 60 years and 15 were more than 60 years. The age profile of GA members and OAL were almost similar except that there was 2.5 per cent OAL below 30 years, whereas in case of GA members there was no member below 30 years.

The educational status shows that more than 40 per cent of the OAL was having education between fourth and ninth classes. 42.5 per cent of them were having education equal to higher than SSLC. The distribution of OAL based on caste was comparable with GA members, OBC consisting more than 50 per cent. Similarly the distribution based on family size also was comparable with GA members with 62.5 per cent OAL having family size between four to five members.

Table 4.39. Socio-economic characteristics of agricultural labourers

SI No.	Particulars	Number	Percentage
1. Distribution of respondents based on age			
1	<30 Yrs	1	2.50
2	30-39 Yrs	8	20.00
3	40-49 Yrs	17	42.50
4	50-59 Yrs	9	22.50
5	>60	5	12.50
	Total	40	100.00
2. Classification of respondents based on gender			
1	Male	3	7.50
2	Female	37	92.50
	Total	40	100.00
3. Distribution of respondents based on caste			
1	SC/ST	6	15.00
2	OBC	23	57.50
3	General	11	27.50
	Total	40	100.00
4. Distribution of respondents based on education status			
1	Up to 4 th	7	17.50
2	Up to 9 th	16	40.00
3	SSLC	14	35.00
4	+2/PDC	3	7.50
	Total	40	100.00
5. Classification of respondents based on economic category			
1	APL	4	10.00
2	BPL	36	90.00
	Total	40	100.00
6. Classification of respondents based on family size			
1	Small	10	25.00
2	Medium	25	62.50
3	Large	5	12.50
	Total	40	100.00

50 per cent of OAL were having small houses less than 600 sq. feet. 67.5 per cent of OAL was having houses valuing less than Rs.2.5 lakhs and no member was

having house with value more than Rs.7.5 lakhs. The economic categorization showed that 90 per cent of the OAL belongs to BPL, but in case of GA members only 55 per cent were in the BPL group. A perusal of overall data suggest that there was clear cut differences in personal, economic and social status of Green army members and Ordinary agricultural labourers, even though GA members was an unbiased selection from agricultural labourers in Wadakkanchery Block. Majority of GA members have come from relatively high social and economic strata of agricultural labourers.

4.5.1.3. Economic characteristics

1. Number of labour days before and after GA

Mean number of days of employment obtained for an ordinary agricultural labourer per year before and after GA intervention is presented in Table 4.40. A reduction of 55 days per year was observed, which is mainly due to the labour savings by GA members as seen in Table 4.40.

Table 4.40. Pattern of employment of Ordinary Agricultural Labourers

Sl. No.	Particulars	Number of employment days		Per cent change
		Before GA	After GA	
1	Farm-working outside GALB	122	59	-51.64
2	Farm-working through GALB	0	0	-
3	MGNREGS	83	82	0.12
4	Others	16	25	56.25
	Total	221	166	-22.89

There was a decrease of 51.64 per cent in the agricultural works of Ordinary Agricultural Labourers due to intervention of GALB in the labour sector. However, there was an increase of 56.25 per cent in number of working days mainly in the field of construction. The number of working days in MGNREGS remained almost the same.

2. Annual Income of OAL

The ordinary agricultural labourers have earned income as wages from various works such as agricultural, MGNREGS, construction works, household works, other skilled or unskilled works in the range from Rs.20,000 to Rs.1,20,000 before GA and from Rs.15,000 to Rs.1,20,000 after GA (Appendix I- Table 7). The distribution of OAL based on their annual income before green army formation is given in Table 4.41. Seventy per cent of OAL was having income as wages between Rs.25,000 and Rs.50,000, and 22.5 per cent between Rs.50,000 and 75,000. After the advent of GA also, almost similar distribution was observed. There were a few members whose annual income was less than Rs.25,000 before or after GA. Among forty respondents there was only one OAL whose income was greater than 1 lakh. A comparison between OAL and GA members showed that the annual income was relatively high for the GA members and that was noticeably increased after joining GA (section 4.2.1.3).

The average annual income of OAL is presented in the Table 4.42. The mean annual income before the formation of GA was Rs.43,838 which was increased significantly to Rs.48,674 after GA formation on current price basis. However, when converted into constant price basis, this significant increase has become significant decrease, a reduction from Rs.36,517 before GA formation to Rs.24,434 after GA

formation. Devi (2012) also got similar result that the real wage hike is not attractive when compared with the nominal wage rate when viewed from the supply side angle.

Table 4.41. Distribution of ordinary agricultural labourers on different income groups

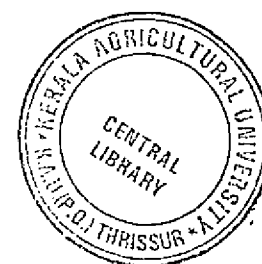
Income (Rs.)	Before GA		After GA	
	Number	Percentage	Number	Percentage
<25000	2	5.00	3	7.50
25001-50000	28	70.00	20	50.00
50001-75000	9	22.50	15	37.50
75001-100000	0	0.00	1	2.50
>100000	1	2.50	1	2.50
Total	40	100.00	40	100.00

The reason for this change is evident from the Table 4.40, where it is seen that there was significant reduction in the number of employment days of OAL from 221 per year before GA formation to 166 per year after GA. In the case of GA members, the employment days increased from 203 per year to 225 after GA formation (Refer Table 4.11).

Table 4.42. Average annual income of OAL at constant and current prices

Period	Income at current price		Income at constant price		CV(%)
	Rs. per year	Per cent change	Rs. per year	Per cent change	
Before GA	43838	11.03	36517	-49.45	37.12
After GA	48674		24434		39.47

173538



3. Family income of ordinary agricultural labourer

The range of annual family income of OAL was observed to be Rs.27,800 to Rs.1,70,000 before GA and Rs.36,000 to Rs.2,65,200 after GA (Appendix I- Table 8). The distribution of OAL according to the annual family income before and after GA members formation is given in Table 4.43. A general increase in the annual income as well as higher percentage of OAL under high family income group is seen after GA formation when compared to the one before GA initiation on current price level.

Table 4.43. Distribution of ordinary agricultural labourers on different income groups

Income (Rs.)	Before GA		After GA	
	Number	Percentage	Number	Percentage
<50000	7	17.50	4	10.00
50001-100000	15	37.50	12	30.00
100001-150000	16	40.00	9	22.50
150001-200000	2	5.00	12	30.00
>200000	0	0.00	3	7.50
Total	40	100.00	40	100.00

The mean annual income (Table 4.44) of the family before GA calculated as Rs.92,826 per year was significantly increased to Rs.1,20,263 during the year 2013-'14 on current price basis, while it was significantly reduced from Rs.77,324 to Rs.60,372 at constant price level after GA initiation, a similar trend as seen in the case of annual income of OAL.

Table 4.44. Average Family Annual income of OAL at constant and current prices

Period	At current price		At constant price		CV(%)
	Income (Rs. per year)	Per cent change	Income (Rs. per year)	Percent change	
Before GA	92826	29.56	77324	-28.08	41.34
After GA	120263		60372		44.67

4. Monthly Family Expenditure

The minimum and maximum monthly family expenditure of OAL before GA was Rs.1,900 and Rs.4,800 and after GA was Rs.2,500 and Rs.6,800 (Appendix I, Table 9). Distribution of OAL according to monthly expenditure is given in Table 4.45. It is seen that, 85 per cent of the OAL have monthly expenditure ranged between Rs.2,500 to Rs.5,500 before GA. After green army, 80 per cent of the OAL were having expenditure in the same range. The mean monthly expenditure of Rs.3,314 of OAL family before GA formation was significantly increased to Rs.4,686 on current price basis and it was Rs.2,761 and Rs.2,352 respectively under constant price level (Table 4.46), indicating a considerable change in the standard of living of OAL before and after GA formation.

Table 4.45. Distribution of OAL in different expenditure groups

Monthly Expenditure (Rs)	Before GA		After GA	
	Number	Percentage	Number	Percentage
1000-2500	6	15.00	0	0.00
2501-4000	25	62.50	10	25.00
4001-5500	9	22.50	22	55.00
5501-7000	0	0.00	8	20.00
Total	40	100.00	40	100.00

Table 4.46. Total monthly expenditure of OAL at constant and current prices

Period	At current price		At constant price		CV(%)
	Expenditure (Rs. per Year)	Percent change	Expenditure (Rs. per Year)	Percent change	
Before GA	3314	41.4	2761	-17.39	22.89
After GA	4686		2352		22.66

The amount spent for different purposes which constituted the total monthly expenditure is presented in Table 4.47. The cost incurred for different components after GA showed significant increase than those incurred after GA formation. A similar trend is also seen when the costs are converted and evaluated at constant price level, except the one for food, in which a significant decrease was observed. Such a trend is not or should not be anticipated in a healthy community. It is to be assumed that amount spent for other components was increased at the expense of the amount spent for food.

Table 4.47. Categorization of total monthly expenditure of OAL

Sl. No.	Particulars	Current Price			Constant Price		
		Before GA	After GA	Per cent change	Before GA	After GA	Per cent change
1	Food	1346	1761	30.83	1121	884	-26.81
2	Fuel	286	426	48.95	238	214	-11.21
3	Health	221	341	54.30	184	171	-7.60
4	Education	263	398	51.33	219	200	-9.50
5	Travel,Entertainment	183	301	64.48	152	151	-0.66
6	Communication	165	275	66.67	137	138	0.72
7	Others	850	1184	39.29	708	594	-19.19
8	Total	3314	4686	41.40	2761	2352	-17.39

Monthly per capita consumption expenditure (MPCE) of the agricultural labourer is worked out to be Rs.818 and Rs.1,157 at current price before and after GA, respectively. According to NSSO (2008) and NSSO (2015),corresponding MPCE for households in Kerala is Rs.1,383 and Rs.3,044.

Table 4.48. Mean Monthly family savings of OAL at current price

Period	Savings(Rs)
Before GA	4422
After GA	5336
Per cent change	20.68

The details of savings of ordinary agricultural labourers are given in Table 4.48. at current price. There was an increase of 20.68 per cent in the savings at current price. Irrespective of a reduction in the number of employment days the increase in the savings shows the thrift habit of agricultural labourers.

4.5.2. Reasons for not joining GA

Ranking of reasons based on garret scores for not joining in green army given by OAL are presented in Table 4.49. Forty two and a half per cent of OAL have told that they are not in a position to work away from theirvillage and raised it as a reason for not joining the green army. Since the work sites can be in any part of Wadakkanchery Block, or sometimes outside the block, OAL particularly women have found it difficult to work away from the village. Thirty fiveper cent of OAL revealed that they were not aware of the establishment of GA, which was ranked as the second reason for not joining green army. A similar number of OAL expressed that if they joined green army their household work will suffer, since the work sites may be far from their house.Same number of OAL has also revealed that the benefits

of joining green army including the salary structure, pension fund, welfare fund and such other things as the reason for not joining.

Table 4.49. Ranking of reasons of OAL for not joining GA

Sl.No.	Reasons	Garret score	Rank
1.	Not in a position to work away from my village	25.75	1
2.	Not aware of the establishment of Green Army	25.13	2
3.	If I join GA, my household work will suffer	22.40	3
4.	Not aware of the benefits of Green Army	19.73	4
5.	Not interested in using machinery	8.95	5
6.	Old age and ill health	6.58	6
7.	Difficulty in going - early going late coming	2.93	7
8.	If I join Green Army my own farm work will suffer	2.93	7
9.	I am already in MGNREGS, cannot go for both	2.50	8
10.	Afraid of non-continuous work	1.83	9
11.	Applied, but didn't get selected	1.83	9
12.	Did not like to work under a formal framework	1.83	9
13.	Time constraints	1.83	9

Other important reasons they raised are difficulty and uninterested in operating machines, old age and ill health, difficulty in going away from home early and coming back late etc. Certain other isolated reasons were raised by oal which are given in Table 4.49.

Table 4.50. Most occurring pair of reasons for not joining GA

Reason 1	Reason 2	Number of respondents with this pair	Percentage
Not aware of the establishment of Green Army	Not aware of the benefits of Green Army	9	22.50
If I join Green Army my household work will suffer	Not in a position to work away from my village	7	17.50

The most important pair of reasons were about 22.50 per cent of OAL (Table 4.50) raised was that they were not been aware of the establishment and not knowing the benefits of the green army. Other pair of reasons raised by 17.50 per cent of OAL was that it is difficult to work away from village and inability to do household work if work sites are away from the village.

4.6. Response of officials on working of Green Army

4.6.1. Impact of GA

The GA officials were asked to express their opinion on how GA had impacted its members on various factors. The respondents were requested to rate each factor represented as a 5 point likert scale indicating the degree of impact with score 0 being a numerical representation of 'No comments', 1 – 'No impact', 2 –

'Minimal impact', 3 – 'Noticeable impact', 4 – 'Great impact' and 5 – 'Significant impact'.

Response of the officials associated with the operations of GA on the impact it made on its members are presented in Table 4.51. A significant Kendall's coefficient of concordance revealed that there is significant agreement among the officials for rating the factors.

Table 4.51. Impact of GA on GA members as perceived by officials.

Sl.No.	Parameters	Rank Score
1.	Labour productivity	3.50
2.	Group performance	3.40
3.	Livelihood improvement	3.30
4.	Banking habit	3.10
5.	Communication ability	3.00
6.	Social Commitment	2.95
7.	Social status	2.90
8.	Professionalism among members	2.85
9.	Labour availability	2.80
10.	Social participation	2.75
11.	Purchasing power	2.75
12.	Social mobility	2.60
13.	Awareness about Government schemes	2.55
14.	Investment	2.50

Significant at 0.01 per cent.

Results presented in the Table 4.51 shows that the official respondents ranked group performance as the parameter contributing to maximum impact to GA

members with a mean rank of 3.4, followed by livelihood improvement, labour productivity and banking habit with mean ranks of 3.3, 3.25 and 3.1 respectively. Investment assets were ranked as the parameter having the least impact.

4.6.2. Organizational linkage

A quantitative expression of the linkage among various institutions and factors which decide the success of GA as perceived by officials is presented in Table 4.52. The scores such as 0,1,2,3,4, and 5 represents no linkage, very limited linkage, limited linkage, good linkage, very good linkage and significant linkage.

The linkage between KAU and GA was rated as most important with the highest score of 15 indicating its role in all aspects such as planning, implementation, supervision, awareness creation and skill up-gradation, which affect the successful formation of GA. The role of local Government, Department of Agriculture and Cooperative Societies also are having good linkage among the various aspects.

Table 4.52. Organizational linkage of GALB with other institutions

Sl. No.	Organization	Plan ning	Implem entation	Super vision	Awarene ss creation	Skill upgrad ation	Total
1	Kerala Agrl. University	3	3	3	3	3	15
2	Local government	3	3	2	2	2	12
3	KrishiBhavan	2	3	2	2	2	11
4	Dept. of Agriculture	2	2	2	2	2	10
5	Cooperative Societies	2	2	1	2	2	9
6	NGO's	1	1	2	1	2	7
7	State Co-operative Bank	1	1	1	1	1	5
8	Dept. of irrigation	1	1	1	1	1	5
9	Civil Supplies Corporation	1	1	1	1	1	5
10	Private Traders	1	1	1	1	1	5

4.6.3. Constraints in the working of GA identified by officials

Officials have raised 44 different constraints which were categorized into 14 groups. The constraints were ranked by Garret ranking technique and are presented in Table 4.53. The most important constraint raised by 40 per cent of the officials with a Garret score of 28.5 per cent was regarding limiting the activities of GA only to rice farming. GA as a labour bank is expected to provide physical and machine labour to farmers for production activities of other crops too. This may provide round the year job opportunities to GA members and attract more labourers to join GA.

Officials also have noted that the planting and harvesting is seasonal and GA face difficulties to finish the operations in time. Shortage of GA members was raised as the second constraint by 20 per cent of the officials.

Though there is prefixed calendar of operations the unexpected rain and consequent unsuitable field condition for mechanical transplanting may derail the entire planning and was raised as the third important constraint of GA raised by 15 per cent of officials.

No new transplanters are procured by GA after its establishment. Maintenance of the present ones is costly and difficult due to difficulty in getting spare parts. Maintenance of machinery is quite expensive and fund limitations may pose difficulties. Procurement of machinery and their maintenance was ranked as the fourth constraint by 15 per cent of the officials.

GA is having good organisational set up. The leadership runs from high power committee to group and team leadership. The decision of group and team leaders directly affect the working and success of GA. 15% of the officials raised lack of good leadership as a constraint for GA for effective working.

Other important constraints raised by officials listed in the Table 4.53 also require attention for remedying in order to have a successful working of GA.

Table 4.53. Ranking of constraints faced by GA according to officials

Sl. No.	Constraints	Score	Rank
1	Only focussing on rice cultivation	28.50	1
2	Member shortage	13.00	2
3	Difficulty in proper planning	11.25	3
4	Machine procurement and maintenance	8.75	4
5	Lack of good leadership	8.00	5
6	Insufficient skillset to use complicated implements	7.50	6
7	Seasonal work- no guaranteed job	7.50	6
8	Lack of public awareness	6.75	7
9	Using out-dated implements which reduces efficiency	6.00	8
10	Unavailability of labourers	5.50	9
11	Difficulty to deliver enough labourers during peak time	3.75	10
12	Dissatisfied members with regards to payment structure	3.75	10
13	Lack of participation of youth	3.75	10
14	Competition from external workers	3.00	11
15	Difficulty in maintaining standardized rate of work	3.00	11
16	Maintaining group synergy	2.50	12
17	Not fully accepted in <i>Kole</i> area	2.50	12
18	Labourers go searching for better opportunities	2.00	13
19	Proper implementation	2.00	13
20	Difficulty in settlement of deals	1.25	14

4.6.4. Suggestions for improvement from officials

The various suggestions for improvement of functioning of GALB was categorized under 18 different categories and ranked on their relevance based on Garret Ranking Technique and are presented in Table 4.54.

Table 4.54. Ranking of suggestions for improvements by officials

Sl.No.	Suggestions for improvement	Score	Rank
1.	Provide additional trainings	23.00	1
2.	Diversification of activities	20.20	2
3.	Adopt new technologies to increase productivity	15.95	3
4.	Recognize the members for their efforts	14.25	4
5.	Try to attract well trained labourers	12.90	5
6.	All cultural operation of rice should be addressed	10.60	6
7.	Building awareness on GA	10.00	7
8.	Additional support from higher authorities	5.85	8
9.	Sacrifice some percentage of profit to ensure work	5.00	9
10.	Adherence to planned activities	3.65	10
11.	Mechanization in all activities to reduce drudgery	3.65	10
12.	Proper meetings should be conducted	3.65	10
13.	Proper planning should be there	3.65	10
14.	Group synergy should be improved	2.80	11
15.	Increase the number of members	2.80	11
16.	Take protective measures to ensure uninterrupted work	2.80	11
17.	Buy machineries rather than renting them	2.20	12
18.	Transportation facilities for GA members	1.35	13

Thirty five per cent of the officials were of the opinion that additional trainings had to be provided to equip the members to handle complex machinery and thus increase the efficiency and productivity. 30 per cent opined that the GA should start to diversify its activities, explore other areas in which they can bring a difference to the existing processes and improve the agricultural sector in Wadakkanchery block. 25 per cent of the officials suggested that GA should adopt the new proven technologies which are guaranteed to increase the productivity in rice farming and to improve the employee morale by recognizing its members for their efforts using a token of appreciation which consequently motivates the member to perform very well again. Another important suggestion that came up was to attract well trained labourers. This will automatically save the time to train them, save the cost associated with training and can utilize their expertise to train other members.

SUMMARY

V. SUMMARY AND CONCLUSION

Green Army Labour Bank (GALB) is an organization formed as a self-sustaining group of skilled labour force fostered by the local body of Wadakkanchery block in Thrissur district of Kerala. GALB is registered under the Travancore Cochin Literary, Scientific and Charitable Societies Act, 1955 in 2010.

Equipped with modern farm techniques, interventions, and farm machinery, and by infusing modern methods into conventional farming, the Green Army has become a role model in the state in a short span. The interventions to organize, train and assure steady supply of labour and credit support to the farmers is presumed to ensure better living conditions both to farmers and farm labourers. A systematic study has been taken up to assess the impact of GALB on the welfare of its major stake holders with the objectives of studying the institutional structure and capital investment of Green Army, to assess the impact of Green Army on the welfare of Green Army members (GA members) and to assess the impact of the programme on the welfare of the farmers who avail the services of Green Army.

Respondents from four groups associated with GALB viz., 40 GA members, 40 rice farmers who have availed the service of GALB for the last two consecutive seasons, 40 agricultural labourers who are not the members of GALB from the location where the Green Army operates and 20 representatives comprising of officials of Agricultural Department, members of local bodies, and officials of co-operative bank in Wadakkanchery Block were randomly selected. The information on the organizational structure of the GALB was collected from the office of the GALB at Athani, Wadakkanchery and training centre of the GALB at Aryampadam, Wadakkanchery and to study other objectives primary data were collected through personal interview method using suitably designed interview schedule which were pretested in pilot survey and finalized for each group.

The socio-economic characteristics of the members of GALB, beneficiary farmers of Green Army and ordinary agricultural labourers, economics of rice farming, constraints and suggestions as perceived by the respondents etc. were analysed using averages and percentages, paired 't' test, Kendall's test of concordance, garret ranking, and welfare analysis of households. The data on expenditure and income were analyzed at the current price and constant price with base year 2005. The deflator factor 2008 (before GA) was 0.833 and the deflator factor 2014 (after GA) was 0.502.

The membership of GALB is opened to marginal farmers and agricultural labourers aged more than 18 years residing in the jurisdiction of Wadakkanchery block panchayat. GALB is functioning on a six level hierarchy system in the order of High Power Committee, Executive Committee, Chief coordinator, Green Army Group, Green Army Team and Green Army Members.

The GALB doesn't own any land or building but have three functional units taken on monthly rent, an office, a garage for machinery and a training centre with five acres of land accessible for conducting practical and farm activities. They also own a fleet of machinery and other equipment. Sources of working capital include annual subscription of Rs.120 each and Rs.five each as contribution for those days he/she works, service charge of mechanical transplanting @ Rs.3,500 and Rs.4,000 per ha within and outside Wadakkanchery Block respectively, and Rs.2,000 per hour for combine harvester, earnings from sponsored trainings conducted by GALB, and grants, subsidies, loans and financial aids from central, state and local governments.

Apart from salary the GALB members get pension, welfare fund, Insurance, bonus, special fund, travelling and daily allowance, communication allowance, and gifts at special occasions. Due to the intervention of GALB, the rice area in Wadakkanchery Block has increased to 3160 hectares in 2009-'10 and 4559

hectares in 2010-'11. An additional area of 320 hectares have been brought under cultivation in puncha season in 2010-'11.

Analysis of the personal profile of GALB members showed that 80 per cent of them were female. No member was below 30 years, 65 per cent were between 40-59 years. All were educated, 60% had SSLC or higher education. 65 per cent belonged to OBC, 22.5 to general category and rest to SC/ST. 55 per cent were classified as BPL and 45% as APL. 77.50 per cent had houses of size greater than 600 sq.ft. 60 per cent had houses valuing more than 2.5 lakhs. 70 per cent had 4-5 members in the family.

Average number of working days of 203 per year was significantly increased to 225 after joining GA, which significantly increased the annual wages/income of the members. The range of annual family income of GA members before and after joining GA was Rs.41,000-2,94,000 and Rs.63,000-3,92,000 respectively. Though there was an increase of Rs.56,647 in the average annual family income on current price basis, the overall annual family income of GA members was found to decrease by 18.10 per cent at constant price level.

The minimum and maximum monthly family expenditure of GA members before joining GA was Rs.1,750 and Rs.7,900 and after joining GA it was Rs.3,150 and Rs.10,000 respectively. Total expenditure for living of a GA member was increased by 54.81 per cent after joining GALB which was significant at the current price. When the expenses were expressed in constant price level, there was decrease of 7.19 per cent after joining GALB. Only 12.5 per cent had any savings before joining GALB, which increased to 22.5 per cent after joining GA. The mean saving was Rs.5,000 before GA and Rs.11,875 after GALB.

The results of regression analysis to study the household welfare taking family consumption as the dependent variable showed the value of R^2 to be 0.551,

denoting that 55.10 per cent improvement in welfare of the GA members could be explained by the variables included in the model, with significant contribution from economic category (APL/BPL), education, age, family size, wages per month received by the members, per month contribution to outstanding loan, empowerment and number of employment days per month. Out of these variables except 'per month contribution to outstanding loan' and 'number of employment days per month' were positively correlated to the total monthly consumption expenditure.

The empowerment of GA members was measured on five different factors which are self-confidence, thrift habit, social consciousness, general awareness about development programmes and team work. Membership in GALB has resulted in general empowerment of the members. 55 per cent of the members have got moderately high empowerment and 27.5 per cent got highly empowered. Advent of GA has empowered the agricultural labourers, however, 17.5 per cent of the members were having a low empowerment.

Analysis of the constraints faced by GA members showed that rigidity with time norms was the greatest constraint, followed by drudgery in using machineries and their maintenance. As they have to travel to distant places in connection with the GALB farming activities and training, the members expressed difficulties in managing household work along with the GA activities.

More than 30 per cent of the GALB members suggested that the GALB should start lease farming in different seasons so that there will be continuous work for the members and higher earning of income. Procurement of women friendly implements and more efficient combine harvesters, power driven cono-weeders can improve the work efficiency and reduce the drudgery. They had also suggested strengthening of group synergy of the GALB members, conduct of regular refresher trainings, and maintenance of work quality to have more acceptances from the farmers.

Analysis of the personal and social characteristics of the beneficiary farmers showed that 80 percent of them were above 50 years, only 2.5 per cent of the farmers were less than 30 years whom can be called as young farmers. All the farmers were having schooling, 75 per cent of them had education more than SSLC. There were no beneficiary farmers belonging to SC/ST, 65 per cent of them belonged to the general category and 35 per cent belonged to OBC. The family size was medium with 4-5 members for more than 70 per cent of the farmers. No selected farmers came under the BPL category. The head of the family was male in 95 per cent of the families.

The mean monthly expenditure before GALB was Rs.5,741 and it significantly increased to Rs.8,158 after GALB at current price. However, when compared at constant price level it significantly decreased by 16.78 per cent.

There was a cent per cent agreement from the farmers that, the activities of GALB should also be extended to crops other than rice. 95 per cent agreed that they prefer GALB for farming operations since GALB is having higher reputation. There was a complete agreement from the farmers towards mechanization on the point that farming is easier with machines than manual practices, machine operations are more remunerative and hence there is good scope for mechanization of field operations. The farmers insisted on acquiring and maintaining suitable machinery, which included paddy transplanters which can plant more number of rows, and with mechanism to adjust spacing between plants and rows to keep optimum spacing suitable for different varieties and seasons, and combine harvesters which have facilities to harvest in more width and to operate under different field conditions such as water stagnation, more clay soils etc.

They also suggested that the GALB should take up all the cultural operations in rice apart from transplanting and harvesting, and in other crops as well. They also suggested including more youngsters in GALB. Diversification of activities like contract farming, procurement and processing of rice were also suggested.

The cost of cultivation of rice increased considerably from Rs.33,440 to Rs.50,736 (51.72 per cent increase) on current price level due to additional cost involved in land preparation to suit mechanical transplanting and in straw bailing. However at constant price level, total cost decreased from Rs.27,857 to Rs.25,470, i.e. 8.57 per cent decrease.

The grain yield was increased by 2432 kg/ha due to the intervention of GALB in rice farming operations. The increase in value of grain was Rs.74,372/ha at current price basis and Rs.20,332/ha at constant price basis. This increase was resulted by an increase in both grain yield and price per kg of rice existed before and after the formation of GALB. An increase of Rs.9,524/- has been there in the value of straw, at current price basis. The increase in gross income per ha was Rs.83,896 at current price basis and Rs.23,154/- at constant price basis after GALB intervention.

The BC ratio at Cost A₁ was only 1.60 before the advent of GALB which increased to 2.59 with an increase of 61.88 per cent after GALB. At Cost C₃, which took account of the costs involved towards rent on land, either owned or leased or both and imputed value of family labour and management cost, the BC ratio was only 0.92, which increased after GALB intervention to 1.68, a 82.61 per cent increase.

The total labour days which included both hired and family labour of 195 per ha before GA reduced to 87 after GA which showed a 55.38 percentage decrease in the total labour requirement per season. Hired labour has been reduced from 138 to 39 after GA, while the family labour remained without much variation with 57 and 48 before and after GA intervention respectively.

Analysis of personal and socio economic profile of the agricultural labourers who are not members of GALB revealed that 65 per cent of them were in the age group of 40 to 60 years and 15 per cent were more than 60 years, 2.5 per cent were

below 30 years.92.5 per cent were females. 50 per cent were having education between fourth and ninth classes. Seven and a half per cent was not having any schooling, an equal member were having education higher than SSLC. 52.5 percent belonged to OBC category and 15 per cent to SC/ST.62.5 per cent of them were having family size between 4 to 5 members.50 per cent of OAL were having small houses less than 600 sq. feet. Sixty seven and a half per cent was having houses valuing less than Rs.2.5 lakhs.

There was significant reduction in the number of employment days of OAL from 221 per year to 166 per year after GALB, equivalent to 24.89 per cent reduction consequent to the substitution of human labour with mechanization due to the intervention of the GALB. The mean annual income of the agricultural labourers was Rs.43,838 which was increased significantly to Rs.48,674 after GA formation on current price basis. At constant price basis, a significant reduction from Rs.36,517 to Rs.24,434 after GA formation was observed. The mean annual family income of Rs.92,826 per year was significantly increased to Rs.1,20,263 after GA at current price basis, while it was significantly reduced from Rs.77,324 to Rs.60,372 at constant price.

Eighty five per cent of the agricultural labourers had monthly expenditure between Rs.2,500-5,500 before GA. The mean monthly expenditure of Rs.3,314 of the family before GA formation was significantly increased to Rs.4,686 on current price basis, and it was Rs.2,761 and Rs.2,352 respectively under constant price level.

Forty two and half per cent of the agricultural labourers have expressed their inability to work away from their village and raised it as a reason for not joining the GALB. Thirty five per cent of them revealed that they were not aware of the establishment of GALB. Almost an equal percentage expressed that if they joined green army their household work will suffer, and they were unaware of the benefits of joining green army including the salary structure, pension fund, welfare fund etc.

The linkage between KAU and GALB was rated as most important with the highest score of 15 indicating its role in all aspects such as planning, implementation, supervision, awareness creation and skill up-gradation, which affect the successful formation and working of GALB as perceived by the officials associated with GALB. The Local Governments, Department of Agriculture and Cooperative Societies were also having good linkage.

The most important constraint raised by 40 per cent of the officials was limiting the activities of GALB only to rice farming. GALB as a labour bank is expected to provide physical and machine labour to farmers for production activities of other crops too. This may provide round the year job opportunities to GA members and attract more labourers to join GALB. Officials also have noted that the planting and harvesting is seasonal and GALB face difficulties to finish the operations in time. Shortage of GALB members was raised as the second constraint by 20 per cent of the officials. Though there is prefixed calendar of operations the unexpected rain and consequent unsuitable field conditions for mechanical transplanting may derail the entire planning and was ranked as the third important constraint of GALB according to 15 percentage of officials. Procurement of machinery and their maintenance also was ranked as a constraint by the officials.

Thirty five per cent of the officials suggested to provide additional trainings to GALB members to empower them in using various advanced machinery. Other suggestions for the improvement of GALB were to diversify the activities of GALB, adopt new technologies to increase productivity, giving recognition to the members for their efforts and attracting young trained labourers to GALB.

Policy implications

Institutionalizing of labour bank system with convergence of Local Self-government, State Government departments, Cooperative banks and NGO's can be a

replicable model for addressing the issues of labour scarcity and lack of capital faced by participating farmers.

The savings in labour to the farmers due to GALB which is the labour days loss to ordinary labourers may have to be compensated by other complementary employment programmes like MGNREGS or other income generating activities.

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APPENDICES

APPENDICES

Appendix i

Table 1: Annual Income Range for GA members

GA members Income range	Min	Max
Before GA - at current price*	12500	225000
Before GA - at constant price	10413	187425
After GA - at current price	30000	305000
After GA - at constant price	15060	153110

* out of 40 respondents, two are having zero income due to not going for any work

Table 2: Annual Family Income Range of GA members

Family Income range	Min	Max
Before GA - at current price	41000	294000
Before GA - at constant price	34153	244902
After GA - at current price	63000	392000
After GA - at constant price	31626	196784

Table 3: Monthly Family Expenditure Range of GA members

Monthly total expenditure - range	Min	Max
Before GA - at current price	1750	7900
Before GA - at constant price	1458	6581
After GA - at current price	3150	10000
After GA - at constant price	1581	5020

Table 4: Annual Income Range for user farmers

User Farmer Income range	Min	Max
After GA - at current price	75000	700000
After GA - at constant price	37650	351400

Table 5. Distribution of user farmers in different income groups whose annual family income less than Rs.4 lakhs

Annual income at current price	Number	Percentage
50000-100000	4	12.50
100000-150000	4	12.50
150000-200000	4	12.50
200000-250000	7	21.88
250000-300000	5	15.63
300000-350000	6	18.75
350000-400000	2	6.25
Total	32	100.00

Table 6: Monthly Family Expenditure Range of User Farmers

Monthly total expenditure - range	Min	Max
Before GA - at current price	3200	8150
Before GA - at constant price	2666	6789
After GA - at current price	4850	11050
After GA - at constant price	2435	5547

Table 7: Annual Income Range for Ordinary Agricultural Labourers

OAL Income range	Min	Max
Before GA - at current price	20000	120000
Before GA - at constant price	16660	99960
After GA - at current price	15000	120000
After GA - at constant price	7530	60240

Table 8: Annual Family Income Range for Ordinary Agricultural Labourers

OAL Family income range	Min	Max
Before GA - at current price	27800	170000
Before GA - at constant price	23157	141610
After GA - at current price	36000	265200
After GA - at constant price	18072	133130

Table 9: Monthly Family Expenditure Range for Ordinary Agricultural Labourers

OAL monthly family expenditure	Min	Max
Before GA - at current price	1900	4800
Before GA - at constant price	1583	3998
After GA - at current price	2500	6800
After GA - at constant price	1255	3414

Table 10. Beneficiary farmers having leased in wetland

Wetland – leased in		
Particulars	No:	per cent
no leased land	20	50.00
<50	2	5.00
50-99	0	0.00
100-249	6	15.00
250-399	4	10.00
400-600	8	20.00
>600	0	0.00
Total	40	100.00

Appendix ii

Performa for performance appraisal of GA members

1. Name of the Panchayat
2. Name of the field collective (FC)
3. Name, Address and the contact number of the president and secretary of the FC
4. Area and number of farmers in the FC
5. Area and number of farmers in the FC who did mechanical transplanting.
6. Date of preparation of mat nursery and transplanting
7. Whether the land preparation was perfect? If not reasons
8. Whether the area of nursery (measure of polythene sheet use) was as prescribed
9. Whether average area transplanted was less than two and half acres per day, if so reasons (change in weather, occurrence of rain etc.)
10. Benefits due to mechanical transplanting
11. Whether any drawbacks noted in transplanting
12. Extent of reduction in cost of cultivation
13. Whether the performance of GA members were satisfactory, if not why?
14. Any suggestions to improve the working of green army
15. Any other service you except from green army

Appendix iii

Kerala Agricultural University (KAU)
College of Horticulture, KAU (Po), Vellanikkara, Thrissur, 680656
Department of Agricultural Economics

Thesis title: Impact of 'Green Army Labour Bank' on the welfare of agricultural labourers

Questionnaire for Green Army Members
(For research purpose only)

1. Name:
2. Address:

Contact Number:

3. Type: APL/BPL
4. Category: GEN/OBC/SC/ST/OTHERS
5. Family Particulars

Sl. No.	Relation ship	Age	Education	Occupation		Income	
				Primary	Secondary	Major	Others

6. Work participation

Sl. No.	Present						Before joining Green Army			Total
	Green Army			Others			Type of work	No of days/year	Wages	
	Type of work	No of days/year	Wages	Type of Work	No of days/year	Wages				

7. Economic welfare

Sl. No.	Particulars	Before		After joining Green Army		Remarks
1.	Income(Rs./year)					
2.	Debts(Rs./year)					
3.	Savings(Rs./year)					
4.	Assets(Rs./year)					Mention assets
4.a.	House	Sq.ft.	Present value(Rs.)	Sq.ft	Present value(Rs.)	
	Tiled					
	Concrete					
	Modification					

8. Monthly family expenditure

Sl. No	Particulars	Before joining G A	After joining G A	Remarks
1.	Food			
2.	Fuel/Gas			
3.	Health			
4.	Education			
5.	Travel and entertainment			
6.	Communication			
7.	Others			
8.	Total			

9. Status of land ownership

Type of Land (cents)	Own	Leased in
Garden Land		
Wet Land		

10. Trainings attended

Before joining Green Army

Sl. No.	Type/title	Period (year and no. of days)	Organizer	Skills acquired
1				
2				
3				
4				

After joining Green army

Sl. No.	Type/title	Period (year and no.of days)	Organizer	Skills acquired
1				
2				
3				
4				

11. Change in empowerment of green army members

Sl. No.	Statement	Scale (0-5)
1	Self confidence	
2	Thrift habit	
3	Social consciousness	
4	General awareness about development programmes	
5	Team work	
6	Others (Specify)	

12. Change in wages for farm activities (before and after Green Army)

Type of work	Before joining Green Army		After joining Green Army	
	Male	Female	Male	Female
Farm Work				
Mat nursery preparation				
Ploughing				
Bund preparation				
Transplanting				
Irrigation				
Weeding				
Fertilizer/manure				
Insecticide/ weedicide				
Harvesting				
Post-Harvest operations				
Non-Farm works				
1. House hold works				
2. Other works				

13. Asset status of members (Mention quantity and purchase price)

Sl. No.	Particulars	Before	After joining Green Army					
			2009	2010	2011	2012	2013	2014
1	Fridge/TV/Motor pump etc.							
2	House							
3	Gas/stove							
4	Vehicle							
5	Cattle							
6	Land							
7	Gold							
8	Kuries							
9	Others							

15. Extent of changes in the personal & social standards of living of GA members

Scale: -3 to +3)

Sl. No.	Statement	-3	-2	-1	0	1	2	3
1	Change in family income							
2	Your contribution to family income							
3	Household indebtedness reduced							
4	Dignity of labour							
5	Accessibility to consumer durables							
6	Self-reliance wrt. to personal expenditure							
7	Bank/ PO savings							
8	Housing facility							
9	Knowledge about Govt. development activities							
10	Spouse's contribution to family income							
11	Recognition in family							
12	Education facility for children							
13	Investment in agriculture or allied activities							
14	Repayment of outstanding loans							
15	Involvement in social activities							
16	Social and political barriers							
17	Efficiency of group/teamwork							
18	Opportunity for regular employment							
19	Family interactions							
20	Involvement in family decision making							
21	Social mobility							
22	Communication ability							
23	Awareness on punctuality							
24	Spirit of group activity							
25	Social commitment							

16. Attitude of members towards Green Army (Scale 1-5) (1- strongly disapprove, 2- disapprove, 3-undecided, 4-approve, 5-strongly approve)

Sl. No.	Statement	1	2	3	4	5
1	My own area of cultivation has decreased after participation in G A					
2	I am attending agrl. works only when G A works are not available					
3	In Green Army drudgery is less than conventional agriculture					
4	Work conditions are improved in Green Army					
5	I may not get Govt. benefits if I am not participating in G A					
6	I will get sure employment in Green Army					
7	Working under Green Army is more dignified than agrl.works					
8	I am getting fixed wages for any work under Green Army					
9	Time norms are convenient under Green Army					
10	Do not like strict personal supervision of farmers					
11	Green Army scheme cause labour scarcity in agriculture					
12	Non cooperation from non-GA members of the region is felt					
13	Bargaining power wrt. to working/ wage conditions increased					
14	More area can be brought under paddy cultivation					
15.	Employment throughout the year is unsure in green army					
16.	Social relationship with non GA members and farmers got reduced since I started working in GA					
17.	GA is concentrating more on cultivation of certain crops like paddy and is neglecting cultivation of other crops					

The domains are: Socio-political values, Values in the domain of primary relations, Socio-economic values & values related to agricultural production

17. Constraints faced by the GA members

Sl.No.	Constraints	Ranking
1		
2		
3		
4		
5		

18. Suggestions for improvement

- 1.
- 2.
- 3.
- 4.

19. What do you think about the future of Green Army?

20. Do you think that similar organizations like Green Army should come in other places? Why?

3. Area under cultivation

Sl. No	Particulars	Wetland		Garden land	
		Crop	Area	Crop	Area
1	Area owned				
2	Leased in before GA				
3	Leased in after GA				
4	Area leased in				
5	Area leased out				
6	Area sown more than once				
7	Area cultivated by GA				

4. Assets owned by the farmer

Sl. No.	Type	No.	Purchase value	Present value	Year of purchase
1.	Livestock				
	a)Cow				
	b)Poultry				
2.	Farm machinery				
3.	Others (specify)				

5. Monthly family expenditure

Sl. No.	Particulars	Before joining Green Army	2013-14	Remarks
1	Food			
2	Fuel/ Gas			
3	Health			
4	Education			
5	Travel and entertainment			
6	Communication			
7	Social commitments			
8	Others			
9	Total			

6. Details of loans availed

Type of loan	Bank	Year	Loan amount	Outstanding amount	Interest rate	Purpose

7. Hiring charge

2008-09		2013-14	
Implement	Charge	Implement	Charge
Tractor		Tractor	
Transplanter		Transplanter	
Harvester		Harvester	
Others		Others	

8. i. Do you have permanent set of labourers working with you? If yes, How many (Nos.)?

ii. If Yes, since how many years?

iii. Wage rate

iv.. If labourers are from non-agricultural sectors any problem due to lack of experience? If yes, list

9. Please Rank reason for opting methods other than manual labourers for cultivation operations

Sl. No.	Reasons	Rank
1	To reduce cost	
2	To reduce delay	
3	To overcome labour shortage	
4	To reduce drudgery	
5	To get increased yield	

10. Wages for agricultural labour before and after Green Army

Type of Work	Before Green Army	After Green Army	Remarks
Men			
Skilled			
Unskilled			
Non- farm works			
Women			
Skilled			
Unskilled			
Non-farm works			

11. Cost of cultivation of rice/ha.

No.	Item	Before Green Army						After Green Army					
		M	W	Lab. Cost	Qty. , rate	Mach. Cost	Total Cost	M	W	Lab. Cost	Qty. , rate	Mach. Cost	Total Cost
1	Land prep.												
2	Seed												
3	Nursery												
4	Transplan t/sowing												
5	Weeding												
6	Manure												
7	Lime, fertilizers												
8	Water mgmt.												
9	Plant protection												
10	Havesting												
11	Post har. operations												
12	Straw bailing												

Rate: Before GA Men..... Women..... Rate: After GA
 Men..... Women.....

12.. Yield and Returns

Year	Crop 1				Crop 2				Total Returns	
	Main product		By product		Main product		By product			
	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Main product	By product
2008-09										
2014-15										

13. Give your feedback on the impact of Green Army on Agricultural Labour market

Sl.No	Statements	Scale (0-5)
1.	Adequate labour force is available	
2.	Quality of work deteriorated	
3.	Wage increase	
4.	Time norms changed (less work time, more rest time)	
5.	Not finishing work in time	
6.	Preferring Green Army work to agricultural works	
7.	Less sincere	
8.	Traditional farm labourers are not available	
9.	No Impact	
10.	Delay in availability	

14. Attitude of farmers towards GA members and mechanization

Sl. No.	Statement	Scale (0-5)
1.	GA members are more sincere	
2.	GA members are not strictly following time norms	
3.	GA members are showing good group synergy	
4.	GA members are not keeping their promise/not coming on dates as they promised	
5.	GA members are having good knowledge about cultivation practices	
6.	There is involvement of people from all sectors in farming after Green Army	
7.	GA members take initiative in crop protection and other after cultivation activities	
8.	Farmers cultivation activities should be supported with Green Army	
9.	Farmers prefer Green Army to farming as Green Army has more reputation	
10.	Green Army works should be extended to other crops	
11.	There is a good scope of mechanization of fields	
12.	Farming is easier with machines than manual practices	
13.	Machine operations are more remunerative	

15. Suggestions for improvement

- 1.
- 2.
- 3.

16. Do you think that similar organizations like Green Army should come in other places? Why?

17. Change in cultivation practices and economics of rice farming

Sl.No	Paticulars	Before GA	After GA
1.	Status of rice farming(Not owning wetland & not cultivating/ owning &cultivating/owning & keeping as fallow/owning but leased out/cultivating own land+leased in land)		
2.	Variety used(local/high yielding /both local &H Y)		
3.	Seeding(directing/manual /mechanical transplanting)		
4.	Nursery(ordinary/mat nursery)		
5.	Seed rate(kg/ha)		
6.	Organic manure used		
7.	Weed control(hand weeding/herbicial)		
8.	Harvesting (Manual/ mechanical)		
9.	Straw utilization (Direct selling/bailing & selling/ unutilized)		
10.	Grain yield (Kg/ha)		
11.	Straw yield (bales/ha)		
12.	Returns from grain (Rs./ha)		
13.	Total return		
14.	Grain yield from the farm		
15.	Straw yield from the farm		
16.	Grain yield return from farm (Rs.)		
17.	Straw yield return from the farm (Rs.)		
18.	Total return from the farm(Rs.)		
19.	Total Cost (Rs./ha)		
20.	Total Cost (Rs./farm)		
21.	B:C ratio		

Appendix v

Kerala Agricultural University (KAU)
College of Horticulture, KAU (Po), Vellanikkara, Thrissur, 680656
Department of Agricultural Economics

Thesis title: Impact of 'Green Army Labour Bank' on the welfare of agricultural labourers

Questionnaire for Ordinary Agricultural Labourers
(For research purpose only)

1. Name:
2. Address:

Contact Number:

3. Type: APL/BPL
4. Category: GEN/OBC/SC/ST/OTHERS
5. Family Particulars

Sl. No.	Relationship	Age	Education	Occupation		Income	
				Primary	Secondary	Major	Other

6. Work participation

Sl. No.	Before the formation of Green Army			After the formation of Green Army			Total
	Type of work	No of days/year	Wages	Type of work	No of days/year	Wages	

7. Economic welfare

Sl. No.	Particulars	Before the formation of Green Army		After the formation of Green Army		Remarks
		Sq.ft.	Present value(Rs.)	Sq.ft.	Present value(Rs.)	
5.	Income(Rs./year)					
6.	Debts(Rs./year)					
7.	Savings(Rs./year)					
8.	Assets(Rs./year)					Mention assets
4.a.	House					
	Tiled					
	Concrete					
	Modification					

8. Monthly family expenditure

Sl. No	Particulars	Before the formation of Green Army	After the formation of Green Army	Remarks
1	Food			
2	Fuel/Gas			
3	Health			
4	Education			
5	Travel and entertainment			
6	Communication			
7	Others			
	Total			

9. Status of land ownership

Type of Land (cents)	Own	Leased in
Garden Land		
Wet Land		

10. Trainings attended (if any)

11. Why you have not joined Green Army?

Sl. No.	Reason	Rank
1.	Not aware of the benefits of Green Army	
2.	Not aware of the establishment of Green Army	
3.	Did not like to work under a formal framework	
4.	Not interested in using machinery	
5.	Due to some political consideration	
6.	If I join Green Army my own farm work will suffer	
7.	If I join Green Army my household work will suffer	
8.	I am already in MGNREGS, cannot go for both	
9.	Not in apposition to work away from my village	
10.	Others (specify if any)-	

14. Liability status of Ordinary Agricultural Labourers

Sl. No.	Liabilities (Loan from)	Before the formation of Green Army					After the formation of Green Army				
		Loan Amount	Interest	Date Availing	Period	Outstanding	Loan Amount	Interest	Date Availing	Period	Outstanding
1.	Bank										
2.	Money lenders										
3.	Friends, relatives										
4.	Co-operatives										
5.	SHGs										
6.	Thrift loans										
7.	Others										

15.. Do you like to join Green Army if you have given a chance to join?

16. What do you think about the future of Green Army?

17. Do you think that similar organizations like Green Army should come in other places? Why?

Appendix vi

Kerala Agricultural University (KAU)
College of Horticulture, KAU (Po), Vellanikkara, Thrissur, 680656
Department of Agricultural Economics

Thesis title: Impact of 'Green Army Labour Bank' on the welfare of agricultural labourers

Questionnaire for officials
(For research purpose only)

1. Name:
2. Education:
3. Post:
4. Experience:
5. Address:

6. Rate overall impact of GA on the following attributes of labour welfare

No.	Statement	Scale (0-5)
1	Livelihood improvement	
2	Labour productivity	
3	Awareness about govt. schemes	
4	Labour wages	
5	Banking habit	
6	Purchasing power	
7	Social status	
8	Distress migration	
9	Group performance	
10	Social commitment	
11	Communication ability	
12	Social mobility	
13	Social participation	
14	Investment	
15	Professionalism among members	
16	Labour availability	

7. Ranking of factors affecting success of the scheme in different phases

No.	Planning	Scale (0-5)
1	Selection of projects	
2	Synchronization with family needs	
3	Fund allocation	
4	Labour budgeting	
5	Risk management options	

No.	Awareness creation	Scale (0-5)
1	Training to green army members	
2	Social inclusion processes	
3	Mechanism of updating of changes in govt. orders and other procedures	
4	Pattern of organizational communication flow	
5	Creation of awareness on responsibilities or duties	
6	Orientation of farmer users	

No.	Implementation	Scale (0-5)
1	Adherence to time schedule	
2	Work site facilities to beneficiaries	
3	Adherence to scientific implementation	
4	Adherence to govt. orders	
5	Timely payments	
6	Inclusion of all stake holders	

No.	Supervision	Scale (0-5)
1	Timely work assessment	
2	Monitoring	
3	Reporting corrective measures	
4	Proactive govt. orders	
5	Follow up measures	

8. Institutional linkages (Rate at 0-5 scale)

No.	Organisation	Plan ning	Imple mentation	Supervi sion	Awareness creation	Skill upgradation
1.	State Agricultural University					
2.	Local Government					
3.	Department of agriculture					
4.	Department of irrigation					
5.	Cooperative Societies					
6.	Civil Supplies Corporation					
7.	NGO's					
8.	Private traders					
9.	Any other agency(pls. specify)					

9. Constraints in project implementation/ working of Green Army (please mention any three)

1.

2.

3.

10. Please give 3 major improvement suggestions

1.

2.

3.

**IMPACT OF 'GREEN ARMY LABOUR BANK'
ON THE WELFARE OF AGRICULTURAL
LABOURERS**

By

SACHU ZACHARIAH JOHN

(2013-11-205)

ABSTRACT OF THESIS

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ABSTRACT

Green Army Labour Bank (GALB) is an organization formed as a self-sustaining group of skilled labour force fostered by the local body of Wadakkanchery block panchayat in Thrissur district of Kerala. A systematic study has been taken up with the objectives of studying the institutional structure and capital investment of GALB, to assess the impact of GALB on the welfare of Green Army members (GAM) and farmers who avail the services of GALB. Data were collected from 40 GAM, 40 user farmers, 40 agricultural labourers who are not the members of GALB and 20 officials through personal interviews.

The membership of GALB is open to marginal farmers and agricultural labourers aged above 18 years residing in the jurisdiction of Wadakkanchery block. GALB functions on a six level hierarchy system in the order of High power committee, Executive Committee, Chief coordinator, Green Army Group, Green Army Team and Green Army Members.

Average number of working days of members of GALB showed a significant increase from 203 days per year to 225 days after joining GALB. The average annual family income of GA members showed 40.51 per cent increase at current price. The monthly consumption expenditure of GA member was increased by 54.81 per cent after joining GALB. Savings of GA members after joining GALB has also increased by 137.5 per cent.

The results of regression analysis to study the household welfare taking family consumption as the dependent variable showed significant relationship with economic category, education, age, family size, wages per month received by the members, per month contribution to outstanding loan, empowerment and number of employment days per month.

Analysis of the constraints faced by GA members showed that rigidity with time norms was the greatest constraint, followed by drudgery in using machineries and their maintenance.

A significant reduction in the number of employment days of ordinary agricultural labourers (OAL) from 221 days per year before GALB formation to 166 days per year was observed consequent to the intervention of GALB. This may be due to consequent reduction in the employment opportunities due to the substitution of manual labour with mechanization by GALB. The mean annual family income of agricultural labourers who were not members of GA significantly increased from Rs.92,826 per year to Rs.1,20,263 after GA. The mean monthly expenditure of the family of agricultural labourer before GA formation has significantly increased to Rs.4686, from Rs.3,314. Nearly 43 per cent of the agricultural labourers have opined that they are not in a position to work away from their village and hence they have not joined the GALB. Many of them (35%) admitted that they were not aware of the establishment of GALB.

Due to the intervention of GALB, the area under rice cultivation in Wadakkanchery block has increased to 4559 ha in 2010-11, compared to 3161 ha in 2009-10. The mechanization intervention has resulted in increasing the cost of cultivation from Rs.33,440 per ha to Rs.50,736 per ha. At the same time, an increase of grain yield by 2432 kg/ha was reported by the farmers, contributing to an increase in gross income to the tune of Rs.83,896. The BC ratio at cost A1 improved from 1.6 to 2.59 as a result of GALB intervention. The labour utilization pattern indicated a savings of 108 days per ha due to GALB in rice cultivation to the farmers.

GALB over the period has proved itself as a replicable model for supplying labour to the farming community and also for safe guarding the welfare of labourers. Through more diversified activities, undertaking lease land farming and through skill upgradation, the GALB can sustain in the future.

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