AGRICULTURAL PRACTICES AND FARMERS EDUCATION IN PONDA TALUKA OF GOA

A Thesis submitted to

Tilak Maharashtra Vidyapeeth, Pune

For the Degree of Doctor of Philosophy (Ph. D.)

in

Economics

under

Faculty of Social Sciences

by

Ms. Sharmila B. Dessai

Under the Guidance of

Dr. SeemaPrabirRath

Department of Economics

Tilak Maharashtra Vidyapeeth, Pune

(March 2017)

CERTIFICATE

This is to certify that the thesis titled, **"Agricultural Practices and Farmers Education in Ponda Taluka of Goa",** which is being submitted herewith for the award of the Degree of Vidyavachaspati (Ph.D.) in Economics of Tilak Maharashtra Vidyapeeth, Pune is the result of original research work completed by Smt. Sharmila B. Dessai under my supervision and guidance. To the best of my knowledge and belief, the work incorporated in this thesis has not formed the basis for the award of any Degree or similar title of this or any other University or examining body upon her.

Place: Pune.
Date: 07.03.2017. **(Dr. Seema Prabir Rath)**

DECLARATION

I hereby declare that the thesis titled, “Agricultural Practices and Farmers Education in PondaTalukaof Goa”, completed and written by me has not previously been formed as the basis for the award of any Degree or other similar title upon me of this or any other Vidyapeeth(University) or examining body.

Place: Pune (Ms. Sharmila B. Dessai)

Date: 07.03.2017.

ACKNOWLEDGEMENT

I have received immense help and encouragement to complete this research work and submit the findings in the form of a thesis. It is my honour and privilege to express my sincere gratitude to some people and institutions, which have helped me directly and indirectly over the last three and half years to complete this humble research work and present the thesis in the present form. At the outset, I express my gratitude to the esteemed Tilak Maharashtra Vidyapeeth (TMV), Pune and all its officials for providing me the research platform leading to Ph. D.

I would like to express my deepest gratitude to my guide Dr. Seema P. Rath, Associate Professor of Economics and Ex- Officiating Principal, Government College of Arts, Science and Commerce, Khandola, Goa for her continuous support, motivation and sincere guidance using her wisdom and knowledge. Without her advice and guidance, I would have not thought of taking up the challenge of this research work. I will be always indebted to her for her constant guidance, support and encouragement that motivated me all the time to handle the research exercise with complete dedication during all the stages of my research endeavour and writing phase of this thesis.

I express my gratitude to all the authors and leading personalities, whose contributions have been quoted or referred in this thesis. It may not be possible to acknowledge any of them by names, but all of them are gratefully acknowledged here. I also take this liberty to apologizebefore each one of them through this if I have unknowingly used their contribution and have missed to quote their contribution since it has not been done with any intention and I am not claiming others contribution as that of mine.

I take this opportunity to express my thankfulness to Dr. Praveen Jadhav, Head of the Department of Economics, Tilak Maharashtra Vidhyapeeth, Pune for his suggestions, guidance and unstinted support from time to time.

My sincere thanks goes to Mr. Nitin K. Bakhale, Zonal agricultural officer Ponda, Goa and Mr. Perni, Assistant Director of Agriculture, Govt. of Goa, Tonca-

Caranzalem, Panjim, Goa for providing valuable information and secondary data required for the study.

I would like to extend my special gratitude to our family friend Mr. SudinJamble for readily shouldering the responsibility of accompanying me during the primary data collection from the farmers of different villages of Pondataluka. He solved all the constraints encountered while collecting such precious information from the farmers while working in the field or while taking rest near their farms. I also record my sincere thanks to all my farmer respondents, who spared their valuable time in providing the necessary information, which forms the soul and the body of my thesis.

I express my sincere thanks to Dr. VithalSukthankar, well known Faculty, Goa Institute of Management (GIM, Goa) and Dr. AtanuBhattacharjee, Statistician for their valuable suggestions and extra ordinary help during the statistical analysis and compilation and presentation of empirical data.

I am thankful to the Officials and staff of Center for Multidisciplinary Development Research (CMDR), Dharwad, Karnataka University, Dharwad, College of Agricultural Science, Dharwad, Central Library, Goa, Goa University Library, Goa, Indian Council of Agricultural Research (ICAR), Old Goa, Government College of Arts Science and Commerce, Khandola, Goa, for permitting me to make use of their libraries to collect valuable information during my research work.

I would also like to sincerely thank Dr. Prabir K. Rath Associate Professor of Geography, Government College Khandola and Chairman, BOS in Geography of Goa University, Goa for his constant support, encouragement and valuable suggestions, which helped me to complete my research work and writing of report within a stipulated time.

My sincere thanks to Mr. AbhayKamat an entrepreneur and expert at Micro-Magic Computer Institute for shouldering the responsibility of carrying out all the computer related work during the course of the research and finally designing the thesis and presenting in the present form.

I would like to sincerely thank Mr. AjitPatil and Mrs. SudhaPatil, Pune for providing me the much needed accommodation during my trips to TMV, Pune for course and administrative works. I would like to thank all my colleagues from Government College, Khandola namely Dr. Lopamudra Bhattacharya, Ms. PriyankaPednekar,

Mrs. RanjanaSavoikar, Mrs. Yogita Joshi and Ms. NivedaKorgaonkar for their help and words of encouragement for my research work.

Completion of this research work is a part and parcel of the fulfillment of my parent's wish of having all their daughters with highest possible qualification in their respective fields. I thank my parents Mrs. SharadaDessai and Mr. BabloDessai who succeeded in inculcating the sense and seeds of achieving higher educational levels among their children. I am also grateful to my in laws, Mr. LaxmanPatil and late Mrs. VasantiLaxmanPatil for their interest, encouragement and support in my studies. I express my thanks to sister Dr. SameetaSawant (Public Health Dentist) Australia and her family members namely Mr. AbhijitSawant, Dr. ManoharSawant and Ms. SheelaSawant, Pune, for their valuable suggestions and encouragement from time to time. I also express my gratitude to my another sister Dr. SampadaDessai, Associate Professor, Gyn-oncology, Malwar Cancer Centre, Kerela and her husband Dr. Vijay Patil, Assistant Professor (Medical Oncology), Tata Memorial Centre, Mumbai for their valuable inputs.

Last but not the least, I would like to extend my special gratitude towards my husband Mr. Sanjay Patil and all our family members for encouraging me to concentrate on my research work sacrificing a lot for me. I thank my two kids, namely Master Sairaj and baby Amruta to have borne a lot with me.

ABBREVIATIONS

NO.	ABBREVIATION	MEANING
1.	2-SLS	Two Stage Least Square
2.	3- SLS	Three Stage Least Square
3.	EINDEX	Education Index
4.	ERHS	Ethiopia Rural Household Survey
5.	ES-SS	Education Sub – Sample Survey
6.	GDP	Gross Domestic Product
7.	GNP	Gross National Product
8.	GSDP	Gross State Domestic Product
9.	HYVs	High Yielding Varieties
10.	I.T.I.	Industrial Training Institute
11.	ICAR	Indian Council for Agricultural Research
12.	KVK	KrishiVigyan Kendra
13.	NA	Not Applicable/Available
14.	NDP	Net Domestic Product
15.	NGO	Non-Governmental Organisation
16.	OECD	Organization for Economic Co-operation and Development
17.	OLS	Ordinary Least Square
18.	SDP	State Domestic Product
19	TFP	Total Factor Productivity

LIST OF TABLES

LIST OF FIGURES

ANNEXURE I

ANNEXURE TABLES

Annexure II

Questionnaire

CHAPTER I

INTRODUCTION

Agriculture is the most important human activity throughout the world. Commensurate with all the advances in technology, it is still the only reliable source of food and an important source of fibers and other products, whose synthetic substitutes are often not good as the natural products and/or more expensive to produce. Development of agriculture is indispensable for the development of a nation and even the mankind. Considering this, many distinguished economists from time and again have emphasized and reiterated the role of agriculture in the development of a country. Eminent economists like Leibenstain H., Lewis W.A., Johnston B.F. and Mellor J.W. have emphasised the importance of agriculture for economic development (Leibenstain, 1957; Lewis, 1954; Johnston & Mellor, 1960). Development of agriculture also facilitates the development of secondary and tertiary sectors. A country can withstand any upheavals if it is self- sufficient with food items and has sufficient raw materials to feed its industries.

In most of the underdeveloped countries, agriculture has been the major contributor to their national income and employment accounting for 40 to 60 per cent of national income and 50 to 80 per cent of the gainful employment of their labour force (Johnston and Mellor, 1960). Even now, it is the only source of livelihood for over 50 per cent of their population (Gardener & Tsakok, 2007). Indian economy is still considered as one of a developing economy where agriculture sector is contributing nearly 18 per cent to its GDP and provides employment to 49 per cent of its people (Government of India 2014-15. Economic Survey of India, 2014-15). Right from the Second Plan, efforts have been made by Government of India to diversify and transform the structure of the

Indian economy. Over the years, even though the relative dependence of the economy on agriculture sector has steadily declined, yet it is the largest source of employment and an important contributor to the overall socio-economic development of India (Government of India 2010-11. Economic Survey, 2010 -11). The green revolution of 1966-69 has helped considerably to improve the productivity of agriculture sector and to achieve self-sufficiency in food grain supply. However, slowly farming is becoming a less attractive occupation due to high cost of cultivation, low returns and uncertainty. Therefore, there is a need to study the area specific problems associated with the agricultural development.

1.1 Education and Agricultural Development

Education is vital for socio-economic development of a country (Kavari, 2000; Iihan, 2001). It raises productivity and creativity of people and promotes entrepreneurship and technological advances. Education and training enable the development of agriculture as well by influencing the agricultural practices. In India, majority of the farmers (85%) belong to marginal category owning, around 45 per cent of the total operational holdings, while 15 per cent of the farmers with medium and large size holdings together own around 55 per cent of the operational area (Government of India. (2010-11).

Agricultural practices widely differ from country to country, region to region, place to place and from farmer to farmer. It also changes over a period within the same area or region or country due to the demand or due to dynamic factors influencing agriculture, such as changes in technology or research findings of soil suitability, availability of additional or alternate sources of irrigation. The green revolution, which started in India during 1960s, has helped in bringing remarkable changes in agricultural practices. Farmer is the pivotal force for agriculture development being responsible for the

selection of crops and animal enterprises suitable to his farm for getting optimum returns from cultivation. Agricultural practices do not come by chance but are chosen by the farmers depending on various factors, such as geographical location and prevailing natural conditions, soil and water resources, pattern of crop demand, market accessibility and past experiences. Hence, to understand agricultural practices followed by the farmers, there is a need to study the farmers' socio-economic background such as. educational level, family size and size of land holdings, organizational participation, family income and asset structure of farmers (Ahmed T., 2006).

The planners and administrators have realized that the resource-poor farmers have not been able to fully adopt the improved technology from time to time. To develop technologies more relevant to these types of disadvantaged farmers, Government of India has introduced various farmer enrichment programmes from time to time, such as National Demonstrations Operational Research Projects, Lab-to-Land and National Agricultural Research Projects. However, these programs could not help to completely overcome the problems of marginal and small farmers who are socially and economically backward. Resultantly, the productivity did not considerably increase due to the lack of proper awareness about the innovations, improved technology, lack of resources to purchase the required inputs and continuation of the use of inappropriate technology (Mosher A.T., 1966).

Use of modern agricultural inputs requires adequate information, knowledge, training, etc. Educated farmers can make use of all the inputs in a better way than illiterate or less educated farmers and are also capable to estimate and analyse the costs and benefits of cultivating different types of crops. How far educational level of farmers can influence agricultural practices is needed to be understood for taking appropriate action to improve agricultural productivity. Education is found to have significant impact on

agricultural development (Dey, 1978; Tilak, 1979; Mook, 1981; Azhar, 1981; Jamison and Lau, 1982; Weir and Knight, 2000; Weir and Woldehana, 2003; Zavalc, Mabaya and Cristy, 2005; Gullacher, 2008; Kumar, 2008; A.C. Egun, 2009). The studies conducted at the international level (Shultz, 1964; Greshon et al, 2003; Thomas, 2005; Hendrick and Kumar, 2008) as well as in India (Milton and Wallace, 1982; N. R. Ravi Prakash, 1989; Singh and Narendra, 1995; Atibudhi and Sahoo, 2000; Gaonkar, 2000; Malk, 2000; Mishra and Hossain, 2000; Ramanmurthy, 2003; Laxmi and Mishra, 2007; Pawde et al, 2011; Makwana, 2013) have focused on the influence of education on agricultural practices. Some studies have found the influence of education on the type of crop cultivated by farmers (Saini, 1963; Hiremath, 1989; A. Narayanmoorthy, 2000; Awasthi et.al, 2000; Surabhi and Pradyuman, 2000; Bhosale, 2000). Thus, the studies reviewed reveal that, education has an impact on economic development, agricultural productivity and agricultural practices. However, in Goa, intensive research on impact of education on agricultural practices is not found. Considering this, the present study attempts to throw light on the link between farmers' education and agricultural practices in Ponda taluka of Goa.

1.2 Aims and Objectives

The prime aim of the present research is to study the influence of farmers' education on adoption of agricultural practices in Ponda taluka of Goa.

The specific objectives of the study are:

1. To get an insight into the agricultural scenario of Goa with special reference to Ponda taluka.
2. To study the socio-economic status of farmers visa-a-visa their levels of education and size of land holdings in Ponda taluka.

3. To review the changes in the pattern of cultivation of crops over a period in Ponda taluka of Goa, and to identify the changes in the cultivation of various crops by level of education and size of land holdings.
4. To assess the reasons for shifting cultivation from low value crops to high value crops by the farmers in the taluka.
5. To empirically analyse the existing agricultural practices and its relation with levels of education of farmers in the study area.
6. To estimate the cost of inputs, productivity and net average income from the main crops grown in the study area.
7. To ascertain the views and ideas of farmers required for the improvement of agriculture in Ponda taluka.

1.3 Hypothesis

The study hypothesises that,

1. There is a positive relation between the level of education of farmers and the cultivation of high value crops.
2. Farmers prefer to undertake cultivation of non-food grain crops rather than food grain crops.
3. The rate of return in the cultivation of non-food grains is more than that of food grain crops.

1.4 Sources of Data and Methodology of Study

The present study confines itself to the investigation of relation between education of farmers and different agricultural practices in Ponda taluka of Goa. The term agricultural practices are used in a broad sense. It not only includes the methods in

which agricultural activities are carried out, but also reveals the proportion of area under different crops, rotation of crops, area under double cropping, use of different inputs in production process, farm management system, costs and benefits of producing different crops.

For this purpose, the study makes use of both primary and secondary sources of data. The primary data is collected directly from the selected farmers (sample) of Ponda taluka through a structured questionnaire. The study collected required information from about 5 per cent of the farmers of the taluka by using stratified random sampling technique from across the village panchayats.

The secondary data has been obtained from various published and unpublished official sources e.g. the relevant information were collected from Zonal Agricultural Offices at Ponda and Valpoi-Goa, Directorate of Agriculture, Economic Survey of Goa, Directorate of Archives and Archaeology, Directorate of Settlement and Land Records, Govt. of Goa, Panaji, Goa; Economic Survey of India, Indian Council for Agricultural Research (ICAR), Old Goa Centre, Directorate of Census Operations, Govt. of India, Panaji, Goa.

The collected information was analysed by using appropriate statistical techniques like mean, correlation coefficient. The collected data have been presented in the form of tables and graphs. The hypotheses of the study are tested by using Chi square technique.

1.5 Importance of the Study

It is universally accepted that agriculture is the backbone of Indian economy. However, a vast majority from the modern generation is withdrawing from agriculture due to less attractive income generation, uncertainty, more physical effort, etc. Goa having very small proportion of its territory suitable for agriculture depends on other states for

supply of essential commodities such as various agricultural products, viz. food grains, vegetables, spices and condiments and especially milk. To improve the agriculture sector and to make it more attractive, it is essential to know the problems associated with the ongoing farming practices and the problems faced by the farmers and to remove the impediments and bottlenecks coming on the way of agricultural prosperity.

With the notable improvement in educational infrastructure, the literacy rate and educational level of people have improved considerably in the state. Therefore, it is pertinent to know the impact of educational achievements on agriculture sector, if any. Through the present study, an effort is made to analyse the impact of farmers' education on agricultural practices and productivity. This would enable to understand whether improvement in the educational level of the farmers has any linkage with the crop combination or cropping diversity in Goa. The findings may motivate to bring the improvements needed to be introduced in the educational system or farming practices to make farming a sustainable, attractive and remunerative occupation. It will also help in knowing the needed changes in education, such as introducing vocational education in agriculture and allied activities, training programmes, etc. Based on the significant findings, broad as well as concrete suggestions can be made to bring improvement in agriculture and education sector in Goa. Moreover, synergy between these two sectors can be maintained.

1.6 Limitations of the Study

Any research endeavour encounters certain limitations for which the present study is not an exception. The present study has the following few limitations:

- For an intensive study of agriculture, the present study focuses only on one taluka of Goa due to the constraints of time and resources.

- The findings of the research can be applicable only in such areas where similar type of physical and human conditions prevail, viz. geographical location and features and agro-climatic conditions and socio-economic profile of the farmers and existence of welfare oriented administration like in Goa.
- The information given by the farmers may have limitations of accuracy as the farmers might not have maintained proper account of various details pertaining to the quantity and cost of inputs used, income generated, etc. Hence, the information provided by the farmers may not be cent percent accurate. Moreover, there are possibilities of reporting errors by the sample respondents.
- The data on different aspects of agricultural practices relate only to Ponda taluka and specifically for the year, 2013-14. Hence, the validity is area and time specific and subjected to changes over time and space.

1.7 Scope for Further Research

The study is a humble beginning and expected to facilitate further and detailed investigation into various matters related to agriculture development either at micro level or macro level. There is a lot of scope for further research relating to the analysis of the contribution of education for agricultural development by extending the study to cover some other region in the state of Goa or in any other part of the country.

1.8 Chapter Scheme

The study is presented in Seven Chapters.

Chapter I: Introduction

The chapter I provide an introduction to the study. It highlights the role played by agriculture sector in the development of a nation and also the link between the education and development of agriculture. It deliberate on background of the study, research questions, hypothesis, objectives of the study, sources of data, sampling design and methodology, significance, limitations of the study and scope of the study for further research.

Chapter II: Review of Literature

In this chapter, review of some of the past studies related to the proposed study is undertaken with a view to find the important and notable contributions made either in Goa or other regions of India and other countries. An attempt is made in this chapter to review some of the literature relating to agricultural practices and farmers education. The review of literature provides valuable knowledge about the present study carried out in other regions and also provides some clues regarding the gaps in the studies already made, which enabled to work out a framework for the present study.

The first section reviews the link between education and economic development, second section deals with the relationship between education and agricultural productivity and the third section reviews the impact of education on agricultural practices. The first section explains the relation between education and economic development. Second section, deals with the studies conducted on the relationship between education and agricultural productivity. Both these sections are subdivided into studies undertaken at (i) the international level and (ii) at the national level. The third section reviewing the impact of education on agricultural practices is divided under two heads as (i) Studies explaining the influence of education on agricultural

practices at the international level and (ii) Studies explaining the influence of education on agricultural practices with in India. Studies explaining the influence of education on agricultural practices within India are again sub divided as (a) studies explaining the impact of education on adoption of technology and (b) studies explaining the relation between education and the cultivation of particular crop. At the end concluding observations are drawn from all the reviews which summarizes the views of the eminent economists regarding the impact of education on agricultural development, agricultural productivity and agricultural practices.

Chapter III: Sources of Data, Sampling Design and Methodology

This chapter includes detailed information about how the research problem is addressed. The sources of primary and secondary data, sampling design and methodology of the study are deliberated in this chapter.

Chapter IV: Status of Agriculture in Goa

This chapter throws light on the performance of agriculture sector in Goa from 1961 onwards, i.e. after Goa became liberated from the Portuguese colonial rule and got integrated with Indian Union. It explains the geographical location, socio-economic status as well as status of agriculture in Goa. Data pertaining to the land use pattern, the type of crops cultivated, total production and productivity of land, etc. in Goa are analysed. While explaining socio-economic status, an attempt is made to compare the factors determining socio-economic status of Goa with that of the country. Efforts are made to explain the trend in the development of agriculture sector from the period of Portuguese rule in Goa. The existing pattern of land utilization is shown with the help of a table. An attempt is made to explain the trends in agricultural productivity and recent development in agriculture sector of Goa. The trends show that, there is

considerable increase in production and productivity of agricultural sector in Goa. However, it indicates that, the increased production is not sufficient to meet the demand of the State for agricultural products. Due to increasing labour costs, cultivation of field crops especially paddy is becoming unprofitable. Farmers of the state are therefore increasingly taking up the cultivation of horticultural crops.

Chapter V: Farmers' Profile in the Study Area

This chapter highlights various features of the study area, i.e. Ponda taluka of Goa. The chapter begins with a brief introduction to Ponda taluka and focuses on the socio-economic features of the farmers in general and sample farmers in particular. The present study has considered variables such as level of education, size of land holdings, family size, type of family system, type of land holdings which enables to understand the contribution of these variables for the status of agriculture in the sample area.

Chapter VI: An Empirical Analysis of Impact of Education on Agricultural Practices and Productivity

This chapter focuses on the main content and findings of the study. It deals with the analysis of impact of education on agricultural practices and productivity and shows the impact of the level of education on agricultural practices and quantum of production. The chapter is divided into five sections. The first section analyses the types of crops grown by farmers. The second section discusses the earnings of farmers by level of education and size of land holdings. Third section deals with an analysis of cost of production, yield and income earned from the cultivation of different types of crops. In this section, efforts are made to find out the correlation between the level of education and various aspects of production. It is found that farmers with higher levels of education devote higher proportion of their land for the cultivation of non-

food grain crops. It is also found that all farmers with every level of education earned higher income by the cultivation of non-food grain crops than that of food grain crops. The fourth section reviews various factors directly and indirectly affecting agricultural activity and views of farmers while the fifth section deals with the testing of hypothesis.

Chapter VII: Summary and Conclusion

This chapter deals with major findings of the study, summary of the study and conclusions derived from the study. Suggestions are made in the light of the issues that have been raised through the study. It also gives an account of the limitations of the study and enlists the scope for further research and enables the academician and policy makers to formulate and implement appropriate policies for a balanced, integrated and overall agricultural development especially in the State of Goa.

References:

1. Ahmed, T. (2006). *An Economic Analysis of Paddy Basal Farming Systems in Southern Karnataka A case study of Mandya District.* (Doctoral thesis). Department of Agriculture Economics, College of Agriculture, Dharwad, University of Agricultural Sciences, Dharwad.
2. Atibudhi, H.N., Sahoo, Sarita. (2000). Effects of Education on Productivity of High Yielding Varieties of Rice in Sambalpur District, Orissa. *Indian Journal of Agricultural Economics*. Vol. 55, No.3.
3. Awasthi, P. K., Gupta, J. K., Raghuwanshi, N. K., Rathi Deepak. (2000). Impact of Krishi Vigyan Kendra on Technology Adoption and Accelerating Agricultural Productivity in Satna District of Madhya Pradesh. *Indian Journal of Agricultural Economics.* Vol. 55, No.3.
4. Azhar, R.A. (1991). "Education and Technical Efficiency during Green Revolution in Pakistan," *Economic Development and Cultural Change* 39(3), pp 651-666.
5. Bhosale, Y. M. (2002). "*A Study of Agricultural Diversification in Kagwad Agricultural Range of Karnataka State*" (Doctoral thesis). Shivaji University, Kolhapur.
6. Bisale, S.M. (2007). "*Dry Farming – A Case Study of Jath Taluka*", (Doctoral thesis) Shivaji University, Kolhapur.
7. Dey, B. (1978). "Effectiveness of Education on Indian Agriculture, "*Manpower journal,* 14 (2) July – September. Pp. 31 - 46.
8. Director of Mines (2010-11), Govt. of Goa, Report on Location of Mines in Goa. Details of Operational Mines for the Period, 2010-2011. Retrieved from www.goadmg.gov.in/operational mines.aspx12/11/2015.
9. Directorate of Agriculture, Government of Goa, (2005-06). *Agriculture Census of Goa*. Panaji, Goa. Retrieved from https://www.goa.gov.in/pdf/goa-agriculture-census-2005-06.pdf.
10. Directorate of Agriculture, Government of Goa. (2010-11). *Agriculture Census of Goa.* Panaji, Goa. Retrieved from www.goadpse.gov.in/Agricultural %20Report%202010.pdf.

11. Egun, A.C. (2009). "Focusing Agricultural Education for better productivity in Nigeria in the 21st Century,'' *International Journal of Educational sciences* (2):87.

12. Gaonkar, R. (2000). Technology Adoption and Agricultural Productivity – A case Study, *Indian Journal of Agricultural Economics*. Vol. 55, No.3.

13. Gardner, B., and Tsakok. (2007). Agriculture in Economic Development primary Engine of Growth or Chicken and Egg? *American Journal of Agricultural Economics.* Vol. 89 (5). Pp. 1145-1151, December. www.ajae.oxfordjournals.org/content/89/5/1145.short.

14. Glauben, Thomas, Tietje, Hendrik and Stefenvogel (2005). "Farm Succession Pattern in Northern Germany and Austria – A survey comparison Retrieved from https://www.researchgate.net/.../241253373_**Farm_succession_patterns_in_Northern_Ge**...

15. Government of Goa. (2010-11). *Economic Survey of Goa*. Panaji, Goa. Retrieved from www.agcensus.nic.in/agcen201011.html.

16. Government of India 2014-15. *Economic Survey of India.* (2014-15). Vol. II. Chapter II Retrieved fromindiabudget.nic.in/es**2014-15**/echapter-volI.pdf.

17. Government of India. (2010-11). *Agricultural Census of India*. New Delhi. Retrieved from www.agcensus.nic.in/document /agcensus2010 /completereport.pdf.

18. Government of India. 2010-11. *Economic Survey of India. (2010-11)*. Vol. II. Chapter II Retrieved from**india**budget.nic.in/budget2011-2012/**survey**.asp reshon, Feder, Just Richard E. Zilberman and David. (2003). "Adoption of Agricultural Innovation in Developing Countries-A Survey*"*. *World Bank staff Working Papers,* Number 542.

*www-wds.**worldbank**.org/external/default/.../**2003**/.../**26**/.../multi0page.tx.*

19. Gullacher, M. (2008). "The impact of Human Capital on Farm level. Input use Argentina Agriculture. CEMA Working paper NO. 380, retrieved from http://hdl. Handle. Net/ 10419/ 84324.24th may 20014.

20. Hiremath, G. K. (1989). "*Impact of Technical Change on Output, Income, Employment and Factor Shares in Indian Agriculture: A Case Study of Karnataka*

BIDI Tobacco Economy and its Problems: An Economic Analysis" (Doctoral thesis).University of Agricultural Sciences, Dharwad-5.

21. Iihan, O. (2001).The Role of Education in Economic Development: A Theoretical Perspective. *Journal of Rural Development and Administration*, Vol. XXXIII, No.1, Winter, pp.39-47. https://mpra.ub.uni-muenchen.de /.../1/

22. Jamison, D.T. and Lau, J. (1982). *"Farmers Education and farm Efficiency."* Baltimore M.D., John Hopkins University Press.

23. Johnston, B.F., and Mellor, J.W. (1960). *The Nature of Agriculture's Contribution to Economic Development*. Food Research Inst. Stud.

24. Johnston, B.F., and Mellor, J.W. (1961).The Role of Agriculture in Economic Development. *The American Economic Review* Vol.51. No.4 (Sep1961) http:// www.Justor.org/stable 1812786 28-9-2015 8.17 UTC.

25. Kavari, S. (2000). *Financing of Higher Education in Goa.* (Unpublished Doctoral thesis). Utkal University, Bhubaneswar.

26. Kumar P., Mittal S. and Hossain Mohabub. (2008). Agricultural Growth Accounting and Total Factor Productivity in South Asia: A Review and Policy Implication, *Agricultural Economics Research Review*, Vol. 21 July- December, pp145-172. https://ideas.repec.org/a/ags/aerrae/47669.html

27. Laxmi, V., and Mishra V. (2007). Factors Affecting the Adoption of Resource Conservation Technology: Case of Zero Tillage in Rice- Wheat Farming Systems". *Indian Journal of Agricultural Economics* Vol.62. No.1. Jan-March 2007, pp. 126-138. www.ageconsearch.umn.edu/bitstream/.../12-Vijay%20Laxmi%20Pandey.pdf.

28. Leibenstain, H. (1957). *Economic Backwardness and Economic Growth.* New York 1957. www.jstor.org/stable/4277969.

29. Lewis, W.A. (1954). *Economic Development with Unlimited Supplies of Labour*. Manchester School.www.la.utexas.edu/users/hcleaver/368/368lewistable.pdf.

30. Makwana, A. K. (2013), Voice of Researches "Agricultural Education in India: Challenges and prospects." *Voice of Research* Vol.2, Issue 3. December 2013. ISSN No 2277-7733. Pp 90-94.

31. Malk, D. P., Singh, S. N., Karwasra, J.C. and Rai, K. N. (2000). Sources of Information Crop Production Technology and Its Valuation in Haryana. *Indian Journal of Agricultural Economics*, Vol. 55. No.3. July-Sept. 2000. Pp.521-529.

32. Milton, M., Snodgrass, Wallance. L. T., (1982). *Agriculture Economics and Resource Management.* Prentice Hall of India Pvt. Ltd. New Delhi- 110001 second edition pp532-533.

33. Mishra, S. N., Hossain, M. M. (2000). Role of Krishi Vigyan Kendra in Diffusion of Farm and Allied Technology among Farmers of Kalahandi District, Orissa. *Indian Journal of Agricultural Economics*. Vol. 55, No.3.

34. Moock, P. R. (1981). "Education and Technical Efficiency of Small Farm Production". *Economic Development and Cultural Change*. 29(4), July, pp. 723-739.

35. Mosher, A. T. (1966). *Getting Agriculture Moving.* Frederic A. Draiger Inc. New York, Pp. 9-12. www.rockarch.org/publications/resrep/white.pdf.

36. N. R. Ravi Prakash (1989). "*Impact of New Paddy Production Technology in Shimoga District of Karnataka State – An Economic Analysis*" (Doctoral thesis) University of Agricultural Sciences, Dharwad -5.

37. Narayanamoorthy, (2000). Farmers' Education and Productivity of Crops: A New Approach. *Indian Journal of Agricultural Economics*. Vol. 55 No.3 July-Sept 2000.PP. 511-518.www.ageconsearch.umn.edu/bitstream/.../2/17-A%20Narayanamoorthy.pdf.

38. Pawde, B. B., Bhise, V. B., Takle, S. R., (2011). *Adoption and Impact of New Agricultural Technology on Tribal Agriculture*. Sereals Publications, Daryaganj, New Delhi-110002 (India) pp 69-70.

39. Ramanamurthy, B. V., Kumara D., Charyala T., and Prasad K. (2003). "Factors Influencing Decision in Agricultural Marketing". Conference Special 2003. Pp.232-242.

40. Saini, G. R. (1963). "Some Aspects of Changes in Cropping Pattern in Western U.P." *Agricultural Situation in India*, Vol. XVIII, No- 6 pp 411-446.

41. Schultz, T. W. (1964). "*Transforming traditional agriculture"*, New Haven; Yale University Press.

42. Singh. K. H., Narendra. (1995). Agricultural Innovations in Kosbad Village. *Tribal Research Bulletin*, Vol. Xvii, No. 2.

43. Surabhi, Mittal and Praduman Kumar. (2000). Literacy, Technology Adoption, Factor Demand on Productivity: An Econometric Analysis. Indian *Journal of Agricultural Economics* Vol.55 No.3 July September 2000 pp. 490-498. www.cabdirect.org/abstracts/20013059815.html.

44. Thomas, Gluben, Tietje, Hendrik and Stefenvogel, (2005). "Farm Succession Pattern in Northern Germany and Austria – A Survey Comparison". www.**irsa-world**.**org**/**prior**/**XI**/**papers**/**18-3**.pdf(18. 10. 2013/3.40pm).

45. Tilak, J. B. G. (1979). "Literacy Education and Agricultural Productivity in India," *Indian Educational Review*, 14 (3), July, pp.1-17.

46. Weir, S. and Knight J. (2000)."Adoption and Diffusion of Agricultural Innovations in Ethiopia: The Role of Education,*" Working paper series 2000 Oxford: Centre for the Study of African Economies.* www.csae.ox.ac.uk/ conferences /**2000**-oia/ pdf**papers**/**weir**2.pdf.

47. Zavalc, H., Mabaya E and Christy R. (2005), "Adoption of Improved Seeds by Small Holder Farmers in Mozambique, http://ideas.org/www.publications. dyson.cornell.edu/.../sp/**2005**/Cornell_Dyson_sp0503.pdf.

CHAPTER II

REVIEW OF LITERATURE

An attempt is made in this chapter to review some of the leading and important literature relating to the topic of the study with a view to get an insight on the topic and to prepare a framework for the present study. The first section reviews the link between education and economic development; second section deals with the literature relating to the relationship between education and agricultural productivity, the third one reviews the studies pertaining to the impact of education on agricultural practices and the fourth section presents the main findings revealed from the review of literature.

2.1 Education and Economic Development

The eminent economists like Adam Smith, Karl Marx, Alfred Marshall and others had emphasised the importance of education in economic development (Kavari, 2000); this has been further strengthened by the empirical studies conducted worldwide over a period of time. Studies explaining the relation between education and economic development are subdivided under two heads as (i) those undertaken at the international level and (ii) those which pertain to the studies at the national level.

(i) Studies undertaken at the international level

Razin (1977) estimated the relationship between the rate of increase in Productivity of labour measured in terms of growth of real per capita GNP and education, measured in terms of the enrolment ratio at the secondary level of education with the help of production function for 11 developed countries over a period of 12 years (1953-65). The study revealed positive and highly significant association between education and the growth of per capita GNP.

Tilak (1986) using linear regression model analysed the relationship between education and economic development in 75 countries of the world classifying the countries into very poor, poor, rich and very rich countries. It was observed that in very poor and rich countries, economic development had a positive and significant relationship with education. On the other hand, in poor and very rich countries the relationship between the two was found to be positive but statistically not significant. While primary and secondary education significantly influenced economic development in very poor countries, it was secondary and higher education which had significant impact on economic development in rich countries. In both poor and very rich countries only secondary education was found to have some impact on economic development.

Tilak (1988) in another cross-country analysis estimated the relationship between education and economic development by using data for 100 countries for vocational secondary education with the help of semi-log regression model. Classifying the countries into low income, middle income and high income countries and 1 year, 10 year and 15 year time lag on enrolments, he found that vocational education contributed positively to economic growth only in case of middle income countries. In low and high income countries the contribution of vocational education turned out to be negative and statistically insignificant. It was concluded that vocational education could contribute positively and significantly to economic growth of those countries having GNP per capita more than $400 and less than $ 5000.

Barros (1991) analysed the relationship between education and economic growth by taking data from sources like Summer and Heston, United Nations and World Bank for 98 countries for the period from 1960 to 1985. Barros model of growth was dependent on initial level of income and on initial level of human capital, proxied by enrolment at

primary and secondary levels. The regression results confirmed that high initial levels of education resulted in high economic growth.

Englander and Gruny (1994) with analytical bank data on school enrolment rates investigated the determinants of productivity growth both over time and at a point of time for 19 countries of Organisation for Economic Co-operation and Development (OECD). They found a significant positive correlation between secondary school enrolment rate and labour productivity. An increase in average enrolment rates by 70 per cent to 95 per cent in OECD countries resulted in about 0.6 per cent growth in annual productivity over the period from 1960 to 1965.

Hill and King (1995) derived the data from United Nations Statistical sources and World Bank documents for 152 countries incorporating only those countries which reported consistent data. The analysis included 42 countries of Sub Saharan Africa, seven from East Asia and seven from the Pacific, 17 from South and South East Asia, 31 from Latin America and Caribbean, 20 from the Middle East and Africa (excluding Israel), and 35 other countries. Their income regression results showed that, the level of female education have a strong and positive effect on GNP. Their GNP equation for gender disparities in education indicates that in those countries where the female to male school enrolment ratio is less than 0.75 their GNP is roughly 25 per cent lower than the countries with smaller gender gap indicating inverse relationship between gender disparities in educational attainment and growth of GNP. Their findings showed that, female education and gender gap in school enrolment are important determinants of both family well-being and economic growth.

Kalsen (1999) by using ordinary least square (OLS) and two Stage Least Square (2-SLS) estimation, for 108 developed and developing countries for the period between 1960 and 1992, found that both the initial lower gender gap and expansion of the

female-male ratio have a significant positive impact on economic growth. The gender inequality in education does impede economic growth directly through distorting incentives and indirectly through its impact on investment and population growth. According to the study, the annual economic growth of South Africa and Sub- Saharan Africa could have been up to 0.9 per cent faster than the actual growth during that period provided there were more balanced educational achievements, and with better promotion of gender – balanced growth in education in 1960s.

Gylfason and Zoega (2001) explored the possible relationship among inequality, education and economic growth with a sample of 87 industrial and developing countries during the period from 1965 to 1996. They analysed different measures of education such as Gross Secondary School Enrolment, public expenditure on education in relation to National Income and expected years of schooling of girls. Using cross-country regression method, it was found that all these three measures of education were directly related to income inequality across countries. The study revealed that an increase of about 3.5 percentage points in public expenditure on education was associated with an increase in per capita GNP growth by one percentage point. The corresponding relationship for males was similar to that of females. An increase in secondary school enrolment by 25-30 percentage point was associated with an increase in annual economic growth by one percentage point. Thus, the study revealed that economic growth varied directly with all the measures of education.

Petrakis and Stamatakis (2002) using a cross country regression model with a relatively small sample size tried to analyse the relationship between education and growth by grouping the countries into advanced, developed and less developed. The empirical results suggested that the link of education and growth varied with respect to

a country's level of development. Primary education is more important in less developed countries, while higher education seems dominant in advanced countries.

Matusha, Siddique and Gils (2006) using data from 1969 to 2003 studied the relative contribution of education to economic growth measured by Per Capita Real Gross Domestic Product in Australia by decomposing annual economic growth into components associated with the change in factor inputs and Total Factor Productivity (TFP). Their study revealed that an increase in higher education enrolment by 1 per cent leads to an increase in real GDP per capita by 0.04 per cent. According to them, human and physical capital growth appeared to contribute about 47 per cent of growth in Real GDP per capita; labour growth less than 7 per cent and TFP 46 per cent during the reference period (1969-2003).

(ii) National Level Studies

Schultz (1961) estimated the contribution of education to economic growth with the help of rate of return to human capital vis-à-vis that to physical capital. It was observed that, education alone accounted for 21 to 40 per cent of growth in the national income in United State of America over the period from 1926 to 1956. An increase in education per member of the employed labour force accounted for 13% to 17% of income growth over the same period.

Psacharopoulos (1972) measured the marginal contribution of each educational level to economic growth in the state of Hawaii. Using the growth accounting equation he found that, with improvement in the quality of labour their contribution to economic growth increased and the contribution of secondary education was found to be the highest.

Tilak (1980) used growth accounting equation models of Schultz and estimated the contribution of all levels of education to the income of the state of Andhra Pradesh and found that, the contribution of education to state income was significant. Difference in contribution of education to the state income between men and women was quite large. The contribution of primary education was higher than that of other levels of education in all the cases except in urban areas where the contribution of secondary education was the highest. A considerable difference in the contribution of education to state income was also observed between backward and non-backward class population.

Sadeghi (1995) investigated into the role of gender gap in literacy levels and enrolment rates on growth of GNP between 1950 and 1989 in Nepal. He found that, narrowing the gender gap in education will result in greater income growth. In a model where growth depends only on educational gender gaps he found that, reducing the gap between male and female literacy levels or between male and female primary and secondary enrolment rates will have a positive and significant effect on growth.

Dandekar (2000) in her doctoral thesis titled "Returns to Education in Sugar Co-operatives in Sangli district: An Economic Analysis" highlights the importance of elementary education and justifies even on economic grounds the Government's policy of universalisation of elementary education. She finds that, investment in continuation of education is beneficial.

2.2 Education and Agricultural Productivity

The foregoing review reveals that education plays an important role in economic development. In this light, an effort is made here to review the literature pertaining to the contribution of education to agricultural productivity. A great deal of work has been done both in India and outside on measuring the contribution of education to

agricultural productivity. Most of the studies, reviewed here concentrated on the impact of formal education. A few studies reflected on the impact of exposure to extension services and agricultural research on agricultural productivity. Studies reviewed here are divided into two categories as those undertaken outside India and those undertaken within India.

(i) Studies Undertaken Outside India

Dey (1978) analysed the relationship between education and agricultural development in 39 countries of the world and 19 states of India. He considered education below primary literate and above primary literate and other variables like per capita income, fertilizers, use of tractors, and irrigated area under cereal to total area under cereal production, rainfall and agricultural yield per hector. He found that, there was very negligible correlation between education and agricultural yield. Education and use of fertilizers were also not significantly correlated. But in cross country analysis, education was found to have a significant relationship with agricultural development and use of fertilizer.

Moock (1981) measured the technical effect of education on the production of maize in Vihiga division of Kenya for the year 1971 with the help of a sample survey of 101 male farm managers. Educational background of the managers was measured by years of formal schooling completed, work experience and extension service contact. Fitting a double log Cob-Douglas production function, the author found that, schooling of more than 4 years produced a higher yield than schooling below 4 years. But when less schooling (below 4 years) was combined with extension contact, its effect on output became positive.

Jamison and Lau (1982) examined the effects of education and extension services on agricultural productivity in Korea, Malaysia and Thailand for the year 1972-73 through a sample survey of individual farms of the above countries with the help of a Cobb-Douglas production function of double log type. A Cobb- Douglas form of profit function was also used (only in Thailand) to examine allocative and market efficiency. The study revealed that education and exposure to extension services influenced use of chemical fertilizers and agricultural productivity to a considerable extent. The profit function used in Thailand indicated that profit tends to increase with increase in level of education.

Azhar (1991) analysed the effect of education on technical efficiency in Pakistan during the green revolution by using data for 1976-77 and a modified Cobb-Douglas production function, in which variables having zero value were included as shift variables. The author measured the impact of education on technical efficiency in case of both new crops (introduced by green revolution) and traditional crop. The result showed that education had a more pronounced effect on technical efficiency in the case of new crop varieties.

Weir and Knight (2000) investigated into the direct role of education at the household and community levels in facilitating the adoption and diffusion of fertilizer use in Ethiopia. Evidences showed that, education encourages initial adoption of innovations and less educated households copied more educated household in a process of social learning. Household level of education was important to the timing of adoption, but less crucial to the extent of adoption. By contrast, site level education appeared not to affect the timing of introduction of innovation to the site, but does influence the eventual extent of diffusion. Thus, there were two externality effects: educated farmers are early innovators, setting examples which might be copied by less educated farmers and

educated farmers were better able to copy those who innovated first, enhancing diffusion of the new technology more widely.

Knight, Weir and Woldehanna (2003) investigated into the impact of education on farmers attitudes on technology adoption in Ethiopia. Data for this study were drawn from related surveys like the Ethiopia Rural Household Survey (ERHS) 1994, Second round of survey (Dercon and Krishnan,1994) for information on education, the education sub-sample Survey (ES-SS) for information on farmers attitudes towards risk and their opinion on new technologies. The variables used by them were average years of schooling using Probit Model. They found that, education had a statistically significant effect on farmers willingness to take risk i.e., one more year of education reduces the probability of being risk- averse by 2.6 per cent. Their study showed that neither age nor sex of the household head had any effect upon risk aversion.

Zavalc, Mabaya and Cristy (2005) investigated the factors influencing adoption of improved maize seeds by small farmers in Mozambique. The data used in the study were obtained from national random sample of 4,908 small farmers conducted by the ministry of Agricultural and Rural Development in 2002. The main factors influencing adoption of improved seeds were identified by using Probit and Logit models. The variables which affected positively with the decision of adopting improved maize seeds were household size, years of formal schooling, off farm employment, location, access to extension service, experience, seed stores, electricity, use of pesticides, fertilizers and irrigation while the factors which affected negatively were age of the head of household, geographical location, access to extension service and credit and farming of traditional cash crops on the decision to adopt improved maize seeds.

Gullacher (2008) tried to find out the linkage between human capital & input choice in agricultural firms in Argentina by using agricultural census data of 1992. His

hypothesis for the study was that, the ratio between the use of non-land inputs like fertilizers, machinery services, herbicides, animal stocks and others to the land inputs increase with an increase in the level of education. His study revealed that increases in managerial human capital are positively associated with the demand for non-land inputs.

A.C. Egun (2009) in his article titled "Focusing Agricultural Education for better productivity in Nigeria in the 21stCentury" feels that, there is a need for refocusing on education to increase agriculture productivity in Nigeria. It is predicted that, providing effective agricultural education to the population, especially to the youth and women in rural areas would help in improving agriculture productivity.

(ii) Studies undertaken within India

Tilak (1979) analysed the impact of literacy and education on agricultural productivity per hector as well as per worker by using cross section data of the 16 states in India. Enrolment per one thousand rural populations, number of teachers per one lakh rural population and public investment in education in rural areas were considered as the indicators of educational development. Using double log production function of Cob-Douglas type, the author found that, all the educational variables, except enrolment were positively related with agricultural productivity per hector as well as per worker. Enrolment was found to have positive but statistically insignificant relation in the case of agricultural productivity per worker.

Randhawa (1983) investigated the impact of level of education of the decision maker on per acre yield and per worker yield in Amritsar district of Punjab with the multi-stage stratified random sampling by using micro data collected from 150 farmers. Fitting a linear regression model, the author found that, educational level of the decision

maker had positive and significant impact on both per acre yield and per worker yield, except for experience and area irrigated, all other variables (area cultivated, fertilizer, finance and mode of farming operation) were also found to be positively and significantly related with per acre yield and per worker yield.

Debi (1984) examined the effect of level of education of farm workers on agricultural productivity in Orissa for the year 1971. The author classified the farm workers into educated and uneducated workers. Using multiple regression technique, the author found that agricultural productivity was significantly related to the level of education. The impact of other variables like land, irrigation and chemical fertilizers were also found to be significant. The relationship between chemical fertilizers and level of education of the farm workers was also estimated with the help of a simple linear regression equation, in which educated and uneducated workers were independent variables and use of fertilizers was a dependent variable. The result indicated the level of education influenced use of chemical fertilizers positively.

Duraisamy (1990) examined the effect of education on technical and allocative efficiency between educated and uneducated farmers by using Cobb- Douglas form of the normalized restricted profit function. The data used in the study were collected through a primary survey covering 461 farm households of 12 villages in two districts of Tamil Nadu. The author found that, education of the farmers and there extension contact increased profit by 12 per cent and 13 per cent respectively. Other variables like farmers age, average education of family members and viability of credit did not seem to have much impact on profit. Using SURE technique, it was found that educated farmers were found to be relatively more efficient than the uneducated ones both from technical and allocative point of view.

Muggur (2004) selected 200 samples from dry and irrigated parts of Belgaum district in Karnataka. In his studies he pointed out that, educated labourers were more productive and efficient. But the level of literacy among agricultural labourers was very low in the study area. Out of 200 sample agricultural labourers in dry and irrigated areas, 75 per cent of them were found to be illiterate and others had only primary or at the most secondary level of education. The rate of illiteracy was found more in dry areas as compared to the irrigated areas. Again, the rate of literacy was very much higher among the members of the agricultural families as compared to the heads of the families. This indicates that the heads of the families have realised the significance of education.

Bisale (2007) made a case study on dry farming in Jath taluka from Sangali district in Maharashtra. He found that, the number of illiterate farmers is more in all farm size land holdings. As far as primary education is concerned, the number of marginal farmers is more than the other farm sizes. Thus the study showed that the size of land holdings varied directly with the level of literacy i.e. higher the level of literacy higher the size of land holders and vice versa.

2.3 Impact of Education on Agricultural Practices.

This section is pertaining to the reviews explaining how the level of education determines the type of agricultural practices undertaken by the farmers. Section is divided into two parts as (i) studies explaining the influence of education on agricultural practices at the international level and (ii) studies explaining the relationship between the level of education and agricultural practice within India.

i. Studies Explaining the Influence of Education on Agricultural Practices at the International Level.

Schultz (1964) in his book "Transforming traditional agriculture", showed the importance of human capital in developing agriculture in dealing with the situation of disequilibrium which results from the introduction of new technology. He surveyed a number of empirical studies, which examined the ability to deal with disequilibrium. Many of the studies found that education plays a strong role in determining rates of adoption of new technology in developing agriculture**.** Studies found a significant relationship between education indicators and farming practices. The education (and extension) is found to be an important factor affecting adoption behaviour of the farmers.

Greshon *et al.* (2003) published a paper titled "Adoption of agricultural innovation in Developing Countries - A survey". In dealing with agriculture in the United States, they made a distinction between worker ability and allocative ability. Allocative ability is the ability to adjust to changes. Theoretically and empirically the farmers with higher education possess higher allocative ability and adjust faster to reduction in nitrogen prices by adopting nitrogen intensive technologies. He further noted that education is particularly important when extension activities are less intense. So according to them farmers with higher education level are quick in adapting to new technologies.

Glauben *et al.* (2005) in their article "Farm succession pattern in Northern Germany and Austria: A survey comparison" finds large differences in education within the samples. Higher levels of agricultural education in Schleswig-Holstein support the specialization pattern observed there, while the higher level of non-agricultural education in Austria goes along with less crop specializations.

Kumar*et al.* **(2008)** attempted to account agricultural growth and total factor productivity in South Asia. According to them, growth in agriculture productivity is essential for the development of the sector. Their study has reviewed the development in agricultural productivity related to South Asian countries. They have stated that, the level of literacy rate is the major factor influencing the total factor productivity. The study revealed that level of literacy determines the productivity of agricultural sector.

ii. Studies Explaining the Relationship Between the Level of Education and Agricultural Practices Within India

These studies are further divided into two groups such as:

(a) Studies explaining the impact of education on adoption of technology and

(b) Studies explaining the relation between education and the cultivation of particular crop.

a. Studies Explaining the Impact of Education on Adoption of Technology.

Singh (1974) from his study in Haryana proved that, the level of farm production is significantly higher on farms where decision-maker is literate than where the decision-maker is illiterate. He found that the impact of the level of education on farm production is relatively strong with secondary education and weak though positive, with both primary and middle education. The increase in farm production at geometric mean level of other inputs due to the literacy was found to be 19.1 per cent. It was 15, 20, and 50 per cent with primary, middle and secondary level education of farmers, respectively. Thus the study underlines the importance of sustained formal education up to a minimum of secondary level for a wide scale change in the farmers' production behaviour.

Milton and Wallace (1982) feel that informal non-compulsory education programs for adult farmers can have a significant impact on agricultural production. Continuous learning is essential for all managers as there are constant technological innovations. Extensive education may take the form of group of farmers meetings, methods and result demonstrations, presentation and analysis of management purposes. It was also found that majority of the tribes of Kosbad village in Palghar district of Maharashtra are not in a position to adopt innovations introduced to them by the volunteer organizations due to lack of education and knowledge about modern agriculture practices, and due to the prevalence of poverty and subsistence economy. The study reported that the authorities of the Block Development Office tried to induce people to take chemical fertilizers and new seed varieties, but a few of them accepted and most of them thought the chemical fertilizers may be harmful to crops. The study concluded that, innovations introduced by the volunteer organizations such as farm tours, exhibitions and fairs have brought a tremendous change in the field of agriculture as well as socio- economic conditions. A good extension worker is one who makes the farmer aware of new ways to do things on the farm as well as relating the nonfarm economy to the farm economy.

N. R. Ravi Prakash (1989) studied the impact of new paddy production technology in Shimoga district of Karnataka state. He found that, in the case of farmers growing high yielding varieties of paddy, nearly 66 per cent of the large farmers were educated above seventh standard while the corresponding figures for medium and small farmers were 36 per cent and 17 per cent respectively. The proportion of small farmers who did not had education was over 30 per cent, while in the case of medium and large farmers the same were as low as 16 per cent and 3 per cent respectively.

In the case of farmers growing local varieties, 5 per cent of small, 20 per cent of medium and 28 per cent of large farmers were educated above seventh standard. A Considerable number of small farmers did not have education (40.54%) and the corresponding figures were nearly 26 per cent for medium and 14 per cent for large farmers.

On the whole, nearly 43 per cent of the farmers growing high yielding varieties of paddy and 17 per cent of the farmers growing local varieties of paddy had education above the seventh standard. Only 15 per cent of farmers in the high yielding varieties category were illiterate, while 28 per cent of the farmers growing local varieties of paddy were illiterate.

Chi-square test was used to determine the significance of difference in the levels of education between farmers growing local varieties of paddy and those growing high yielding varieties of paddy. His conclusion was that, higher the level of education, higher is the use of high yielding varieties of seeds and lower the level of education, higher was the use of local varieties of seeds.

Singh and K. H. Narendra (1995) studied the agricultural innovations that have been introduced in Kosbad village from Dahanu taluka in Maharashtra. The study indicated that establishment of various agricultural institutions and training centres in the Kosbad area by the Ghokhale Education Society have brought many changes among the tribes in their agricultural practices. The tribal farmers are found to have started, to use tractors instead of wooden ploughs, new verities of seeds, electric pump sets for irrigation purpose and chemical fertilizers.

Atibudhi and Sahoo (2000) made an attempt to analyse the effects of formal education on productivity of High Yielding Varieties (HYVs) of rice in Sambalpur district of Orissa during the year 1999-2000. The results of the study indicated that the highest

average yield of 44.72 quintals of rice per hector was obtained by farm operators who had more than 10 years of formal education, followed by farm operators with 5 to 10 years of formal education. The lowest yield of 38 q/ha was realized by illiterate farm operators. In terms of additional benefit -cost analysis, the farm operators with 5 to 10 years of school education got 7.8 times more additional benefits over the additional cost for literate farm operators (up to 5 years of school education). The level of adoption of technology also indicated similar trend with higher level of technology adoption for 5 to 10 years of formal educated farm operators and more than 10 years of formal educated farm operators than the literate and illiterate farm operators**.** The results also imply that above 5 years of formal school education for farm operators is needed so as to have significant impact on farm productivity. But was found that, more than 10 years of formal education of farm operators has neutral technical effect on farm productions.

Gaonkar (2000) attempted to study the extent of technology adoption by the farmers and the factors affecting the use of technology based on primary data collected from 90 farmers from two villages, Agonda and Maxem, in Canacona taluka of South Goa district in Goa. The study found that, there was a direct relationship between education and technology adoption by the farmers. All the 69 literate farmers (76.67 per cent) were in favour of adoption of new technology. This shows that, receptivity of new technology depends upon the education of the farmers. Other factors which affected the process of technology adoption by the farmers were effective extension services, credit facilities, and ownership right of the cultivators on land, attitude of the people towards agriculture and size of the holding. The study thus shows that, besides other factors, education and extension services play an important role in the adoption of technology.

Kar (2000) tried to investigate the relationship between agricultural development and rural poverty in West Bengal during the period from 1980-81 to 1997-98 and identified

the casual factors for the remarkable agricultural development in the state. Literacy, irrigation, wage and fertilizer use were taken as key factors which were responsible for adoption of new technology. It was found with the help of linear regression analysis that, education did not have significant effect on fertilizer use for the year 1981 but this became significant in 1991. It was found that the districts with higher literacy rate had higher productivity level.

Malk *et al.* (2000) stated that the adoption of improved technology comes through the educational process, the purpose of which is to bring about the desired changes in farmers knowledge of agricultural technology, skills and attitudes, which they develop towards the development of agrarian society. The study confines to the Hisar district of Haryana state and is based on the primary data collected from 90 farmers randomly selected from two villages. The study concluded that, the higher amount of expenditure was incurred by the farmers with matriculate and above level of education on acquiring information that improves agricultural practices, such as improved varieties of seeds, information related to sowing times and quality seeds of different crops. Thus, it is implied that, level of education of the farmers determines the expenditure incurred on gathering information about improved agricultural practices.

Mishra and Hossain (2000) made an attempt to assess the effectiveness of *Krishi Vigyan Kendra,* Kalahandi of Orissa on diffusion of farm and allied technologies among the trained farm families in the adopted villages. The Kendra, since its inception in 1994 conducted training programmes for farm families on crop production, horticulture, plant protection, agricultural engineering, animal, science, fishery, extension education and home science. Besides these, it held front-line demonstrations on other crops and allied activities and on-farm testing for farmers and farm women. Out of the total number of trained farmers in the year 1994-95, 100 farmers were randomly selected

from five adopted villages for survey purpose. From the study, it was found that in terms of adoption of new technology, introduction of HYV paddy ranked first with 32 per cent increase during the five-year period (1994-95 to 2000) followed by improved cotton cultivation and hybrid tomato cultivation. Further it was found that 41 per cent more farm families became self- employed through farming during the five year period. About 37 per cent of the respondents could change their educational status to middle school level, 29 per cent more trainees used improved implements and 28 per cent of the respondents moved to 20,000 annual income bracket. From this, it is clear that informal education played important role in educating farmers about different agricultural practices.

Pandey (2000) attempted to find out the extent of adoption of modern technology among the farm households with varying levels of education and examine the factors affecting the adoption of modern technology in farming in two agriculturally developed villages having uniform agro-climatic and infrastructural conditions in Pipli block of Puri district, Orissa. The data on different aspects of adoption related to only paddy crop and for the year 1998-99. The findings of the study revealed significant difference in the adoption of modern technology (HYV seeds, chemical fertilizers, machinery and implements) between the farm households with varying levels of education. The regression analysis indicated that, in the case of farmers having education at primary level, the amount of institutional support and hours spent on extension education explained the extent of adoption. In the case of farmers between primary and secondary education, the ratio of non-farm income to total income, years of education, amount of institutional support and hours spent on extension education were found to have significant impact on the amount spent on modern technology. For the farmers with secondary education and above, the ratio of non-farm income to total family income,

years of formal education and hours spent on extension education showed significant relationship with amount spent on modern technology. Above study clearly indicated that there is direct relationship between education level of farmers and adoption of new technology. Hence, the study suggested that, efforts should be undertaken to provide regular extension education through the agricultural officials of the block to the less educated farmers for higher adoption of technology so as to increase the agricultural productivity.

Saha (2000) stated that in backward agricultural regions, formal education creates awareness about the new technological opportunities. Researcher used household level cost of cultivation data for *aman* rice cultivation in West Bengal relating to the year 1989-90 to examine (a) the factors influencing the educational achievements of rural households and (b) the relationship between the educational status and use of selected modern inputs (viz., HYV seeds, fertilizer and plant protection chemicals). Using various limited dependent variable techniques, researcher found that, educational achievements were strongly influenced by its economic endowments such as land and value of capital. However, in respect of the adoption of new technological package, the effect of formal education was mainly operative through eradicating illiteracy. Households with at least one literate member were found to apply greater fertilizer and had greater probability in using plant protection chemicals. However, the effect of literacy on farmers' decision to cultivate HYV seeds and the degree of adoption (i.e. proportion of HYV coverage) was not found to be statistically significant despite having expected directions. The actual level of educational achievement, however, did not have any major impact, except in the use of plant protection chemicals. This study revealed that, rather than the content of formal education, as measured by the level of

educational achievement, its role in creating farmers' awareness is more important in adopting technological changes in backward agricultural regions.

Sarawgi *et al.* (2000) made an attempt to know the extent of knowledge and adoption of tomato production technology and association among the different attributes of tomato growers with knowledge, adoption and economics of tomato crop. The study is based on data collected from a sample of 50 tomato growers selected randomly from five villages of Maihar block of Satna district, Madhya Pradesh for the year 1998-99.

The findings of the study regarding the extent of knowledge, adoption and economic performance of the tomato growers indicated that, a larger number of tomato growers had high knowledge but low extent of adoption, while extent of economic performance found to be high. It was also found that, there was significant association between different attributes, namely education, economic motivation, scientific orientation, innovativeness, contact with extension personnel and sources of information with the extent of knowledge of recommended tomato technology. The study showed that, the awareness of farmers towards technological recommendations is very poor in the study area. Therefore it is suggested that, proper extension education should be organised to make them aware of the recommended technology in the study area.

Sharma et al. (2000) stated that, training to rabbitry entrepreneurs increased the knowledge level which in turn enhanced per unit productivity and income on rabbit farms. The rabbitry has been taken up as a subsidiary occupation by a majority of the farmers. The level of education of trained entrepreneurs was comparatively higher than that of untrained entrepreneurs. The rabbitry units established by trained entrepreneurs were comparatively recent and smaller than rabbitry units of untrained entrepreneurs. The wool yield and income per rabbit was higher by 12 and 8 per cent respectively on farms of trained entrepreneurs than on untrained entrepreneurs. The number of trained

entrepreneurs facing different problems was lower than that of untrained entrepreneurs. Thus formal training has a definite role to play not only in enhancing the productivity and income but also improving efficiency.

Ramanamurthy*et al.* (2003) analysed the factors influencing decision making behaviour of farmers in the case of vegetable seeds in Andhra Pradesh. The study was undertaken in Rangareddy and Medak districts of Andhra Pradesh. A total of 89 respondents were selected from six villages by following proportionate random sampling technique. The study revealed that, literate farmers preferred to purchase HYV seeds of vegetables. Literate farmers even preferred to go and purchase the seeds by visiting the nearby town or city when the preferred variety was not available while illiterate would purchase the local variety or other variety recommended by dealers. The study revealed that, level of literacy determines the variety of seeds by farmers. The study suggested providing training and education about the use of HYV seeds to the farmers.

Laxmi and Mishra (2007) stated that, the level of education of the respondent has positive impact on the new technology adaption. They also stated that, education level of the rest of the family members also affects the decision making process. Hence they calculated Education Index (EINDEX) i.e. average education level of all the adult members of the family to reflect the education of the entire family. The study revealed that, the influence of education index on the probability of technology adoption was positive but not significant in Haryana. However, it turns out to be negative and significant in the case of Bihar. This may be due to the unobserved socio-economic variables such as least involvement of educated persons in farming**.** Hence, they feel that not only the education level of farmer but also the education level of other members in family affects the decision making process.

Pawde *et al.* (2011) stated that, socio-cultural factors like the educational status and value orientation of the farmers affect adoption of improved practices. Their study revealed that, farmers who are highly educated tend to adopt a large number of agricultural practices than those who are poorly educated. They concluded that, the level of education of a farm family has a positive relation with the adaptation to new technology.

Makwana (2013) Stated that, main aim of agricultural education is to prepare human resources for agriculture sector. The global food demand is expected to be doubled by 2050 while at the same time the availability of natural resources are continuously reducing and deteriorating. Inadequate attention to agriculture has led to increase in food prices making it inaccessible to poor people. In India, approximately 75 per cent of the poor people reside in villages who mostly are small and marginal farmers and landless labourers. This leads to overcrowding of agriculture for livelihood with lower marginal productivity. Moreover, they overexploit natural resources for their subsistence. Harmonizing science and technology inputs is the only solution to nurture rural livelihood without degrading natural resources. Hence, proper agricultural education is the only solution for the country like India to meet the increasing demand from agricultural sector. More efforts are required to transform Indian agricultural education system to make it more sensitive and responsive to the need of the country.

b. Studies Explaining the Relation between Education and the Cultivation of Particular Crop.

Saini (1963) studied cropping pattern for two periods 1936-37 and 1956-57 choosing two districts, viz. Muzzaffanagar and Meerut of Uttar Pradesh. He found that, there is a shift in favour of cash crops and superior cereals as against inferior cereals and pulses. Increased irrigation facilities, related profitability of crops and socio-economic factor

like literacy level are the three main reasons for these changes. The most important shift in the cropping pattern over the period has been in favour of sugarcanes. Increased availability of irrigation, setting up of sugar mills in the area and increase in the level of literacy during the period and support policy of the government seemed to have contributed to the big increase in the sugarcane cultivation in these districts.

Hiremath (1989) in his thesis stated that, within any size of holdings, the proportion of people acquiring higher levels of education declined when moved from the primary education to the pre-university level. A good majority (about 70 per cent) of farmers growing bidi tobacco were literate with a minimum of primary level education. The farmers in all the size grew all varieties of crops; the level of education did not seem to influence the choice of bidi tobacco varieties.

Narayanamoorthy (2000) analysed the role of farmers' education in the productivity of crops using two seasons' data of 200 sample farm households collected from one of the highly irrigated regions of Tamil Nadu. The study estimated five alternative specifications of production function (both the Cobb-Douglas and linear forms). The bivariate analysis indicated that the use of yield increasing inputs is significantly higher among the higher educated (above 5 years of schooling) group of farmers when compared to the less educated group of farmers (up to 5 years of schooling). The estimates of production function relating to the Samba paddy indicate that the coefficient of education is positive but not significant in influencing the productivity of paddy. In the Thaladi season, the coefficient of education is negative in four out of five alternative specifications, but none of them is significant. The result of the study shows that, the role of farmers' education is limited or insignificant in the productivity of crops when farmers cultivate uniform variety of crop in a modern dynamic agricultural set-up.

Awasthi *et al*. (2000) made an attempt to examine the extent of transfer and adoption of farm technology together with cost-benefit ratio and to evaluate the training programmes under Krishi Vigyan Kendra (KVK) at four villages of Majhagawan block of Satna district, Madhya Pradesh in the year 1998-99. Only crop production and home science technology were transferred by KVK in these villages. The study brought out that, during the Kharif season paddy, jowar wheat and gram crops were included in the programme for purposes of demonstrations of improved cultivation practices. Among the components of crop production technology, the highest adoption in both the seasons were reported for seedbed preparation and sowing method. Fertilizer use, plant protection measures, seed treatment and irrigation were least adopted which happen to be the purchased inputs representing a major portion of the total cost. Adoption of complete package of practices was higher on crops grown in Rabi than that in the Kharif season.

Surabhi and Praduman (2000) have estimated the cost for cultivation of rice and wheat. The data was collected from different states by dividing them into four regions i.e. (a) Eastern region comprising of Bihar, Orissa, Assam, and West Bengal states (b) Western region comprising of Rajasthan, Madhya Pradesh, Maharashtra, and Gujarat states. (c) Northern region comprising of Uttar Pradesh, Haryana, Punjab, and Himachal Pradesh states, (d) Southern region comprising of Andhra Pradesh, Tamil Nadu, Karnataka, and Kerala states. The simultaneous recursive model (in double log linear form) for rice and wheat was undertaken by using a three-least squares (3SLS) and seemingly unrelated regression estimates (SURE) for estimation procedure. The study covered the period from 1973 to 1995. The averages at state level were derived from the farm level cost of cultivation data under the “Comprehensive Scheme for the Study of Cost of Cultivation of Principal Crops”, Directorate of Economics and

Statistics, Ministry of Agriculture, Government of India. The model for rice and wheat was estimated by using 3-SLS and SURE estimation procedure.

The results of the study showed that, the decision on the adoption of HYVs is influenced significantly by rural literacy, electrification, crop irrigated area. The elasticity of HYVs with respect to literacy was higher for wheat (0.60) as compared to rice (0.38). Higher use of inputs was induced through HYVs as a result of higher rural literacy rate. The share of literacy adoption of HYVs increased from 22 per cent during 1973-90 to 74 per cent during 1990-95 for rice. In the case of wheat, literacy contribution in technology adoption increased from 42 per cent in 1973-90 to 90 per cent in 1990-95. Use of fertilizers and adoption of HYVs under rice in the eastern region is at a low level as compared to the northern and southern regions of India. Literacy is also low in this part.

The study showed that literacy has a positive and significant relation with crop productivity and a strong link between literacy and farm modernisation. Level of literacy emerges as an important source of growth in the adoption of technology, use of modern inputs like machine, fertilizers, and yield.

Bhosale (2002) examined factors responsible for agricultural diversification in Karnataka. According to him, among all other factors responsible for agricultural diversification, education is one of the most important factors. Out of 38 per cent of the farmers who opted for crop diversification towards high value crops, 36 per cent farmers had completed at least 4 years of education in formal schools and only 2 percent of illiterate farmers opted for crop diversification towards high value crops**.** This indicates that, higher the level of education higher the rate of crop diversification towards high value crops.

2.4 Concluding Observations

There is a great deal of literature available in the forms of articles in the Journals, proceedings of seminars and conferences, edited volumes of publications, chapters of doctoral thesis submitted to the Universities, books, on line publications and resource materials, which are directly and indirectly related to the present study. The present study attempted to incorporate few of them to provide the framework for the study. The above review of literature (Schultz, 1961; Psacharopoulos, 1972; Razin, 1977; Barros, 1991; Hill and King 1995; Dandekar and Rath, 2000; Gylfason and Zoega, 2001; Matusha, Siddique and Gils, 2006) found that there is positive relation between education and economic development of the countries. Studies relating to the development of specific countries have revealed that, primary and secondary education play an important role in the process of economic development in less developed countries, while the higher education plays an important role in developed and rich countries (Tilak 1986; Petrakis and Stamatakis, 2002). Similarly, primary education plays an important role in rural parts of the country while secondary and above level of education plays an important role in the urban areas of the country (Tilak 1980). Education also influences agricultural development (Dey, 1978; Tilak, 1979; Mook, 1981; Azhar, 1981; Jamison and Lau, 1982; Weir and Knight, 2000; Zavalc, Mabaya and Cristy, 2005; Gullacher, 2008; Kumar, 2008; A. C. Egun, 2009) with an impact on agricultural practices (Schultz, 1964; Greshon Feder, Richard E. Just and David Zilberman, 2003; Glauben Thomas, Tietej Hendrik and Vogel Stefen,2005; Milton and Wallace, 1982; N. R. Raviprakash, 1989; Singh, K. H. and Narendra, 1995; Atibudhi and Sahoo, 2000; Gaonkar, 2000; Kar, 2000; Malk *et al.*2000; Mishra and Hossain, 2000; Pandey, 2000; Saha, 2000; Ramanmurthy *et al*. 2003; Laxmi and Mishra, 2007; Pawde *et al.* 2011; Makwana, 2013).Some studies have found the influence of

education on the type of crop cultivated by farmers (Saini, 1963; Hiremath, 1989; A. Narayanmoorthy, 2000; Awasthi *et al.*, 2000; Surabhi and Praduman, 2000; Bhosale, 2000). Thus the studies reviewed above revealed that, there is significant impact of education on economic development. However, apart from education, many other factors such as size of landholdings, demonstration effect also influence agricultural productivity and agricultural practices. In this direction efforts are made in the present study to know the extent of effect of education on agricultural practices in Ponda taluka of Goa.

References

1. Atibudhi, H. N., Sahoo, Sarita. (2000). Effects of Education on Productivity of High Yielding Varieties of Rice in Sambalpur District Orissa. *Indian Journal of Agricultural Economics*. Vol. 55, No.3.

2. Awasthi, P. K., Gupta, J. K., Raghuwanshi, N. K., Deepak, Rathi. (2000). Impact of Krishi Vigyan Kendra on Technology Adoption and Accelerating Agricultural Productivity in Satna District of Madhya Pradesh*. Indian Journal of Agricultural Economics.* Vol. 55, No. 3.

3. Azhar, R.A. (1991). "Education and Technical Efficiency during Green Revolution in Pakistan," *Economic Development and Cultural Change* 39(3), pp 651-666.

4. Barro, R. (1991). "Economic Growth in Cross Section of Countries," *Quarterly Journal of Economics* 106, 407-443.

5. Bhosale, Y. M. (2002). "A Study of Agricultural Diversification in Kagwad Agricultural Range of Karnataka State", (Doctoral thesis), Shivaji University, Kolhapur.

6. Bisale, S. M. (2007). "*Dry Farming – A Case Study of Jath Taluka* "(Doctoral Thesis), Shivaji University, Kolhapur.

7. Dandekar Vandana, S. (2000). "*Returns to Education in Sugar Co-Operatives in Sangli District: An Economic Analysis*." (Doctoral thesis). Shivaji University, Kolhapur.

8. Debi Brown. (1984). "Effect of Education on Agricultural Productivity". *American Journal Alternative Agriculture.* Vol. 6. March, pp. 17 - 24.

9. Dey, B. (1978). "Effectiveness of Education on Indian Agriculture, "*Manpower journal*, 14 (2) July – September. Pp. 31 - 46.

10. Duraisamy, (1990). "Technical and Allocative Efficiency of Education in Agricultural Production" Retrieved from http: /www labour.

    Bnu.Edu.In/ resource/ jee/ 0212/ changes% 20in%20returns% 20ed. labor. Bnu.edu.in. 23rd May 2014.

11. Egun, A. C., (2009). "Focusing Agricultural Education for better productivity in Nigeria in the 21st Century,'' *International Journal of Educational Sciences* (2):87-90.www.citeseerx.ist.psu.edu/viewdoc/download?doi=10.**1**.**1**.602.7078.

12. Englander, A.S. and Gurney, A. (1994), "Medium term Determinants of OECD Productivity" OECD Economic Studies, 22, 49-109. Retrieved fromhttp://gbr.sagepub.com/content/17/2/257.refs.

13. Gaonkar, R. (1993*). Financing of Agriculture by Commercial Banks in Goa* (Doctoral thesis). Department of studies in Economics, Karnataka University, Dharwad, India.

14. Glauben, Thomas, Tietje, Hendrik and Stefenvogel (2005). "Farm Succession Pattern in Northern Germany and Austria – A Survey Comparison" Retrieved from.www.**irsa-world.org/prior/XI/papers/18-3**.pdf (18. 10. 2013 /3.40pm).

15. Greshon, Feder, Just Richard E. Zilberman and David. (2003). "Adoption of Agricultural Innovation in Developing Countries-A Survey*"*. *World Bank Staff Working Papers*, Number 542.

16. Gullacher, M. (2008). "The Impact of Human Capital on Farm Level. Input Use Argentina Agriculture. CEMA Working paper NO. 380, retrieved from http://hdl. Handle. Net/ 10419/ 84324.24th may 20014.

17. Gylfason, T. and Zoega, G. (2001). "Education, Social Equality and Economic Growth: A view of the Landscape," Retrieved from http://www. Ssrn. Com/.

18. Hill, M. A. and King, E. M. (1995). "Women's Education and Economic Wellbeing," *Feminist Economics* 1, 21-46.

19. Hiremath, G. K. (1989). "*Impact of Technical Change on Output, Income, Employment and Factor Shares in Indian agriculture: A case study of Karnataka BIDI Tobacco Economy and its Problems: An Economic Analysis*". (Doctoral thesis). University of Agricultural Sciences, Dharwad-5.

20. Jamison, D. T. and Lau, J. (1982). *"Farmers Education and farm Efficiency."* Baltimore M. D., John Hopkins University Press.

21. Kar, A. (2000). Role of Rural Literacy and Other Factors in Agriculture Productivity Growth of West Bengal. *Indian Journal of Agricultural Economics.* Vol. 55, No.3.

22. Kavari, J., (2000). Financing of Higher Education in Goa (2000). (Doctoral thesis). Utkal Univ., Bhubaneshwar.

23. Klasen, S. (1999), "Does Gender Inequality Reduce Growth and Development? Evidence from Cross Country Regression." *The World Bank, Policy Research Report on Gender and Development Working Paper Series*, No. 2.

24. Knight, J., Weir, S., Woldehanna, T. (2003). "The Role of Education in Facilitating Risk – Taking and Innovation in Agriculture". *Journal Development Studies*, 39:61. www.library.wur.nl/WebQuery/wurpubs/326633.

25. Kumar P., Mittal S. and Hossain Mohabub. (2008). Agricultural Growth Accounting and Total Factor Productivity in South Asia: *A review and policy implication, Agricultural Economics Research review*, Vol. 21 July- December, pp145-172. https://ideas.repec.org/a/ags/aerrae/47669.html.

26. Laxmi, V., and Mishra, V. (2007). Factors Affecting the Adoption of Resource Conservation Technology: Case of Zero Tillage in Rice- Wheat Farming Systems". *Indian Journal of Agricultural Economics* Vol.62. No.1. Jan-March 2007, pp. 126-138. www.ageconsearch.umn.edu/bitstream/.../12-**Vijay**%20**Laxmi**%20Pandey.pdf.

27. Makwana, A., K. (2013), Voice of Researches "Agricultural Education in India: Challenges and prospects." *Voice of Research* Vol.2, Issue 3. December 2013. ISSN No 2277-7733. Pp 90-94.

28. Malk, D. P., Singh, S. N., Karwasra, J. C. and Rai, K. N. (2000). Sources of Information Crop Production Technology and Its Valuation in Haryana. *Indian Journal of Agricultural Economics*, Vol. 55. No.3. July-Sept. 2000. Pp. 521-529.

29. Matshuhita, S., Siddique, A. and Giles, M. (2006). Education and Economic Growth: Case study of Australia," Retrieved from https://ideas.repec.org/p/uwa/wpaper/06-15.html.

30. Milton, M., L. T. Wallance. (1982). *Agriculture Economics and Resource management.* Prentice Hall of India Pvt. Ltd. New Delhi- 110001, second edition, pp 532-533.

31. Mishra, S. N., Hossain M. M. (2000). Role of Krishi Vigyan Kendra in Diffusion of Farm and Allied Technology among Farmers of Kalahandi District, Orissa. *Indian Journal of Agricultural Economics.* Vol. 55, No.3.

32. Moock, P. R. (1981). "Education and Technical Efficiency of Small farm Production". *Economic Development and Cultural Change*. 29(4), July, pp. 723-739.

33. Muggur, M. N. (2004). "*The Mobility of Agricultural Labourers and Their Economic Conditions in Dry and Irrigated Regions – A case study of Belgum District*".(Doctoral thesis). Karnatak University, Dharwad.

34. N. R. Ravi Prakash (1989). "*Impact of New Paddy Production Technology in Shimoga District of Karnataka State – An Economic Analysis*". (Doctoral thesis). University of Agricultural Sciences, Dharwad -5.

35. Narayanamoorthy. (2000). Farmers' Education and Productivity of Crops: A New Approach. *Indian Journal of Agricultural Economics*. Vol. 55 No.3 July-Sept. 2000. PP. 511-518. www.ageconsearch.umn.edu/bitstream/.../**2**/17-A%20**Narayanamoorthy**.pdf.

36. Pandey, R. K. (2000). Yield Gap of Wheat and Constraints in Adoption of New Technology by the Farmers in Plateau Region of Bihar. *Indian Journal of Agricultural Economics.* Vol. 55, No.3.

37. Pawde, B. B., Bhise, V. B., S. R. Takle. (2011). *Adoption and Impact of New Agricultural Technology on Tribal Agriculture.* Sereals Publications, Daryaganj, New Delhi-110002 (India) pp 69-70.

38. Petrakis P. E., Stamatakis, D. (2002). "Growth and Educational Levels: A Comparative Analysis," *Economics of Education Review* Volume 21, Issue 5, October, pp 513-521.

39. Psacharopoulos, G. (1972). "Measuring the Marginal Contribution of Education to Economic Growth". *Economic Development and Cultural Change*, 20(4) July. Pp. 641-658.

40. Ramanamurthy, B. V., Kumara D., Charyala T., and Prasad Krishna. (2003)." Factors Influencing Decision in Agricultural Marketing. *Conference Special 2003*. Pp.232-242.

41. Randhawa, S. S. (1983)," Education and Agricultural Productivity". *Productivity*, 24(1), Pp. 35 – 39.

42. Razin, A. (1977). "Economic Growth and Education New Evidence." *Economic Development and Cultural Change.* Vol. 25 (2), pp. 317-324.

43. Sadeghi, J. M. (1995)." The Relationship of Gender Difference in Education to Economic Growth. A Cross- Country Analysis,' ERF (Economic Research Forum) for the Arab Countries, *Iran and Turkey working paper* no. 9521.

44. Saha, A. (2000). Education and Adoption of HYV Technology, Evidence from Rice cultivation in West Bengal. *Indian Journal of Agricultural Economics.* Vol. 55, No.3.

45. Saini, G. R. (1963). "Some Aspects of Changes in Cropping Pattern in Western U. P." *Agricultural Situation in India.*Vol. XVIII, No- 6 pp 411-446.

46. Sarawgi, A. K., Beohar, B. B. and Agrawal, S. K. (2000). Adoption Behaviour in relation to Economic Performance of Tomato Production in Satna District of Madhya Pradesh. *Indian Journal of Agricultural Economics,* July-September 2000, Vol. 55. No 3.

47. Schultz, T. W. (1964). *"Transforming Traditional Agriculture",* New Haven; Yale University Press.

48. Schultz, T. W. (1961). *"Education and Economic Growth",* N. B. Henry ed. Social forces influencing American Education, Chicago; Chicago University Press. Pp 48-88.

49. Sharma, A. K., Mehta, Prakash, Sharma, S. K. and Guleria, J. S. (2000). Impact of Education on Productivity and Problem Tackling in Rabbitry in Hills. *Indian Journal Agricultural Economics.* Vol. 55, No. 3 July – September.

50. Singh, B. (1974). "Impact of Education on Farm Production". *Economic and Political Weekly,* Vol. 9. No. 39, September 28, pp.A-92-A-96.

51. Singh, K. H., Narendra (1995). Agricultural Innovations in Kosbad Village. *Tribal Research Bulletin,* Vol. XVII, No. 2.

52. Surabhi, Mittal, and Praduman Kumar. (2000). Literacy, Technology Adoption, Factor Demand on Productivity: An Econometric Analysis. Indian *Journal of Agricultural Economics* Vol.55 No.3 July September 2000

53. Tilak, J. B. G. (1980). "Contribution of Education to Economic Growth in Andhra Pradesh" *Manpower Journal (New Delhi)*, 16 (2) July- September, pp.31-48.

54. Tilak, J. B. G. (1986). "Education in an Unequal World," in Educational Planning: A Long Term Perspective, *Society for the Study in Regional Disparities*, New Delhi, PP.227-423.

55. Tilak, J. B. G. (1988). "Vocational Education and Economic Growth." *Journal of Educational Planning and Administration* 2 (1 and 2), Jan.-Apr., pp 157-177.

56. Tilak. J. B. G. (1979). "Literacy Education and Agricultural Productivity in India," *Indian Educational Review*, 14 (3), July, pp.1-17.

57. Weir, S. and Knight J. (2000)."Adoption and Diffusion of Agricultural Innovations in Ethiopia: The Role of Education," *Working paper series 2000 Oxford: Centre for the Study of African Economies.* www.csae.ox.ac.uk/conferences/**2000**-oia/pdf**papers**/**weir**2.pdf.

58. Zavalc, H., Mabaya, E. and Christy R. (2005), "Adoption of Improved Seeds by Small Holder Farmers in Mozambique, http://ideas. repec. org/.www.publications.dyson.cornell.edu/.../sp/**2005**/Cornell_Dyson_sp0503.pdf.

CHAPTER III

RESEARCH DESIGN

The present study has been carried out to find out the prevailing nature and extent of relationship between the educational level of farmers and farming practices carried out by them in Ponda taluka of Goa in recent times (2011-12 to 2015-16) in a careful and systematic manner by collecting information from primary and secondary sources and analysing the collected information with the help of useful and appropriate statistical measures and techniques.

3.1 Sources of Data

The study makes use of both primary and secondary sources of data.

Primary Sources

The primary data is collected directly from the sample farmers of Ponda taluka through a structured questionnaire. The questionnaire was framed to elicit information from the sample farmers keeping in mind all the objectives of the study. The questionnaire contained questions pertaining to socio-economic background of the farmers, type of crops cultivated, output produced, cost incurred, income earned marketing of the product produced, sources of finance, changes undertaken for the last twenty years by the farmers, reasons for growing a particular type of crop, view of the farmers practicing agriculture as their occupation, etc. The questionnaire used for the survey work is placed in Annexure II.

Secondary Sources

The data pertaining to different Village Panchayats of Ponda taluka, in the State of Goa, India are obtained from various published and unpublished official sources like

Economic Survey of India, Economic Survey of Goa, Indian Council for Agricultural Research (ICAR), Old Goa, Census of India, various offices of Government of Goa such as the Directorate of Agriculture, Zonal Agricultural Offices at Ponda and Valpoi - Sattari, Goa, Directorate of Archives and Archaeology, Directorate of Settlement and Land Records.

3.2 Sampling Design

To have a meaningful investigation and representative reflection of ground realities, the study selected 5 per cent of farmers (above 300 farmers) from Ponda taluka of North Goa district of Goa by following stratified random sampling technique.

Selection of the State

The state of Goa is selected for the present study for the following reasons.

1. Goa is one of the smallest states of India where the study of agricultural practices in relation to farmers' education has not been adequately done so far.
2. As compared to other states of India, Goa was freed from colonial rule lately and as such it offers an ideal situation for a comparative study of agricultural practices with the rest of India.
3. Goa, which already exhibits a semi urban outlook with an urbanization level of over 62 per cent, is in the process of further urbanization (Government of India, 2014-15. Economic Survey of India, 2014-15). Therefore, it would be of great academic interest and would be a helpful guide for policy formulation for development of agriculture sector.
4. In the light of decreasing scope for mining, which was one of the prime activities till 2012-13, the development of agriculture is required to play a

pivotal role in generating employment and for sustaining the development of the state.

5. In some rural as well as some urban parts of Goa, agriculture is still a major source of earning of a large section of the population.

Selection of the District

The state of Goa has two districts namely South Goa and North Goa. On agricultural front, North Goa district is more prosperous than South Goa. Goa has a total of 78,020 holdings with an operated area of 88,994 Hectares. North Goa district has nearly 59 per cent of the holdings with 58 per cent of total operational area while, South Goa has 41 per cent of total holdings with 42 per cent total operated area (Government of Goa 2010-11, Agricultural Census Survey, 2010-11).

Selection of Taluka

Ponda taluka of North Goa district has been selected for the present study. It lies at the heart of the state, which has been historically a hub of agricultural activities with a wider scope for horticultural crops due to the availability of numerous springs in the taluka. Mining was an important economic activity in Goa up to 2012-13. All the mines were in operation in Bicholim, Sattari, Sanguem, Quepem and Bardez talukas of Goa. In Ponda taluka not a single mine was in operation till 2010-11(Directorate of Mines, Goa-2012). So it is felt that the economic development of Ponda taluka can be very well supplemented by agricultural activities.

Selection of Villages

Ponda taluka has eighteen village panchayats (Revenue Villages) and one municipality representing all the villages and urban area. A minimum sample size of 5 per cent of the operational holdings from across all the village panchayats were selected to have a

proper representative sample. The above sample size is selected based on all the revenue villages to portray true representation of topographical, spatial (regional) and socio-economic variations existing in the revenue villages and among the farmers. The table number 3.1 provides the details of selection of representative samples.

According to Agriculture Census of Goa 2005-06, there were 5612 operational holdings in Ponda taluka of Goa. However, the total number of operational holdings in Ponda taluka has been considered as 5422 by deducting 190 operational holdings belonging to the revenue villages of Usgaon-Ganjem. These villages were excluded from the analysis pertaining to Ponda taluka as these two villages formed the part of other Legislative Assembly Constituencies (Pale and Valpoi constituencies respectively). Moreover, when the talukas of Goa were getting restructured in 2012 to form a new taluka named as Dharbandora, these two revenue villages were supposed to be transferred to other talukas.

Out of the total number of operational holdings in Ponda, over 84 per cent were marginal holdings, nearly 13 per cent were small holding, slightly over two per cent were medium holdings and less than one per cent were large holdings (Table 3.2). The sample from each of the panchayat is further selected so as to have proper representation of all the four categories of farmers that is marginal, small, medium and large farmers. In order to have a proper representation, adequate percentage of farmers were chosen randomly depending on the size of each type of operational holdings (Table 3.2).

Table 3.1: Panchayat-wise Selection of Sample Operational Holdings from Ponda Taluka

Sr. No	Name of the Panchayat/ Municipality	Total No. of operational holdings in the Panchayat/ Municipality	5% of operational holdings	Actual No. of sample selected	Sample as Percentage of holdings.
1.	Bandora	256	13	15	5.85
2.	Betora- Nirankal	758	38	46	6.06
3.	Betki- Khandola	27	3	3	11.11
4.	Bhoma- Adkona	90	5	6	6.66
5.	Bori	338	17	20	5.91
6.	Kundaim	318	16	22	5.03
7.	Curti-Khandepar	155	8	12	6.45
8.	Durbhat	125	9	11	8.8
9.	Madkaim	180	9	12	5.00
10.	Panchwadi	218	11	13	5.96
11.	Ponda	87	5	5	5.74
12.	Quela	150	8	8	5.33
13.	Querim	320	16	19	5.93
14.	Shiroda	901	50	55	6.10
15.	Tiverem	74	4	5	6.75
16.	Veling	679	34	35	5.15
17.	Verem	329	17	17	5.16
18.	Volvoi	89	5	5	5.61
19.	Wadi–Talauli	80	4	4	5.00
	TOTAL	**5422**	**272**	**313**	**5.77**

Source: Zonal Agricultural Office, Ponda Goa.

Accordingly, 240 (5.24 per cent) of marginal land holdings, 50 (7.24 per cent) small operational holdings, 12 (10 per cent) medium size operational holdings and 11 (27.50 per cent) large operational holdings were selected randomly as samples for the study. Farmers from each selected operational holdings were interviewed with the help of a structured questionnaire.

Table 3.2: Selection of Sample Holdings by Classification

Type of Operational Holding	Total No. of operational holdings	Sample size	Percentage of sample to the total operational holdings
Marginal	4572 (84.32%)	240	5.24
Small	690 (12.73%)	50	7.24
Medium	120 (2.21%)	12	10.00
Large	40 (0.74%)	11	27.50
Total	**5422 (100%)**	**313**	5.77

Source: Compiled from Agriculture census of Goa, 2005-06.

3.3 Methodology

The present study is an attempt to investigate relationship between education of farmers and different agricultural practices in Ponda taluka of Goa. The term agricultural practices is used in a broad sense so as to include not only methods in which agricultural activities are carried out but also the proportion of area under different crops, rotation of crops, area under double cropping, use of different inputs in production process, farm management system, costs and benefits of producing different crops. The required information was obtained from primary and secondary sources.

The collected information was analysed by using appropriate statistical techniques. Arithmetic mean, median, percentiles, Correlation co-efficient, regression analysis have been used to analyse the data. Coefficient of correlation has been used to establish the relation between the level of education and the various agricultural practices undertaken by the farmers.

For the purpose of analysis, the different levels of education are assigned a numerical value in ascending order as illiterate -0, primary – 4, middle -7, secondary -10, higher secondary -12, Graduation – 15, Post-graduation-17, professional Graduation -16, I.T.I. -11, Diploma -13.Farmers with graduate, post graduate and professional level of

education are clubbed together and are referred as graduates and above while farmers with I.T.I. and diploma level together is referred as other category.

Correlation coefficient and Regression analysis have been used to assess the impact of education on cost, productivity and net income earned from the major crops grown in Goa. Chi Square and regression analysis are used to test the hypothesis of the study. The collected data are represented in the form of tables and graphs.

References

1. Directorate of Agriculture, Government of Goa (2005-06) *Agriculture Census of Goa*. Panaji, Goa. Retrieved from https://www.**goa**.gov.in/pdf/**goa-agriculture-census-2005-06**.pdf
2. Directorate of Agriculture, Government of Goa. (2010-11). *Agriculture Census of Goa* Panaji, Goa. Retrieved from www.**goa**dpse.gov.in/**Agricultural**%20Report%202010.pdf
3. Directorate of Mines (2011), Details of Operational Mines for the period 2010-11, "Report on Location of Mines in Goa (2010-11)", Govt. of Goa, Panaji, Goa. Retrieved from www.goadmg.gov.in/operational mines.aspx12/11/2015.
4. Government of India. (2014-15). Economic Survey of India, (2014-15). Retrieved from **india**budget.nic.in/**survey**.asp.

CHAPTER IV

STATUS OF AGRICULTURE IN GOA

4.1 A Profile of Goa

Goa is the smallest state of India with a geographical area of 3702 sq. kms. and the fourth smallest one by size of population. It is situated on the western coast with the boundaries defined in the North by Terekhol River separating Goa from Maharashtra. To the east and south, it shares boundaries with the state of Karnataka, while to the west by the Arabian Sea. The state presents a hilly area sloping downwards to the coast with rivers providing inland waterways, with a navigable length of 256 kms. (Government of India Gazetteer, 1979).

The following map depicts the location and internal administrative divisions of Goa.

Figure 1: Map of Goa

Goa has been divided into two districts that are North Goa and South Goa. Panjim is the capital city of Goa and headquarter of North Goa. Margao is headquarter of South

Goa district. These two districts of Goa are further divided into twelve talukas. Bardez, Bicholim, Pernem, Ponda, Sattari and Tiswadi talukas belong to North Goa while Canacona, Mormugao, Quepem, Salcete, Sanguem and Dharbandora (Kaisuvkar) come under South Goa district.

According to the Census of India 2011, Goa had a population of 14.58 lakh with a sex ratio of 973 and overall density of population of 394 per sq. km. The rural Goa has a semi urban feature with an urbanization level of more than 62 per cent (Census of India, 2011). The State has a higher overall literacy rate of around 89 per cent, male literacy rate of 93 per cent and female literacy of 82 per cent. The Per Capita Net State Domestic Product of the State is seen increasing at a faster rate. At constant prices it increased from Rs. 24, 421 crores in 2012-13 to Rs. 26, 092 crores in 2013-14 registering a growth rate of 6.84 per cent over the previous year (Government of Goa, 2013-14, 2014-15; Economic Survey of Goa, 2013-14, 2014-15).

The sector-wise contribution to the Gross State Domestic Product (GSDP) shows that, tertiary sector plays a very important role in Goan economy with a share of over 63 per cent in the SDP in 2013 followed by secondary sector (31 per cent) while primary sector had a meagre share of around 5 per cent (Government of Goa, Economic Survey of Goa, 2014-15). Most of the demographic features of the state are better compared to those for the country as a whole (Table 4.1). The state ranks 4th in terms of literacy level as per 2011 census and had the highest per capita income in the country as per economic survey of 2014-15 (Government of Goa, Economic survey of Goa, 2014-15).

Table 4.1: Demographic Features of Goa and all India (2011)

Sr. No.	Indicators	North Goa	South Goa	All Goa	All India
1	Total population (in lakh)	818008	640357	1,458,365	1.21(billion)
2	Density of population (per sq.km)	471	326	398	382
3	% of urban population	NA	NA	62.17	31.16
4	Sex ratio	963	986	974	946
5	% of population below poverty line	NA	NA	5.09	21.9
6	Literacy rate	89.57	87.59	88.58	74.04
7	Birth rate	16.81	13.04	14.92	20.97
8	Death rate	9.36	6.68	8.02	7.48

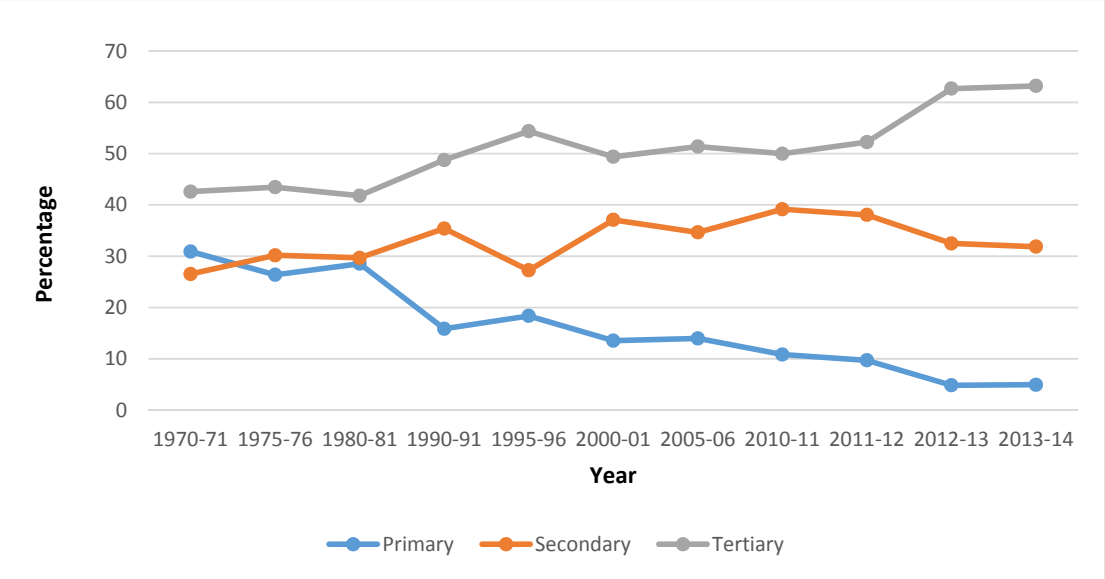
Source: Compiled from Hand book (2011) Directorate of Statistics and Planning Government of Goa & Economic Survey of Goa & India – 2014-15.

The contribution to the Gross State Domestic Product (GSDP) by broad sectors at constant prices clearly indicates declining role of primary sector in the Goan economy over the years (Fig. 4.2). The contribution made by primary sector to GSDP was nearly 31 per cent in 1970-71, which declined to 16 per cent in 1990-91 and further to below 5 per cent in 2012-13. However, a marginal increase in the contribution of primary sector to GSDP is observed during the year 2013-14, which might be due to ban and closure of mining activity in the state.

The distribution of Goan workforce reveals that, large proportion of the workforce belongs to the category of other workers, which has been increasing over the decades. The proportion of other workers in the total workers increased from 70 per cent in 2001 to over 87 per cent in 2011 with an Annual Compound Growth Rate of two per cent. In the year 1960-61, about 60 per cent of the workforce was engaged in agriculture which declined in successive years (Gazetteer of Goa, 1979). The proportion of cultivators

and agricultural labourers has decreased in absolute as well as in relative terms over the years indicating a negative Compound Growth Rate of over four per cent and nearly three per cent respectively between 1991 and 2011. The proportion of cultivators has declined from 16.6 percent in 1991 to 9.7 percent in 2001 with a corresponding decline in agricultural labourers from 10.9 per cent to 6.9 per cent (Table 4.2).

Fig 4.2: GSDP by Broad Sectors at Constant Prices (2004-05) (in Percentages)



Source: Compiled from Economic survey of Goa (2014 -15)

Table 4.2: Distribution of Workforce in Goa, 1991-2011

Sr. No.	Category	1991	2001	2011	ACGR (%)	
					1991-2011	2001-2011
1	Cultivators	68,636	50395	31354	-4.04	-5.14
		16.63	***9.64***	***5.43***		
2	Agricultural Labourers	44,775	35806	26760	-2.67	-3.18
		10.85	***6.85***	***4.63***		
3	Household Industry Workers	9,835	14746	14708	2.14	-0.03
		2.38	***2.82***	***2.54***		
4	Other workers	289490	421908	504426	2.97	2.00
		70.14	***80.69***	***87.38***		
5	**Total Workers**	**412736**	**522855**	**577248**	1.78	1.11
		100.00	***100.00***	***100.00***		

Note: Figures in Italic represent percentage to the total

Source: Census, Government of Goa, 2005-06 & Economic survey of Goa 2013-14

4.2 Agriculture in Goa

Agriculture plays an important role in the economic development of a country. Since agriculture meets the demand for necessities and provides employment to vast majority of population, its development is of vital importance. Agriculture being the primary sector played a very significant role in the Indian economy which is evident from its contribution to the GDP, employment and its share in the country's export. In the country, its contribution to GDP was 56.5 per cent in 1950-51. Under the five year plans with service and manufacturing sectors growing rapidly and agriculture sector limping, the percentage share of agriculture in GDP declined and reached a level of 14.4 per cent in 2010-11 (Government of India, 2011-12; Economic survey, 2011-12).

India has a variety of climatic and soil conditions, which results in diverse agro-climatic zones and makes it possible to grow a wide variety of agricultural products. This is partially true even in the case of the tiny state of Goa. In Goa also agriculture sector played an important role like Indian economy before 1970 .The original settlers in Goa brought extensive land under cultivation (De Souza Savio, 2014) and these settlers later formed associations and named it as "Gaonkars". "Gaonkars" were settled in various districts and villages. Larger parts of village land remained common property and was managed commonly by the Gaonkars of the village. Gaonkars were called "Communidades", by Portuguese when they started ruling Goa. According to the 'Foral de Usos e custumes' (Register describing social system of Goan Villages dated 16th September, 1526), the term Gaonkar refers to a governing or managing headman, in the Deccan or on the west coast. When Goa came under the rule of Kadambas, the Muslims and the Portuguese, the governing and management of village affairs became the primary duties of the village Gaonkars.

The most important feature of the communidade was that, it owned all the land in the village other than the ones owned by private families. It administered the land by auctioning rights of cultivation of its paddy fields and harvesting of its plantation of coconuts, cashews or mangoes for a period of three year. These auctions generated 80 to 90 per cent of the income of the communidades. This income was used to pay land tax to the government, provide community services, maintain religious places, administer the communidade properties, repay loans, build financial reserves and pay dividend to the shareholders. Communidades used to spend 20 to 25 per cent of its annual income on property development works like lining paddy fields with laterite blocks to prevent flooding, lining water courses, and allocating harvested water, planting orchards of long maturing trees like coconuts, mangoes and cashews (De Souza Savio 2014) .

Since the Gaokares or communinades had the sole ownership of the wild unclaimed land of the village, they had the full right to give the vacant uncultivated land to any of the landless villagers freely among those who rendered various services to the village in one form or the other, like temple brahmin, gatekeeper, washer man, cobbler, carpenter and black smith. Gaonkars were free to give the land to such villagers who were ready to bring waste land under cultivation in return for a payment of rent at a concessional rate for a period of 25 years and thereafter at a full customary rate. However, Gaonkars did not had any right to give the village land to non- residents of the village. The consent of all the Gaonkars was required for the sale and purchase of any inherited property in the village.

4.2.1 Land and Climatic Condition

Goa has three different types of land for agricultural activities i.e, Khazan land, Ker land, and Morod land. Khazan land that covered an area of 43 per cent of paddy

cultivation (Techno Economic survey of Goa, 1964) consists of low-lying areas, often below sea level along the estuaries. This land is used for monsoon paddy crop followed by Rabi vegetables. Pisciculture is also carried out in limited areas by regulating flow of water. Ker land that constituted an area of about 41 percent of the paddy cultivation is situated at low elevation above sea level having a high water table. Arable, sandy loams soils fit for multiple cropping through irrigation. Rabi paddy, vegetables, pulses, etc. are grown in these areas. Morod land which covers an area of about 16 per cent is upland or terraced field suitable for horticultural / plantation crops or single rain fed crop of paddy. Morod lands are very low in fertility and are subject to rapid erosion. They are in fact rocky tracts in the red laterite hilly areas and paddy is grown on such tracts (Gazetteer of the Union Territory Goa, Daman and Diu. 1979).

Goa has mainly three categories of soil, viz., laterite or lateritic, alluvial and sandy. The soil of Goa is mainly lateritic (81 per cent). The agricultural low lying lands mainly of coastal talukas are alluvial belts (8 per cent), primarily formed through sedimentation along the principal rivers. Sand dunes (11 Per cent) are found along the coastal lines. Most of the remaining land which is under forests originates from the archaeological rock formation (Government of Goa: Directorate of Agriculture, Golden Jubilee Report, 1961- 2011).

The climate of Goa is warm and humid. During the month of June to September, Goa gets heavy rainfall from south-west monsoon. The average annual rainfall in the state is about 3,500 mm and humidity is generally above 60 per cent. Round the year the temperature varies on an average between 20 and 36 degree centigrade (Techno Economic Survey of Goa, Daman and Diu, 1964).

In Goa traditional sources of irrigation are storage tanks, small diversion bandharas, natural spring and wells. For Rabi paddy irrigation is mostly from storage tanks. In

some places small diversion works are constructed on streams to irrigate paddy fields during Rabi season. Considerable area under areca nut depends on various springs at higher altitude. After liberation of Goa, a number of Government “lift irrigation schemes” were started. Irrigation wells were also opened. Further, Salaulim and Anjunem irrigation projects of the state have added more than 10,000 hectors of land to irrigated area (Government of Goa: Golden Jubilee of Liberation Report, 1961-2011).

4.2.2 Agriculture during Portuguese Rule

During Portuguese rule agriculture was not given importance as it was treated only as a subsidiary industry. Most of the agricultural products were imported from the neighbouring states like Maharashtra and Karnataka which worked cheaper than investing in agricultural inputs to produce them locally. Due to this reason, agricultural practices in Goa remained backward. Even now, it is based on the century old system of conservation of water for irrigation by small bunds made of mud. After liberation of Goa, the old system of agricultural practices gradually became ineffective particularly in low lying area with the increase in other economic activities like mining (De Souza, 1990).

4.2.3 Agriculture during Post Liberation Period

After the liberation of Goa and particularly more recently, agriculture is being regarded as an important sector. In spite of the fact that over-three-fifths of the working population has agriculture as the primary occupation and 39 percent of the total surface area is under agricultural crops, yet this sector contributed only about one-sixth to the Net State Income (Government of Goa: Agriculture Census Report, 2005-06) and contributed only 3.84 per cent during 2014-15 (Government of Goa, 2015-16,

Economic Survey of Goa). Even though, rich varieties of high value crops like coconut, mango, areca nut, pineapple and vegetables are grown, the average production thereof is still unsatisfactory offering immense scope for development.

Recently farmers in Goa prefer to undertake the cultivation of non-food grain crops rather than food grain crops leading to a momentum in horticulture activity. At present horticulture is the major agricultural activity in the state that accounts for nearly 61 per cent of the total cropped area. Horticulture crops in the state include cashew, mango, banana, coconut, etc. This is evident from the fact that the total land area cultivated under paddy has come down from 52177 hectors in 2005-06 to 47237 hectors in 2011-12. On the other hand, the total cultivated area under horticulture crops has increased from 104033 hectors in 2005-06 to 105357 hectors in 2011-12 (Government of Goa, 2012-13; Economic Survey of Goa, 2012-13). There is a change in cropping pattern in Goa as farmers are shifting from the cultivation of low value crops to high value crops.

The area under cultivation in the state shows an increase between 2001-02 and 2011-12 (Table 4. 3). But there was a decrease in the area under cultivation during the subsequent years, that is from 2012-13 and 2013-14. During this period, the relative shares of paddy and sugarcane, in the total cultivated area show a slight decline while that of cashew, coconut, areca nut, banana, pineapple, and vegetables show an increase.

However, the production of most of the crops in the state have remained almost static, there has been a shortfall in the targeted area coverage and production of different crops except for ground nuts. The productivity per hector of land has increased in the case of almost all the crops (Table 4. 4).

4.3 Pattern of Land Utilisation in Goa

The state has 3, 61,113 hectors of total area for land utilization of which 1,31387 was the net sown area (35.49%). It has a forest cover of 34.74 per cent cultivable waste land

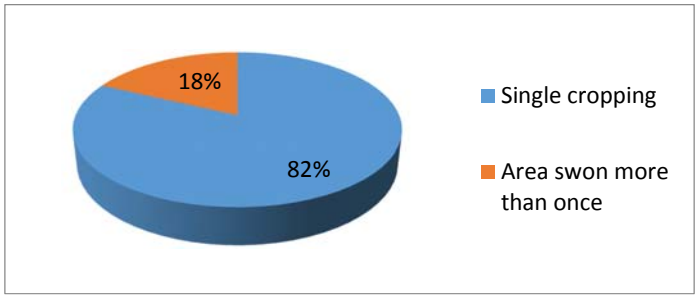
of 14.54 per cent and permanent pastures of 0.36 per cent of the total area. Over 10 per cent of the land is not available for cultivation (Table 4.3). Out of the net sown area, nearly 18 per cent area was sown more than once while remaining 82 per cent was sown once in a year (Fig 4.3). A major proportion of net sown area is used for growing horticulture crops (59.54 per cent) followed by food grains (37.65 per cent). A small area was used for cultivating sugarcane and oilseeds (2.81 per cent) (Table 4.3). Over three fourth of the net sown area (76 per cent) was dependent on monsoons while, 24 per cent of the net sown area was under irrigation (Fig. 4.4). Total population supported by agriculture was 16 per cent while 92 per cent farmers were holding only up to two hectors of land (Table 4.3).

Table 4.3: Pattern of Land Utilisation in Goa, 2009

Land Utilisation	**Area in hectors**	**Percentage**
Total area for land utilization	3,61,113	100.00
Forest cover	1,25,473	34.74
Land not available for cultivation	37,137	10.28
Permanent pastures & other grazing land	1,305	0.36
Cultivable waste land	52,533	14.54
Net area sown	1,31,387	35.49
Total cropped area	1,60,320	46.94
Food grain crops	55,148	37.65
Horticulture crops	1,01,481	59.54
Sugarcane, oilseeds	3,721	2.81
Population supported by agriculture	-	16
Holding up to 2 Ha	-	92

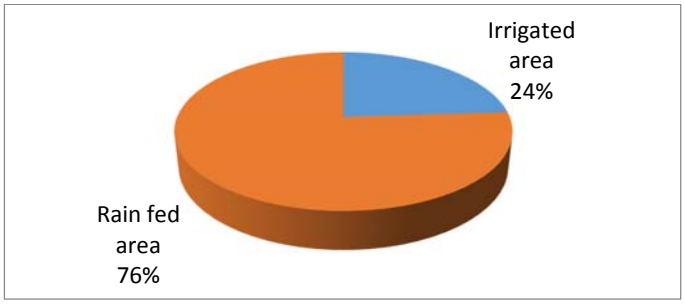
Source: Government of Goa, Golden Jubilee of Liberation Report (1961-2011)

Fig. 4.3: Area Cultivated More than Once and Single Cropping



Source: Compiled from Government of Goa, Golden Jubilee of Liberation Report (1961-2011)

Fig. 4.4: Area under Irrigation and Rain Fed in Goa



Source: Compiled from Government of Goa, Golden Jubilee of Liberation Report (1961-2011)

4.4. Trends in Agricultural Production in Goa

The total cultivated area in Goa increased considerably from 111373 hectors in 1960-61 to 157302 hectors in 1997-98 (Table 4.4). But the area under crops decreased to 152958 hectors in 2001-02 and further to 147750 hectors in 2013-14 with slight fluctuations in between. The soil and climatic condition of Goa facilitate the production of the following crops (Government of Goa, Golden Jubilee of Liberation Report 1961-2011).

Fruits: Under the category of fruits Mango, Cashew, Coconut, Banana, Pineapple, Jackfruit, Areca nut, etc. are grown.

Cashew is one of the main crops grown in Goa. There has been a continuous increase in the percentage share of area under cultivation of cashew and has emerged as the major crop of Goa overtaking paddy. Its share in the total area under cultivation has

increased from 29 per cent in 1960-61 (which was the second major crop) to around 38 per cent in 2013-14 (Table 4.4). The productivity of cashew crop also has increased from 9.23 tons per hector to 43.50 tons in 2013-14 (Table 4.5).

In the case of coconut, the percentage share of land under cultivation has slightly increased during the period from 1960-61 (16.61%) to 2013-14 (17.43%) while, the productivity per hector of land has increased from 378,440 nuts in 1960-61 to 497,670 nuts in 2013-14.

Percentage share of areca nut crop in the total area under cultivation has decreased marginally between 1960-61 (1.55%) and 2009-10 (1.18%). However, the productivity per hector of areca nut has increased from 100.81 tons in1960-61 to 166.38 tons in 2013-14.

The percentage share of area under banana cultivation has increased form nearly one per cent in 1960-61 to 1.57 per cent in 2009-2010. The banana productivity almost doubled from 600 tons in 1961-62 to 1132 tons per hector in 2013-14.

Percentage share of area under pineapple cultivation has registered a marginal increase from 0.04 per cent in 1960-61 to 0.20 per cent in 2009-10, while the productivity per hector of pineapple increased significantly from 1000 tons during 1960-61 to 1661 tons per hector in 2009-10.

Field Crops: Under field crops, paddy is the major crop cultivated in Goa. Other crops under this category are ragi, sugarcane, and groundnut.

Paddy which was the major crop of Goa has been losing its importance as evident from the percentage share of area under cultivation of paddy has decreased considerably from 45 per cent in 1960-61 to 29 per cent in 2013-14 (Table 4.5). But the productivity per hector of paddy registered almost three fold increase from 159 tons to 443 tons during the same period (Table 4.5).

In the case of groundnut, the percentage of area under cultivation which was negligible in 1960-61 (0.04%) increased to over two per cent in 2011-12 while decreased to 1.75 per cent in 2013-14. Accordingly the total production of groundnuts continuously increased from 49 tons in 1960-61 to 8000 tons in 2011-12 but later decreased and was 6590 tons in 2013-14. The productivity of land cultivating groundnut has increased significantly from 98 tons per hector in 1960-61 to 254 tons in 2013-14.

In the case of sugarcane, the percentage share of area under cultivation has been negligible over the years (0.06 in 1960-61 and 0.59 per cent in 2013-14). The total sugarcane production increased significantly between 1960-61 (28228 tons) and 2001-02 (70565 tons) but decreased in the succeeding years. The sugarcane productivity of land increased from 4326 tons per hector in 1960-61 to 5856 tons in 2001-02 but decreased to 5091 in 2011-12. However, in the later years it increased and was 5467 tons per hector in 2013-14.

Vegetables: Main vegetables grown in Goa are Brinjal, Lady Finger, Chilies, Cucumber, Pumpkin, Gourds, Radish, Bottle gourd and Long beans.

There has been a remarkable increase in the area under cultivation of vegetables and their productivity in Goa. The percentage share of area under cultivation of vegetables increased from a negligible 0.07 per cent to 4.74 per cent and productivity increased from 813 tons to 1141 tons per hector during the period from 1960-61 to 2013-14.

Flowers: Generally, Jasmine, Dalia, Hibiscus, Marigold, Orchids, Gerbera, etc. are grown in Goa and were not grown on a commercial basis. However, recently few farmers have started growing flowers on commercial basis.

Spices: Among spices, Goa is known for black pepper, nutmeg, kokum, cinnamon, etc. These spices are grown along with other horticultural crops.

Tubers like yam, elephant foot, sweet potato, etc. are grown in Goa on a small scale along with other horticultural crops.

Table 4.4: Trends in Cultivated Area by type of Crops in Goa (in percentages).

Crop	**1960-61**	**1997-98**	**2001-02**	**2011-12**	**2012-13**	**2013-14**
Paddy	45.17	35.30	32.29	30.62	29.98	28.98
Pulses	6.28	6.53	6.18	6.45	6.51	5.48
Groundnut	0.04	0.91	1.09	2.07	2.03	1.75
Sugarcane	0.06	0.83	0.79	0.59	0.56	0.59
Cashew	29.20	33.19	35.34	36.13	36.47	37.86
Coconut	16.61	15.76	16.36	16.68	16.82	17.43
Areca nut	1.55	0.92	1.05	1.12	1.13	1.18
Banana	0.99	1.19	1.37	1.48	1.50	1.57
Pineapple	0.04	0.19	0.20	0.18	0.19	0.20
Vegetables	0.07	4.80	4.97	4.21	4.35	4.74
Black pepper	NA	0.37	0.37	0.47	0.47	0.22
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
In Hectares	**111373**	**157302**	**152958**	**154277**	**152872**	**147750**

Source: Compiled from Directorate of Agriculture Government of Goa 2014-15 and Economic survey of Goa 2014-15

Table 4.5: Trends in Total Production and Productivity by Type of Crop in Goa (in tons).

	1960-61	1997-98	2001-02	2011-12	2012-13	2013-14
Paddy	79948	221253	126523	182945	184282	189760
(in tons)	*158.94*	*398.41*	*256.21*	*387.29*	*402.10*	*443.16*
Pulses	3500	7799	8368	8286	8974	8926
	50.01	*75.90*	*88.56*	*83.28*	*90.20*	*110.20*
Groundnut	49	2552	2527	8000	7469	6590
	98.00	*177.59*	*151.95*	*250.47*	*240.32*	*254.34*
Sugarcane	28228	64200	70565	46584	46006	47669
	4326	*4938*	*5856*	*5091*	*5387*	*5467*
Cashew	3000	5220	22976	23240	23804	24332
	9.23	*10.00*	*42.50*	*41.70*	*42.70*	*43.50*
Coconut (in million nos.)	70	120	125	129.28	122.72	128.15
	378440	*484105*	*499500*	*502449*	*477287*	*497670*
Areca nut	1735	1800	2500	2867	2884	2895
	100.81	*124.14*	*156.25*	*165.91*	*166.80*	*166.38*
Banana	6600	10650	15482	25824	25918	26308
	600.00	*568.00*	*737.24*	*1131.14*	*1132.78*	*1132.01*
Pineapple	400	4500	4500	4562	4800	4900
	1000.00	*1500.00*	*1500.00*	*1658.91*	*1660.90*	*1661.02*
Vegetables	634	69460	70467	78201	80511	79920
	812.82	*920.00*	*927.20*	*1203.46*	*1211.60*	*1141.06*
Black pepper	NA	103	174	234	231	234
	NA	*17.49*	*30.37*	*32.01*	*32.04*	*73.58*

Note: Figures in Italic represent per hectare productivity (in tons).

Source: Directorate of Agriculture Government of Goa 2014-15 and Economic survey of Goa 2014-15.

4.4.1 Agro Processing: Development of agro processing industries are essential for the development of agriculture sector as processing of products adds value to agriculture produce and helps farmers to get better prices for their products. Cashew kernel processing, Feni extraction are the important agro-based industries found in Goa. Firms processing fruits like mango, kokum, jamun have been coming up in Goa which has a great opportunity to grow further as the demand for processed fruits has been increasing in the modern days. Agro-based cottage industries such as making of papad, pickles, medicine, masala, etc. are also coming up. In order to encourage such industries state government is promoting the development of Self Help Groups (SHGs) by introducing schemes like Yashswini. Under this scheme financial assistance of rupees one lakh is provided by the Social Welfare Board to each of the SHGs. This financial assistance includes 25 per cent subsidy and 75 per cent interest free loan repayable in five years (Department of social welfare).

4.4.2 Marketing: Development of agriculture needs availability of proper marketing facility. The marketing facility for the agriculture produce in Goa is available at Government market yards, co-operative societies, private dealers, local market, etc.

4.4.3 Agro Tourism in Goa: Goa is a popular global tourist destination and presently growing as one of the preferred agro eco-tourism destination. Farmers having agriculture as base with spice and horticulture plantation, floriculture and nature resources like rivers, ponds, rich biodiversity, jungles with various flora and fauna, adventurous sports, healthy and peaceful environment with entertainment are venturing into this business along with agriculture (Government of Goa. Golden Jubilee of Liberation Report 1961-2011). This has facilitated increased attraction towards agriculture, especially tropical plantation in Goa.

4.5 Concluding Remarks

The contribution made by primary sector to GSDP has declined from nearly 31 per cent in 1970-71,to below 5 per cent in 2012-13.But the closure of mining during the year 2013-14 has forced the farmers to look positively towards farming activities in the state. The production and productivity of all the crops in the state have increased significantly between 1960-61 and 2013-14 with some fluctuations in between in the total production of some of the crops like, paddy, sugarcane, groundnuts and coconuts.. Recently farmers in Goa prefer to undertake the cultivation of non-food grain crops rather than food grain crops leading to a momentum in horticulture activity. At present horticulture is the major agricultural activity in the state that accounts for nearly 61 per cent of the total cropped area.

Even though there has been considerable improvement in productivity of agricultural sector in Goa, it is just not sufficient to meet the demand. Due to increasing labour costs, cultivation of field crops especially paddy is becoming unprofitable. The farmers of the state are therefore increasingly taking up the cultivation of horticultural crops. Goa being a highly preferred tourist destination for domestic and foreign tourists, there has been ever increasing demand for horticulture crops like high value vegetables, herbs, corns, fresh flowers, herbal medicines, etc. The increasing demand for horticulture crops is also due to the inflow of outside labour force. The demand for horticulture crops unlike food crops are relatively income elastic. Hence, the increasing Per Capita Income in the state has been leading to considerable increase in the demand for these crops. Due to this, Goa has to depend on neighbouring states like Maharashtra and Karnataka for supply of vegetables and other horticultural products. Even though cashew cultivation has grown widely the manufacturers of cashew nuts have to import

raw cashew from other countries like Sri Lanka, Malaysia, etc. to meet their requirements.

Declining involvement in agriculture may be attributed to small land holdings, high wages and non-availability of agriculture labourers. In addition to this, increasing urbanization has exerted pressure on land making the agriculture activity economically less viable in relative terms.

Considering these strengths and weaknesses, a number of measures have been initiated to revitalize the agriculture sector. It is a positive sign that though the percentage share of the farming population has been reducing, the annual agriculture production under major crops like paddy, vegetable, Cashew and coconut have been gradually increasing due to various incentives provided to the farmers, such as high yielding variety seeds, better management practices, mechanization in agriculture, agriculture infrastructure and remunerative rate for the produce.

References

1. Asian Educational services. (1986).*A Historical and archaeological sketch of Goa.* New Delhi. PP. 115-116.
2. Baden, P, (1892). The village of Goa in the early 16th century. *Journal of the Royal Aesthetic society,* 1900.Vol.32, P.277.
4. Baden, P. (1957). *The Indian village community*, New Haven.1957, p.362-365.
5. Department of Social Welfare, Government of Goa (2015). socialwelfare.goa.gov.in/schemes/cat/91
6. De Souza, S. (2014). "*The Comunidades of Goa*" Retrieved from https://en.wikipedia.org/wiki/History_of_Goa.
7. De Souza, T. R. D. (1990). Goa through the Ages: An Economic History, pp.220-221, Issue 6, Goa University publication series, ISBN 81-7022-2265
8. Dhume, A. R. (1986). *The Cultural History of Goa from 10000 B.C- 1352 A.D*. Panaji Goa. pp.100-185. nla.gov.au/anbd.bib-an5829585
9. Directorate of Statistics and Planning Government of Goa & Economic Survey of Goa & India – 2014-15. Hand book (2011). *Retrieved from* **goa**dpse.**gov**.in/publications/**Economic_survey_2014-15**.pdf
10. Esteves, S. (1966). *Goa and its features. Mumbai*: Manaktalas. PP. 8.
11. Gaonkar, R. R. (1993), *Financing of Agriculture by Commercial Banks in Goa.* (Doctoral thesis) Department of studies in Economics Karnatak University, Dharwad India.
12. Gazetteer of the Union Territory Goa, Daman and Diu. (1979). *District gazetteer, Volume1*. Panajim Goa; Gazetteer Dept., Govt. of the Union Territory of Goa, Daman and Diu.
13. Goa. (India: State). (2001). Directorate of Archives and Archaeology, Goa University. Goa in the sub-continent: Seminar papers. Goa: Directorate of Archives and Archaeology, Govt. of Goa.
14. Gomes, O. (1987). *Village Goa: A study of Goan Social Structure and Change. S. Chand,* Pp. 426.
15. Government of Goa. (2005-06). Agricultural *Census of Goa*. (2005-06). Retrieved fromecostatassam.nic.in/reports/**agri_census2005-06**.pdf

16. Government of Goa. (2010-11). *Agricultural Census of Goa.* (2010-11). Retrieved from**www.goa**dpse.gov.in/**Agricultural**%20Report%202010.pdf
17. Government of Goa (2015-16). *Economic survey of Goa. 2015-16.* Retrieved from https://knoema.com/.../economic-survey-2015-16-india-per-capita-net-st.
18. Government of Goa, Directorate of Agriculture Goa. (2011).*Golden Jubilee of Liberation Report. (1961-2011).*Panjim, Goa.
19. Government of Goa. (1964). Report of the Goa land reform commission. (1964). Panaji. Pp. 22-2.
20. Government of Goa. (2009-10).*Economic Survey of Goa*. (2009-10). Retrieved from**goa**dpse.gov.in/publications/**economicsurvey**0910.pdf
21. Government of Goa. (2012-13).*Economic Survey of Goa*. (2012-13). Retrieved from **goa**dpse.gov.in/publications/**ECONOMIC_SURVEY_2012-13**.pdf.
22. Government of Goa. (2014-15).*Economic Survey of Goa*. (2014-15). Retrieved from **goa**dpse.gov.in/publications/**Economic_survey _2014-15**.pdf
23. Government of India, (1973). Town and country planning organization, ministry of works and housing, Regional study of Goa.
24. Government of India. 2011-12.*Economic survey 2010-11. Retrieved from* **india**budget.nic.in/es**2011-12**/estat1.pd
25. Mitragotri, V. R. (1999). *A Socio-Cultural history of Goa from the Bhojas to the Vijayanagara.* Institute Menezes Braganza. Pp. 45-48.
26. Rath, S.P. (2013), The Status of Agriculture in Goa in Prasad, K.N. (ed.) Regional Development in the Era of Globalisation, Liberalisation and Privatisation (Proceedings of the National Seminar sponsored by UGC, CRO, Bhopal), Adhyayan Publishers and Distributors, New Delhi.
27. Sakhardande, P. (2014). '' 7th national Conference on Marine Archaeology of Indian Ocean Countries: Session V" Heritage and history of Goa. NIO Goa, Retrieved 30 May 2014.
28. Sarto, E. (1986). *Politics and political leadership in Goa New Delhi, Sterling Publishers* Pvt. Ltd.
29. *Techno Economic Survey of Goa, Daman and Diu.* (1964). National Council of Applied Economic Research New Delhi. Pp. 24-50.
30. Yadzani, G (1966). *The early history of Deccan*. London: Oxford University PP.33.

CHAPTER – V

FARMERS' PROFILE IN THE STUDY AREA

Understanding the profile of the study area and the sample population would enable proper analysis. In this context, the present chapter provides a brief profile of the study area and a detailed account of the profile of sample farmers in the study area.

5.1 Profile of the Study Area

Ponda taluka of North Goa district of Goa has been selected for the present study. It is located at 15.40^0 North and 74.02^0 East (Techno Economic Survey of Goa, 1964) and lies along the national highway 4A that, connects Panaji, capital city of Goa and Belgaum of the neighbouring state of Karnataka. According to the Census of India 2011, Ponda taluka had a population of 1,65,830 (constituting 8.79% of the state population) that consisted of 51.8 per cent males and 48.2 per cent females. Ponda had an average literacy rate of 85.2 per cent (with male literacy of 86.7 per cent and female literacy of 83.5 per cent) which is lower than the state average (88.70%) but higher than the national average (74%) (Census of Goa, 2011).

Ponda is the gateway to Goa's Bondla and the Mahavir wild-life sanctuaries. Butterfly conservatory of Goa in Ponda attracts many tourists. Ponda is progressing as an Agro–tourism destination having many spice plantations like Sahakari Spice Farm, Pascoal Spice Farm, Tropical Spice Farm, and Savoi Plantation. The owners of these farms have combined farming activity along with tourism (Agro-Eco-Tourism).

5.2 Profile of the Sample Farmers

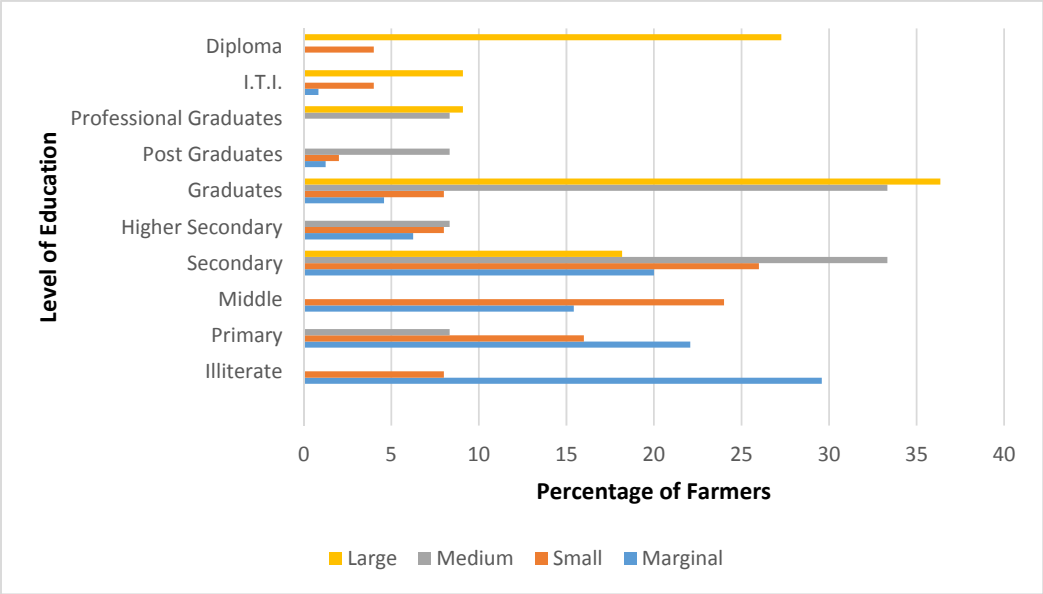
Socio- economic background of a society influences the accessibility to the resources, livelihood pattern, standard of living, etc. It predicts the psychological and behavioural

components of a sample namely knowledge, attitude, perception, adoption, level of aspiration, risk bearing ability and economic motivation (Roy *et al.* 2013). There are many social and economic variables which define socio economic status of an entity. The selection of the variables depends on the purpose of a study. The present study has considered variables such as level of education, size of land holdings, family size, type of the family system, etc. which will enable to understand the contribution of these variables for the status of agriculture in the sample area.

5.2.1 Level of Education

Level of education is one of the main factors influencing socio-economic status of any economy. The size of land holding is expected to have an influence on the level of education of the farmers as level of education depends upon socio-economic background of the people. It is observed that, the highest proportion of the marginal farmers (29.58%) were illiterate, while in the case of small farmers eight percent were illiterate (Fig.5.1). However, no medium and large farmers belonged to illiterate category. Maximum proportion of marginal (87%) and small farmers (74%) belonged to secondary and below education level, while maximum proportion of the medium and large farmers were graduates and above (50 percent and 45.45 per cent respectively). Thus the analysis of farmers by level of education and size of landholding clearly indicates that, there is a direct association between the size of landholdings and the level of education of farmers

Fig 5.1: Distribution of Sample Farmers by Level of Education (in percentages)



Source: Primary Survey, 2014

5.2.2 Size of Family and Size of Land Holdings

The size of family is another important indicator of socio-economic status. It is found that, highest proportion of marginal farmers (30.83%) belonged to family size of four followed by five members (17.08%) (Table 5.1). In the case of small and medium farmers highest percentage of farmers, i.e. 40 per cent and 33.33 per cent respectively had 5 members in their families. On an average nearly 50 per cent sample farmers had a family size of 4 to 5. Compared to all other farmers, the large farmers had large size families as evident from the fact that, 45 per cent of large farmers had 9 members and above in their families. So it can be said that majority of large farmers have large size of families due to joint family system which is evident from the fact that nearly 55 per cent of large farmers belong to joint family system (Table 5.3). The proportion of joint families existing among other size farmers was relatively less. This reflects that the large family size of farmers in Ponda is influenced by the prevalence of joint family system in the farming families owning bigger size landholdings.

Table 5.1 Distribution of Sample Farmers by Family Size and Size of Land Holdings (in percentages).

Family Size	Type of Farmers				
	Marginal	**Small**	**Medium**	**Large**	**All**
1	0.42	0.00	0.00	0.0	0.32
2	5.42	2.00	0.00	0.0	4.47
3	15.00	18.00	16.67	0.0	15.02
4	30.83	14.00	25.00	27.3	27.80
5	17.08	40.00	33.33	18.2	21.41
6	13.75	8.00	8.33	9.1	12.46
7	10.42	6.00	0.00	0.0	8.95
8	3.75	10.00	8.33	0.0	4.79
9	0.42	0.00	8.33	18.2	1.28
10	2.08	2.00	0.00	0.0	1.92
11 and above	0.83	0.00	0.00	27.3	1.60
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Primary survey, 2014

5.2.3 Size of Family and Level of Education

It is an accepted fact that the family size usually may have an inverse relationship with the level of education. It can be observed from the Table 5.2 that majority of the farmers (64.4%) irrespective of level of education had their family size between 3 and 5. Among illiterate farmers, the highest proportion (21.33%) had the family size of four followed by five (20%) and six (16%). The highest proportion of farmers with primary education (25.81%) belonged to the family size of five followed by four (24.19%) and three (20.97%). Among middle school educated, over 24 per cent had the family size of four, another 22 per cent six and over 18 per cent had six members in their family,. A maximum proportion of secondary educated farmers (43.28%) had four members and over 19 per cent had five member families. Among the higher secondary educated farmers, 20 per cent each belonged to the family size of three and four and another 15 per cent each had the family size of five and six. The highest percentage of graduate farmers (34.78%) had families with four members followed by families with five

members (21.74%). Maximum proportion of post graduates farmers had five member families (60%) followed by three member families (40%). In the case of farmers with professional education, the family size was either four (50%) or five (50%).This indicates that, there is no specific relationship between farmers' education and family size of farmers in Ponda. This is because the size of the family may not depend only on the level of education but also on other factors like, effectiveness of family planning measures introduced by the Government, type of family system, religious beliefs, socio-economic and cultural background. Goa, has successfully implemented family planning measures and Ponda taluka is not an exception to this.

Table 5.2: Family Size of Sample Farmers based on Education (in percentages).

Family Size	Level of Education								
	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates	Post Graduates	Professional	All level
1	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32
2	8.00	1.61	2.04	4.48	5.00	8.70	0.00	0.00	4.47
3	14.67	20.97	8.16	11.94	20.00	8.70	40.00	0.00	14.38
4	21.33	24.19	24.49	43.28	20.00	34.78	0.00	50.00	28.12
5	20.00	25.81	18.37	19.40	15.00	21.74	60.00	50.00	21.09
6	16.00	9.68	22.45	4.48	15.00	13.04	0.00	0.00	13.10
7	9.33	12.90	16.33	7.46	0.00	0.00	0.00	0.00	8.95
8	5.33	3.23	6.12	2.99	10.00	8.70	0.00	0.00	4.79
9	1.33	0.00	0.00	2.99	0.00	0.00	0.00	0.00	1.28
10	2.67	0.00	2.04	1.49	10.00	0.00	0.00	0.00	1.92
11 and above	0.00	1.61	0.00	1.49	5.00	4.35	0.00	0.00	1.60
Grand Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Primary Survey, 2014

5.2.4 Type of Family System

The type of family system is expected to have an influence on the agricultural practices. If the farmers belong to joint family with large number of family members, especially in the case of marginal and small farmers, they can use their family members to carry out different agricultural activities. There is a practice of joint family system even now in the study area as is evident from the Table 5.3. The proportion of joint families was relatively more in the case of medium and large farmers. This could be attributed to the fact that, the large farmers continue with joint family system to avoid the division of land.

In general it is an expected view that the more educated might prefer to have nucleate family rather than joint family system. In the study area, no specific relation could be observed between the level of education and the type of family among marginal and small farmers. However, 75 per cent of the medium and 100 per cent of large farmers with secondary education had the joint families, while the corresponding figures for graduate medium and large farmers was only around 17 per cent and 40 per cent respectively. Thus, it reveals that to some extent the level of education plays a role in the type of family system followed by the medium and large farmers.

Table 5.3: Distribution of Farmers by Type of Family and Level of Education (in percentages).

Level of Education	Type of Farmers									
	Marginal		Small		Medium		Large		All	
	Joint	Nucleate	Joint	Nucleate	Joint	Nucleate	Joint	Nucleate	Joint	Nucleate
Illiterate	23.94	76.06	0.00	100.00	0.00	0.00	0.00	0.00	22.67	77.33
Primary	26.42	73.58	12.50	87.50	0.00	100.00	0.00	0.00	24.19	75.81
Middle	37.84	62.16	16.67	83.33	0.00	0.00	0.00	0.00	32.65	67.35
Secondary	16.67	83.33	15.38	84.62	75.00	25.00	100.00	0.00	22.39	77.61
Higher Secondary	33.33	66.67	50.00	50.00	0.00	100.00	0.00	0.00	35.00	65.00
Graduate and above	14.29	85.71	20.00	80.00	16.67	83.33	40.00	60.00	20.00	80.00
Others	0.00	100.00	0.00	100.00	0.00	0.00	50.00	50.00	20.00	80.00
All level	25.00	75.00	16.00	84.00	33.33	66.66	54.54	46.46	32.21	68.03

Source: Primary Survey, 2014.

5.2.5 Number of Languages Known

The number of languages known by farmers is expected to have an influence on the farmers' ability to acquire knowledge about different agricultural practices. It is observed that, number of languages known by the farmers varied directly with the farm size (Table 5.4). Maximum number of large farmers knew four languages (82%) while a small proportion of marginal farmers (13%) knew four languages. This is mainly due to the difference in the level of education of different types of farmers. It is obvious that the higher educated people know more languages.

The same is evident from the survey that, overall maximum illiterate farmers (71%) knew only one language with a small proportion (3%) of them having the knowledge of three languages and none with four languages. As the level education increases, there

is increased proportion of farmers having knowledge of more languages. In the case of farmers who are graduates and above, over 93 per cent knew four languages.

Table 5.4: Number of Languages known by the Farmers by Size of Land holdings and Level of Education (in percentages).

Type of Farmers	No of languages	Level of Education							
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduate and above	Others	Total %
Marginal	1	71.83	22.64	0.00	0.00	0.00	0.00	0.00	26.25
	2	28.17	64.15	72.97	12.50	0.00	0.00	50.00	36.66
	3	0.00	11.32	27.03	77.08	26.67	0.00	0.00	23.75
	4	0.00	1.89	0.00	10.42	73.33	100.00	50.00	13.33
	Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Small	1	50.00	12.50	0.00	0.00	0.00	0.00	0.00	6.00
	2	0.00	12.50	16.67	0.00	0.00	0.00	0.00	6.00
	3	50.00	75.00	75.00	92.31	25.00	20.00	0.00	62.00
	4	0.00	0.00	8.33	7.69	75.00	80.00	100.00	26.00
	Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Medium	3	NA	0.00	NA	75.00	100.00	16.67	0.00	41.66
	4	NA	0.00	NA	25.00	0.00	83.33	0.00	58.00
	Total	**NA**	**0.00**	**NA**	**100.00**	**100.00**	**100.00**	**0.00**	**100.00**
Large	2	NA	NA	NA	0.00	NA	0.00	25.00	9.09
	3	NA	NA	NA	50.00	NA	0.00	0.00	9.09
	4	NA	NA	NA	50.00	NA	100.00	75.00	81.81
	Total	**NA**	**NA**	**NA**	**100.00**	**NA**	**100.00**	**100.00**	**100.00**
All	1	70.67	22.58	0.00	0.00	0.00	0.00	0.00	13.32
	2	26.67	56.45	59.18	8.96	0.00	0.00	20.00	24.46
	3	2.67	19.35	38.78	79.10	30.00	6.67	0.00	25.22
	4	0.00	1.61	2.04	11.94	70.00	93.33	80.00	36.98
	Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Primary Survey, 2014.

5.2.6 Age-wise Distribution of Sample Farmers

The age group of farmers is likely to determine the type of agricultural practices followed by them. If a larger proportion of farmers belong to young age group, then there are greater possibilities of adopting new techniques of production. It is observed from Table 5.5 that, all type of farmers taken together, maximum proportion of farmers belonged to the middle age group (41-60) and lowest proportion of the farmers belonged to the younger age group (21-40). On an average, a large proportion of illiterate (64%) and primary educated (53.23%) farmers belonged to old age group of above 60 years while, with increased level of education maximum proportion of farmers belonged to middle age group (Table 5.5). With every higher level of education, the percentage of farmers in the age group of 21 – 40 years also increased that is from1.33 per cent at the illiterate level to 30 percent at the graduate level. This is a good sign for agricultural development that, higher proportion of younger generation with higher levels of education is seen taking up agriculture as their occupation provided that they take up farming with interest and by choice .

Table 5.5 Age-wise Distribution of Farmers by Level of Education and Size of Holdings (in percentages).

Type of Farmers	Level of Education								
	Age	Illiterate	Primary	Middle	Secondary	Higher secondary	Graduates and above	Others	All level
Marginal	21-40	1.41	3.77	10.81	25.00	20.00	28.57	0.00	10.83
	41-60	36.62	45.28	72.97	60.42	66.67	57.14	100.00	52.50
	61 & above	61.97	50.94	16.22	14.58	13.33	14.29	0.00	36.66
	All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Small	21-40	0.00	0.00	0.00	7.69	25.00	40.00	25.00	10.00
	41-60	0.00	37.50	75.00	84.62	75.00	60.00	50.00	62.00
	61 & above	100.00	62.50	25.00	7.69	0.00	0.00	25.00	28.00
	All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Medium	21-40	NA	0.00	NA	0.00	0.00	33.33	0.00	16.66
	41-60	NA	0.00	NA	100.00	100.00	50.00	0.00	66.66
	61 & above	NA	100.00	NA	0.00	0.00	16.67	0.00	16.66
	All	NA	100.00	NA	100.00	100.00	100.00	0.00	100.00
Large	21-40	NA	0.00	NA	0.00	NA	20.00	0.00	9.09
	41-60	NA	0.00	NA	100.00	NA	40.00	100.00	72.72
	61 & above	NA	0.00	NA	0.00	NA	40.00	0.00	18.18
	All	NA	0.00	NA	100.00	NA	100.00	100.00	100.00
All	21-40	1.33	3.23	8.16	19.40	20.00	30.00	10.00	13.16
	41-60	34.67	43.55	73.47	68.66	70.00	53.33	80.00	60.52
	61 & above	64.00	53.23	18.37	11.94	10.00	16.67	10.00	26.31
	All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

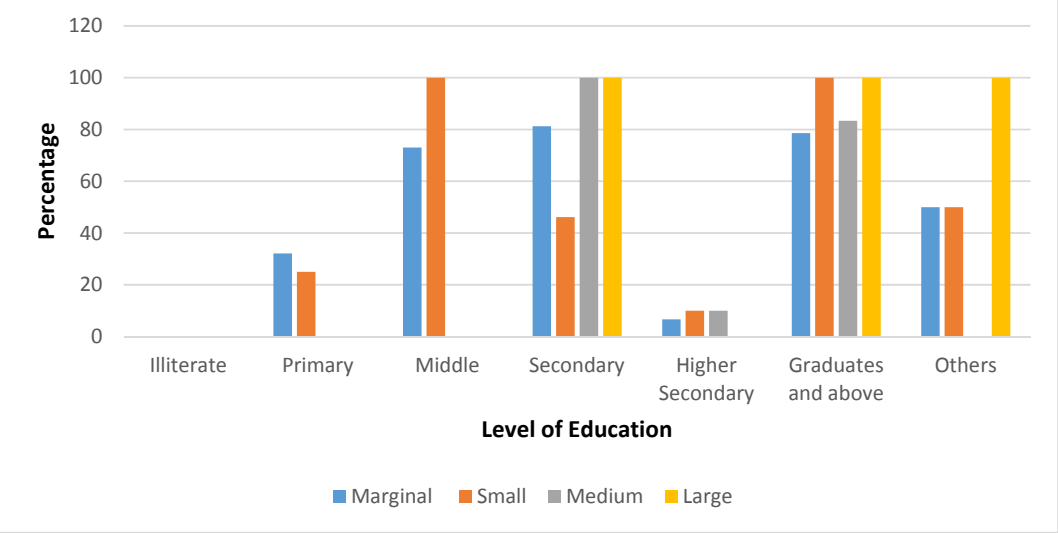
Source: Primary Survey, 2014.

5.2.7 Training and Workshops Attended by Farmers

Training and workshops attended by farmers is expected to have a positive impact on the type of agricultural practices followed by farmers. Studies carried out in the past like Nataraju (1991) has proved that, those farmers who attended training and workshops have succeeded in adopting new techniques of production than those who have not attended any training or workshop. In the present study it can be observed that, illiterate sample farmers did not attend any training or workshops on farming (Fig.5.2). Relatively a larger proportion of farmers with higher levels of education excluding

small farmers with secondary and all type of farmers with higher secondary education participated in the farm training and workshops. The overall proportion of farmers' participation in these programmes varied directly with the farm size. All the large farmers, irrespective of their level of education had participated in the farm workshops and training programmes.

Fig: 5.2: Participation of Farmers in Farm Training & Workshops at each Level of Education by size of Holdings (in Percentages)



Source: Primary Survey, 2014.

5.2.8 Type of Ownership of Land

The type of ownership of land possessed by the farmers can influence production and productivity of agriculture. If farmers possess the land that they cultivate, and do not have to share their produce with others, then they tend to take more interest in cultivation which leads to increase in production and productivity of farms. Gaonkar (1993) pointed out that, the existence of "communidade" (Gaonkar) system in the selected villages in Goa in particular and Goa in general was an impediment to agricultural development in the state. The members of 'communidade' retain the ownership rights and lease their lands to the tenants for cultivation. Naturally, tenants are not interested in developing the land. For the owners of the land (members of the Communidade) agriculture is of secondary importance since most of

them reside in urban areas and have other sources of income. Hence, the system of 'Communidade' is considered as the main cause of agricultural backwardness in Goa.

The present study reveals that, the proportion of owned land directly varied with farm size. All the large size farmers owned the land either by inheritance (81.81%) or by purchase (18.18%) (Table5.6). On the contrary, a large proportion of marginal farmers (70%) cultivated land on the basis of tenancy. On the whole, the owned land is positively related to the level of education, where in 90 per cent of the farmers with graduation and above levels of education owned the land by inheritance (80%) and by purchase (10%). However, only 24 per cent of the illiterate farmers owned land by inheritance. Overall, tenancy farming formed over 60 per cent of the total cultivation in the study area.

Table 5.6: Distribution of Farmers by Type of Ownership of Land and Education Level (in percentages)

Size of Holdings	Level of Education								
	Type of Ownership	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduate and above	Others	All
Marginal	Ancestral	23.94	26.42	21.62	25.00	33.33	78.57	50.00	28.33
	Bought	0.00	1.89	0.00	2.08	6.67	7.14	0.00	1.66
	Tenancy	76.06	71.70	78.38	72.92	60.00	14.29	50.00	70.00
	Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Small	Ancestral	25.00	50.00	75.00	61.54	50.00	80.00	25.00	58.00
	Bought	0.00	12.50	0.00	0.00	25.00	0.00	0.00	4.00
	Tenancy	75.00	37.50	25.00	38.46	25.00	20.00	75.00	38.00
	Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Medium	Ancestral	NA	80.00	NA	75.00	100.00	100.00	NA	83.33
	Bought	NA	NA	NA	0.00	0.00	0.00	NA	0.00
	Tenancy	NA	20.00	NA	25.00	0.00	0.00	NA	16.66
	Total	NA	100.00	NA	100.00	100.00	100.00	NA	100.00
Large	Ancestral	NA	NA	NA	100.00	NA	60.00	100.00	81.81
	Bought	NA	NA	NA	0.00	NA	40.00	0.00	18.18
	Tenancy	NA	NA	NA	0.00	NA	0.00	0.00	0.00
	Total	NA	NA	NA	100.00	NA	100.00	100.00	100.00
All	Ancestral	24.00	29.03	34.69	37.31	40.00	80.00	60.00	37.06
	Bought	0.00	3.23	0.00	1.49	10.00	10.00	0.00	2.56
	Tenancy	76.00	67.74	65.31	61.19	50.00	10.00	40.00	60.38
	Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Primary Survey, 2014

5.2.9 Average Size of Land Holdings

Earlier studies like Chattopadhyay and Sengupta (1997) have proved that, there is an inverse relationship between the size of farm and farm productivity. Level of education is expected to have an influence on average size of land holding. In the case of marginal farmers of the study area, no relation between the level of education and average size of land holdings is observed (Table 5.7). But among small famers a positive relationship between the level of education and average size of land holdings can be observed as the average size of landholding varied from 1.64 hectors for illiterate farmers to 2.2 hectors for higher secondary and 2.57 hectors for diploma educated farmers. In the case of medium farmers, the average size of landholdings varied positively with the level of education only up to general graduation level. In the case of large farmers, the average size of land holdings varied inversely with the level of education i.e., it was 26.6 hectors among farmers who studied up to secondary level while 11 hectors among the farmers who were professionally qualified. This could be attributed to the large proportion of secondary educated large farmers belonging to joint family system compared to the higher educated large farmers (Table 5.3).

From the above analysis it can be asserted that, there is a positive relationship between the level of education and average size of land holdings in the case of small and medium farmers. However, no such relation is observed between the two in the case of marginal farmers while there was inverse relationship between the level of education of the large farmers and average size of landholdings. On average, each marginal farmer owned an area of less than 0.5 hectors, small farmer around 2 hectors, medium farmer around 6 hectares and large farmer owned over 17 hectors of land. The inequality in the ownership of land is very high among the sample farmers as marginal farmers who were nearly 77 per cent of the total sample farmers owned only around 24 per cent of the

cultivated land while the large farmers constituting four per cent of the total farmers owned nearly 41 per cent of the land.

Table 5.7: Average Size of Land Holding Owned by Different Types of Farmers' by Level of Education (in hectors)

Level of Education	Type of Farmers			
	Marginal	**Small**	**Medium**	**Large**
Illiterate	0.31	1.64	NA	NA
Primary	0.56	1.76	4.80	NA
Middle	0.41	1.85	NA	NA
Secondary	0.42	2.11	5.68	26.2
Higher Secondary	0.40	2.2	6.00	0.00
Graduates	0.48	1.7	6.64	18.51
Post graduates	0.58	1.00	4.70	NA
Professional Graduates	NA	NA	6.00	11
I.T.I.	0.55	2.55	NA	10
Diploma	NA	2.57	NA	20.94
All Level	0.46	1.93	5.63	17.33

Source: Primary Survey, 2014.

5.2.10 Number of Crops Grown on the same Land

The extent of utilisation of the cultivatable land depends on the number of crops grown on the same land in a year. More than one crop grown on the same land during a year would provide full time employment for the farmers, increase the total income earned from farming and is expected to have effect on development of agriculture. It is observed from the study that, the total percentage of farmers growing more than one crop was relatively higher (25.83%) among marginal farmers, followed by t small farmers (16%), and medium farmers (9.33) (Table 5.8). However, all the large farmers cultivated only one crop. This is because the possibility of double cropping depends on the type of crop grown in an area. As majority of the marginal and small farmers grow

paddy and vegetables, it is possible for them to practice double cropping while, the large and medium farmers mostly cultivate cash crops i.e., high value crops, they cannot resort to double cropping based on season.

An effort made in the study to see whether there is any relation between the level of education of farmers and the number of crops grown on the same land in a year based on season. In the case of marginal farmers, with an exception of farmers with middle level of education, the proportion of farmers resorting to double cropping increased with the level of education up to the higher secondary level of education of farmers. In the case of small farmers, the farmers other than illiterate, middle and secondary educated, cultivated only one crop on the same land during the year. In the case of medium farmers all the farmers cultivated only one crop with an exception of around 17 per cent of farmers with graduation and above levels of education. It can be seen that, 100 per cent of large farmers grew only one crop on the same land during a year as all the large farmers cultivated non-food grain crops like cashew, coconut, areca nut and mango. The overall picture does not show any link between numbers of crops and the levels of education. Those farmers who cultivated two crops on the same land during a year were cultivating either kharif paddy and rabi paddy or paddy during kharif season and vegetables or pulses during rabi season. The selection of crop cultivation also depends on the suitability of area and on the tradition followed from generations. This is especially true in the case of high value crops like cashew, areca, and other tropical crops. In Goa, traditionally large farmers have been growing these crops.

Table 5.8: Number of Crops Cultivated during a year on the Same Land by Level of Education (in percentages).

Level of Education/ No. of Crops	Size of Holdings										
	Marginal			Small		Medium		Large		All Size	
	No Crop	One	Two	One	Two	One	Two	One	No Crop	One	Two
Illiterate	11.26	67.60	21.12	50.00	50.00	NA	NA	NA	10.66	66.67	22.67
Primary	3.63	65.45	30.90	100	0.00	100	0.00	NA	3.23	69.35	27.42
Middle	7.5	65.00	27.5	75.00	25.00	NA	NA	NA	5.76	67.30	26.92
Secondary	0.00	68.88	31.11	76.92	23.08	100	0.00	100	0.00	73.43	26.46
Higher Secondary	0.00	80.00	20.00	100	0.00	100	0.00	NA	0.00	85.00	15.00
Graduate and above	0.00	85.71	14.29	100	0.00	83.33	16.67	100	0.00	90.00	10.00
Others	0.00	100	0.00	100	0.00	NA	NA	100	0.00	100	0.00
All levels	3.19	69.58	25.83	84	16	91.66	9.33	100	2.80	78.82	18.35

Source: Primary Survey, 2014.

5.2.11 Years of Experience in Farming Activity

Number of years involved in farming activity by the farmers, is bound to have an effect on agricultural practices and productivity. Edeoghon (2008) reported that, farmers usually get involved in the agricultural practices that they are more familiar with than other practices. The farmers who have been long in the farming activity are usually older, less educated and more resistant to changes than new entrants. In the present study, illiterate farmers were found only among marginal and small farmers and over 75 per cent of the marginal and 100 per cent of illiterate small farmers were found to be in the farming activity for over 40 years (Table 5.9). However, maximum proportion of educated farmers had less number of years into farming with an exception of large farmers. On the whole, the number of years involved in cultivation is seen inversely related to the level of education. Over 75 per cent of the illiterate farmers have been into farming for over 40 years and over 27 per cent of illiterate and primary educated farmers were into farming for over 50 years. This proportion is lower with increased

levels of education. This trend can be attributed to the progress of education in Goa after its liberation from Portuguese rule and especially after it got its statehood. All the illiterate and most of the less educated farmers belong to marginal and small size land holdings.

Table 5.9: Number of Years in Farming Activity by Level of Education and Size of Landholdings (in percentages)

Size of Holding	No. of years	Level of Education							
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduation and above	Others	*All level*
Marginal	Below 10	00.00	00.00	5.41	00.00	6.67	14.29	00.00	2.08
	11 to 20	00.00	3.77	13.51	18.75	20.00	28.57	00.00	9.58
	21 to 30	5.63	18.87	13.51	37.50	26.67	14.29	00.00	17.91
	31 to 40	18.31	24.53	48.65	35.42	20.00	14.29	100.0	28.33
	41 to 50	50.70	30.19	16.22	8.33	20.00	28.57	00.00	32.91
	51&above	25.35	22.64	2.70	00.00	6.67	00.00	00.00	13.33
Small	Below 10	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
	11 to 20	00.00	00.00	00.00	7.69	25.00	20.00	25.00	8.00
	21 to 30	00.00	00.00	33.33	38.46	75.00	60.00	25.00	32.00
	31 to 40	0.00	37.50	58.33	46.15	0.00	20.00	25.00	36.00
	41 to 50	25.00	12.50	8.33	7.69	0.00	0.00	25.00	10.00
	51&above	75.00	50.00	0.00	0.00	00.00	0.00	00.00	14.00
Medium	Below 10	NA	00.00	NA	00.00	00.00	00.00	NA	00.00
	11 to 20	NA	00.00	NA	00.00	00.00	33.33	NA	16.66
	21 to 30	NA	00.00	NA	50.00	100.0	00.00	NA	25.00
	31 to 40	NA	00.00	NA	00.00	00.00	33.33	NA	16.66
	41 to 50	NA	00.00	NA	50.00	00.00	16.67	NA	25.00
	51&above	NA	100	NA	00.00	00.00	16.67	NA	16.66
Large	Below 10	NA	NA	NA	00.00	NA	00.00	00.00	00
	11 to20	NA	NA	NA	00.00	NA	20.00	00.00	9.09
	21 to 30	NA	NA	NA	00.00	NA	20.00	25.00	18.18
	31 to 40	NA	NA	NA	50.00	NA	40.00	75.00	54.54
	41 to 50	NA	NA	NA	50.00	NA	20.00	00.00	18.18
	51&above	NA	NA	NA	00.00	NA	00.00	00.00	00.00
All	Below 10	00.00	00.00	4.08	00.00	5.00	6.67	00.00	2.25
	11 to 20	00.00	4.84	10.20	14.93	20.00	30.00	10.00	12.85
	21 to30	5.33	17.74	18.37	37.31	40.00	16.67	10.00	20.77
	31 to 40	17.33	22.58	51.02	35.82	15.00	23.33	50.00	30.72
	41 to 50	49.33	27.42	14.29	11.94	15.00	20.00	30.00	23.99
	51&above	28.00	27.42	2.04	00.00	5.00	3.33	00.00	9.39

Source: Primary Survey, 2014.

5.2.12 Practicing Farming with Passion or Compulsion

Whether the farmers have undertaken farming activity with passion or by compulsion might affect agricultural production. If the farmers are forced to take up farming due to non-availability of any other employment then, there are greater possibilities that farmers might take little interest in farming. If farmer takes farming activity with passion then, he will try to employ best agricultural practices which can help in increasing productivity of farm.

The proportion of farmers, undertaking farming activity with passion is seen directly associated with the size of land holdings (Table 5.10). In the case large farmers, over 90 per cent opted for farming with passion, while only 45 per cent of marginal farmers have taken up farming activity by passion in the study area. Even though specific relation cannot be established between the level of education and the way they are involved in farming activity, it can be seen that a large proportion of graduate farmers have taken up to agriculture by choice. This is a welcome trend as the involvement of higher educated farmers would enable to revive the agriculture sector.

Table 5.10: Distribution of Farmers Undertaking Farming with Passion or Compulsion by Level of Education and Size of Landholding (in percentages).

Level of Education	Size of Holding									
	Marginal		Small		Medium		Large		All	
	Passion	Compulsion	Passion	Compulsion	Passion	Compulsion	Passion	Compulsion	Passion	Compulsion
Illiterate	35.21	64.79	50.00	50.00	NA	NA	NA	NA	36.00	64.00
Primary	50.94	49.06	87.50	12.50	100.00	00	NA	NA	56.45	43.55
Middle	45.95	54.05	75.00	25.00	NA	NA	NA	NA	53.06	46.94
Secondary	45.83	54.17	84.62	15.38	75.00	25.00	50.00	50.00	55.22	44.78
Higher Secondary	60.00	40.00	25.00	75.00	100	00.00	NA	NA	55.00	45.00
Graduates and above	50.00	50.00	80.00	20.00	83.33	16.67	100	00.00	70.00	30.00
Others	100	00.00	100	00.00	NA	NA	100	00.00	100	00.00
All level	45.41	54.58	76.00	24.00	83.33	16.66	90.90	9.90	73.91	26.28

Source: Primary Survey, 2014.

5.2.13 Farmers Seeking Alternative Jobs

When an individual seeks some other job, it implies that, he is doesn't have likeness and or sufficient earning from his present occupation. The proportion of farmers seeking alternative job was maximum in the case of marginal farmers (30.83%) which goes on decreasing with increasing size of land holdings and it was only around nine per cent in the case of large farmers (Table 5.11). Among marginal farmers, the percentage of secondary educated farmers seeking other jobs was maximum (50.75%), while it was the lowest in the case of illiterate farmers (8%). The reason cited for seeking alternative jobs is the low availability of land per head and very low income generated from farming.

Majority of the farmers from marginal land holdings and with higher levels of education expressed their reluctance to take up alternative jobs. Increasing proportion of small farmers with above secondary education was interested in other kinds of job. The proportion of farmers seeking alternative jobs was over 33 per cent for the graduate medium farmers, and only 20 per cent in the case of large farmers. So the above analysis reveals that a small proportion of farmers with higher levels of education are interested in other kinds of jobs. The reasons revealed by those sample farmers who were not looking out for alternative jobs are: i) Some farmers were already employed or had a side business ii) Age factor leading to no job openings available for the farmers aged above 50 years iii) Some of the farmers think that if they go for a job then there will be no one to take care of their farm iv) Some farmers with higher levels of education have taken up the activity voluntarily and they do not want to undertake any other activity other than agriculture and v) Some of the medium and large farmers get fully engaged in farming activity with involvement in agro tourism as a side business.

Table 5.11: Distribution of Farmers Seeking Alternative Jobs by Level of Education and Size of Landholdings (in percentages).

Level of Education	Size of Holding									
	Marginal		Small		Medium		Large		All	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Illiterate	8.45	91.55	0.00	100	NA	NA	NA	NA	8.00	92.00
Primary	26.42	73.58	0.00	100	0.00	100	NA	NA	22.58	77.42
Middle	45.95	54.05	0.00	100	NA	NA	NA	NA	34.69	65.31
Secondary	58.33	41.67	46.15	53.85	0.00	100	0.00	100	50.75	49.25
Higher Secondary	46.67	53.33	50.00	50.00	0.00	100	NA	NA	45.00	55.00
Graduates and above	14.29	85.71	0.00	100	33.33	66.67	20.00	80.00	16.67	83.33
Others	0.00	100	25.00	75.00	NA	NA	0.00	100	10.00	90.00
All level	**30.83**	**69.16**	**18.00**	**82.00**	**16.66**	**82.33**	**9.09**	**90.90**	**18.64**	**81.09**

Source: Primary Survey, 2014.

5.2.14 Continuation of Farming after Getting Alternative Job

All the farmers who were interested to join alterative jobs, irrespective of their levels of education intend to continue with farming even after getting alternative job with an exception of a small proportion of marginal farmers (Table 5.12). Thus, majority of the farmers who are undertaking agriculture as their occupation do not want to leave the occupation even if they get an alternative job.

Table 5.12: Distribution of Farmers Showing Continuation of Farming after Getting Job by Level of Education & Size of Landholdings (in percentages).

Level of Education	Type of Farmers									
	Marginal		Small		Medium		Large		All	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Illiterate	95.77	4.23	100	0.00	NA	NA	NA	NA	96.00	4.00
Primary	100.00	0.00	100	0.00	100	0.00	NA	NA	100.00	0.00
Middle	94.59	5.41	100	0.00	NA	NA	NA	NA	95.92	4.08
Secondary	93.75	6.25	100	0.00	100	0.00	100	0.00	92.54	7.46
Higher Secondary	93.33	6.67	100	0.00	100	0.00	NA	NA	95.00	5.00
Graduates and above	92.86	7.14	100	0.00	100	0.00	100	0.00	96.67	3.33
Others	100.00	0.00	100	0.00	NA	NA	100	0.00	100.00	0.00
Total Percentage	*95.83*	*4.16*	*100*	*0.00*	*100*	--	*100*	*0.00*	98.95	1.04

Source: Primary Survey, 2014.

5.2.15 Monthly Income of Farmers from Farming Activity

Income earning is the main factor that encourages people to take up the job and continue in the same job. In the study area, a higher proportion (66.66%) of marginal farmers are found in the income group of Rs. 2000 and below while, only eight per cent of small farmers belonged to this income group (Table 5.13). Maximum proportion of other size farmers i.e., 62 per cent small farmers, 67 per cent of medium farmers and 100 percent of large farmers belonged to the income group of Rs.5001 and above. This obvious that, the income derived from farming activity is directly related to the size of land holdings. In the case of marginal farmers with an exception of graduates, higher proportion of farmers from every level of education was found in the monthly income group of Rs. 2000 and below. Relatively less proportion of farmers earned income of Rs.2001- 5000. Nearly 64 per cent of graduate and 100 per cent farmers from other levels of education were earning income between Rs. 2001 and Rs.5000.

Overall, only eight percent of small farmers were in the income group of Rs.2000 and below while, 30 per cent were earning between Rs.2001 and Rs.5000. With an exception of farmers with primary and secondary level of education, higher proportions of small farmers were in the income group of Rs.5000 and above. All the small farmers taken together, 62 per cent of them were in the income group of Rs.5000 and above.

A large proportion (66.66%) of medium farmers earned monthly income of Rs.5000 and above with an exception of 25 per cent of secondary (earning below Rs.2000), 100 per cent of primary and 33 per cent of graduation and above educated farmers (with income of Rs.2001 and 5000).

In the case of large size of land holdings, 100 per cent farmers belonged to the income group of over Rs.5000.

On an average it can be observed that, with an exception of farmers with primary level of education, the proportion of farmers earning below Rs.2000 decreased with increasing levels of education and the proportion of farmers earning Rs.5000 and above increased with increasing levels of education. This indicates that, monthly income of the farmers earned through farming activity increased with the increasing levels of education.

Table 5.13: Distribution of Farmers on the basis of Monthly Income from Farming Activity by Level of Education & Size of Landholdings (in percentages).

Type of Farmers	Monthly Income	Level of Education							
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	*All level*
	Below 2000	84.51	67.92	59.46	68.75	53.33	7.14	0.00	66.66
	2001- 5000	14.08	24.53	27.03	27.09	20.01	64.29	100	25.00
	5000 & above	1.41	7.55	13.51	4.17	26.67	28.57	0.00	8.33
Marginal	Total	100	100	100	100	100	100	100	100
	Below 2000	0.00	12.5	16.66	7.69	0.00	0.00	0.00	8.00
	2001- 5000	50.00	12.5	50.00	30.76	25.00	20.00	0.00	30.00
	5000 & above	50.00	75.00	33.33	61.54	75.00	80.00	100	62.00
Small	Total	100	100	100	100	100	100	100	100
	Below 2000	NA	0.00	NA	25.00	0.00	0.00	NA	8.33
	2001- 5000	NA	100	NA	0.00	0.00	33.33	NA	24.99
	5000 & above	NA	0.00	NA	75.00	100	66.67	NA	66.66
Medium	Total	NA	100	NA	100	100	100	NA	99.98
	5000 & above	NA	NA	NA	100	NA	100	100	100
Large	Total	NA	NA	NA	100	NA	100	100	100
	Below 2000	80.00	59.68	48.98	52.25	40.00	3.33	0.00	40.15
	2001- 5000	16.00	24.19	32.64	25.38	20.00	40.01	20.00	25.48
	5000 & above	4.00	16.13	18.37	22.39	40.00	56.67	80.00	33.93
All	Total	100	100	100	100	100	100	100	100

Source: Primary Survey, 2014.

5.3 Concluding Observation:

The present study reveals that, there is positive association between the level of education and the various socio-economic aspects of farming like size of farm, practice of joint family system, number of languages known by the farmers, farmers attending training and workshops, proportion of land owned by inheritance, proportion of farmers with younger age group and monthly income earned through farming activity, while an inverse relation was observed between the level of education and the farmers interested in other alternative job and also in the case of number of years in farming activity. Other socio-economic factors like undertaking farming by passion varied directly with the size of land holdings.

References

1. Census of Goa. (2011) www.census2011.co.in › States
2. Chatopadhyay, M., Sengupta. (1997). Farm Size and Productivity. A new book at the old debate, *Economic and Political Weekly,* 32 (42). A 172 – A175.
3. Edeoghon, C.O. Ajaye, M.T. and Ugboya, T.O. (2008). Awareness and Use of Agricultural Practices by Arable Crop Farmers in Ikpoba Okha Local Government Area of Edo State. *Journal of Sustainable Development in Agriculture and Environment* Vol. 3 (2): Pp. 55-63
4. Gaonkar, R. (1993*). Financing of Agriculture by Commercial Banks in Goa* (Doctoral thesis). Department of studies in Economics Karnatak University, Dharwad, India.
5. Nataraju B., Balavenkatasubbaiah, M., Baig M., Singh D. B. & Sengupta, K. (1991). A report on the distribution of Bacillus thuringiensis in Seri cultural areas of Karnataka. *Indian Journal of Sericulture,* 30 (1): 56-58.
6. Roy M. L., Chandra N., Kharbikar H. L., Joshi P. and Jetrhi R. (2013). Socio – economic Status of Hill Farmers: An Exploration from Almora District in Uttarakhand. *International Journal of Agriculture and Food Science Technology*. Research India Publication Volume 4, Number 4 Pp. 353 – 358.
7. *Techno Economic Survey of Goa, Daman and Diu.* (1964). National Council of Applied Economic Research New Delhi. Pp. 24-50.

CHAPTER VI

AN EMPIRICAL ANALYSIS OF IMPACT OF EDUCATION ON AGRICULTURAL PRACTICES AND PRODUCTIVITY

An attempt has been made in this study to investigate the relationship between the levels of education and agricultural practices in Ponda taluka of Goa. This chapter is divided into six sections. First section analyses cultivation of different types of crops by farmers. Second section discusses earnings of farmers by level of education and size of land holdings. Third section deals with an analysis of cost of production, yield and income earned from the cultivation of different types of crops. The fourth section reviews various factors affecting agricultural activity. Fifth section deals with testing of hypothesis and the sixth one provides concluding observations.

6.1 An Analysis of Cultivation of Different Types of Crops

Type of crop grown by farmers depends on the natural factors such as climatic condition, type of soil, and on various socio-economic factors. Several studies undertaken in the past have provided the reasons for the farmers' preference to cultivate cash crops or non-food grain crops rather than food grain crops. Guided by the principle of comparative advantage, the farm households with resources to produce cash crops most efficiently might specialise in the production of cash crops and buy food crops which raise their overall income (J. Govereh and T. Jayne, 2003). Farmers with larger landholdings cultivate more cash crops than food crops as a means of diversification and /or to increase their income (C. Timmer, 1997) as the cash crop have a positive effect on farmers income (Nagash and Swinnen, 2012; Chege et-al. 2013). With the more income generation from cash crops, the farm households would be provide with the means to save and invest in a more productive form and accelerate a process of

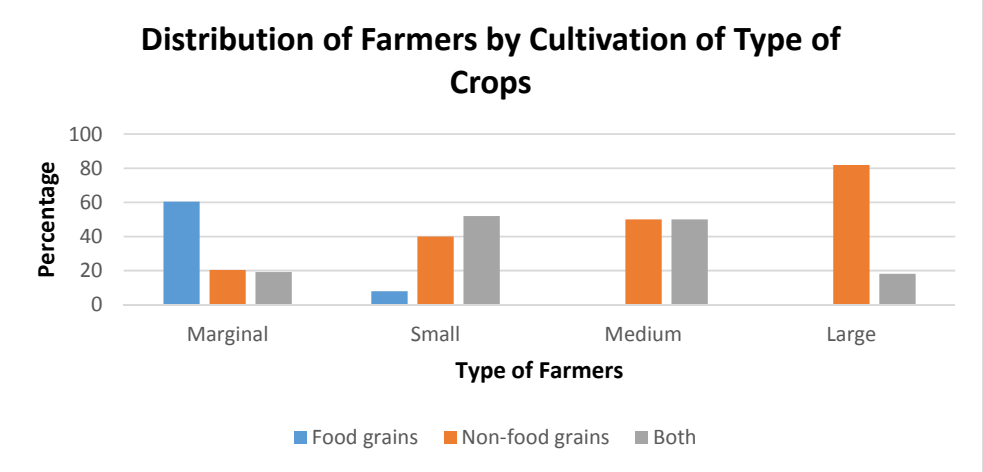
agricultural commercialisation. The commercialisation of small scale farms with profit potential is an important component of a transition towards future food security (Fanet et al., 2013). The export potential of cash crops would also contribution towards poverty reduction when there is a broad based participation by farmers in an area, with labour intensive production processes, and potential positive linkages to staple crop productivity in cash crop production. Household-level spill over effects can result when production of a crop is commercialised. It enables the farm household to acquire new resources that would not otherwise be accessible (Poulton, Dorward, and Kydd, 2005). It is proved that, cash crops bring substantial wage and employment opportunities to the rural economy, over a time cash crops provide a stimulus to the agricultural innovation by raising capital for agricultural investment and accelerating the build-up of institutions that enable further commercialization. Cash crop production enables farmers and farm workers to increase their living standards, thus contributing to food security. The production of cash crops offers farmers, opportunities for investment and improving management in their farms, stimulating agricultural innovation and increasing yields (Achterbosch, T.J., S. van Berkum and G.W. Meijerink, 2014);. The risk of food crop failures in subsistence economy households is more likely to encourage diversification into cash crops. As the cultivation of cash crops requires large initial investments, the farmers with increasing income would be able to cultivate cash crops (Masanjala, 2005).

The present section analyses the type of crops grown in the sample area. For the sake of analysis, the crops are broadly divided into food grain crops and non-food grain crops. In the study area, 48 per cent of the farmers cultivated only food grains and nearly 27 per cent farmers cultivated only non-food grain crops. Nearly 25 per cent of the farmers cultivated food grain crops as well as non-food grain crops. Including double

cropping, overall 69 per cent of the net sown area was under the cultivation of non-food grain crops while 40 per cent of the net sown area was under the cultivation of food grain crops. In absolute terms, out of the 657 hectors of land under cultivation, 417 hectors of land was under the cultivation of high value crops, i.e., non-food grain crops while 240 hectors of land was under the cultivation of low value crops, i.e., food grain crops (Table 6.5)**.**

The proportion of farmers cultivating exclusively food grain crops decreased with increase in the size of land holdings (Fig 6.1). Large farmers did not cultivate exclusively food grain crops while a large proportion of marginal farmers (60.42%) cultivated only food grain crops. It can be observed that with an exception of marginal farmers, in all other categories, the proportion of farmers cultivating non-food grain crops was higher than cultivating food grain crops. Majority of the large farmers (81.82%) cultivated only non-food grain crops. As compared to small and medium farmers, the proportion of farmers cultivating both the crops was less for marginal and large farmers.

Fig. 6.1: Distribution of Farmers by Cultivation of Type of Crops (in percentages)



Source: Primary Survey, 2014.

6.1.1 Cultivation of Food Grain Crops

In the case of all marginal farmers, nearly 80 per cent of farmers cultivated food grain crops (Table 6.1). Food grain crops were cultivated by around 60 per cent of small farmers and 50 per cent of the medium farmers, while only 18 per cent of the large farmers cultivated food grains.

From the above it can be seen that majority of the farmers especially marginal farmers, irrespective of the education level cultivate food grains mostly paddy (rice) which is the staple food of people of Goa. Even when the farmers want to shift their cultivation towards non-food grain crops, they keep at least some part of their land only for the cultivation of paddy, so as to avoid complete dependency on market for the purchase of their staple food. Despite high cost of cultivation of paddy, those farmers continue to cultivate it because they have a special taste for the rice grown in their own field and feel that, their paddy possesses high nutritional value. However, large farmers hardly prefer to cultivate food grains.

In the case of all size farmers with educational level up to higher secondary, no specific relation between cultivation of food crops and the level of education is observed. The percentage of farmers cultivating food grain crops was very high till higher secondary education level while the same was low among graduates. From the analysis it is understood that, less percentage of farmers with very high levels of education cultivate food grain crops. With an exception of medium farmers, the percentage of farmers cultivating food grain crops varied inversely with the size of land holdings.

Table 6.1: Distribution of Farmers on the basis of Cultivation of Food Crops by Level of Education and size of Land holding (in percentages).

Size of Holdings	Level of Education							
	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	**Total %**
Marginal	80.28	83.02	83.78	79.17	80.00	85.71	0,00	79.58
Small	75.00	50.00	83.33	53.85	50.00	60.00	25.00	60.00
Medium	NA	100	NA	25.00	100	50.00	NA	50.00
Large	NA	NA	NA	0.00	NA	18.18	NA	18.18
All	77.64	77.67	83.55	52.67	76.66	53.47	25.00	NA

Source: Primary Survey, 2014.

Reasons for Non-Cultivation of Food Crops

Cultivation of food grain crops is very important for achieving self-sufficiency in food grain production. If the state is not self-sufficient in the production of food grains then it has to depend on the neighbouring states for meeting its demand. Despite the introduction of various schemes to increase the production of food grains by the state Government, farmers were reluctant to undertake the cultivation of food grain crops. Some of the reasons cited by the farmers for not cultivating food grain crops were Non-availability of sufficient land (17% of marginal farmers and 16% of small farmers) (Annexure table 6.1), problem of water/ lack of irrigation (13% of marginal farmers), non-availability of labour (6% of marginal farmers, 11% per cent small farmers,14% large farmers), problem of fencing (10 % marginal farmers, 5% small farmers), non-profitability (38% marginal farmers 63% small farmers 100% medium farmers 86% large farmers) and other reasons including the problem of pollution, lack of subsidies and support price (15% marginal 5% small). One of the most important reasons cited by the farmers for the non-cultivation of food grain crops is low profitability. This is true since rice is supplied by the Government at subsidized rate through fair price shops,

while the cost of cultivation is more. So, several farmers have given up the cultivation of paddy.

In the case of all the farmers taken together, a higher proportion of illiterate farmers were not cultivating food grain crops because of non-availability of adequate area of land (33%) followed by non-profitability in cultivating it (27%) (Table 6.2). Higher proportions of farmers (62%) with primary education were not cultivating food grains because of non-profitability. In the case of farmers with middle level of education, higher proportion were not cultivating because of fencing problem (38%) followed by lack of irrigation facility (25%) and labour problem (25%). Higher proportions of farmers with graduate and above levels of education (100%), I.T.I. and diploma education (78%), secondary (40%) and higher secondary (40%) education were not cultivating food grains because of non-profitability. Overall 51 per cent of the farmers were not cultivating food grains because of low profitability in the cultivation of food grain crops.

The above analysis reveals that, higher proportion of farmers irrespective of the size of land holdings responded that, they do not cultivate food crops because it is not profitable. They also feel that the cost of cultivating food grains especially paddy is more than buying rice from market.

Table 6.2: Distribution of Farmers on the basis of Reasons for Non Cultivation of Food Crops by Level of Education (in percentages)

Reasons	Level of Education							***Total %***
	Illiterate	Primary	Middle	Secondary	Higher secondary	Graduate and above	Others	
Less land	33.33	7.69	0.00	15.00	20.00	0.00	22.22	***14.03***
No irrigation	13.33	15.38	25.00	0.00	20.00	0.00	0.00	***10.53***
Cost & availability of labour	6.67	7.69	25.00	5.00	20.00	0.00	0.00	***9.19***
Fencing problem	13.33	0.00	37.5	5.00	0.00	0.00	0.00	***7.97***
Not profitable	26.66	61.53	12.5	40.00	40.00	100.00	77.77	***51.20***
Any Other	6.66	7.69	0.00	35.00	0.00	0.00	0.00	***7.05***
Total %	***100.00***	***100.0***	***100.00***	***100.00***	***100.00***	***100.00***	***100.00***	***100.00***

Source: Primary Survey, 2014.

6.1.2 Cultivation of Non-Food Grain Crops.

There has been a growing trend in the cultivation of non-food grain crops. Karunakaran (2013) found that, the number of farmers cultivating non-food grains increased leading to increase in the percentage of area covered under non-food grain crops. On the other hand, farmers growing food grain crops decreased leading to decrease in the percentage of total area under food crops, giving the evidence of diversification. Majority of the farmers, except marginal farmers in the study area cultivated non-food grain crops (Table 6.3) and, the cultivation of non-food grain crops varied directly with the size of land holdings.

On the whole, cultivation of non-food grain crops varied positively with the level of education with an exception of graduates. The percentage of farmers cultivating non-food grains shows an increase from around 37 per cent at the illiterate level to 65 per cent at higher secondary level and further to 100 per cent among I.T.I and diploma holders.

Thus, the cultivation of non-food grain crops varied directly with the size of land holdings and the level of education with an exception of farmers with middle level of education and graduate marginal farmers and middle, secondary and graduate educated small farmers.

Table 6.3: Distribution of Farmers Cultivating Non-food Crops by Level of Education and Size of Land Holdings (in percentages)

Size of Holdings	Level of Education							*Total %*
	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	
Marginal	33.8	39.62	35.14	43.75	53.33	42.86	100	*39.58*
Small	100	100	91.67	92.31	100	60	100	*92.00*
Medium	NA	100	NA	100	100	100	NA	*100*
Large	NA	NA	NA	100	NA	100	100	*100*
All	37.33	48.39	48.98	56.72	65.00	60.00	100	59.48

Source: Primary Survey, 2014.

Reasons for Not Cultivating Non-food Grain Crops

In the case of medium size and large size of land holdings all the farmers cultivated non-food grain crops. It is quite possible that, even though farmers are interested to cultivate variety of crops, it won't be possible for them to do so because of some limiting factors. An attempt is made in this study to know the reasons for non-cultivation of non-food grain crops by the farmers (Annexure table 6.2). It is understood that, small size area and the lack of irrigation facility are the main problems faced by

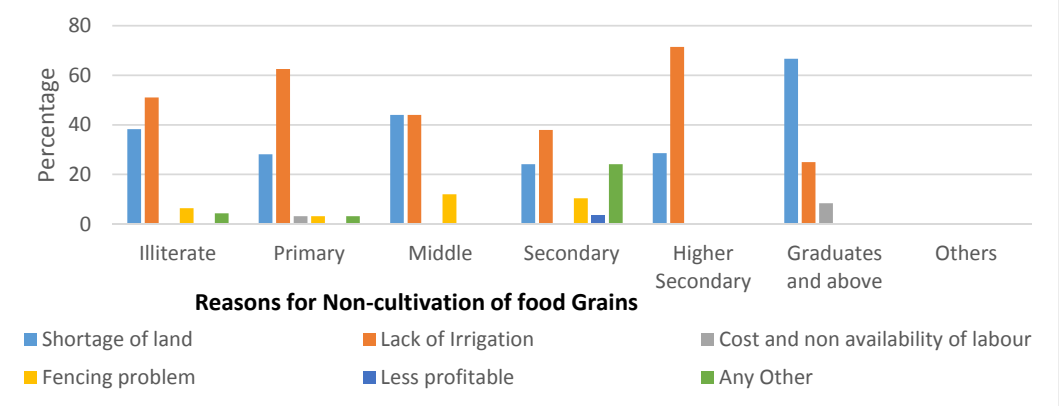
the farmers from marginal and small size of land holdings for the non-cultivation of non-food-grain crops.

Lack of Irrigation Facility: Perennial supply of water is the most important determining factor in the cultivation of non-food grain crops like areca nut, banana sugarcane, high yielding varieties of cashews and vegetables. Majority of the marginal farmers except graduates and 50 per cent of graduate small farmers cited non-availability of irrigation facility as the main reason for not cultivating non-food-grain crops (Annexure table 6.2).

Size of Land Holdings: The availability of sufficient land is also viewed by some farmers as a requirement for the cultivation of non-food grain crops. A large proportion of marginal farmers with graduate (75%), and middle school education (42%) and graduate small farmers (50%) revealed that, shortage of cultivable area was the main reason for not opting to cultivate non-food grain crop by them (Annexure table 6.2).

In the case of all the farmers taken together the reasons for not cultivating non- food grain crops included inadequate supply of water (49%) , insufficient land (38%), fencing problem (5%), other reasons including pollution (5%), high cost and shortage of labour supply (2%) and non-profitability (1%) (Fig. 6.2).

Fig. 6.2: Distribution of Farmers on the Basis of Reasons for Non-cultivating Non-food grain Crops by Level of Education and Size of Land Holdings (in percentages



Source: Primary Data, 2014

6.1.3 Cropping Pattern by Size of Holdings

Cultivation of a particular type of crop may depend on the size of land holdings. It can be observed from the study that, majority of the farmers cultivated paddy kharif, paddy rabi, cashew, coconut and areca nut (Table 6.4). Proportion of farmers cultivating paddy kharif varied between zero per cent of large farmers and 64 per cent of marginal farmers. Overall, 57 per cent of farmers cultivated paddy kharif. In the case of paddy rabi with an exception of medium farmers the proportion of farmers cultivating rabi paddy decreased with the increasing size of land holdings. The proportion varied between nine per cent of the large farmers and 31 per cent of marginal farmers. This indicates that, less proportion of farmers with bigger size of land holding cultivated paddy.

The proportion of farmers cultivating cashew varied between 13 per cent among marginal farmers and 100 per cent among large farmers indicating that, larger proportion of farmers with bigger size of land holdings cultivated cashew. Proportion of farmers cultivating coconut varied between 11 per cent among marginal farmers and nearly 73 per cent among large farmers. In the case of areca nut with an exception of medium farmers the proportion of farmers cultivating it varied between 17 per cent among marginal farmers and 73 per cent among large farmers. It can be observed that, only, higher proportion of marginal farmers cultivated food grain crops. In the case of small, medium and large farmers the proportion of farmers cultivating non-food grain crops was higher than the food grain crops indicating that, farmers with larger size of land holdings preferred to cultivate non-food grain crops.

Table No 6.4: Distribution of Farmers by Type of Crops Cultivated (in %)

Type of Crop	Type of Farmer				Total
	Marginal	Small	Medium	Large	
Paddy Kharif	63.75	42.00	41.67	0.00	57.51
Paddy Rabi	30.83	24.00	33.33	9.09	28.75
Pulses Kharif	2.50	2.00	0.00	0.00	2.24
Pulses Rabi	0.42	2.00	8.33	0.00	0.96
Cashew nut	12.92	62.00	83.33	100	27.16
Coconut	10.83	54.00	66.67	72.73	22.04
Areca nut	17.08	62.00	58.33	72.73	27.8
Banana	3.33	18.00	8.33	54.55	7.67
Vegetables	4.58	10.00	0.00	0.00	5.11
Mango	2.50	4.00	16.67	45.45	4.79
Pine apple	0.00	8.00	0.00	0.00	1.28
Spices	0.00	10.00	8.33	54.55	3.83
Other	0.00	2.00	8.33	27.27	1.6
All	100	100	100	100	100
Farmers (in numbers)	**240**	**50**	**12**	**11**	**313**

Source: Primary Survey, 2014

6.1.4 Cropping Pattern by Level of Education

Crops can be broadly classified as high value crops or non-food grain crops and low value crops or food grain crops. High value crops are basically the cash crops like cashew, coconut, areca nut, mango, spices, banana, vegetables, pineapple and other crops including bamboo and sugarcane.

The study revealed that, farmers with higher levels of education allocated higher percentage of cultivated land including the area under double cropping for the cultivation of high value crops (Table 6.5). In the case of illiterate farmers, a significant proportion that is, nearly 97 per cent of land was used for the cultivation of low value crops like paddy and pulses while a small proportion that is only around eight per cent of land was used for the cultivation of high value crops. Farmers with four years of education used nearly 85 per cent of their land for the cultivation of low value crops

and 50 per cent of land was used for the cultivation of high value crops including 39 per cent of land under double cropping. Farmers with seven years of education devoted nearly 80 per cent of their land for the cultivation of low value crops while, nearly 55 per cent was used for the cultivation of high value crops which included 35 per cent area under double cropping. Farmers with secondary level of education used nearly 26 per cent of their land for the cultivation of low value crops and around 83 per cent was used for the cultivation of high value crops indicating that, at the secondary level of education there is substantial decrease in the percentage of farmers cultivating low value crops. It is important to note that, farmers with secondary level of education and above did not cultivate any pulses. Out of the total land cultivated by the farmers with twelve years of education, around 28 per cent of their land was used for the cultivation of low value crops and nearly 81 per cent was used for the cultivation of high value crops including 9 per cent area under double cropping. Graduate farmers devoted around seven per cent of their land for the cultivation of low value crops and 93 per cent of land is used for the cultivation of high value crops. Farmers with post graduate education used around 12 per cent of their land for the cultivation of low value crops and 90 per cent of land is used for the cultivation of high value crops. Farmers with professional education did not use any land for the cultivation of low value crops. The percentage of land used for the cultivation of low value crops and high value crops farmers with ITI qualification was nearly seven per cent and 93 per cent respectively. The same percentage is around two per cent and 98 per cent respectively for the diploma educated farmers. Above discussion implies that, farmers with higher levels of education use higher percentage of their land for the cultivation of high value crops and farmers with low levels of education that is up to seven years of education use higher proportion of their land for the cultivation of low value crops.

Table 6.5: Total Land Area Covered under Variety of Crops by Farmers (in hectors)

Crops	Level of Education										Total
	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates	Post Graduates	Professionals	I.T.I.	Diploma	
Paddy Kharif	124.65	14	13.72	20.6	4.00	NA	NA	NA	NA	NA	183.06
Paddy Rabi	6.58	15	10.55	13.5	1.65	8.79	NA	NA	1.00	1	53.88
Pulses Kharif	NA	0.5	0.68	1.5	NA	NA	1.9	NA	NA	NA	2.68
Pulses Rabi	NA	0.3	NA	0.12	NA	NA	NA	NA	NA	NA	0.42
Total Food grain crops	**131.23**	**29.8**	**24.95**	**35.72**	**5.65**	**8.79**	**1.9**	**NA**	**1.00**	**1.00**	**240.04**
Percentage of net total sown area for food crops.	**97.24**	**84.61**	**80.28**	**25.55**	**27.73**	**6.78**	**11.51**	**0.00**	**7.34**	**1.67**	**39.69**
Cashew nut	4.35	6.75	10.5	21.37	8.1	42.7	2.7	10.00	3.1	17.3	126.87
Coconut	2.5	3.59	2.1	12.7	2.05	13	0.7	5.8	2.1	11.25	55.79
Areca nut	3.63	5.66	3.16	34.86	5.9	31.04	0.7	7.00	3.4	20.55	115.9
Banana	0.09	0.78	0.58	0.43	0.3	4.5	10	1.00	NA	4.00	21.68
Vegetables	0.35	0.26	0.4	0.29	0.2	NA	0.2	NA	NA	NA	1.7
Mango	NA	0.19	NA	0.7	0.02	8.48	0.5	1.8	0.4	3.00	15.09
Pineapple	NA	0.4	NA	NA	NA	3.00	NA	NA	NA	0.25	3.65
Spices	NA	0.05	0.2	1.00	NA	15.00	NA	3.00	2.00	3.5	24.75
Others	NA	0.02	NA	45.00	NA	3.00	NA	NA	4.00	NA	52.02
Total Non-food crops	**10.92**	**17.7**	**16.94**	**116.35**	**16.57**	**120.72**	**14.8**	**28.6**	**15**	**59.85**	**417.45**
Percentage of Net total sown area for non-food crops.	**8.09**	**50.26**	**54.50**	**83.23**	**81.34**	**93.21**	**89.69**	**100.00**	**93.75**	**98.35**	**69.02**
Grand Total	142.15	47.5	41.89	152.07	22.22	129.51	16.7	28.6	16	60.85	657.49
Area under Double cropping	6.93	13.56	10.95	13.91	1.85	0.00	0.2	0.00	0.00	0.00	49.2
Net Total sown Area	135.22	35.22	31.08	138.16	20.37	129.51	16.5	28.6	16	60.85	601.71

Source: Primary Survey, 2014

6.1.5 Area under Double Cropping.

In the study area double cropping was undertaken by farmers in the case of cultivation of paddy, pulses and vegetables. Graduate farmers, professionals, I.T.I., and diploma qualified were not undertaking double cropping. Of all those farmers who were undertaking double cropping, the proportion of land under double cropping was the maximum among farmers with primary education (39%) (Table 6.6), Thus the proportion of farmers growing double crops varied between 39 per cent at the primary level to one per cent at the post graduate level indicating that, with an exception of illiterate farmers, less proportion of farmers with higher levels of education were undertaking double cropping. Illiterate farmers used only about five per cent of their land area for double cropping. This is because, a large numbers of farmers owned small plots of land and lack of irrigation facilities during winter season for the cultivation of rabi crops.

Table 6.6: Proportion of Area under Double Cropping by Levels of Education (in percentages)

Type of crop	Level of Education					
	Illiterate	Primary	Middle	Secondary	Higher secondary	Post Graduates
Paddy Rabi	4.62	29.47	25.18	0.08	7.42	0.00
Pulses Rabi	0.00	0.71	0.00	0.0007	0.00	0.00
Vegetables	0.24	0.24	0.95	0.19	0.9	0.2
Total	4.87	38.50	35.00	9.14	8.32	1.21

Source: Primary Survey, 2014.

6.2 Net Earnings from Cultivation by Type of Crops

Net Earnings from Cultivation by Type of Crops

An efficient allocation of resources among different uses is usually based on the net earnings. The net earnings from cultivation also influence the decision of continuation on farmers in the cultivation of specific crop and/or continuation in farming activity. In view of this, the present section analyses net earnings of farmers from different types of crops by size of land holdings and levels of education.

There were no sample farmers with professional education among marginal farmers, below seven years of education among medium farmers and below primary education among large farmers. Food grain crops were not grown by the marginal farmers belonging to the educational level of other category, small farmers with professional education, and medium farmers with higher secondary, professional, and other category education while, in the case of large farmers only graduate farmers cultivated food grains. Above analysis indicates that there were many farmers who abstained from growing food grain crops. It can be observed from the survey that, with an exception of post graduate farmers from marginal size of land holdings and graduate farmers from large size of land holdings, at every level of education, the net income earned by each type of farmers by cultivating non-food grains was higher than the income earned from food grain crops at all levels of education (Annexure Table 6.3 to 6.6).

When the net average income earned per hector of land by all farmers by level of education from cultivating different types of food grain crops (Table 6. 7) is compared with the income of the farmers earned by cultivating various non-food grain crops or cash crops (Table 6. 8) it is found that, all the farmers taken together, the net average per hector income earned was the highest from the cultivation of Spices (Rs. 189733), followed by Areca nut (Rs. 104183), Mango (Rs. 90061), Vegetables (Rs. 84166), Cashew (Rs. 74603) and Coconut (Rs. 58381).

The income earned was the lowest from Pulses Kharif (Rs.21581), followed by Paddy Rabi (Rs. 24612) and Paddy Kharif (Rs.29412).

Table 6.7: Net Average Income (per hector) of farmers by type Food Crops (in Rupees)

Level of Education	Paddy Kharif	Paddy Rabi	Pulses Kharif	Pulses Rabi
Illiterate	3257	3861	NA	NA
Primary	30808	15806	25500	28000
Middle	41145	33114	31250	NA
Secondary	29906	22008	8000	83333
Higher Secondary	11536	43818	NA	NA
Graduates	34236	45796	NA	NA
Post graduates	55000	NA	NA	NA
Professionals	NA	NA	NA	NA
I.T.I.	NA	20000	NA	NA
Diploma	NA	12500	NA	NA
Average	29412	24612	21581	55666

Source: Primary Survey, 2014.

Table 6.8: Net Average Income (per hector) of Farmers by Type of Non-food Crops (in Rupees)

Level of Education	Cashew	Coconut	Areca nut	Banana	Vegetables	Mango	Pineapple	Spices	Others
Illiterate	22074	8370	80276	2222	35429	NA	NA	NA	NA
Primary	53742	38483	106928	100000	56000	71764	12500	200000	250000
Middle	112412	20000	74672	49444	156666	NA	NA	10000	5333
Secondary	73925	49219	86574	65166	76071	96666	NA	335400	800
Higher Secondary	95368	47433	88715	80000	15000	75000	NA	NA	NA
Graduates	35777	90196	241216	58974	NA	106476	6667	62009	16666
Post graduates	162963	85000	58714	8000	250000	200000	36364	NA	NA
Professionals	56611	38037	98833	32000	NA	69000	85000	398667	100
I.T.I.	27159	139375	120139	NA	NA	11521	NA	640000	38750
Diploma	106000	67700	85768	40000	NA	NA	NA	91533	4666
Average	74603	58381	104183	48422	84166	90061	35132	189733	52682

Source: Primary Survey, 2014.

6.3 Impact of Education on Cost, Productivity and Net Income

Education is supposed to influence cost of production as the educated farmers would be well informed about the cost efficiency in the selection of various inputs and would be in a position to decide about the least cost input combinations. Accordingly productivity and net earnings could be expected to be higher with higher levels of education. Considering this possibility, in the present section, an attempt is made to estimate the association between the level of education of farmers with the per hector cost, productivity and net income earned from the cultivation of different crops.

6.3.1 Paddy

Paddy is the principal food crop of Goa. It can be cultivated twice a year. Paddy cultivated during monsoon season is called Kharif paddy while, paddy cultivated during winter season is called rabi paddy. Rice being the staple food of people from Goa, a large proportion of marginal farmers (64%) cultivate kharif paddy and around one-third (31%) cultivate rabi paddy to meet their daily needs for rice (Table 6.4). Paddy cultivation is mainly dependent on rain water in Goa. Hence the proportion of farmers cultivating kharif crop is much more than that of rabi paddy. The main sources of irrigation for rabi paddy are rivers and streams. The mean and median area under cultivation of paddy was 3032 sq. mts. and 2000 sq. mts. respectively. The mean yield of paddy was 877.6 kgs. and the median yield was 500 kgs. in the study area. The maximum area under cultivation of this crop was 40,000 sq. mts.

Kharif Paddy: Kharif paddy was grown by all type of farmers with an exception of large farmers and accounted to around 58 per cent of the total farmers. The analysis of data shows that, for the marginal farmers the coefficient of correlation between the level of education and cost, yield and net income per hector was positive but insignificant

(Table 6.9a.1). This might be because education is not the only factor determining the cultivation of kharif paddy but there are other factors like experience of farmers in farming activity, influence of the farm practices of the farmers from nearby area, etc. In the case of small farmers the correlation of level of education with cost and income was positive but insignificant while it was negatively insignificant for yield per hector. This could be due to the association of productivity with fertility of soil, efficiency and quality of all other variables because of which the productivity might not have been increased with increase in the cost of production. For medium farmers the coefficient of correlation for cost was positively insignificant and it was negative for the yield and net income per hector. This is because with the increased level of education, medium farmers are undertaking higher expenditure on inputs but productivity of land might not increase to the extent of increase in the expenditure and hence the coefficient of correlation is negative with respect to yield and income. All farmers taken together the correlation coefficient for cost was positive and highly significant but it was negatively insignificant for yield and net income. This is because all farmers taken together, with higher level of education farmers undertake more expenditure on agricultural inputs but it is not associated with increased yield and increased income. With the increased level of education farmers cultivate their land more intensively by incurring more expenditure on the cultivation of paddy. As mention in the section I of this chapter, it could be because of the importance of rice as a staple food of people in Goa. The cost of production is directly related to the levels of education of each size of farmers, indicating that cost efficiency is negatively related to levels of education. Even the productive efficiency is negatively related with levels of education as the correlation coefficient is negative with the yield for different farmers but for marginal farmers.

Table 6.9a.1 Correlation Coefficient of Level of Education with Cost, Yield, and Income with respect to Kharif Paddy

Size of Farm	Cost	Yield	Income
Marginal	0.57	0.59	0.39
Small	0.6	-0.2	0.33
Medium	0.51	-0.8	-0.8
Large	NA	NA	NA
All	0.77	-0.2	0.3

Source: Compiled from Primary Survey, 2014.

a. **Rabi Paddy:** Farmers from all the size landholdings cultivated but formed only around 29 per cent of the total sample farmers. In the case of marginal farmers, the coefficient of correlation between the level of education and cost, yield and net income was positive (Table 6.9a.2) and was highly significant in the case of net income. This might be because with increased level of education, farmers might be undertaking increased amount of expenditure on the various inputs which might have resulted in increased yield leading to increased income per hector. For small farmers the correlation coefficient between the level of education with cost, yield and income was negative indicating that with the increased level of education farmers were undertaking less expenditure on inputs used in the process of production resulting in low yield and low income. The correlation coefficient between the level of education and cost and yield per hector was negative for medium and all farmers taken together indicating that, expenditure incurred on inputs and yield was less with increased levels of education. Coefficient of correlation between the level education and income was positively significant for medium farmers and positively insignificant for all farmers taken together. This might be because with the increased level of education medium farmers might be selling their produce at better prices. In the

case of large farmers only one single farmer was growing rabi paddy hence it was not possible to get the correlation. Besides this, the cultivation of rabi paddy depends on the availability of irrigation facility. Marginal farmers could manage their small fields either by using traditional methods of irrigation like diverting spring or river grater artificially towards their fields but the supply of water in such ways becomes difficult for the cultivation of the large areas. In the study area, cultivation of rabi paddy is undertaken intensively by marginal farmers on the banks of the river after the rainy season. The land used for such cultivation is very fertile giving very high yield as compared to other land used by small and medium farmers for the cultivation of rabi paddy.

Table 6.9a.2 Correlation Coefficient of Level of Education with Cost, Yield, and Income from Rabi Paddy

Size of Farm	Cost	Yield	Income
Marginal	0.35	0.01	0.89
Small	-0.2	-0.84	-0.95
Medium	-0.23	-0.8	0.97
Large	NA	NA	NA
All	-0.16	-0.6	0.21

Source: Compiled from Primary Survey, 2014.
Note: NA not applicable as no cultivation of Rabi paddy

6.3.2 Cashew

Cashew is one of the largest and popular plantation crops in Goa. Mostly, land with hilly terrains is used for the cultivation of this crop. Since processed cashew nuts are exported to other countries it has become an important mode of earning foreign exchange to the Government exchequer. Cashew nut is known for its high nutritional value and hence there is an ever increasing demand for it from the tourists as well as from neighbouring states. A unique feature of cashew plantation in Goa is that, apples

of cashew are used to extract juice which is processed into intoxicating drink (liquor) called feni. Age old traditional methods are used to convert it into liquor. As this liquor is known for its special taste there is increasing demand for it not only from local people but also from domestic as well as foreign tourists. It brings additional income to the farmers cultivating cashew. According to the farmers cultivating cashew, entire expenditure on the cashew farm can be met, if they extract the juice from cashew apples, process it into liquor and sell it in the local market. In such cases, whatever income farmers receive by selling cashew nuts is a net income for the farmers.

Among the sample farmers of Ponda taluka, maximum area brought under cashew cultivation was 100,000 sq. mts. The average area under cultivation was 3182 sq. mts. with an average yield of 1150 Kgs. It is observed that, the level of education has a positive relation with cost, yield and income in the case of each size farmers, with an exception of yield of marginal farmers (Table 6.9b), For medium farmers, the coefficient of correlation of level of education with the cost, yield as well as net return was highly significant. In the case large farmers coefficient was positively significant with respect to cost per hector and perfectly positive for the net income. This might be because large farmers with higher levels of education export their product to other countries which fetch them higher price. Thus it implies that, the cultivation of cashew is highly influenced by the level of education, especially in the case of medium and large farmers.

Table 6.9b Correlation Coefficient of Level of Education with Cost, Yield, and Income in respect of Cashew

Size of Farm	Cost	Yield	Income
Marginal	0.46	-0.7	0.4
Small	0.39	0.32	0.18
Medium	0.71	0.74	0.7
Large	0.7	0.43	1
All	0.6	0.48	0.24

Source: Compiled from Primary Survey, 2014.

6.3.3 Coconut

Coconut is the second major plantation crop in Goa. There is an ever increasing demand for coconuts in the state as it forms an important ingredient in the staple food of Goa that is fish, curry and rice. In Goa, coconut trees are found in the backyard of almost every household. Planting coconut trees in the home gardens is one of the most common features and the way of life of the people in Goa. The study revealed that, maximum area under the plantation of coconut was 80,000 sq. mts. While the average area was 1604 sq. mts. with an average yield of 2,490 numbers of coconuts per hector. With an exception of large farmers, the relationship of the level of education with cost, yield and income in growing coconuts was positive but insignificant (Table 6.9c). This indicates that, the level of education does influence the cultivation of coconut to some extent. In the case of large farmers, the coefficient of correlation for cost, yield as well as net return was negative implying that the more educated large farmers might have taken less interest in the cultivation of coconut compared to the relatively less educated.

Table 6.9c Correlation Coefficient of Level of Education with Cost, Yield, and Income from Coconut

Size of Farm	Cost	Yield	Income
Marginal	0.14	0.14	0.54
Small	0.33	0.62	0.48
Medium	0.5	0.21	0.3
Large	-0.4	-0.4	-0.4
All	0.2	0.11	0.07

Source: Compiled from Primary Survey, 2014.

6.3.4 Areca nut

The areca trees are more delicate than the coconut trees. It requires abundant irrigation during hot summer months. Therefore, the plantation of these trees is mostly found

where there is perennial supply of water. As the trees grow well in shades of other trees, cultivation is common in low lying areas along with the other fruit bearing trees. Cultivation of areca nut is undertaken on commercial lines in Goa. In the study area it is found that, the farmers who have shifted their cultivation from food grain cultivation to non-food grain crops have opted for planting areca trees. It is observed from the analysis that, the maximum area under the cultivation of areca nuts was 1, 40,000 sq. mts. with an average area of 2234 sq. mts. while, the mean yield was 1975 Kgs. The level of education is observed to have negatively correlated with the cost, while positively correlated with yield and net income in the case of marginal and small farmers (Table 6.9d). This could be because of proper use of inputs like fertilizers, insecticides and pesticides by educated farmers. The farmers with low levels of education might be using them in more than required quantities which might be destructing the production of areca nut leading to low yield and income. In the case of medium farmers, correlation coefficients between education and cost, yield and net income are negative. In the case of large farmers, even though coefficient of correlation of level of education with cost is positively insignificant and, yield is negatively insignificant, the net return is positively significant. This could be due to the better marketing strategy followed by more educated large farmers. The coefficient of correlation of level of education with the cost and yield is negatively insignificant and income is positively insignificant for all the farmers taken together. On the whole, this indicates that, the level of education does not have much impact on the cultivation of areca nuts but it has some effect on net earning which could be attributed to the effective marketing strategy adopted by higher educated farmers.

Table 6.9d Correlation Coefficient of Level of Education with Cost, Yield, and Income in Respect of Areca nut

Size of Farm	Cost	Yield	Income
Marginal	-0.3	0.2	0.42
Small	-0.1	0.15	0.05
Medium	-0.74	-0.3	-0.72
Large	0.44	-0.8	0.95
All	-0.36	-0.02	0.0003

Source: Compiled from Primary Survey, 2014.

6.3.5 Banana

It is one of the important fruits commercially cultivated in the study area. Hardly any farmer undertakes cultivation of banana exclusively. In most of the cases, cultivation of banana is undertaken along with the cultivation of areca nut and coconut. Common varieties of bananas that were found in the study area include Amti (Mysore), Raspali (Silk), Velchi (Neypoovan), Saldatti (Saba), Savarboni (Bluggoe), Myndoli (Horn plantain) and Sugandhi (Pisang awak). There is an increasing demand for bananas in the market because of its high nutritional value and relatively lower prices. It is observed from the analysis that, the maximum area under the cultivation of banana was 1,00,000 sq. mts. with an average area of 8476 sq. mts. while, the mean yield was 13,840 kg per hector. The correlation coefficient of the level of education with cost and income is positive while with yield it is negatively insignificant for marginal farmers (Table 6.9e) implying that, with the increased level of education farmers spend more on inputs but productivity of land might not be responsive to the increasing expenditure. With the increased levels of education marginal farmers might be selling their product in better markets like co-operative stores where they earn higher price and hence the coefficient of correlation between the incomes received by marginal farmers

with respect to the level of education is moderately positive. For small farmers, the correlation between the level of education and cost is positively insignificant while with yield and income it is negatively correlated. In the case of medium farmers, the coefficient of correlation between the level of education and cost is perfectly negative while it is perfectly positive for yield and negatively insignificant for income. This might be because with increased level of education farmers might be making proper use of inputs like fertilizers, pesticides and insecticides, thus resulting in increasing productivity. For large farmers, the coefficient of correlation between the level of education and cost as well as yield is positive while it is negative in the case of income. For all farmers taken together, the correlation coefficient of education is insignificant and negative for cost and income while it is positive for the yield. The analysis indicates weak and mostly inverse relationship of level of education with the variables under consideration.

Table 6.9e Correlation Coefficient of Level of Education with Cost, Yield, and Income from Banana

Size of Farm	Cost	Yield	Income
Marginal	0.38	-0.1	0.52
Small	0.61	-0.84	-0.6
Medium	-1	1	-0.6
Large	1	0.5	-1
All	-0.09	0.01	-0.03

Source: Compiled from Primary Survey, 2014.

6.3.6 Vegetables

Some of the prominent vegetables that were grown in the study area were brinjal, lady finger radish, cucumber, pumpkin, drumstick, and red leafy vegetable, varieties of gourds, sweet potatoes, chilies and onions. The analysis revealed that, maximum area under vegetable cultivation was 5000 sq. mts. while the average area was 1317 sq. mts.

with an average yield of 6.64 kg. per sq. mt. Medium and large farmers were not cultivating vegetables. For marginal farmers, the correlation coefficient between the levels of education and cost was negatively insignificant while it was positively insignificant with yield and income (Table 6.9f). It might be because of proper use of inputs by more educated farmers resulting in reduction in expenditure and increase in yield and income. It can be observed that, for small and all farmers taken together, coefficient of correlation of the levels of education with cost, yield as well as income is positively insignificant. Thus the level of education has positive but insignificant effect on the cultivation of vegetables.

Table 6.9f Correlation Coefficient of Level of Education with Cost, Yield, and Income from Vegetables

Size of Farm	Cost	Yield	Income
Marginal	-0.3	0.07	0.05
Small	0.59	0.13	0.18
Medium	NA	NA	NA
Large	NA	NA	NA
All	0.24	0.02	0.4

Source: Compiled from Primary Survey, 2014.

6.3.7 Mango

Different varieties of mangoes are grown in the study area. Some of them include mancurade, mussarade, xavier, alfonsa and colaco. Production of mangoes is much dependent on the climatic conditions especially during the flowering seasons of the plant. If there are frequent changes in climate then the trees are unable to bear fruits and thus yield would be low. Absence of proper marketing facilities is another most important reason for the farmers not taking interest in the cultivation of mangos. When there is bumper crop, farmers are forced to sell their produce at a very low price. Lack

of fruit processing industries in Goa is one of the most important reasons for keeping farmers away from the cultivation of fruits like mangoes on commercial lines. It is observed from the analysis that, the maximum area under mango plantation was 30,000 sq. mts with an average area of 8,839 sq. mts. while the mean yield was 102 kgs. Positive correlation is observed between the level of education and cost and yield for marginal (insignificant), small and all farmers taken together (Table 6.9g). For small farmers, the cost was positively significant and yield was positively insignificant, while the net income for marginal, small and all farmers taken together were negatively insignificant. This could be because, with increased level of education farmers from marginal, small and all farmers taken together might be spending more on the cultivation of mangoes and hence coefficient of yield is positively related to the levels of education. In the case of large farmers, the correlation between the levels of education for cost as well as yield was negative while there was no correlation between the level of education and the income.

Table 6.9g Correlation Coefficient of Level of Education with Cost, Yield, and Income in Respect of Mango Cultivation

Size of Farm	Cost	Yield	Income
Marginal	0.14	0.69	-0.1
Small	0.76	0.58	-0.6
Medium	1	NA	NA
Large	-0.4	-0.3	0
All	0.39	0.05	-0.36

Source: Compiled from Primary Survey, 2014.

6.3.8. Spices

Spice plantation is a major attraction for the tourist in Goa. Peculiar feature of spice plantations in the study area is that, most of them have started practicing organic

farming. Special tours are organized in these farms and information is provided to the tourists about the importance of different varieties of spices. Some major spices that are produced in these farms include black pepper, cardamom, nutmeg, vanilla, cinnamon, cloves, chilies, coriander and ginger. In the study area maximum area brought under spice plantation was 50,000 sq. mts. Average area under cultivation was 21,428 sq. mts. with an average yield of 38.42 kgs. Cultivation of spices was undertaken only by small and large sample farmers. The correlation coefficient between the level of education with average cost, yield and net income from per hector of cultivation of spices is negative for the small, large as well as for all the farmers taken together (Table 6.9h). This might be because, the cultivation of spices might not be dependent on the level of education but on other factors like size of land holdings, technical knowhow, irrigation facility, experience of farmers, etc.

Table 6.9h: Correlation Coefficient of Level of Education with Cost, Yield, and Income from Spices

Size of Farm	Cost	Yield	Income
Marginal	NA	NA	Na
Small	-0.8	-0.73	-0.7
Medium	NA	NA	NA
Large	-0.8	-0.3	-0.4
All	-0.68	-0.61	-0.56

Source: Compiled from Primary Survey, 2014.

6.3.9 Concluding Observations

Relation Between Level of Education and Cost of Production: Above analysis between the level of education and the per hector cost incurred on the cultivation of crops reveals that, for the kharif crop the correlation between the level of education and the average cost incurred on inputs is positive but not significant for marginal, small,

and medium farmers. In the case of rabi paddy, the correlation is negative with an exception of marginal farmers.

For the production of cashew, correlation between the level of education and the average cost incurred on inputs is positive for marginal, small, medium and large farmers. It is positive and insignificant for marginal and small farmers and it is positive and significant for medium and large farmers. For all farmers taken together it is positive but insignificant. For the coconut production with an exception of large farmers the correlation between the two is positive but insignificant. In the case of areca nut, except for large farmers the correlation between the two is negative. For the cultivation of banana, the correlation is positive but insignificant for marginal and small farmers for large farmers it is perfectly positive. It is negative for medium farmers. For vegetable production, the correlation is negative for marginal farmers and it is positive but insignificant for small farmers. In the case of mango production, it is positive for marginal, small and medium farmers. The correlation is positive and significant for small and medium farmers. For large farmers it is negative. For the production of spices, the correlation is negative for all type of farmers cultivating spices.

The above findings reveal that, there is no much significant impact of the level of education on the average cost of inputs used by farmers. This is because farmers do not undertake farming activity in isolation. Irrespective of the level of education, farmers always try to learn and adopt the practices followed by other farmers. For example, when farmers come to know that, the uses of particular variety seed leads to higher productivity, then other farmers irrespective of the level of education and cost of seeds make use of those seeds. In the same way, when one farmer from neighbourhood brings machine in his farm, other farmers also follow the same method irrespective of the level of education. This states that, the average cost of inputs used in farms do not depend

only on the level of education of farmers, but also other factors like awareness and availability of inputs to be used in the production and also has much to do with demonstration effect.

Relation between Level of Education and Productivity: An analysis between the level of education and the yield per hector indicates that, in the case of kharif and rabi paddy the correlation between average yield and education is negative with an exception of marginal farmers where a positive correlation is observed. For cashew crop, with an exception of marginal farmers, the correlation between the two is positive. It is positive and significant for medium farmers. With an exception of large farmers the correlation between the level of education and yield per hector is positive for coconut production. In the case of areca nut, the correlation is positive for marginal and small farmers. It is negative in the case of medium, large and for all the farmers taken together. For the production of banana, correlation is negative for marginal and small farmers but it is positive for medium and large farmers. In the case of vegetable production it is positive for marginal, small and as all the farmers taken together. In the case of the production of mangos, with an exception of large farmers, the correlation is positive for all the categories of farmers. For spices, the correlation is negative for all the farmers.

The forgoing analysis shows that, in the case of majority of the crops, the correlation between the level of education and the yield produced per hector is positive but not significant. This indicates that, the level of education has limited influence on the yield of different crops. It leads to the conclusion that, there are many other factors which might be influencing agricultural productivity more significantly than level of education.

Relation Between level of Education and Net Income: An analysis between the level of education and the net income earned on per hector of land reveals that, in the case of kharif paddy with an exception of medium farmers, the correlation is positive but insignificant for marginal, small and all the farmers taken together. For the rabi crop, with an exception of small farmers correlation is positive and significant for marginal and medium farmers. For all farmers taken together it is positive but insignificant.

In the case of cashew production, the correlation between the two is positive for all the categories of farmers. It is positive and significant for medium and large farmers and for the remaining categories of farmers correlation is positive but insignificant. In the case of coconut production, with an exception of large farmers, correlation between the level of education and the net income earned from the production of coconut is positive but insignificant for all the categories of farmers. In the case of areca nut production, with an exception of medium farmers the correlation is positive for all the categories of farmers. It is positive and highly significant for large farmers. In the case of banana production with an exception of marginal farmers, the correlation is negative for all the categories of farmers cultivating banana. For the production of vegetables, correlation is positive but insignificant for all the categories of farmers who cultivated vegetables. In the case of production of mangoes, the correlation is negative for marginal, small and all farmers taken together. It is positive and very insignificant for large farmers. In the case of spices, it is negative for all the categories of farmers who cultivated spices.

From the above analysis it is true that, for the majority of the farmers, correlation between the level of education and the income earned by cultivating various crops is positive. This shows that, majority of the farmers with higher levels of education earned higher levels of income by cultivating different crops.

6.3.10 Correlation between the Levels of Education and Costs of Inputs by Type of Crop.

Level of education is expected to determine the cost incurred on various inputs used in the process of agricultural production. Farmers with higher level of education might always try to make proper use of available inputs resulting in reduction in cost incurred on inputs. Judicious use of inputs not only reduces the overall cost of production but also results in higher yield and higher income. It is observed from the analysis that, with an exception of areca nut, banana and vegetables the correlation coefficient between the level of education and costs incurred on HYV seeds is found to be positive for all the major crops (Table 6.10). With an exception of mango cultivation, the coefficient of correlation between the level of education and cost incurred on irrigation is positive for all the crops cultivated by the farmers. As far as cost on fertilizer is concerned, the coefficient of correlation is positive with respect to paddy kharif and rabi, coconut, areca nut and vegetable cultivation, while it is negative for banana and mango cultivation. With an exception of vegetable cultivation, the coefficient of correlation between the level of education and the cost incurred on manure is negative for all the crops. As far as the cost on labour and traditional equipment is concerned, the coefficient of correlation with the level of education is negative for all the crops except for paddy kharif and rabi. With an exception of vegetable cultivation, the coefficient of correlation between the cost incurred on modern equipment and the level of education is found to be positive. The cost incurred on pesticides and insecticides is positively correlated with the level of education for all the crops.

The correlation coefficient between the level of education and the use of inputs was positive for irrigation, insecticides and modern equipment (Table 6.10). It was negative

for fertilizer, manure, labour and traditional equipment. As far as the use of seeds is concerned, there was no correlation between the level of education and the use of HYV seeds. Thus the education has a limited impact on the use of important inputs for agricultural production. This reveals that, other factors determining the use of agricultural inputs might be more influential than that of the level of education.

Table 6.10: Correlation Coefficient between Cost Incurred on Inputs and the Level of Education of All Farmers on All Crops

Crops	Seeds	Irrigation	Fertilizer	Manure	Labour	Traditional Equipment	Modern Equipment	Insecticides
Paddy kharif	0.89	--	0.91	-0.36	0.74	0.55	0.74	0.92
Paddy Rabi	0.26	0.26	0.53	-0.73	-0.60	-0.26	0.40	0.62
Cashew	0.24	0.58	--	-0.21	-0.21	-0.26	0.40	0.62
Coconut	0.17	0.54	0.32	-0.09	-0.29	-0.03	0.44	0.54
Areca nut	-0.20	0.15	0.44	-0.36	-0.66	-0.47	0.55	0.23
Banana	-0.19	0.38	-0.10	-0.22	-0.80	-0.80	0.50	0.20
Vegetables	-0.10	0.69	0.05	0.44	0.15	0.20	-0.47	0.27
Mango	0.04	-0.17	-0.17	0.18	-0.12	-0.60	0.46	0.28

Source: Compiled from Primary Survey, 2014.

6.4 Factors Indirectly Affecting Agricultural Activity and Views of Farmers

Various factors might influence agricultural productivity and development of agriculture sector indirectly. This section deals with the different possible factors indirectly affecting the productivity of agriculture sector in the study area.

6.4.1 Farmers Engaged in Other Activities

Some of the farmers engage in other related and unrelated economic activities as well to supplement their income. This provides them employment throughout the year with an alternative source of income. The proportion of sample farmers engaged in other

activities increased with increasing size of land holdings (Table 6.11) ranging between the lowest 10.83 per cent of marginal farmers and the highest 63.63 per cent of large farmers. The percentage of farmers undertaking allied activities increased with increasing level of education except for higher secondary educated. It was around 11 per cent in the case of illiterate farmers, nearly 27 per cent for farmers with graduation and above qualifications and 30 per cent for I.T.I. and Diploma holders. So it can be stated that, the level of education, size of holdings have a positive influence on farmers involvement in allied activities.

Table 6.11: Farmers Engaged in Other Activities by Level of Education and Size of Landholdings (in percentages).

Level of Education	Size of Holding				
	Marginal	**Small**	**Medium**	**Large**	**All Size**
Illiterate	11.27	NA	NA	NA	10.66
Primary	11.32	25.00	NA	NA	12.90
Middle	16.22	8.33	NA	NA	14.28
Secondary	6.25	23.08	100	100	17.91
Higher Secondary	6.67	NA	100	NA	10.00
Graduates and above	14.29	20.00	NA	36.36	26.66
Others	0.00	25.00	8.33	9.09	30.00
All levels	*10.83*	*16.00*	*58.33*	*63.63*	*37.19*

Source: Primary Survey, 2014.

Income earned by farmers from allied activities

Income from other activities forms as a subsidiary income for the farmers. The average monthly income derived from other economic activities by marginal farmers was the maximum for graduates (Rs.16000), while was the minimum for illiterates (Rs.1287) (Table 6.12). In the case of small farmers, it ranged between the minimum Rs. 2000

(primary educated) and the maximum Rs. 30,000 (Diploma holders). Among medium size farmers, it varied from minimum Rs. 15,000 (Secondary educated) and maximum Rs. 19,000 (Diploma holders). In the case of all the large farmers engaged in other jobs along with farming, the monthly average income earned from other activities was above Rs. 20,000 and it was the highest for graduate large farmers. Even though, no firm direct association could be established between the level of education and the earnings from allied activities, to some extent a link between these variables could be observed among the sample farmers.

Table 6.12: Average Monthly Income of Farmers from Allied Activities by Level of Education & Size of Land Holdings (in Rupees.)

Level of Education	Size of Holding			
	Marginal	Small	Medium	Large
Illiterate	1287	NA	NA	NA
Primary	1300	3350	NA	NA
Middle	4825	2000	NA	NA
Secondary	4166	13666	15000	NA
Higher Secondary	2000	NA	17000	NA
Graduates	16000	NA	NA	38750
Post graduates	NA	NA	NA	NA
Professional Graduates	NA	NA	NA	25000
I.T.I.	NA	NA	NA	25000
Diploma	NA	30000	19000	20000

Source: Primary Survey, 2014.

6.4.2 Farmers' Perceptions about Cost and Returns in Farming Activity

Responses of the farmers pertaining to cost and returns are very important. In the case of marginal farmers, higher percentage of farmers, irrespective of their education level responded that, over the years there is increase in cost of production and decrease in

returns from farming activity (Annexure table 6.7). Over 46 per cent of higher secondary educated and nearly 29 per cent of the graduate marginal farmers said that, there is increasing returns as well as increasing cost while another 29 per cent graduates said that, there is increase in the cost while the returns have remained the same. A higher percentage of small farmers with education up to middle level responded that, there is increasing costs and decreasing returns in agricultural production. Higher percentage of farmers from secondary school level education onwards stated that, there is increasing cost as well as increasing returns from farming activity. In the case of medium farmers 100 per cent primary, 25 per cent of secondary educated and around 17 per cent graduates responded that, there is increasing cost and decreasing returns while higher percentage that is 75 per cent, 100 per cent and 50 per cent of farmers with secondary, higher secondary and graduate education respectively responded that, there is increasing cost as well as increasing returns in farming activity.

In the case of large size of land holdings, all most all farmers from all levels of education replied that, over the years there is increase in the cost as well as increase in the returns in farming activity. Thus, a larger percentage of farmers with larger size land holdings and with higher levels of education responded that, there is increase in the cost of production along with the increase in the returns in farming activity. On the other hand higher percentage of farmers with lower size of land holding stated that, they have been facing increasing cost with decreasing returns from farming activity.

In the case of all the farmers irrespective of size of land holdings higher proportion of farmers from illiterate level of education (89%) (Table 6.13), primary (92%), middle (76%), and secondary (63%) responded that there is increasing cost and decreasing returns over the years in farming activity. Higher proportion of farmers from higher secondary (60%), graduate (50%) and I.T.I. and diploma holders (60%) responded that,

there is increase in cost as well as increase in returns in farming activity. So the above analysis indicates that, higher proportion of farmers from higher levels of education experience increasing cost along with increasing returns in farming activity while, higher proportion of farmers with lower levels of education face increasing cost and decreasing returns in farming activity.

Table 6.13: Responses of Farmers regarding Changes in Costs and Returns over the Years by Levels of Education (in percentages).

Responses	Level of Education							*Total %*
	Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	
Increasing Cost & Decreasing returns	89.33	91.94	75.51	62.69	40.00	23.33	40.00	*60.4*
Increase in cost & increase in returns	0.00	0.00	8.16	20.90	60.00	50.00	60.00	*28.43*
Returns same	2.67	0.00	14.29	2.99	0.00	20.00	0.00	*5.70*
No response	5.33	1.61	2.04	5.97	0.00	0.00	0.00	*2.13*
Any other reason	2.67	6.45	0.00	7.46	0.00	6.67	0.00	*3.32*

Source: Primary Survey, 2014.

6.4.3 Changes in Agricultural Practices

Improvement in agricultural practices can help in the development of agriculture sector. Adoption of agricultural practices depends on various factors like level of education, size of holdings, extension education, demonstration effect, etc. Level of education is expected to have a positive impact on the implementation of modern agricultural practices like use of High Yielding Variety (HYV) seeds, modern equipment, insecticides and pesticides. Surabhi M. and Praduman K. (2000), in their study have

noticed that, literacy has positive and significant relation with crop productivity and a strong link between literacy and farm modernization.

Seeds: In the present study area, over 90 per cent of farmers were using HYV seeds which ranged between the minimum 90 per cent of small farmers and maximum 100 per cent of large farmers (Annexure table 6.8). The use of HYV seeds is seen increasing with increasing levels of education except for the farmers with middle school education. An analysis of link between education of different types of farmers and use of HYV seeds shows that the higher proportion of educated marginal and small farmers used HYV seeds excluding the diploma and ITI educated farmers. All the large and medium size farmers used HYV seeds (Table 6.14).

Modern Implements: The use of modern implements shows a positive relationship between the size of land holdings which varied between the lowest 79 per cent by marginal farmers and the highest 100 per cent by large farmers. In the case of all the farmers with an exception of primary educated farmers, a positive relationship is observed in the use of modern implements (Table 6.14). Within each category of farmers also, a positive relation is observed between the level of education and use of modern appliances excluding the primary, diploma and ITI educated marginal farmers and secondary, diploma and ITI educated small farmers. All the medium and large farmers were seen using modern appliances for cultivation (Annexure table 6.8).

Cultivation of New Crops: A considerable proportion of medium (50%) and small (32%) farmers have taken up the cultivation of new crops while, only a small proportion of marginal (4.58%) and large (9.09%) farmers have opted to the introduction of new crops (Annexure table 6.8). The reason for larger percentage of small and medium farmers taking up the cultivation of new crop is that, these farmers hold relatively larger size of land holdings. Hence there is more scope for experimenting with new crops on

their land. Most of them have given up the cultivation of paddy and planted cash crops like areca nut, coconuts and bananas. Cultivation of cash crops requires bigger size land, as small plots of land are not viable for the cultivation of cash crops. Marginal farmers hold very small size of land holdings. They do not want to give up the cultivation of their staple food, especially paddy. Such farm lands are suitable for the cultivation of paddy and vegetables while not much suitable for other crops. In the case of large holdings, there is hardly any farmer undertaking the cultivation of paddy. Majority of the large farmers from the sample size have been cultivating cash crops. They are satisfied with the income that they earn from the cultivation and hence they do not want to shift to cultivate new crops. No specific relation between the level of education and introduction of new crop cultivation could be established with all farmers taken together (Table 6.14) and within each size of farmers. No farmer with I.T.I. and Diploma qualification attempted to cultivate new crops.

Use of Pesticides and Insecticides: The use of pesticides and insecticides is seen having a direct relationship with the size of land holdings which ranged between the lowest 58 per cent of marginal farmers and the highest 100 per cent of large farmers (Annexure table 6.8). It is observed that, use of pesticides and insecticides varied positively with the increase in the level of education (Table 6.14). It varied between the lowest 7 per cent of illiterate farmers and 100 per cent of higher secondary and above qualified farmers. Similar relationship among all marginal farmers and the small farmers excluding secondary educated (6.49%) is observed in the use of pesticides and insecticides.

No Change: Total percentage of farmers who did not carry out any change in their farm practices varied inversely with the size of landholdings and lied between nil large farmers and 25 per cent of marginal farmers (Annexure table 6.8). Percentage of

marginal and small farmers and all size farmers who did not carry out any change in farming practices decreased with increasing levels of education that varied from zero farmers with Diploma, ITI, and higher secondary and above education levels to 51 per cent of illiterate farmers(Table 6.14). This could be because with increased level of education farmers might have acquired knowledge that use of HYV seeds, modern implements, insecticides and pesticides and cultivation of high value crops helps in increasing the productivity of farms and thus farmers with increased level of education might have undertaken more changes in their farms.

Table 6.14: Changes Made by Farmers in Cultivation by Level of Education (in percentages)

Changes made	Level of Education							
	Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	***All level***
Started Using HYV Seeds	92.00	98.39	95.92	98.51	100	100	70.00	93.54
Started Using Modern Implements	70.67	54.84	85.71	97.01	100	100	70.00	82.60
Shifted Cultivation from Low Value Crops to High Value Crops.	0.00	8.06	2.04	20.9	30.00	26.67	0.00	12.40
Insecticides & Pesticides	6.67	54.84	85.71	85.07	100	100	80.00	73.18
No change	50.67	30.65	14.29	4.48	0.00	0.00	0.00	14.29
any other	0.00	4.84	0.00	2.99	0.00	3.33	0.00	1.59

Source: Primary Survey, 2014.

Shifting Cultivation from Low Value Crops to High Value Crops

In the study area, overall 12.40 per cent farmers shifted cultivation from low value crops to high value crops. There was no shifting in cultivation among illiterate farmers (Table 6.14). A larger proportion of farmers who shifted from low value crops to high value

crops from every level of education (that is, 60 per cent from primary level, 100 per cent from middle level, 78 per cent from secondary level, 83 per cent from higher secondary level and around 88 per cent from graduate and above level, did so because they found cultivating low value crops is not profitable (Table 6.15). Other farmers shifted their cultivation because of insufficiency of water for cultivation (20% primary and 13% graduate and above level of education), non-availability of labour (20% primary, 07% secondary and 16% higher secondary educated) and fencing problem (14% secondary educated).

6.15: Reasons for Shifting Cultivation from Low Value Crops to High Value Crops (in percentages)

Reasons	Size of holdings	Primary	Middle	Secondary	Higher Secondary	Graduate& above
Not profitable	Marginal	60.00	0.00	14.28	16.66	37.50
	Small	0.00	100.00	42.85	50.00	12.50
	Medium	0.00	0.00	21.42	16.66	25.00
	Large	0.00	0.00	0.00	0.00	12.50
Non availability of water	Small	20.00	0.00	0.00	0.00	0.00
	Medium	0.00	0.00	0.00	0.00	12.50
Non-availability of labor	Marginal	20.00	0.00	0.00	0.00	0.00
	Small	0.00	0.00	7.14	16.66	0.00
Fencing problem	Marginal	0.00	0.00	7.14	0.00	0.00
	Small	0.00	0.00	7.14	0.00	0.00

Source: Primary Survey, 2014

6.4.4 Agricultural Finance

Finance is very important for undertaking permanent improvement over land, meeting the expenses of cultivation and carry out various agricultural activities. If there is lack of finance, then it will not be possible to carry out agricultural activities on time and effectively, hence the productivity of agricultural sector is bound to get adversely

affected. Gaonkar, R. R. (1993) pointed out that, banks have to realise their constructive role in the development of agriculture. Similarly, the farmers also should realise the fact that, banks are ready to finance their bold and viable projects and should make the best use of banking facilities available for them.

Awareness about Sources of Finance

One of the main problems faced by Indian farmers is lack of capital and proper awareness of sources of finance which drives them towards money lenders and makes their life miserable. Hence, farmers should be aware of various sources of finance that can be availed by them for agricultural activities. Sarawgi, Beohar and Agrawal (2000) stated that awareness about sources of finance and schemes plays an important role in determining agricultural productivity. They found that, there was a significant association between different attributes, namely education, economic motivation, availability of information on various aspects of agriculture (including awareness about finance) and the level of productivity in the tomato growing region of Satna district of Madhya Pradesh.

In the case of sample marginal farmers of Ponda taluka, around 63 per cent were aware of sources of finance and the awareness is seen more with better levels of education except for farmers who studied higher secondary and graduation (Annexure table 6.9). Subsequently, awareness of sources of finance increased with increasing levels of education among small farmers except for an interesting case wherein, all illiterate small farmers reported knowing of sources for agricultural finance. All the medium and large farmers reported of having awareness about the sources of finance available for agricultural purpose.

Overall, awareness about finance shows an increase with increasing level of education as awareness proportion increased from 32 per cent at the illiterate level to 97 per cent at the graduation and above levels of education (Table 6.16).

Thus the analysis indicates positive relation between the size of land holdings as well as educational levels of all farmers taken together with the awareness on the sources of agricultural finance. In order, to bring cent per cent awareness about availability of finance and agricultural finance schemes, extension programmes need to be organised for the farmers.

Borrowings by Farmers

In the present study with certain exceptions, a positive link between the levels of education farmers and borrowing money from different sources for agricultural purpose by each type of farmers is observed (Annexure table 6.10). Among the marginal farmers, the proportion of borrowers ranged between 13 per cent of illiterates and 57 per cent of graduates and above qualified. In the case of small farmers it varied between 25 per cent of illiterates and 80 per cent of graduates and above qualified. Among medium size farmers it was nil in the case of primary educated and 100 per cent for higher secondary educated. Around 67 per cent of the medium farmers with graduation and above education resorted to borrowing for agricultural purpose. Among large farmers, the proportion of borrowers ranged between minimum 50 per cent of secondary and 100 per cent of diploma and I.T.I. educated farmers.

Overall, with an exception of farmers with higher secondary level of education, the proportion of farmers availing finance increased with the increasing levels of education. It shows an increase from 25 per cent at the illiterate level to nearly 67 per cent at the graduate and above level (Table 6.16), indicating positive relation between the level of education and the farmers availing loans from financial institutions.

Sources of Finances

Apart from the availability of credit, it is also necessary to see the sources of credit as it indicates the ease and cost of borrowing. There are various sources of credit for agricultural sector in Goa. Some of the most popular sources include commercial banks and co-operative banks and co-operative societies. Farmers usually borrow from those sources which they consider as the best. Farmers' choice of obtaining loans from different sources depends upon various factors like the rate of interest charged on loans, nearness of financial institution, formalities and procedures to be followed, the time taken by the lending institution in granting loan, method of repayment, etc. In the study area, farmers obtained loans mainly from three different sources, such as commercial banks, co-operative societies and other sources consisting of traders, friends and relatives. Reason behind obtaining finance from traders, friends and relatives is that, there is no need of completing any formality and most of the time such borrowing is free of cost. It can be observed that, around 60 per cent of marginal farmers, nearly 66 per cent of small farmers, around 78 per cent of medium farmers, and around 38 per cent of large farmers obtained finance from commercial banks (Annexure table 6.11). This shows that, with an exception of large farmers, the proportion of farmers obtaining finance from commercial banks increased with the increasing size of land holdings. In the case of large size of land holdings relatively less proportion i.e. around 37 per cent of borrowing was from commercial banks. It is observed (Table 6.16) that, the proportion of farmers obtaining finance from commercial banks increased with increasing level of education till up to the higher secondary level. It is increased from 25 per cent among illiterate farmers to 89 per cent among the farmers who studied up to higher secondary level. Nearly 76 per cent graduate farmers obtained finance from commercial banks. On the other hand, proportion of farmers obtaining finance from co-

operative societies decreased from 75 per cent among illiterate farmers to 11 per cent at higher secondary level, but the proportion shows an increase to 19 per cent at graduate level. Thus, relatively higher proportions of farmers with higher levels of education obtained loans from commercial banks. The total percentage of farmers obtaining loans from co-operative societies was between nearly 34 per cent (small farmers) and 37 percent (marginal farmers, and large farmers) among different sizes of farmers with an exception of medium farmers (22%). It is clear that, except for large farmers, the proportion of farmers obtaining finance from co-operative societies shows a decrease with increasing levels of education. In the case of large farmers, the proportion of borrowing is the same as that of marginal farmers (37%) (Annexure table 6.11). Besides obtaining finances from commercial banks, farmers obtain finances from other sources like traders. They obtain finance from the traders well in advance during the various agricultural operations to be carried out. Traders do not charge any rate of interest from the farmers but the farmers are supposed to sell their crops only to the traders from whom they borrow the money for the entire year. Traders deduct the amount of loan taken by the farmers as advance and the remaining amount of the value of the crops is paid to the farmers after receiving the crops. Only the farmers having goodwill of traders are in a position to obtain such finances. Among the surveyed farmers, nearly 3 per cent of marginal farmers and 25 per cent of large farmers obtained finance from traders. Overall, with an exception of farmers with secondary level of education, farmers obtaining finance from commercial banks increased with increasing levels of education. On an average, nearly 57 per cent of farmers obtained finance from commercial banks, around 41 per cent from co-operative societies and only around two per cent borrowed from other sources. Thus analysis indicates that, higher proportion

of farmers from higher levels of education preferred to obtain finance from commercial banks. It is healthy to see that no sample farmer borrowed from money lenders.

Reasons for Obtaining Finance from a Particular Source

All most all the sample farmers with different educational level borrowed from a particular source considering low rate of interest, less formalities and easy availability taken together (Table 6.16) with an exception of illiterate and middle school educated marginal farmers (Annexure Table 6.12). These marginal farmers gave more importance to less formalities (57.14 per cent of illiterates) and easy availability (83.33 per cent of middle school educated). This clearly highlights the need to provide credit facilities to the needy farmers involving less procedures and formalities with easy availability.

Rate of Interest on Borrowings

The rate of interest paid by the farmers affects the cost of cultivation. The willingness of farmers to borrow also depends upon the rate of interest charged by various financial institutions. In the study area, nationalized banks charged 4 per cent interest under interest subvention scheme introduced by the government while most of the co-operative societies and private commercial banks charged 7 per cent on agricultural borrowings. Some co-operative societies charged 12 per cent interest. Other lenders like traders charged a nominal and very low rate of interest.

It is revealed from the survey that, maximum proportion of farmers irrespective of size of land holdings and educational level paid interest rate of 7 per cent excluding the illiterate marginal farmers and I.T.I. and diploma educated small farmers (Annexure table 6.13). A large number of illiterate marginal farmers, around 57 per cent and 50 per cent I.T.I. and diploma educated small farmers could obtain loan at a more subsidized interest rate of 4 per cent under interest subvention scheme. On an average10

per cent marginal, 7 per cent small, zero per cent medium and 12.50 per cent large farmers could obtain finance at the rate 4 per cent rate of interest.

Overall, around 80 per cent farmers paid 7 per cent rate of interest on loans (Table 6.16).while, around 13 per cent of the farmers availed loan under interest subvention scheme provided by the government and paid 4 per cent rate of interest. Very less proportion of farmers that is around three per cent paid 12 per cent rate of interest.

This clearly highlights the need for making the borrowing procedure simple and less time consuming so as to make priority lending at a subsidized rate actually helps the needy farmers.

Mode of Repayment of Loans by Farmers

There are various ways of repayment of loans by the farmers. Majority of the farmers prefer to repay it after harvesting of crops and some farmers who are financially well off repay it through monthly instalments. Some farmers prefer to repay the loan as and when they get some money in their hands, as they do not follow fixed way as such to repay loan.

A major proportion of marginal, small and medium size farmers repaid the loans after harvests (Annexure table 6.14) with the exceptions of 75 per cent of graduate and 50 per cent of I.T.I. and diploma educated small farmers, 67 per cent of secondary educated medium size farmers who repaid loans through monthly instalments. However, majority of the large farmers resorted to repayment of loans through monthly instalments.

Overall, nearly 84 per cent of farmers repaid loans after harvest, around 15 per cent repaid through monthly instalments and only one per cent repaid loan as and when they possessed adequate money in their hands (Table 6.16).

Thus, the above analysis indicates that, repayment of loan by farmers do not depend on the level of education. Other factors affecting repayment of loan are more influential than the level of education.

Table 6.16: Various Aspects of Borrowing by Level of Education (in percentages)

	Level of Education							
Awareness Availability of Sources of Finance	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	*All level*
Aware	32.00	69.00	82.00	85.00	85.00	97.00	90.00	*86.33*
Not Aware	68.00	31.00	18.00	15.00	15.00	3.00	10.00	*13.59*
Availing Finance								
Availing	13.33	30.65	42.86	47.76	45.00	66.67	80.00	*60.40*
Not Availing	86.67	69.35	57.14	52.24	55.00	33.33	20.00	*39.48*
Sources of Borrowing								
Commercial Banks	25.00	46.43	66.67	51.72	88.89	76.19	42.86	*56.82*
Co-operative Societies	75.00	53.57	23.81	48.28	11.11	19.05	57.14	*41.13*
Any Other	NA	NA	9.52	NA	NA	4.76	NA	*2.04*
Reasons for Obtaining Finance from Particular Source								
Less Formalities	50.00	0.00	9.52	0.00	0.00	0.00	0.00	*8.50*
Easy Availability	0.00	0.00	47.62	0.00	0.00	0.00	0.00	*6.80*
Low Interest Rate	0.00	0.00	0.00	6.25	0.00	0.00	0.00	*0.89*
Less Formalities, Easy Availability &Low Rate of Interest	50.00	100	42.86	93.75	100	100	100	*83.80*
Interest Rate								
4%	50.00	5.26	0.00	6.25	0.00	10.00	16.67	*12.59*
7%	50.00	89.47	90.48	78.13	100	85.00	66.67	*79.96*
12%	0.00	5.26	0.00	12.50	0.00	0.00	0.00	*2.53*
Any Other	0.00	0.00	9.52	3.13	0.00	5.00	16.67	*4.90*
Repayment of Loan								
After Harvest	100	94.74	100	84.38	100	61.90	50.00	*84.43*
Monthly Instalments	0.00	5.26	0.00	15.63	0.00	33.33	50.00	*14.88*
Any Other Way	0.00	0.00	0.00	0.00	0.00	4.76	0.00	*0.68*

Source: Primary Survey, 2014.

6.4.5 Agricultural Marketing

Farmers sell their produce at different places. Some of the common places where they sell their agricultural produce are co-operative societies, market yards and local shops. A larger proportion of marginal and small farmers sold their produce to co-operative societies, but when we compare the share that is sold in local shops, it was relatively larger in the case of marginal farmers compared to small farmers (Annexure table 6.15). Besides this, 50 per cent of farmers from higher secondary education sold their produce to market yards. Therefore, no specific relation between the level of education and sale of the produce at a particular place could be observed.

In the case of medium size holdings, all the farmers from primary and secondary level of education sold their produce to co- operative societies, while 100 per cent farmers with higher secondary and nearly 67 per cent graduate farmers sold their produce to market yards. This shows that medium farmers with higher levels of education preferred to sell their produce to market yards, while farmers with lower levels of education sold their produce to co- operative societies.

In the case of large farmers, 80 per cent and 100 per cent farmers from graduation and other category of education, respectively, sold their produce to co-operative societies. All the secondary educated large farmers exported their produce either to other states or to other countries as they produced mainly cashew and coconut. So there is no specific relation observed between the level of education and sale of agricultural produce except in case of medium farmers.

In the case of all farmers, irrespective of the level of education, 68 per cent of farmers sold their produce to co-operative societies and remaining 13 per cent farmers sold their produce in market yards, 19 per cent at local shops and one per cent was exported to

other countries. (Table 6.17), indicating that there is no specific relation between the level of education and the sale of the agricultural produce by the farmers.

Reasons for Selling Agricultural Produce at Particular Place

Various factors are responsible for the sale of agricultural produce by the farmers at a specific place. Main reasons for selling their produce at a specific place include, price received for their produce. Farmers think that, if they sell their produce at a particular place they get the right price for their produce compared to other buyers. Some farmers prefer to sell their product in a nearby market while some farmers sell their produce at a specific place especially to co-operative societies because government provides them support price but if they sell their produce somewhere else, they do not get the benefit of support prices provided by the government. Any other reason includes farmers selling their produce especially to the traders from where they could obtain finance for any purpose and not only to undertake agricultural activities. In the study, it is found that, larger proportion of marginal farmers sold their produce taking into consideration, price offered, nearness of market, and availability of government support price. All the farmers with secondary and above levels of education sold their produce guided by right price, nearness of market and availability of support price **(**Annexure table 6.16).

In the case of small size of land holdings, larger proportion of farmers sold their produce at particular place because of right price, nearby market and support price. But at the same time 25 per cent from illiterate and middle school educated, 30 per cent from secondary and 50 per cent from higher secondary level of education sold their produce at a specific place as they had obtained advance money and interest free loans from the traders. Thus, there is no much relation between selling of produce at a particular place and the level of education of small farmers.

In the case of medium and large farmers 100 per cent farmers sold their produce at a particular place because of right price, nearby market and support price irrespective of level of education. Thus price for the agricultural produce received by the farmers is one of the main factors that determine the place of sale of agricultural product.

Irrespective of the size of land holdings, at all the levels of education around 92 per cent of farmers sold their produce at a specific place because of right price, nearby market and support price (Table.6.17). A few farmers (8%) sold their produce at a specific place where they could obtain finance very easily.

Thus, there is no specific relation as such between the level of education and the reason for the sale of crops at a particular place.

Responses of Farmers Regarding Prices of Agricultural Product

Prices of agricultural products play an important role in determining the profitability of farmers. If the farmers are satisfied with the prices for their product then it forms as an incentive to undertake more production. In the present study it is found that, all the farmers irrespective of size of land holdings (Annexure table 6.17) and level of education said that, they got right price for their product and they were quite satisfied with the prices they received for their product from the market (Table 6.17). Thus, there is no relation between the level of education, the size of holdings and the response regarding the prices of farm products.

Table 6.17: Different Aspects of Marketing Agricultural Products (in percentages)

Places of sale	Level of Education							
	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	All
Place of Sale of Crops								
Co-operative Societies	53.3	74.3	72.4	68.2	30.00	71.4	90.00	67.72
Market Yards	3.3	0.00	10.3	11.4	35.00	25.00	10.00	12.69
Local Shops	43.3	25.7	17.2	18.2	0.00	3.6	0.00	19.04
Any Other	0.00	0.00	0.00	2.3	35.00	0.00	0.00	0.78
Reasons for Selling Agricultural Produce at a Particular Place								
Right Price, Nearby, Support Price	93.33	94.29	82.76	90.7	84.62	100	100	92.24
Any Other Reason	6.67	5.71	17.24	9.3	15.38	0.00	0.00	7.75
Response for Getting Right Agricultural Price								
Right Price	100	100	100	100	100	100	100	100
Not Right Price	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00

Source: Primary Survey, 2014.

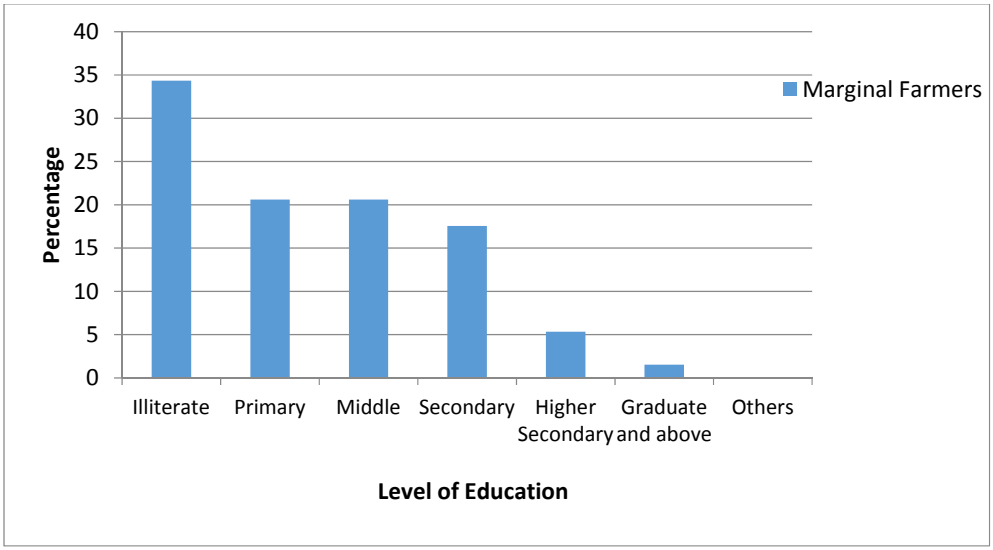
6.4.6 Agricultural Production for Self-Consumption

Some farmers undertake cultivation only for self-consumption and not to sell it in the market. The proportion of sample marginal farmers undertaking production exclusively for self-consumption shows a decrease from 34.35 per cent at the illiterate level to 1.53 per cent at the graduate level and further to zero per cent for diploma and I.T.I. holders. Those farmers who undertake production only for self-consumption so do due to inadequate area of land to produce for sale. Not a single farmer with small, medium and large size landholdings produced exclusively for self-consumption and all these farmers produced the crops for commercial purpose. Thus, indicating that, farmers who undertake production only for self-consumption is only because of inadequate size of

land. In the case of marginal farmers, Production exclusively for self-consumption is inversely related with the level of education. (Fig.6.3).

Fig 6.3: Cultivation Exclusively for Self-consumption by Marginal farmers by level of Education (in percentages)

.



Source: Primary Survey, 2014

6.4.7 Agricultural Schemes

Governments introduce various agricultural schemes to encourage farmers to adopt better agricultural practices leading to improvement in efficiency and development of agriculture.

Awareness of Schemes: Availing the benefits of agricultural schemes needs awareness of schemes by farmers. It can be observed that, awareness of various agricultural schemes in the study area increased with increasing size of land holdings till up to medium holdings that ranged between 31 per cent for the marginal farmers and 67 per cent for medium farmers (Annexure table 6.18). The awareness of schemes was slightly lower among large farmers (64%) compared to medium farmers (67%). Up to higher secondary education, farmers' awareness about agricultural schemes was seen being positively related with the level of education. It shows an increase from nearly 29 per

cent at illiterate level to 95 per cent at higher secondary level, while among graduate farmers, the awareness was slightly lower (93%) than that of higher secondary educated farmers. In the case of marginal land holdings, with an exception of farmers with secondary level of education, the proportion of farmers with awareness of agricultural schemes varied positively with increasing levels of education that lied between around 10 per cent of the illiterates and 46 per cent of the middle school educated farmers. In the case of small farmers, awareness of agricultural schemes shows a mixed relation with the levels of education as from the illiterate level (50%) up to the middle level of education (33%), the awareness decreased while from secondary education level it showed a continuous increase.

An inverse relation between level of education and awareness about the availability of agricultural schemes is observed among medium farmers as it decreased from 100 per cent at primary level of education to around 67 per cent at graduation level. In the case of large farmers, there is a positive relation between the level of education and the awareness about the agricultural schemes. Among all the farmers, with an exception of farmers with middle school education awareness about schemes increased with increasing level of education. The proportion of farmers who were aware of the schemes varied between 29 per cent at the illiterate level to 95 per cent at the higher secondary level of education (Table 6.18). Thus the analysis indicates that, there is positive relation between the level of education and the awareness of schemes up to higher secondary level of education. Overall, nearly 72 per cent farmers were aware about the availability of schemes.

Farmers Availing Government Schemes

Availing of different agricultural schemes would help the farmers to reduce their cost of production and get better price for their products. In the case of marginal farmers,

the proportion of farmers availing schemes increased with increasing level of education with an exception of secondary and higher secondary educated farmers. It increased from nearly ten per cent at the illiterate level to 57 per cent at the graduate and above level (Annexure Table 6.19). The proportion of small farmers availing schemes increased with increasing level of education excluding primary educated farmers. However, no specific relation between the level of education and availing benefits was observed among medium farmers, while a positive relation was found in the case of large farmers. On the whole, the proportion of all farmers obtaining benefits varied directly with the level of education which increased from 12 per cent at the illiterate level to around 63 per cent at the graduate level (Table 6.18).

Table 6.18: Awareness and Utilisation of Agricultural Schemes by Farmers by Level of Education (in percentages)

Awareness and Availability of Schemes	**Level of Education**							
	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	*All level*
Aware	29.33	64.52	61.22	82.09	95.00	93.33	80.00	72.18
Not Aware	70.67	35.48	38.78	17.91	5.00	6.67	20.00	27.78
Avail	12.00	29.03	42.85	43.28	47.61	63.33	72.72	54.83
Not Avail	88.00	70.96	57.14	56.71	52.38	36.66	27.27	45.17

Source: Primary Survey, 2014.

6.4.8 Use of Internet by Farmers

In the modern days information received through multimedia can play a very important role in the use of various agricultural practices. This is because, the extent of use of internet services by farmers might determine the exposure of farmers to new techniques and developments in agriculture sector, as well as demand and supply condition and price prevailing in different parts of the country and world. This can positively influence

their agricultural practices, including shifting of crops and marketing opportunities. Malk Singh, Karwasra and Rai (2000) found that, higher amount of expenditure was incurred by highly educated people on acquiring information about improved agricultural practices from different sources.

The marginal farmers from the study area did not use internet, while 25 per cent of the small farmers with higher secondary and other categories of education and 17 per cent of graduate medium farmers used internet to collect information relevant to farming decisions. In the case of large farmers, 50 per cent of the secondary educated farmers, 80 per cent of the graduate farmers and 75 per cent of the farmers from other categories of education used internet (Table 6.19). This reveals that, internet for agricultural purpose was used only by the farmers with secondary and above levels of education and majority of them was cultivating bigger area of land.

Table 6.19: Use of Internet by Farmers by Level of Education and Size of Land Holdings (in percentages)

Size of Holdings	Response	Level of Education							
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and	Others	*Total %*
Marginal	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*0.00*
	No	100	100	100	100	100	100	100	*100*
Small	Yes	0.00	0.00	0.00	0.00	25.00	0.00	25.00	*4.00*
	No	100	100	100	100	75.00	100	75.00	*96.00*
Medium	Yes	NA	0.00	NA	0.00	0.00	16.67	NA	*8.33*
	No	NA	100	NA	100	100	83.33	NA	*91.66*
Large	Yes	NA	NA	NA	50.00	0.00	80.00	75.00	*72.72*
	No	NA	NA	NA	50.00	100.00	20.00	25.00	*36.36*

Source: Primary Survey, 2014.

6.4.9 Views of Farmers on Profitability of Cultivation

It is very important to know what the farmers think about practicing agriculture as their occupation. With an exception of farmers at higher secondary level, higher proportion of marginal farmers from every level of education felt that, farming is a profitable occupation. A small proportion of marginal farmers (i.e. nearly 11% illiterate, 19% primary, 24% middle school, 19% secondary and 13% higher secondary educated) felt that, farming is not a profitable occupation (Table 6.20).

In the case of small farmers, all the illiterate and farmers with higher secondary and above levels of education stated that, farming was a profitable occupation. Nearly 50 per cent of primary, 25 per cent of middle school and 38 per cent of secondary educated small farmers viewed farming as no profit and no loss making activity, while 15 per cent of secondary educated farmers found farming as a non-profitable occupation. All the medium and large farmers viewed farming as a profitable activity. Above analysis indicates that, farmers who felt that farming is not a profitable occupation existed only in marginal and small size of land holdings, while cent per cent of medium and large farmers revealed that, farming was a profitable activity.

Table 6.20: Views of Farmers on Profitability of Cultivation (in percentages)

Types of Farmer	Views of Farmer	Level of Education						
		Illiterate	Primary	Middle	Secondary	Higher secondary	Graduate	Others
Marginal	Profitable	59.15	62.26	56.75	43.75	40.00	71.42	100
	Non Profitable	11.26	18.86	24.32	18.75	13.33	0.00	0.00
	No Profit No Losses	29.57	18.86	18.91	37.5	46.67	28.57	0.00
	Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Small	Profitable	100	50.00	75.00	46.15	100	100	100
	Non Profitable	0.00	0.00	0.00	15.38	0.00	0.00	0.00
	No Profit No Losses	0.00	50.00	25.00	38.46	0.00	0.00	0.00
	Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Medium	Profitable	NA	100	NA	100	100	100	NA
	Total	**NA**	**100**	**NA**	**100**	**100**	**100**	**NA**
Large	Profitable	NA	NA	NA	100	100	100	100
	Total	NA	NA	NA	**100**	**100**	**100**	**100**

Source: Primary Survey, 2014.

6.4.10 Views of Farmers on Bringing Improvement on Land

The experiences of farmers help to diagnose the problems needing attention to improve agriculture sector. The following views were expressed by the sample farmers to improve agriculture productivity in their area.

Fencing: Major problem faced by the farmer in practicing agriculture as an occupation was lack of fencing for the fields. Those farmers who were cultivating paddy responded that, they are forced to give up the cultivation because of the non-availability of permanent fencing. Since there is no permanent fencing they are supposed to fence the farm every year which involves huge cost, lot of use of time and human energy. In the case of marginal farmers, with an exemption of farmers from primary and secondary levels of education, the proportion of farmers facing the problem of fencing increased with increasing levels of education. It varied between 38 per cent at the illiterate level to 100 per cent the I.T.I. and diploma educated marginal farmers (Annexure table 6.20). Overall, 38 per cent of the marginal farmers faced the problem of fencing. Especially farmers growing paddy were not interested in continuation of the cultivation because of non-availability of permanent fencing. The proportion of small farmers who believed that the provision of fencing could increase the agricultural production and productivity was 25 per cent among illiterate farmers, 50 per cent among graduate and above levels of education and 40 per cent among I.T.I. and diploma holders (Annexure table 6.21). No medium farmer cited fencing as a problem in the development of agriculture (Annexure table 6.22). In the case of large farmers 20 per cent of higher secondary, 25 per cent of graduate and above and 15 per cent of I.T.I and diploma educated farmers (Annexure table 6.23) were of the view that, provision of fencing could help in bringing improvement on land. For all farmers, relatively higher proportion from higher secondary (50 %), graduate and above (61%) and other levels

of education (86%) felt that fencing is the main problem in the development of agriculture (Table 6.21).

Irrigation: Besides fencing problem, lack of irrigation facility was considered as a blockade by the farmers for resorting to double cropping in their fields. In the case of marginal farmers, with an exception of farmers with primary and secondary levels of education, the proportion of them viewing lack of irrigation facility as a problem increased with the increased levels of education. It varied between 26 per cent at the illiterate level to 100 per cent at the other category of education. Nearly 23 per cent of all marginal farmers were of the view that, they were not in a position to cultivate double crops of paddy because of lack of irrigation facility (Annexure table 6.20). The proportion of small farmers who felt that proper irrigation facility would help in improving agricultural productivity varied from 15 per cent for secondary educated farmers to 60 per cent of the farmers with graduate and other levels of education (Annexure table 6.21). In the case of medium farmers, it ranged between 17 per cent of primary educated and 100 per cent of graduate and above educated medium farmers (Annexure table 6.22) while it was 15 per cent for I.T.I and diploma educated to 25 per cent of the graduate and above educated large farmers (Annexure table 6.23). Nearly 22 per cent of all the farmers responded that, they were not in a position to undertake double cropping because of lack of irrigation facility (Table 6.21).

Pollution Control: Pollution has been emerging as a major issue affecting agriculture production. According to some of the sample farmers, rejects of mines and industries dumped on the river buds get mixed up with water during rainy season and pollute water and thus create problem for farming activities in nearby areas. For marginal farmers the proportion varied between 5 per cent with middle school educated to 50 per cent for the other category educated (Annexure table 6.20); for small farmers 20 per cent of other

category educated to 50 per cent of the illiterate) (Annexure table 6.21); and for the large farmers it ranged between 15 per cent of the other category educated and 25 per cent of graduate and above educated farmers (Annexure table 6.23). With an exception of farmers from higher secondary education (100%), no medium farmers felt that, pollution is a problem for agricultural development (Annexure table 6.22). Nearly 10 per cent of the marginal farmers, 18 per cent small, 8 per cent medium and 18 per cent large farmers said that, pollution is a major problem for agricultural development. For all farmers taken together, larger proportion of farmers from graduate and above level (30 %) and I.T.I. and diploma level of education (57%) (Table 6.21) were of the view that, pollution problem has been emerging as a major issue affecting agriculture production.

Low Support Price: When the cost of production is higher than the price what farmers get from selling the product in the market, there is no incentive left among them to continue with farming activities. In order to overcome such problem and to provide incentives to farmers, the Government declares support price for the crops well in advance before the cropping season so that farmers should not hesitate to cultivate more. But farmers feel that the prices what they receive in the form of support prices are very low. The marginal farmers who felt that, increased support price should be provided by government agencies increased with increasing levels of education varying between 3 per cent at illiterate level to 100 per cent at I.T.I and diploma holders, with an exception of farmers with primary and secondary education. Overall, nine per cent of the marginal farmers felt that support prices should be increased (Annexure table 6.20). Among small farmers, nearly 17 per cent with middle school education, 15 per cent of secondary, 25 per cent of higher secondary, 40 per cent of graduate and I.T.I. holder and overall 18 per cent felt that, provision of support price for the agricultural

products by the government can help in increasing agricultural productivity (Annexure table 6.21). In the case of medium farmers, 25 per cent with secondary education, 100 per cent with higher secondary education and around 17 per cent with graduation and above qualification believed that, providing support price would help in bringing improvement in agriculture (Annexure table 6.22).

In the case of large size of holdings, 50 per cent of the farmers with secondary level of education, 20 per cent with graduation and, 25 per cent with I.T.I. and diploma education (Annexure table 6.23) felt that, providing support prices could help increasing productivity of land. Among all farmers taken together, 11 per cent of the farmers were of the opinion that, the support price provided by the government for different crops is not sufficient as the actual cost of production remains high (Table 6.21).

Availability and Cost of Labour: High cost of labour and shortage in the availability of labour during peak seasons is cited as another major problem by the farmers for smooth cultivation. In the case of marginal farmers, this proportion varied between 5 per cent (primary level) and 100 per cent (other category education) and 11 per cent of all marginal farmers felt that, due to non-availability of labour they had to restrict their farming activity (Annexure table 6.20). For small farmers, the proportion varied between nearly 8 per cent among middle school educated and 60 per cent among graduate and above. Some of the small farmers (14%) felt that, availability of labour during peak season and reduction in the cost of labour could help in increasing agricultural productivity (Annexure table 6.21). However, the sample medium farmers did not perceive lack of availability labour and cost of labour were hindering agricultural production (Annexure table 6.22). Some large farmers (20% higher secondary, 7 per cent I.T.I. and diploma holders and overall 9%) viewed lack of

availability and cost of labour are creating problems in development of agriculture (Annexure table 6.23). Overall, relatively higher proportion of farmers from graduate and above level (48 %) and I.T.I. and diploma level of education (71%) (Table 6.20) informed that, they face the problem of labour supply during peak seasons like thrashing and harvesting seasons.

Old Age Pension: Farmers opined that, there should be facility of providing pension to them after attaining sixty years of age, so that, more people could undertake farming activity as their full time occupation on commercial lines. Since there is no security of earning income during older age, farmers are reluctant to undertake farming activity as a full time occupation. At a younger age people try for many other jobs and they turn to agricultural activities only as a last resort, when they could not get any other job, especially government jobs. This proportion ranged between 6 per cent at primary level and 50 per cent for other category educated marginal farmers (Annexure table 6.20); 8 per cent and 40 per cent among middle level and other category of educated for small farmers (Annexure table 6.21); 25 per cent from secondary level and 17 per cent from graduate and above level for medium farmers, (Annexure table 6.22); and 20 per cent from higher secondary, 25 per cent from graduate and above and 15 per cent from other levels of education for large farmers. Overall, 9 per cent of the marginal farmers, 14 per cent of the small farmers, 17 per cent of the medium farmers and 18 per cent of the large farmers felt that, government should provide pension to the farmers after attaining sixty years of age (Annexure table 6.23). For all farmers taken together this proportion ranged between 5 per cent for higher secondary and nearly 57 percent for other category educated and on the whole nearly 10 per cent of the farmers opined that, provision of pension could lead to agricultural development (Table 6.21).

Insufficient Subsidy: Farmers feel that, more subsidies are required so that, they could make adequate use of chemical fertilizers and modern machines in their fields. A few farmers said that, the extent of subsidies provided by the government on the purchase of chemical fertilizers, insecticides and pesticides, hiring of modern machines like tractors, thrashers and harvesters is not sufficient. The proportion of farmers who felt that provision of subsidies could increase the production and productivity of agriculture varied between 8 per cent (secondary level) and 100 per cent (other category) for marginal farmers (Annexure table 6.20); between100 per cent (illiterate) and 17 per cent (middle level) for small farmers (Annexure table 6.21); 100 per cent (higher secondary) and 17 per cent (graduates and above) for medium farmers (Annexure table 6.22); and 15 per cent (other category) and 20 per cent (higher secondary level) for the large farmers (Annexure table 6.23). Overall, 5 per cent of marginal, 32 per cent small, 25 per cent medium, 18 per cent large and 10 per cent of all farmers taken together (Table 6.21) said that, provision of more subsidies would lead to agricultural development.

Size of Landholdings: Farmers were of the view that, if they had more land with them they would have undertaken farming activity with a larger scale and would have increased their agricultural output. According to these farmers, government should pass such a law whereby it could transfer the Government owned land among those farmers who possess small holdings but are interested in cultivating more land. The proportion of farmers with this view varied between zero per cent of secondary and 100 per cent of other category educated marginal farmers (Annexure table 6.20), 60 per cent of other category and 80 per cent of graduate educated small farmers (Annexure table 6.21), 8 per cent of other category and 25 per cent of graduate and above educated (Annexure table 6.23), and overall 8 per cent of the large farmers (Table 6.21). However, the

medium farmers were not of the view that, provision of more land would lead to increase in agricultural production (Annexure table 6.22).).

Lack of Training: Farmers felt that, they could not make effective use of chemical fertilizers and modern machines in their fields because of lack of proper training. According to these farmers if training is provided for them they could have carried out agricultural practices in more scientific manner with the help of modern equipment the proportion of which varied between 3 per cent (farmers with middle level of education) and 100 per cent (other category) for marginal farmers (Annexure table 6.20), 8 per cent (middle school education) and 40 per cent (other category) for small farmers (Annexure table 6.21). In the case of medium and large farmers, 25 per cent (Annexure table 6.22) and 50 per cent (Annexure table 6.23) from secondary level and 9 per cent (Table 6.21) from all levels were of the view that, provision of training is necessary for farmers.

Lack of Awareness of Agricultural Schemes: Besides the above cited problems, farmers felt that, many a times they are not aware of the various schemes available to facilitate and improve various agricultural operations and hence they could not get benefits from such schemes. This proportion ranged between zero per cent (higher secondary) and 50 per cent (other category) for

Marginal farmers (Annexure table 6.20); zero per cent (illiterate farmers) and 20 per cent (other category) for small farmers (Annexure table 6.21); and 16 per cent (other category) and 50 per cent (middle school) for large farmers (Annexure table 6.23). Overall seven per cent of marginal, 12 per cent of small, 9 per cent of large and 8 per cent of all farmers felt that, awareness about schemes among farmers would help in increasing the productivity of agriculture while medium farmers were not of the view

that, lack of awareness about agricultural schemes hinders the development of agriculture sector (Annexure table 6.22).

Cost of Fertilizer: According to some farmers, the high cost of fertilizer discourages the use of fertilizers in adequate quantities. This expression varied from 8 per cent (middle school) to cent percent (other category) for marginal farmers (Annexure table 6.20); 8 per cent (middle school) to 40 per cent (other category) for small farmers (Annexure table 6.21); and 25 per cent (graduates and above) to 15 per cent (other category) for large farmers (Annexure table 6.23). Overall, seven per cent of marginal, 32 per cent of small, 18 per cent of large farmers and eight per cent of all farmers taken together believed that, more awareness about agricultural schemes is required for the development of agriculture while farmers from middle level of education were not of the view that, awareness about schemes hinders the process of development of agriculture (Annexure table 6.22).

From the above analysis it could be understood that, relatively higher proportion of farmers with graduation and above levels of education, as well as the I.T.I. and diploma educated farmers expressed their views on the various problems that they face in practicing agriculture as their occupation. The farmers with lower levels of education were less vocal about the various problems faced by them in effective cultivation. Thus, it is observed that, farmers with higher levels of education could analyse the problems in a better way than that of farmers with lower levels of education.

Table 6.21 Responses of All Farmers for Bringing Improvement on Land (in percentages)

Problems faced by Farmers	Illiterate	Primary	Middle	Secondary	Higher secondary	Graduates and above	Others	All
Fencing	38.4	30.6	38.8	23.9	50.00	60.9	85.7	35.78
Irrigation	26.00	14.5	20.4	14.9	20.00	39.1	100	21.72
Low Support Price	2.7	1.6	10.2	10.4	20.00	43.5	71.4	10.86
Old age Pension	5.5	9.7	6.1	10.4	5.00	30.4	57.1	10.22
Pollution	11.00	6.5	4.1	14.9	10.00	34.8	42.9	11.82
Lack of Awareness about Schemes	2.7	6.5	10.2	10.4	0.00	17.4	28.6	7.66
Lack of Training	4.1	4.8	4.1	9.00	10.00	34.8	57.1	8.94
Availability and Cost of Labour	5.5	8.1	6.1	6.00	10.00	47.8	71.4	10.86
Larger size of Landholdings	5.5	1.6	4.1	0.00	10.00	47.8	14.3	8.94
High cost of Fertilizers	1.4	0.00	8.2	11.9	0.00	39.1	100	8.3
Low Subsidies	9.6	4.8	0.00	7.5	5.00	43.5	57.1	10.22

Source: Primary Survey, 2014.

6.5 Hypotheses Testing

This section deals with testing of hypothesis of the study based on empirical investigation.

1. **There is positive relationship between the education of farmers and the cultivation of high value crops.**

One of the hypotheses of the study is that, the proportion of farmers cultivating non-food grain crop increases with the levels of education of farmers. This hypothesis is tested by using regression analysis and Chi Square.

Table 6.22: **Proportion of Sample Farmers Growing High Value Crops by Levels of Education**

Level of Education	Proportion of Farmers Growing High Value Crops
Illiterate	30.36
Primary	43.86
Middle	40.23
Secondary	46.38
Higher Secondary	54.05
Graduates	79.41
Post Graduates	75.00
Professionals	100.00
I.T.I.	86.67
Diploma	80.00

Source: Primary data, 2013-14

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.87	0.76	0.73	12.15

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	3308.95	1	3308.95	22.40	0.002
Residual	1034.00	7	147.71		
Total	4342.95	8			

Coefficients

	Unstandardized Coefficients		**Standardized Coefficients**	**T**	**P-Value**	**Sig.**
	B	Std. Error	Beta			
(Constant)	24.21	8.77	0.00	2.76	.012337	0.025
Level of Education	3.53	0.74	0.87	4.73	.000741	0.002

Null Hypothesis- H_0: There is a negative relation between the levels of education of farmers and the cultivation of high value crops

Alternative Hypothesis- H_1: There is a positive relation between the levels of education of farmers and the cultivation of high value crops

$R^2 = 0.76$ means that 76% of the variation of farmers growing High Value crops around its mean is explained by the level of education.

H_0: $\beta = 0$ and H_1: $\beta \neq 0$

The coefficient of level of education has estimated standard error of 0.74, t-statistic of 4.73 and p-value of 0.000741.

Result: Since the P-Value is less than 0.05 ($P < 0.05$), it is statistically significant at significance level of .05. Hence, the null hypothesis H_0 is not accepted and the alternative hypothesis H_1 is accepted.

This establishes that, there is a positive relationship between education of farmers and the cultivation of high value crops.

The same hypothesis is also tested by using Chi Square as below.

Table 6.22a: **Distribution of Sample Farmers by Type of Crops Grown by Levels of Education**

Level of Education	Food grain Crops	Non-food grain Crops	Both	Total
Illiterate	47	15	13	75
Primary	32	13	17	62
Middle	25	8	16	49
Secondary	29	21	17	67
Higher Secondary	7	6	7	20
Graduates	9	10	4	23
Post Graduates	2	3	0	5
Professionals	0	2	0	2
I.T.I.	0	5	0	5
Diploma	0	4	1	5
All	151	87	75	313

Null Hypothesis- H_0:There is a negative relation between the levels of education of farmers and the cultivation of high value crops

Alternative Hypothesis- H_1: There is a positive relation between the levels of education of farmers and the cultivation of high value crops

DF= 18

X^2 (Chi square) Tabulated at point 0.05= 28.869 and

at point 0.01=34.805

X^2 (Chi square) Calculated = 1124.589

Result: As the Chi square calculated is greater than the tabulated value the null hypothesis H_0 is not accepted and the alternative hypothesis H_1 is accepted.

This proves that more educated people in the study area prefer to cultivate non-food grain crops than that of food grain crops.

2. **Farmers prefer to undertake cultivation of non-food grain crops than that of food grain crops.**

The second hypothesis of the study is that, farmers prefer to grow non-food grain crops than that of food grain crops. This hypothesis is tested by using Chi square.

Table 6.23: Distribution of Farmers by types of Crops grown

Type of farmers	Food grains	Non-food grains	Both	Total
Marginal	145	49	46	**240**
Small	4	20	26	**50**
Medium	0	6	6	**12**
Large	2	9	0	**11**
Total	**151**	**84**	**78**	**313**

Source: Primary Data, 2013-14.

The null hypothesis- H_0: Farmers do not prefer to cultivate food grain crops than growing non-food grain crops.

The alternative hypothesis -H_1: Farmers prefer to cultivate of non-food grain crops than growing food grain crops.

DF= 6

X^2 (Chi square) Tabulated at point 0.05= 12.592 and

at point 0.01=16.812

X^2 (Chi square) Calculated = 77.38968

Result: As the Chi Square calculated is greater than the tabulated value, the null hypothesis H_0 is not accepted and the alternative hypothesis H_1 is accepted.

This proves that farmers in the study area prefer to cultivate non-food grain crops than that of food grain crops.

3. **The net return from the cultivation of non-food grain crops is more than that of food grain crops**

The study also hypothesized that, the net return from growing non-food grain crops is more than the earning from food grain crops. Chi square method is used to test this hypothesis.

Table 6.24: The Net Earnings of the Farmers from cultivation by type of crops and level of Education (in Rupees)

Level of Education	Food crops	Non-food crops	Total
Illiterate	3682	30270	33952
Primary	29780	89596	119375
Middle	39943	83933	123876
Secondary	34000	83524	117524
Higher Secondary	27080	441105	468185
Graduates	51081	94340	145421
Post Graduates	55000	81529	136529
Professionals	NA	60495	60495
I.T.I.	20000	161175	181175
Diploma	12500	87366	99866
Total	**273067**	**1213331**	**1486398**

Source: Primary Survey, 21013-14

The Null Hypothesis- H_0: The net return from the cultivation of non-food grain crops is less than that of food grain crops.

The Alternative Hypothesis- H_1: The net return from the cultivation of non-food grain crops is more than that of food grain crops.

DF= 9

X^2 (Chi square) Tabulated at point 0.05= 16.919 and

at point 0.01=21.666

X^2 (Chi square) Calculated = 172159.9

Result: As the Chi Square calculated is greater than the tabulated value, the null hypothesis H_0 is not accepted and the alternative hypothesis H_1 is accepted.

Thus, the study establishes that earnings from growing non-food grain crops is more than the income earned from food grain crops.

6.6 Concluding Observations

From the above empirical investigation leads to the following concluding observations: The type of crop cultivated by the farmers is influenced by the size of land holding. Large farmers were not cultivating exclusively food grain crops while a large proportion of marginal farmers (60.42%) cultivated only food grains. As compared to small and medium farmers, the proportion of farmers cultivating both the crops was less for marginal and large farmers. This is because, the marginal farmers are interested continue paddy cultivation since it is their staple food, while the large farmers being into cultivation of non-food grain crops are satisfied with their farm income.

The study did not find any specific relationship between the level of education and the cultivation of food grain crops. The main reasons cited for non-cultivation of food grain crops were lack of availability of sufficient land to cultivate (33% of illiterate farmers), fencing problem (38% of middle school educated farmers) and low profitability (farmers with other levels of education).

The level of education is observed to have a positive relation with the cultivation of non-food grain crops. The proportion of farmers cultivating non-food grain crops increased with increasing level of education except for the farmers with graduate and above level of education. Most of the farmers with higher secondary and below levels of education expressed their inability to cultivate non-food grain crops due to non-availability of adequate and perennial supply of water, while majority of farmers from graduate and above levels of education (67%) were not cultivating non-food grains due to lack of sufficient land. The sample farmers were of the view that improving agricultural productivity in their area would need proper fencing, improvement in irrigation facility, control of pollution, appropriate support prices, easy availability of labour and lower wages.

The proportion of farmers as well as the proportion of land used for cultivating non-food grain crops taken together positively with the level of education, excluding graduate farmers.

Farmers with higher levels of education brought very low proportion of land under double cropping. Graduate farmers, professionals, I.T.I., and diploma holders didn't adopt double cropping. Farmers with primary level of education brought highest proportion of land under double cropping (39%), while farmers from post graduate level of education brought only one per cent of land under double cropping.

All the farmers taken together earned higher net average income by cultivating of non-food grain crops than from growing food grain crops. This implies that cultivation of non-food grain crops is quite profitable than the cultivation of food grain crops.

The net income earned by all the types of farmers by cultivating non-food grains was higher than the income earned from food grain crops at all levels of education with an exception of post graduate marginal farmers and graduate large farmers. All the farmers

taken together, the net average per hector income earned was the highest from Spice cultivation (Rs. 189733) followed by Areca nut (Rs. 104183) while it was the lowest from Pulses Kharif (Rs.21581), followed by Paddy Rabi (Rs. 24612).

The costs incurred on seeds were seen to have positive relation with the levels of education in the cultivation of paddy, cashew, coconut and mango while it was negative for areca nut, banana and vegetables. This is because HYV seeds are perceived as not suitable for the prevailing climatic conditions in the study area. Hence, educated farmers are also sometimes opposed to the use of HYV seeds. The relation of cost incurred on irrigation with the levels of education was positive for all the crops except for mango cultivation. The cost incurred on fertilizer was positively related with educational level of farmers in the cultivation of paddy, coconut, areca nut and vegetables while it was negative for the cultivation of banana and mango. Negative correlation is observed between the level of education and the cost incurred on manure for all the crops except vegetables; cost incurred on labour as well as traditional equipment for all the crops except for paddy. A positive relationship between the cost incurred on modern equipment and the level of education is found for all the crops with an exception of vegetables. In the case of pesticides and insecticides, a positive correlation with the level of was observed for all the crops.

The correlation between the total cost incurred on cultivation and the level of education was positively significant for kharif paddy while, it was positively insignificant for cashew, coconut, vegetables and mango. It was negatively insignificant for the cultivation of rabi paddy, areca nut, banana and spices.

The coefficient of correlation between the total yield obtained and the level of education was positive but insignificant from the cultivation of cashew, coconut, banana, vegetables and mango while, it was negatively insignificant for kharif paddy, rabi

paddy, areca nut and spices. It was positive but insignificant in the case of kharif paddy, rabi paddy, cashew, coconut, areca nut and vegetables while, negatively insignificant for banana, mango and spices.

The level of education is seen to have a positive influence on farmers' involvement in other activities. Higher proportion of farmers with larger size land holdings and with higher levels of education was of the view that, there is increase in the cost of production along with the increase in the returns in farming activity. On the other hand larger proportion of farmers with lower size of land holding was of the view that, they have been facing increasing cost with decreasing returns from farming activity.

Agricultural practices like, use of HYV seeds, insecticides, pesticides, modern implements, and plantation of new crops varied positively with the levels of education. Other changes including rotation of crops, use of irrigation facilities and use of labour have not shown any significant change. Since small and medium farmers hold relatively larger area of land compared to marginal farmers, it was possible for them to experiment with the cultivation of new crops especially non-food grain crops.

The awareness of different aspects of agricultural finances has a positive relation with the level of education of the farmers. The proportion of agricultural borrowing from commercial banks was more among educated farmers while a larger percentage of illiterate farmers borrowed from co-operative credit societies. Maximum proportion of farmers, from all educational levels had to pay interest rate of 7 per cent on their borrowings. Majority of the marginal farmers repay loans only after harvest. A majority of the farmers who repaid their loans through monthly instalments were either possessed bigger size of land holdings or they belonged to higher levels of education as these farmers had alternative sources of income.

Larger proportion of farmers with all size of land holdings sold their produce to the co-operative societies except the farmers with higher secondary education (30%), while a significant proportion of illiterate farmers (43%) sold their produce to the local shops.

The farmers from all levels education and size of land holdings, found to be satisfied with the price received for their agricultural product in the market.

All the farmers, excluding a sizeable proportion of the marginal farmers produced agricultural output for self-consumption and for commercial purpose. Among the marginal farmers, cultivating exclusively for self-consumption decreased with increasing levels of education.

The proportion of farmers taking benefits of the agricultural schemes had a positive relation with levels of education. The use of internet to obtain information pertaining to the agricultural production was limited to a few farmers with secondary and above levels of education.

Farming is viewed as a profitable occupation by a larger proportion of farmers from higher levels of education and with bigger size land. The sample farmers were of the view that proper fencing, improvement in irrigation facility, control of pollution, appropriate support prices, easy availability of labour and lower wages would help in improving agricultural productivity in their area.

All the hypotheses postulated in the beginning of the study were tested and found valid from the empirical investigation.

References

1. Achterbosch, T. J., S. van Berkum and G. W. Meijerink, 2014. Cash crops and food security; Contributions to income, livelihood risk and agricultural innovation. Wageningen, LEI Wageningen UR (University & Research centre), LEI Report 2014-015, 57 pp.; 20 fig.; 3 tab.; 60 ref.
2. C. Timmer., (1997). Farmers and markets: The political economy of new Paradigms.connection.ebscohost.com/**c**/.../**farmers-markets-political-economy-new-paradigms**
3. Chege, Jane, John Mburu, Rose Nyikal, and Beatrice Muriithi. 2013. 'Export Horticulture Farming on Food Security of Smallholder Farmers'. In. http://purl.umn.edu/160475.
4. Fan, Shenggen, Joanna Brzeska, Michiel Keyzer, and Alex Halsema. 2013. 'From Subsistence to Profit: Transforming Smallholder Farms'. Washington, DC: International Food Policy Research Institute. http://www.ifpri.org/publication/subsistence-profit.
5. Gaonkar, R. (1993*). Financing of Agriculture by Commercial Banks in Goa* (Doctoral thesis). Department of studies in Economics Karnatak University, Dharwad, India.
6. J.Govereh and Jayne T.S. (2003). Cash cropping and food crop productivity synergies or trade-off? ageconsearch.umn.edu/bitstream /177857/2/ agec**2003**v028i001a004.pdf
7. Karunakaran, N. (2013). Growth trends in area, production and productivity of crops in Kerala: A fifty years' experience. *Southern Economist* Vol. 51, No. 17 Pp.35.
8. Malk, D. P., Singh, S. N., Karwasra, J. C. and Rai, K. N. (2000). Sources of Information Crop Production Technology and Its Valuation in Haryana. *Indian Journal of Agricultural Economics,* Vol. 55. No.3. July-Sept. 2000. Pp.521-529.
9. Masanjala W. H. (2005). Cash crop liberalization and poverty alleviation in Africa evidence from Malawi. Agricultural Economics 35 (2006) 231 -240 CMS.Medcol.mw/cmc-uploaded-resources/4685-20.pdf.

10. Negash, Martha, and Johan F. M. Swinnen. 2012. 'Biofuels and Food Security: Micro-Evidence from Ethiopia'. SSRN Scholarly Paper ID 2279334. Rochester, NY: Social Science Research Network. ageconsearch.umn.edu /bitstream/126793/2/**Negash**.pdf

11. Poulton, C., Dorward, A., & Kydd, J. (1998). The Revival of Smallholder Cash Crops in Africa: Public and Private Roles in the Provision of Finance. Journal of International Development, 10(1), 85–103.

12. Sarawgi, A. K., Beohar, B. B. and Agrawal, S. K. (2000). Adoption Behaviour in relation to Economic Performance of Tomato Production in Satna District of Madhya Pradesh. *Indian Journal of Agricultural Economics,* July-September 2000, Vol.55.No3.

CHAPTER VII

SUMMARY AND CONCLUSIONS

The prosperity of agriculture facilitates the growth of almost all other sectors of the economy. Goa, the smallest state of India even though has limited requirements for food items owing to its small size, needs to depend on neighbouring states for the supply of food grains, pulses, vegetables and fruits. Being a favoured destination for large number of domestic and foreign tourists, there is increasing demand for food products. To utilize this opportunity, there is a need to increase the production and productivity of agriculture sector. This would enable Goa to reduce its dependence on neighbouring states for supply of food products. In this effort, every aspect associated with agricultural productivity and production needs to be studied in detail to take appropriate action. From this point of view, the present study attempts to analyse the relationship between the level of education of farmers and the agricultural practices followed by them along with other aspects related to development of agriculture.

The focal objective of this study was to analyse the impact of level of education of farmers on the adoption of agricultural practices. Other specific objectives include, to compare the socio-economic status of farmers as per their levels of education and size of landholdings, to study the extent of change in the pattern of cultivation of crops over a period of time, assess the reasons for shifting cultivation from low value crops to high value crops, estimate the cost and productivity of food grain crops and non-food grain crops and to comprehend the views and ideas of farmers regarding practicing agriculture as their occupation.

The present chapter is divided into three sections. First section summarises the main findings of the study, the second section provides suggestions to improve agriculture

sector in Goa based on the study, and the third section highlights the limitations of the study and scope for further research.

This study is based on both primary and secondary (published and unpublished official) sources of data. The study collected required information by selecting a sample of over 5 per cent of the farmers from across village panchayats and municipal area of Ponda taluka of Goa by following stratified random sampling technique. Collected information is analysed and the hypotheses of the study are tested by using appropriate statistical techniques such as mean, correlation coefficient, regression analysis and chi square.

7.1 **Main Findings**

The following are the main findings of the study:

- The total cultivated area in Goa increased considerably from 111373 hectors in 1960-61 to 157302 hectors in 1997-98. However, the area under crops decreased to 152958 hectors in 2001-02 and further to 147750 hectors in 2013-14. The following are the major examples of increased production and productivity of main crops in Goa.

  Cashew is one of the main crops grown in Goa. There has been a continuous increase in the percentage share of area under cultivation of cashew and has emerged as the major crop of Goa overtaking paddy. The percentage share of land under coconut cultivation has slightly increased during the period from 1960-61 (16.61%) to 2013-14 (17.43%) while, the productivity per hector of land has increased from 378,440 nuts in 1960-61 to 497,670 nuts in 2013-14. The percentage share of areca nut in the total area under cultivation has decreased marginally between 1960-61 (1.55%) and 2009-10 (1.18%), while the productivity per hector of areca nut has increased from 100.81 tons in1960-

61 to 166.38 tons in 2013-14.Paddy is the major cereal crop cultivated in Goa. Other crops under this category are ragi, sugarcane, and groundnut. Paddy which was the major crop of Goa has been losing its importance as evident from its decreasing percentage share of total area under cultivation from 45 per cent in 1960-61 to 29 per cent in 2013-14. However, the productivity per hector of paddy registered almost three fold increase from 159 tons to 443 tons during the same period.

There has been a remarkable increase in the area under cultivation of vegetables and their productivity in Goa. The main vegetables grown in Goa are Brinjal, Lady Finger, Chilies, Cucumber, Pumpkin, Gourds, Radish, Bottle gourd and Long beans. The percentage share of area under cultivation of vegetables increased from a negligible 0.07 per cent to 4.74 per cent and productivity increased from 813 tons to 1141 tons per hector during the period from 1960-61 to 2013-14.

- There were 5422 operational holdings in Ponda taluka of Goa owned by large, medium, small and marginal farmers. The taluka witnesses the cultivation of various food grain and non-food grain crops. It is also progressing as an agro-tourism taluka having six major spice plantations. Owners of these farmers have combined farming with tourism promoting agro-eco-tourism. It has been found that they are getting sizeable income from these activities.
- There is positive association between the size of farm holding and the level of education of farmers. Highest proportion of marginal farmers (29.58) was illiterate, while in the case of small farmers 8 per cent were illiterate. However, no medium and large farmers belonged to illiterate category.

- In the study area overall 24 per cent of the farmers were illiterate, which is double than the overall percentage of illiteracy at the state level. As illiterate farmers do not know to read and write they do not come to know about the new techniques of production and hence continue to use traditional techniques of production.
- A great inequality is observed in the distribution of cultivable land since a larger proportion of farmers (76%) belonged to marginal size of landholdings. The small size land holding is uneconomical as it is unsuitable for the use of modern implements forcing the farmers to stick to the use of traditional techniques of cultivation. Hence, agricultural production gets adversely affected.
- The mean and median family size in the study area was five. Even though the level of education has not shown any specific effect on the family size of the farmers, family planning measures have been quite effective in all the parts of the state of Goa including the study area.
- The proportion of nucleate farming families among the sample farmers was higher with exception of large farmers.
- Farmers with higher levels of education and larger size holdings knew more number of languages. This enables farmers to acquire knowledge about improved agricultural practices carried out in other areas of the State or outside the state, which helps in reducing the cost of production and increasing returns from cultivation.
- Higher proportion of younger generation with higher levels of education is also taking up agriculture as one of their preferred occupation.
- Illiterate sample farmers did not attend any training or workshops on farming while, relatively larger proportion of farmers with higher levels of education

excluding small farmers with secondary and all type of farmers with higher secondary education participated in the farm training and workshops. The overall proportion of farmers' participation varied directly with the farm size. All the large farmers, irrespective of their levels of education had participated in the farm workshops and training programs.

- The type of ownership of land directly varied with the level of education, which is evident from the fact that 80 per cent of the farmers with graduation and above levels of education owned land by inheritance while it was only 24 per cent in the case of illiterate farmers.
- Positive relationship is observed between the level of education and average size of land holdings for small and medium farmers. No such relation can be seen between the two in the case of marginal farmers while, there was inverse relationship between the level of education of the large farmers and average size of landholdings.
- There was no link between the level of education and the number of crops grown on the same land while the proportion of farmers growing more than one crop, decreased with increase in the farm size.
- The number of years in farming activity is seen having inverse relation with the level of education. Over 75 per cent illiterate farmers have been into farming for over 40 years and over 27 per cent of illiterate and primary educated farmers were into farming for over 50 years in the study area.
- Even though, large proportion of graduate farmers have taken up agriculture by choice no specific relation can be established between the level of education and the way they are involved in farming activity. However, proportion of

farmers, undertaking farming activity with passion is seen directly associated with the size of land holdings.

- Farmers seeking alternative job varied positively with the level of education while it varied inversely with the size of land holdings. However, with an exception of a small proportion of marginal farmers all farmers who were interested to join alterative jobs, intended to continue with farming even after getting alternative job.
- Monthly income of the farmers earned through farming activity increased with the increasing level of education. With an exception of farmers from primary level of education the proportion of farmers earning below Rs. 2000 decreased with increasing level of education on the other hand the proportion of farmers earning Rs. 5000 and above increased with increasing level of education.
- The size of land holding influenced the type of crop cultivated by the farmers. The proportion of farmers cultivating exclusively food grain crops decreased with increase in the size of land holdings. Large farmers were not cultivating exclusively food grain crops while a large proportion of marginal farmers (60.42%) cultivated only food grains. With an exception of marginal farmers, in all other categories, the proportion of farmers cultivating non-food grain crops was higher than cultivating food grain crops. Majority of the large farmers (81.82%) cultivated only non-food grain crops. As compared to small and medium farmers, the proportion of farmers cultivating both the crops was less for marginal and large farmers. This is because marginal farmers own small size of land and they do not want to give up the cultivation of paddy since it is their staple food. The large farmers are already into cultivation of non-food grain crops and they are satisfied with their income that they receive from their farms.

- The proportion of farmers growing food grains decreased with increase in the size of holdings. It decreased from 80 per cent in the case of marginal size holdings to nearly18 per cent for the large size land holdings. However, the study did not find any specific relationship between the level of education and the cultivation of food grain crops. The main reasons cited for non-cultivation of food grain crops were lack of availability of sufficient land to cultivate (33% of illiterate farmers), fencing problem (38% of middle school educated farmers) and low profitability (farmers with other levels of education).
- A positive relation between the level of education and the cultivation of non-food grain crops is observed. With an exception of farmers at graduate and above level, the proportion of farmers cultivating non-food grain crops increased with increasing level of education. Most of the farmers with higher secondary and below levels of education stated that the non-availability of adequate and perennial supply of water for not cultivating non-food grain crops, while majority of farmers from graduate and above levels of education (67%) were not cultivating non-food grains due to lack of sufficient land.
- The sample farmers were of the view that proper fencing, improvement in irrigation facility, control of pollution, appropriate support prices, easy availability of labour and lower wages would help in improving agricultural productivity in their area.
- Farmers with higher levels of education allocated higher proportion of land area for the cultivation of non-food grain crops. The proportion of farmers cultivating non- food grain crops taken together also varied positively with the level of education, excluding graduate farmers.

- All types of farmers taken together, farmers with higher levels of education brought very less proportion of land under double cropping. Graduate farmers, professionals, I.T.I., and diploma holders didn't adopt double cropping. Farmers with primary education brought highest proportion of land under double cropping (39%), while farmers with post graduate education brought only one per cent of land under double cropping.

  The net average income earned by cultivating non-food grain crops by all farmers taken together was higher than the income generated from cultivating food grain crops. This implies that cultivation of non-food grain crops is quite profitable than the cultivation of food grain crops. At each level of education the net income earned by cultivating non-food grains by all the types of farmers taken together was higher than the income earned from food grain crops with an exception of post graduate marginal farmers and graduate large farmers. The net average per hector income was the highest from Spice cultivation (Rs. 189733) followed by Areca nut (Rs. 104183), while it was the lowest from Pulses Kharif (Rs.21581), followed by Paddy Rabi (Rs. 24612).

- The costs incurred on seeds were observed to have positive relation with the levels of education in the cultivation of paddy, cashew, coconut and mango while it was negative for areca nut, banana and vegetables. This is because HYV seeds are perceived as not suitable for the prevailing climatic conditions in the study area. Hence, educated farmers are also sometimes averse to the use of HYV seeds. The relation of cost incurred on irrigation with the levels of education was positive for all the crops except for mango cultivation. The cost incurred on fertilizer was positively related with educational level of farmers in the cultivation of paddy, coconut, areca nut and vegetables while it was negative

for the cultivation of banana and mango. Negative correlation is observed between the level of education and the cost incurred on manure for all the crops except vegetables; cost incurred on labour as well as traditional equipment for all the crops except for paddy. Coefficient of correlation between the cost incurred on modern equipment and the level of education is found to be positive for all the crops with an exception of vegetables. In the case of pesticides and insecticides, a positive correlation was observed for all the crops.

- Correlation of coefficient between the total cost incurred on cultivation and the level of education was positively significant for kharif paddy while, it was positively insignificant for cashew, coconut, vegetables and mango. It was negatively insignificant for the cultivation of rabi paddy, areca nut, banana and spices.
- The correlation between the total yield and the level of education was positive but insignificant from the cultivation of cashew, coconut, banana, vegetables and mango while, it was negatively insignificant for kharif paddy, rabi paddy, areca nut and spices.
- The net income derived and the level of education are found to have positive but insignificant correlation in the cultivation of kharif paddy, rabi paddy, cashew, coconut, areca nut and vegetables while, the relation was negatively insignificant for banana, mango and spices.
- The level of education has a positive influence on farmers' involvement in other activities.
- A larger proportion of farmers with bigger size land holdings and with higher levels of education were of the view that, there is increase in the cost of production along with the increase in the returns in farming activity. On the

other hand larger proportion of farmers with lower size of land holding were expressed of facing increasing cost with decreasing returns from farming activity.

- Use of HYV seeds, insecticides, pesticides, modern implements, and plantation of new crops varied positively with the levels of education. Other changes including rotation of crops, use of irrigation facilities and use of labour have not shown any significant change. Since small and medium farmers hold relatively larger area of land it was possible for them to cultivate new crops especially non-food grain crops.
- The awareness of different aspects of agricultural finance was seen to have a positive link with the level of education of the farmers. A larger proportion of more educated farmers obtained agricultural finance from commercial banks while a larger percentage of illiterate farmers borrowed from co-operative credit societies. Maximum proportion of all the farmers, had to borrow agricultural finance at an interest rate of 7 per cent. Majority of the marginal farmers repaid their loans only after harvest while, majority of the farmers who repaid their loans through monthly instalments either possessed bigger size of land holdings or they belonged to higher levels of education. These farmers had alternative sources of income, hence could repay their loan through monthly instalments.
- A larger proportion of farmers with all size of land holdings sold their produce to the co-operative societies except for the farmers with higher secondary education (30%), while a significant proportion of illiterate farmers (43%) sold their produce to the local shops.
- Irrespective of the level of education and size of land holdings, farmers were found to be satisfied with the price received for their agricultural product in the market.

- All the farmers, excluding a sizeable proportion of the marginal farmers produced agricultural output not only for self-consumption but also for commercial purposes. Among the marginal farmers, cultivating exclusively for self-consumption decreased with increasing levels of education.
- The proportion of farmers taking benefits of the agricultural schemes had a positive relation with levels of education.
- Only a few farmers with secondary and above levels of education used internet to obtain information pertaining to the agricultural production.
- Farming is viewed as a profitable occupation by a larger proportion of farmers from higher levels of education and with bigger size land holdings and were quite satisfied with farming as their occupation.
- The sample farmers were of the view that proper fencing, improvement in irrigation facility, control of pollution, appropriate support prices, easy availability of labour and lower wages would help in improving agricultural productivity in their area.

Validation of Hypotheses

All the hypotheses postulated in the beginning of the study through rigorous review of literature and ground familiarity were tested and found valid as evident from the empirical investigation.

The study had hypothesised that, (i) there was positive relationship between the education of farmers and the cultivation of high value crops, (ii) Farmers prefer to undertake cultivation of non-food grain crops than that of food grain crops and (iii) the net return from the cultivation of non-food grain crops is more than that of food grain crops.

7.2 Conclusion

The education of farmers is an important determinant of agricultural development of a region as evident from the present study. It influences selection of crops, use and cost of inputs, yield and net income. However, there are various other factors such as the size of land holdings, training, awareness as well as demonstration effects which influence agricultural production and productivity by influencing agricultural practices.

7.3 Suggestions and implications

Based on the empirical investigation, the study suggests following measures to improve agricultural productivity and development, especially in the study area.

- Introduction of Farming in the Co-Curriculum: Education has externalities as it enables the family members, neighbours, relatives of the educated person to get the benefit of information and knowledge of the educated person. Therefore, it is advisable to introduce farming in the curriculum /co-curriculum at the secondary and higher secondary schools in line with NCC, NSS, Physical Education, JRC and Scouts and Guides as an option. This would motivate the students to learn the dignity of farming and inculcate a sense of pride in involving in farming related activities.
- Trainings on the proper use of pesticides and insecticides: Proper use of pesticides and insecticides is a must for increasing production and productivity of agriculture sector. In the study area, it was found that many farmers do not make proper use of pesticides and insecticides in terms of quantity and / or timing. If the farmers are trained in the use of pesticides and insecticides then it could help in reducing the cost incurred on pesticides and insecticides and protecting the crops and thereby improving agriculture productivity.

- ¤ Encouraging research and development: A recent change in weather condition has resulted in untimely rains. Encouraging research and development of seeds, especially paddy which can be suitable for the changing climatic condition could help in solving the problem faced by the farmers in cultivating paddy.
- ¤ Developing Organic Farming: In the study area there is enormous and incredible scope for developing organic farming. Large and medium farmers practicing agro tourism have developed organic farms. They produce organic agro products either on their own or purchase it from nearby centres and sell it in their outlets located in their farms. Even though the prices of organic products are higher, tourists prefer to buy organic products, such as organic cashew, spices like black pepper, turmeric, nutmeg, chilies and banana. Efforts should be made to create awareness among local people about the importance of organic products. The small and marginal farmers also should be encouraged to practice organic farming in their farms. Workshops should also be organized at the panchayat and local levels on organic farming to have larger and effective participation.
- ¤ Encouraging Agro-tourism: Tourism has a wide scope in the study area. Combining agriculture with tourism activity could help in increasing the productivity of agriculture sector. There is increasing demand for high value crops like fruits, vegetables and flowers from the domestic as well as foreign tourists. Besides this, the natural flora and fauna can be effectively used for developing agro tourism. Some of the large farmers have already started combining agricultural activity with tourism. Efforts could be made to encourage such activities among medium and small farmers as well.
- ¤ Providing permanent fencing: Fencing is one of the major problems faced by majority of the farmers in the study area. Permanent fencing should be provided at

a subsidized rate so that the farmers do not have to waste their time, money and energy on fencing their land every year. Especially, farmers cultivating paddy are reluctant to undertake cultivation because of lack of fencing. So the efforts should be made to solve the problem of fencing so that it could lead to increase in production and productivity of agricultural sector.

- Perennial supply of water: Large number of farmers do not cultivate two crops because of lack of irrigation facility, especially during rabi and summer season. Providing irrigation facilities for such farmers could help in solving the problem to some extent. Creation of awareness on the existing subsidy schemes for construction of wells and installing modern machines like sprinklers might help farmers to utilize these schemes for improving irrigation facility on their lands and would enable to cultivate more than one crop.
- Control on Pollution: In the study area, a large proportion of farmers faced the problem of pollution caused by industrial wastes, mine rejects and household wastes discarded in river water. Besides this, khazan lands existing in the low lying areas used for the cultivation of rice face the problem of saline water entering into the fields during high tides, thus creating a problem for the sustainable development of agriculture. Proper steps should be taken which could lead to complete ban on discarding the wastes in rivers as well as on the banks of the rivers. Recycling of mine rejects or developing such plants and seeds, which can be cultivated by using the mine rejects could be an important measure in this direction. To solve the problem of saline water entering into the low lying fields, construction of concrete wall and planting of mangrove trees could help in reliving the problem. Research and development should be encouraged to develop seeds which can withstand the salinity of the sea water.

- Mechanization of Agriculture: The problem pertaining to labour could be solved by resorting to mechanisation of cultivation. There has been very limited use of machines for cultivation by the sample farmers in the study area. According to the sample farmers, they are not able to use machines because of inappropriate type and size of land, problems associated with the availability of spare parts and servicing facility for the repairs of machines. Besides these, lack of skill and knowledge to operate modern machines by the farmers is another impediment in the process of mechanization of agriculture. This problem could be solved by training farmers in the use of modern appliances and making available required facilities /machines on co-operative basis. Cheaper and special machines should be developed especially to use in hilly areas and on small holdings to encourage mechanization as well as to bring fallow land under cultivation.
- Developing Floriculture: In Goa, there is high demand for flowers which is mostly met by importing from neighbouring states like Maharashtra and Karnataka. Efforts could be made to develop floriculture on commercial lines by identifying the flowers which can be grown on a large scale suitable to the soil and climatic condition of Goa and the study area.
- To augment and implement the above measures, a huge sum of finance is required in addition to the wholehearted co-operation from the farmers and the local people. The financial requirements could be met by involving various development agencies of the state and the central government. In addition, NGOs and corporate sectors should also extend their helping hand. Crop insurance measures needs to be strengthened in the study region.
- There is a lot of potential in the study area to develop scientific and organic farming; enthusiasm also appears among a larger section of educated farmers. Hence, the

agriculture development initiatives should get immediate patronage for a sustainable development of agriculture in the study area.

- Most importantly, the formal and informal cooperation among the farmers, especially among marginal and small farmers is required to have mutually beneficial agricultural farming. This would help the farmers to overcome the limitations of uneconomical landholdings and shortage and expensive labour supply.

7.4 Limitations of the Study

The present study has the following limitations and scope for further research.

- For an intensive study of agriculture, the present study focuses only on one taluka of Goa due to the constraints of time and resources.
- The findings of the research can be applicable only in such areas where similar type of physical and human conditions prevail, viz. geographical location and features and agro-climatic conditions and socio-economic profile of the farmers and existence of welfare oriented administration like that of Govt. of Goa.
- The information given by the farmers may have limitations of accuracy as the farmers might not have maintained proper account of various details pertaining to the quantity and cost of inputs used, income generated, etc. Hence, the information provided by the farmers may not be cent percent accurate. Moreover, there are possibilities of reporting errors by the sample respondents.
- The data on different aspects of agricultural practices relate only to Ponda taluka and specifically for the year, 2013-14. Hence, the validity is area and time specific and subjected to changes over time and space.

- The present study has considered the level of education of the farmers' only while, the level of education of other family members also might influence the agricultural practices followed by the farmers.

7.5 Scope for Further Research

The above discussion indicates that, there is still a wide scope for undertaking further research related to agriculture development at micro, mesoand /or macro level. The horizon of the study area and the field of study can be extended for further research.

There is a scope for further research relating to the analysis of the contribution of education for agricultural development by extending the study to cover some other regions in the state of Goa and / or in any other part of the country. An intensive study of specific crop and /or group of crops can also be undertaken to facilitate policy formulation for impressive agricultural development. Similar studies can also be undertaken to establish relationship of agriculture with specific level and type of education for different areas / segments. It can also be applied for any physical divisions like watershed.

BIBLIOGRAHY

1. Acharya, S., I.J. Ahluwalia, K. L., Krishna and Patnaik Ila. (2006). *Economic Growth in India* in K. S. Parikh (ed.) Explaining Growth in South Asia. New Delhi. Oxford.

2. Acharya, S.S. (2004). Agricultural Marketing in India. Vol. 17 of *Millennium study of Indian Farmers*. New Delhi, Government of India. Academic Foundation.

3. Adhiguru, P., Birthal P.S. and Ganesh, K, B. (2009). Strengthening pluralistic agricultural information delivery in India. *Agricultural Economics Research Review* 22, Pp 71 -79.

4. Agarwal, I., Priya, S., and Bhuvaneswai, S. (2005). Contract Farming in Cotton – A case study in Tamil Nadu. *Indian Journal of Agricultural Marketing* Vol. 19 (2), Pp.153-161.

5. Agarwal, P. K., (2008). Global Climate Change and Indian Agriculture, Impacts, Adoption and Mitigation. *Indian Journal of Agricultural Sciences* 10.

6. Agarwal, P. K., Hebbar, P. K., K.B. Venugopalan,M.V., Rani, B. A., Biswal, A., and Wani, S.P. (2008). Quantification of Yield Gaps in Rainfed Rice, Wheat, Cotton and Mustard in India. Global *Theme on Agro-eco system Report* No. 43. International Crops Research Institute for the Semi and Tropics, Patancheru 502324, Andhra Pradesh. India.

7. Ahluwalia, M. (2011). Prospects and Policy Challenges in the Twelfth Plan. *Economic and Political Weekly*, 46(21), 88 -105.

8. Ahmed, T. (2006*). An Economic Analysis of Paddy Basal Farming Systems in Southern Karnataka A case study of Mandya District*. Doctoral thesis. Dept. of Agriculture Economics, College of Agriculture Dharwad, University of Agricultural Sciences Dharwad.

9. Alc, M., and Flinn J. (1989). Profit Efficiency among Basmati Rice producers in Pakistan Punjab. *American Journal of Agricultural Economics*, 71(2) 303 – 310.

10. Anderson, C.A. and Bowman, M.J. eds. (1965). Education and Economic Development. Chicago, Aldine.

11. Anderson, J.R. and Feder, G. (2004). Agricultural extension, Good intensions and hard realities. *World Bank Research Observer*, 19(1), 41 -60.

12. Anon, (2013). Vision 2030, Indian Council of Agricultural Research. www.Icar. Org.in retrieved on 5-10 2013.

13. Ansari, M.M. (1987). Education and Economic Development Perspective for Policy Planning New Delhi. Association of Indian University.

14. Appleton, S. and Balihuta A. (1996). Education and Agricultural Productivity. Evidence from Uganda, *Journal of International Development*, John Wiley and Sons, Ltd.

15. Arrow, K. (1973). Higher Education as a Filter, *Journal of Public Economics*, 2 (3), Pp.193 -216.

16. Bajpai, V. K. (2006). Confidence series in Developmental Issues of Indian Economics Kala Sanskruti Publications, Mumbai.

17. Bajrang, and Kumar A. (2012). Performance of Agriculture Sector in Haryana. *Southern Economist* Vol.51, No 4.

18. Balogh, T. and Streeten P. (1968). The Coefficient of Ignorance. Economics and Education, London, Penguin Pp. 383 – 395.

19. Barah, B.C. and Sirohi Smita. (2011). *Dimensions of Agrarian Distress in India*. Concept Publishing co., New Delhi. Pp. 284.

20. Barghouti, S. and Meenashi, J.V. (2004), Agricultural Diversification for the Poor, Guidelines for Practioners, *Agriculture and Rural Development Discussion paper 1*. Washington DC. The World Bank.

21. Basole, A. and Basu, D. (2011). Relations of production and modes of surplus extraction in India, Part I. Agriculture, *Economic and Political Weely*, 46(42), 41- 58.

22. Becker, G.S. and Chiswick B.R. (1966). Education and Distribution of Earnings, *American Economic Review*, May 56 (2).

23. Benhabib, J. and Spiegel, M (1994). The Role of Human Capital in Economic Development. Evidence from Aggregate Cross – country Data. *Journal of Monetary Economics,* Vol. 34.

24. Bhatia, S.S. (1965). Patterns of Crop Concentration and Diversification in India. *Economic Geography.* Vol. 41, Pp. 39-56.

25. Bils, M. and Klenow, D.J. (2000). Does Schooling Cause Growth? *American Economic Review,* Vol. 90 Pp. 1160 – 1183.

26. Birthal, P.S., P. K. Joshi and A.V. Narayanan. (2011). Agricultural Diversification in India, Trends, contribution to Growth and Small Farmers Participation. ICRISAT, Mimco. www.nddb. Org. Retrieved on 10.10. 2013.

27. Blaug, M. (1987). *The Economics of Education and the Education of an Economist,* England. Edward Elger, Hampshire.

28. Blaug, M. (1970). *An Introduction to the Economics of Education*. London, Allen Lane, The Penguin Press.

29. Bqadenpowell, (1957). *The Indian village Community*. New Haven, pp.362-365.Baden Powell, "The Village of Goa in The Early 16th Century", 1900 Vol. 32, pp. 277.

30. Brithal, P.S. (2008). Linking smallholder livestock producers to markets issues and approaches. *Indian Journal of Agricultural Economics* 63(1) Pp.19 – 37.

31. Brithal, P.S., Jha, A. K., Joshi P. K. and Singh D. K. (2006). Agricultural Diversification in north eastern region of India, Implications for growth and equity. *Indian Journal Agricultural Economics* 61(3), Pp.328 – 340.

32. Brithal, P.S., Joshi P. K., Chauthan, S. and Singh, H. (2008). Can horticulture revitalize agricultural growth? *Indian journal of Agricultural Economics* 63 (3), 310 – 321.

33. Challa, V. and S.V. Subba, Reddy. (2013). Economics of Sericulture – A micro level study. *Southern Economist* Vol. 52, No. 6 Pp. 33.

34. Chand, R., Garg S. and Pandey L. (2009), Regional Variations in Agricultural Productivity. A District level study. Discussion Paper NPP

01/2009 New Delhi *National Centre for Agricultural Economics and Policy Research.*

35. Charreau, C. (1974). "Systems of Cropping in the Dry Tropical Zone of West Africa with Special Reference to Senegal." Paper presented at the *International Workshop on Agricultural Practices ICRISAT*, Hyderabad, 18-21 NO. 1974. **http://oar.icrisat.org/653/1/RA_00020.pdf**

36. Cheru, Fantu and Modi, Renu. (2013). *Agricultural Development and Food Security in Africa – The Impact of Chinese, Indian and Brazilian Investments.* Pub. Zed Books.

37. Colman, David and Trevor, Young. (1993). *Principles of agricultural economics, Markets and prices in less developed countries.* Cambridge, Cambridge University press 1989.

38. Dantawala, M.L. (1991). *Agrarian Structure and Agrarian Relations in India*, Indian Agricultural Development Science. Second (Revised) Edition Oxford and NBH Publishing 10 Pvt. Ltd.66, New Delhi.

39. Datt, R., Sundharam, K.P.M. (2002). *Indian Economy*. S Chand and Company Ltd, New Delhi.

40. De- Schlippe, P. (1956). Shifting Cultivation in Africa, Routledge and Kegan, London. U.K.www.pdf.usaid.gov/pdf_docs/PCAAA007.pdf

41. Deoghare, P.R., Sharma, R. and Goel, S.K. (1991). Impact of Mixed Farming Systems on Income and Employment of Small Farms in Karnal District of Haryana. *Agricultural Situation in India*, 46 (1):665-670.

42. Deosthali, V. and Nikam C. (2004). Rice- Region wise Growth Trends in Maharashtra, *Economic and Political Weekly*, Mumbai, January 17, pp. 240-242.

43. Dhingra, I. C. (2010). *The Indian Economy*, Environment and Policy. Sultan Chand and Sons. Education Publishers, New Delhi Pp. 312.

44. Dogra, B. (1988). Who is the real Kissan*? Agriculture and Rural Economy in India*. Deep and Deep Publications, F- 159,

45. Dorge, J.T., Yadav, D.B., and Kadam S.A. (2012). Economics of different farming systems in Western Maharashtra. *Southern Economist* Vol. 50, No. 22 Pp. 4.

46. Duckham, A.N. and Masefield. (1970). *Farming Systems of the World*, Allied Publishers, Bangalore.

47. Duraiswami, P. (1991). Effects of Education and Extension Contacts on Agricultural Production. *Indian Journal of Agricultural Economics*. Vol.XLVII 1001, Pp. 205-213.

48. Dutt, R. D., Sundharam, K.P.M. (2000). *Elementary Economics*, ABS publishing house, Calcutta.

49. Erch-Cheng-Hwa. (1983). Contribution of Agriculture to Economic Growth – Some Empirical Evidence. *Staff Working Papers No. 619*, Washington D.D., U.S.A.

50. Fei, J.C. and Ranis G. (1961). *A Theory of Economic Development*. American Economic Review.

51. Gaonkar, R. R. (2000). Technology Adoption and Agricultural Productivity – A case Study. *Indian Journal of Agricultural Economics.* Vol. 55, No.3.

52. Ghosh, M. (1995). Agricultural Development and Rural Poverty in India. *Indian Journal of Agricultural Economics*, Vol. 51, No.3. Pp.374 -379.

53. Gibbon, D. (1981). "Rainfed Farming systems in the Mediterranean region". *Plant and Soil*, 58: 59-80 http://link.springer.com/article/10.1007%2FBF02180049

54. Govereh, J. and Jayne, T. (1999). *Effects of Cash Crops Production on Food Crop Productivity in Zimbabwe Synergies or Trade-offs?* MSU International Development working papers No, 74. Department of Agricultural Economics Michigan State University Michigan 48824. Retrieved from https://www.researchgate.net/.../46471925_**Effects_of_Cash_Crop_Producti**.

55. Government of India, Planning Commission, (2006). *An approach to the Eleventh five year plan*. Pp 5.

56. Grover, I., Yadav L., Grover, D. (2002). *Extension Management*. Agro-tech publishing Academy, Udaipur.

57. Gulati, Ashok. (1998). *Indian Agriculture in an Open Economy will it prosper?* Oxford University press New Delhi.

58. Hayami, Y. and Ruttan, V. (1971). *Agricultural Development. An international perspective.* Baltimore, Maryland, U.S.A. Johns Hopkins press.

59. Hiremath, G. K. (1989). *Impact of Technical Change on Output, Income, Employment and Factor shares in Indian Agriculture. A case study of the Karnataka bidi tobacco economy and its problems – An economic analysis*. Doctoral thesis, No. 1133. University of Agricultural Sciences Dharwad, Karnataka.

60. Hirschman, A.O. (1958). *The Strategy of Economic Development in Developing Countries.* New Haven, Connecticut, U.S.A. Yale university press.

61. Indian Council of Agricultural Research. (1981). *Guidelines for Entire Farming System Demonstrations.* All India Coordinated Project on National Demonstrations, New Delhi, 1-12.

62. **ICAR-Central Coastal Agricultural Research Institute, Ela, Old Goa, Goa**

63. www.**icar**.org.in/Vision%202050%20CCARI,%20**Goa**%20.pdf

64. Jha, D. (2001). *Agriculture Research and Small Farmers,* presidential address 60th Annual conference of Indian society of Agricultural Economics.

65. John, W. (2013). *Agricultural Supply Chains and the Challenge of Price Risk*. Pub. Routledge.

66. Joseph, K. J. (1995). *Regional and Temporal Variation in Agricultural Production and Productivity in Kerala – An economic analysis*. Doctoral thesis. No 4746. University of Agricultural Sciences, Dharwad, Karnataka.

67. Joshi, P.K. et al. (2004). Agricultural Diversification in South Asia-Pattern, Determinants and Policy Implications, *Economic and Political Weekly*, Mumbai, June 12, pp.2451-2457.

68. Judson. R. (1998). "Economic Growth and Investment in Education: How Allocation Matters," *Journal of Economic Growth*, 3(4), 337-360.

69. Jugale, V.B. (1991). *Theories of Agricultural Finance*. HB, Atlantic.

70. K.N. Ravi Kumar, V.T. Raju. (1991). "Trends in Production and Arrivals of Important Agricultural Commodities into Regulated Markets of Andhra Pradesh", *Indian Journal Agricultural Marketing* 13(3) 1999, pp, 82-86.

71. Kalirajan, K.P. and Shand, R.T. (1985). Type of Education and Productivity: A Quantitative Analysis of Tamil Nadu Rice Farming. *Journal of Development Studies*, 21(2) Pp. 232 -243.

72. Kallur, M.S. (1985). *An Economic Analysis of Agrarian Changes in Left Bank Command Area of the Tungabhadra Irrigation Project in Karnataka*. Doctoral Thesis Karnataka University, Dharwad.

73. Kesarkar, S.,Narayan, R., Patil, V., Gaonkar, V. (2012). Cashew Nut Cultivation in Goa State with special Reference to Organic Cultivation Practices. *Indian Research Journal of Extension Education*, Special Issue (Volume II), pp. 136-144.

74. Krantz B.A. (1974). Cropping Patterns for Increasing and Stabilizing Agricultural Production in the Semi-arid tropics. Paper presented at the International Workshop on farming Systems. ICRISAT.Hyderabad, 18-21 Nov., 1974. www.oar.**icrisat**.org/653/1/RA_00020.pdf.

75. Krishna K. L., and Kapila U. (eds.). (2009). *Readings in Indian Agriculture and Industry*. Darya Ganj. New Delhi. Academic Foundation.

76. Kumar, S. (2008). *Indian Agriculture and the Globalization, Agriculture under Globalization.* Dominant Publication and Distributors, New Delhi – 2 Pp. 10.

77. Kumari, S. (2007). *High Value Cash Crops Agriculture in Himachal Pradesh – A Study in Documentation and Valuation of Environmental Costs.* Doctoral Thesis CSK Himachal Pradesh Krishi Vishvavidyalaya Pamampur – 176062 (H.P.) India. Retrieved fromshodhganga.inflibnet.ac.in/ bitstream/10603/10550/7/07_chapter-ii.pdf

78. Lokmanya, B.S. (1983). *Economic evaluation of the impact of modern technology on mixed plantations in Sirsi taluk of Uttar Kannada District of Karnataka: A Case Study. Doctoral Thesis*, No 600. University of Agricultural Sciences Dharwad, Karnataka.

79. Louis, A., Jean H. I., Neantro S. R. (2012*). Geographical Indications and International Agricultural Trade – The Challenge for Asia*. Published by Palgrave Macmillan.

80. Macie, A. B. (1964). The Role of Agriculture in Economic Growth and Development. *Agricultural Economics*, Vol.4, No.3, Illions, December 1964, P.8.

81. Mahofa**,** G. (2007). *Economic Analysis of Factors Affecting Cotton Production in Zimbabwe*. Post graduate thesis, Department of Agricultural Economics and Extension Faculty of Agriculture; University of Zimbabwe. Retrieved from ageconsearch.umn.edu/bitstream/134490/2/**Mahofa**%20**thesis**.pdf

82. Mandal R. M., Bezbaruah M.P. (2013). *Indian Journal of Agricultural Economics* Vol.68, No.2 April – June 2013.

83. Mandal, R. (2010). Cropping Pattern and Risk Management in the flood Plains of Assam. *Economic and Political Weekly*, Vol.45, No.33 August 14.

84. Meenakshi, V. (1984). *An Analysis of Pesticides use by Farmers in North Taluka of Karnataka.* Doctoral thesis, University of Agricultural Sciences, Dharwad, Karnataka.

85. Melinamani, V. K. (2007). *Interlinkages among agricultural research investment, agricultural productivity, poverty and food and nutritional security in Karnataka – A Socio economic Analysis.* Post graduate thesis, No. 9519. University of Agricultural Sciences Dharwad, Karnataka.

86. Menon, S. K. (1979). *Resource use and Productivity in Grape Cultivation in North Taluka of Bangalore*. Post graduate thesis, No. 2492. University of Agricultural Sciences Dharwad, Karnataka.

87. Mishra, S. K. and Puri, V.M. (1999). *Indian Economy*. Himalaya Publishing House, Bombay 1999.

88. Mishra, S. K., and Puri, V. K. (2006). *Developmental Issues of Indian Economics*, Publishing House, New Delhi.

89. Mohammed, R. M. (2010). Lack of Technology and Awareness. *Southern Economist*, Vol. 48, No.24, Pp. 5-6.

90. Mohan, L. (2007), *Economic Efficiency of Cropping pattern under different sources of Irrigation* Post graduate thesis, No.8468. University of Agricultural Sciences Dharwad, Karnataka.

91. Mohanty, B.B. (2009). Regional Disparities in Agricultural Development of Maharashtra, *Economic and Political weekly Mumbai*, Feb 7, 2009, Vol. 6, pp. 63-69.

92. Mosher, A.T. (1966). *Getting Agriculture Moving*, Frederic A. Praiger Inc. New York, 9-12.

93. Murthy, S. P. S. (1986). *Resource Productivity in Agriculture in Bangalore District of Karnataka.* Post Graduate thesis, No. 1920,University of Agricultural Sciences, Dharwad, Karnataka.

94. Nawalkishore, A. (1970). *A Critical Study of Tribal Education*. S. Chand and Company, New Delhi.

95. Norman, D.W. (1978). *"Farming Systems and Problems of Improving Them" in Kowal, J.M. and Kassam,* A.H. (Eds) Agricultural Ecology of Savanna: A Case Study of West Africa. Clarendon Press Oxford, 318-347.

96. Norman, M.J.T. (1979). *Annual Cropping Systems in the tropics- An Introduction*. University Press Florida, Gainesville, 1-10.

97. Padmini, S.V. (2005). *Economics of Arecanut Cultivation in Shimoga District – A case Study*. Doctoral thesis. Karnataka University Dharwad.

98. Padmini, V.S. (2005). "*Economics of Areca nut Cultivation in Shimoga District: A case study*. Doctoral Thesis, Karnataka University Dharwad.

99. Parthasarathy, G. (1969). "Economics of IR-8 Paddy: Factors affecting its adoption in a Tank Irrigated District" *Economic and Political Weekly,* Sept. 20, 1969, Vol. 4(38) pp. 1519-1523.

100. Patel, M.L. (1982). Crop pattern and related factors. *Economic and Political weekly.* Vol. XVII. Nos. (1 &2), Pp. 38 – 44.

101. Patil, N.P., and Hiregouder S.L. (1963)." Economics of Cropping Pattern under Tank Irrigation in South Eastern Dry Region of Mysore". *Indian Journal of Agricultural Economics.*Vol. XVIII No. -1. Pp 32-36.

102. Planning commission. Government of India, plan documents from 1952 to 2004, Delhi.

103. Podda, R. S. (1999). *Economic Analysis of Farmers Participatory Approach for Irrigation System Management in Karnataka: A case study of Chikkapadasalagi barrage.* Post graduate thesis No. 5513.University of Agricultural Sciences Dharwad, Karnataka.

104. Rana, R. K. (1990). Land Productivity differentials in India. An Empirical Study. *Indian Journal of Agricultural Economics* 41(1), 51 -55.

105. Randhawa, M.S. (2002). Agricultural Research in India, Indian Council of Agriculture research, New Delhi.

106. Rane, A.A. and Deorukhkar, A.C. (2007). *Economics of Agriculture.* 2nd Enlarged Ed.,HB, Atlantic.

107. Reimund, R. (2008). Science for Agriculture and Rural Development in Low – income Countries, Pub. Springer (Exc.).

108. Robert, E. Pingali P. P. (2010), *Handbook of Agricultural Economics.* Pub. North Holland.

109. Ruthenberg, H. (1971), *Farming systems in the Tropics*. Clarendon Press, Oxford, 1-6.www.pdf.usaid.gov/pdf_docs/PNAAP608.pdf

110. Sadhu, A.N., Singh, A. (2004). *Fundamentals of Agricultural Economics.* Himalaya Publishing House, Mumbai.

111. Sastry, N.T. (1993). *Optimum Enterprise System for Farmers in Chitoor district of Andhra Pradesh* (1993). Post graduate thesis. No 4524. University of Agricultural Sciences Dharwad, Karnataka.

112. Satihal, Dayanand G. (2005). *Population Growth and Agricultural Change in Karnataka*. Doctoral Thesis. Karnataka University, Dharwad.

113. Saturnino, M., Borras, J., Marc, E. & Cristobal, K. (2008). *Transnational Agrarian Movements Confronting Globalization*. Pub. Willy – Blacwell.

114. Schultz, T.W. (1968). *Economics of Growth and Agriculture,* Tata Mc-grow Hill, Mumbai.

115. Shah, J., Patel, M. P., and Woran D. (2013). Changing Cropping Pattern in Gujarat – A regional Analysis – (National Dairy Development Board NDDB), Gujarat, *Agricultural Economics Research Review* Vol. 26 Pp. 255.

116. Shah. C.H. (1991). *Agricultural Development of India, Policy and problems,* orient Longman, Mumbai.

117. Siddalingappa, P. (2002). *Regional Development and Agricultural Productivity – An Economic Analysis across Agro Climatic zones. Post graduate thesis*. No 7267. University of Agricultural Sciences Dharwad, Karnataka.

118. Singh, A., and Sadhu, A.N. (1991). *Agricultural Problem in India.* Himalaya Publishing House, Bombay, P. 151.

119. Singh, A.J. (1992). *Agricultural Development and Employment patterns in India. A Comparative Analysis of Punjab and Bihar*. M.R. Khurana, Concept Publishing Company, New Delhi – 59.

120. Singh, M. (2006). *Address to the second agriculture summit*, publication division, Govt. of India, 2007, 2008 Delhi.

121. Singh, S. (2008). *Contract Farming for Agricultural Development. Review of Theory and Practice with special reference to India.* Books.google.com https//books. Google .in/ Pp. 191 – 226.

122. Smalley, R. (2013). *Plantations Contract Farming and Commercial Farming Areas in Africa:A Comparative review*. Retrieved fromwww.fao.org/uploads/media/FAC_Working_Paper_055.pdf

123. Srivastava, R. (1990): "*Rural manpower assessment and planning educational needs for India's education*". Doctoral thesis, University of Delhi.

124. Sundar, I. (2009), *Principles of Agricultural Economics.* Pub.by Sarup and Sons.

125. Suresh, H. (2001). *Performance of organic farming in Shimoga district of Karnataka – An economic analysis*. Post graduate (Agriculture) thesis, University of Agriculture Sciences, Dharwad, Karnataka (India).

126. Tahashildar, H.M, (2002). *"An economic analysis of grape and pomegranate in Karnataka: A case study of Bijapur district"*. Doctoral thesis. Karnataka, University, Dharwad.

127. Thakur, L., Sharma, K.G. and Khandkar, U.R. (2000). Adoption of Advanced Agricultural Technologies by Marginal and Small Farm Families of Mandsaur District in Madhya Pradesh. *Indian Journal of Agricultural Economics*, July-September 2000 Vol.55, No. 3.

128. Timmer, C.P. (1988). *The Agricultural Transformation. Handbook of Development Economics.* Vol. 1, edited by H.Chenery and T.N. Srinivasan, Amsterdan, North Holland. Pp.275-331

129. Tope, S. (1975). *Dynamics of Educational Development in Tribal India*. Classical Publications, New Delhi.

130. Torne, S.R. (2009). *An Economic Analysis of Farming Systems in North Kankan Region of Maharashtra.* Post Graduate thesis, No.9839. University of Agricultural Sciences, Dharwad, Karnataka.

131. Tyagi, B. P. (1998). *Agricultural Economics and Rural Development.* Published by Jaiprakash and Co. Meerut.

132. Vadiyal, K. S. (1977). *Impact of Modern Production Technology on Employment Potential and Income Distribution in Selected parts of Rural Karnataka.* Post Graduate thesis, No. 215. University of Agricultural Sciences, Dharwad, Karnataka.

133. Vaidyanathan, A. (2010). *Agricultural Growth in India, Role of Technology, Incentives and Institutions.* Oxford University Press.https://global.**oup**.com/academic/.../**agricultural-growth-**9780198064473

134. Wilde, J.C. de. (1967). *Experiences with Agricultural Development in Tropical Africa,* Vol.1. John Hopkins Press, Baltimore. *https://www.ids.ac.uk/files/dmfile/Wp64.pdf*

135. Wright, A. (1971). *Systems Analysis in Agricultural Management* (Eds.), Dent, J.B. and Anderson, T.R., John Wiley and Sons.

ANNEXURE –I

TABLES

Table 6.1 Reasons for Non cultivation of Food Crops by Level of Education and Size of Land Holdings (in percentages)

Size of holdings	Reasons	Level of Education							Total %
		Illiterate	Primary	Middle	Secondary	Higher secondary	Graduate and above	Others	
Marginal	Less land	35.71	0.00	0.00	10.00	50.00	0.00	100.00	**17.3**
	No Irrigation	14.29	22.22	33.33	0.00	50.00	0.00	0.00	**13.46**
	Cost & availability of labour	7.14	11.11	16.67	0.00	0.00	0.00	0.00	**5.76**
	Fencing problem	14.29	0.00	33.33	10.00	0.00	0.00	0.00	**9.61**
	Not profitable	21.43	55.56	16.67	20.00	0.00	100.00	0.00	**38.46**
	Any Other	7.14	11.11	0.00	60.00	0.00	0.00	0.00	**15.38**
Small	Less land	0.00	25.00	0.00	33.33	0.00	0.00	0.00	**15.78**
	No Irrigation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**--**
	Cost & availability of Labour	0.00	0.00	50.00	0.00	50.00	0.00	0.00	**10.52**
	Fencing problem	0.00	0.00	50.00	0.00	0.00	0.00	0.00	**5.26**
	Not profitable	100.00	75.00	0.oo	50.00	50.00	100.00	100.00	**63.15**
	Any Other	0.00	0.00	0.00	16.67	0.00	0.00	NA	**5.26**
Medium	Not profitable	NA	NA	NA	100.00	100.00	100.00	NA	**100**
Large	Cost & availability of labour	NA	NA	NA	100.00	0.00	0.00	0.00	**14.28**
	Not profitable	NA	NA	NA	0.00	0.00	100.00	100.00	**85.71**

Source: Primary Survey, 2014

Table 6.2 Reasons for Non-Cultivation of Non-Food Grain Crops by Level of Education and Size of Land Holdings (in percentages).

Size of Holdings		Level of Education							
		Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	***Total %***
Marginal	Less land	38.3	28.13	41.67	30	28.57	75	NA	*36.95*
	No Irrigation	51.06	62.5	45.83	55	71.43	12.5	NA	*52.17*
	Cost & availability of labour	0.00	3.13	0.00	0.00	0.00	12.5	NA	*1.44*
	Fencing problem	6.38	3.13	12.5	15	0.00	0.00	0	*7.24*
	Any Other	4.26	3.13	0.00	0.00	0.00	0.00	0	*2.17*
Small	Less land	NA	NA	100	NA	NA	50.00	NA	*75*
	No Irrigation	NA	NA	0.00	NA	NA	50.00	NA	*25*

Source: Primary Survey, 2014.

Note: All the medium and large farmers cultivate non food grain crops.

Table 6.3: Net Average Income of Marginal Farmers by Level of Education (in Rupees)

Food grain crops	Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates	Post Graduates	I.T.I.	Diploma
Paddy Kharif	2882	51965	49818	48553	17286	88764	115000	NA	NA
Paddy Rabi	3829	14442	46154	40286	43818	49057	NA	NA	NA
Pulses Kharif	NA	25500	37500	8000	NA	NA	NA	NA	NA
Pulses Rabi	NA	28000	NA	NA	NA	NA	NA	NA	Na
Net Average Income	3355	29976	44490	32279	20368	45940	115000	NA	NA
Non-food grain crops									
Cashew nut	27785	103462	49760	164286	254000	46000	220000	NA	NA
Coconut	4090	8129	20000	46350	94444	18621	110000	50000	NA
Areacanut	77372	78301	21802	89819	156765	439135	58714	93750	--NA
Banana	2222	116667	30000	100000	NA	NA	NA	NA	NA
Vegetables	35429	100000	200000	120000	15000	NA	NA	NA	NA
Mango	NA	43529	NA	50000	75000	87500	NA	NA	NA
Spices	NA	200000	10000	NA	NA	3704	NA	NA	6400
Average Income Non-food grain	29379	92869	55260	95075	119209	118991	84357	71875	6400

Source: Primary Survey, 2014.

Table 6.4: Net Average Income of Small Farmers by Level of Education (in Rs.).

Crops	**Level of Education**									
Food grain crops	**Illiterate**	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates**	**Post Graduates**	**Professional**	**I.T.I.**	Diploma
Paddy Kharif	3633	37647	32473	38000	6250	10500	36000	NA	NA	NA
Paddy Rabi	3894	31351	20075	21739	NA	NA	NA	NA	20000	12500
Pulses Kharif	NA	NA	25000	NA	NA	NA	NA	NA	NA	NA
Pulses Rabi	NA	NA	NA	83333	NA	NA	NA	NA	NA	NA
Net Average Income	3763	34499	25849	47690	6250	10500	36000	**NA**	20000	12500
Nonfood grain crops										
Cashew nut	16364	49016	175065	35945	8421	46400	NA	NA	31818	212000
Coconut	12650	88571	NA	14375	2400	152857	NA	NA	128125	132000
Areacanut	83182	135556	127543	75833	NA	318913	NA	10000	26667	75484
Banana	NA	83333	68889	67500	80000	NA	NA	NA	NA	40000
Vegetables	NA	12000	113333	32143	NA	NA	NA	NA	NA	NA
Mango	NA	100000	NA	150000	NA	150000	NA	NA	2375	NA
Pineapple	NA	12500	NA	NA	NA	NA	36364	NA	NA	NA
Spices	NA	NA	NA	NA	NA	6667	NA	NA	NA	NA
Others	NA	250000	NA	NA	NA	NA	NA	NA	NA	NA
Net Average Income	37398	91372	121207	62632	30273	134967	36364	10000	47246	114871

Source: Primary Survey, 2014

Table No 6.5 Net Average Income of Medium Farmers by Level of Education (in Rs.).

Crops	Level of Education							
Food grain crops	**Primary**	**Secondary**	**Higher Secondary**	**Graduates**	**Post Graduates**	**Professionals**	**I.T.I.**	**Diploma**
Paddy Kharif	2812	3166	NA	3444	14000	NA	NA	NA
Paddy Rabi	1625	4000	NA	8333	NA	NA	NA	NA
Pulses Kharif	NA	NA	NA	NA	NA	NA	NA	NA
Pulses Rabi	NA	NA	NA	NA	NA	NA	NA	NA
Net Average Income	2218	3583	NA	5888	14000	NA	NA	NA
Nonfood grain crops								
Cashew nut	8750	21545	23684	12256	81481	62222	NA	NA
Coconut	18750	30000	45455	154815	60000	1074	NA	NA
Areacanut	NA	166667	20667	16667	NA	NA	240000	NA
Banana	NA	NA	NA	63333	8000	NA	NA	NA
Vegetables	NA	NA	NA	NA	250000	NA	NA	NA
Mango	NA	90000	NA	NA	NA	NA	NA	NA
Pineapple	NA	NA	NA	6667	NA	NA	NA	NA
Spices	NA	NA	NA	193333	NA	NA	NA	NA
Others	NA	NA	NA	NA	NA	NA	2500	4666
Net Average Income	13750	61722	29935	63865	99870	21232	121250	4666

Source: Primary Survey, 2014.

Table No 6.6 Net Average Income of Large Farmers by Level of Education ((in Rs.).

Crops	Level of Education						
Food grain crops	**Middle**	**Secondary**	**Graduates**	**Post Graduates**	**Professional**	**I.T.I.**	**Diploma**
Paddy Kharif	NA	NA	NA	NA	NA	NA	NA
Paddy Rabi	NA	NA	80000	NA	NA	NA	NA
Pulses Kharif	NA	NA	NA	NA	NA	NA	NA
Pulses Rabi	NA	NA	NA	NA	NA	NA	NA
Net Average Income	NA	NA	80000	NA	NA	NA	NA
Non food grain crops							
Cashew nut	NA	NZ	38451	NA	51000	22500	24767
Coconut	NA	106154	34494	NA	75000	480000	3400
Areacanut	NA	13978	190150	NA	18766666	NA	96052.63
Banana	NA	28000	54615	NA	32000	NA	NA
Vegetables	NA	NA	NA	NA	NA	NA	NA
Mango	NA	NA	81927	200000	69000	20666.66	NA
Pineapple	NA	NA	NA	NA	85000	NA	NA
Spices	NA	167700	44333	NA	1999333.33	320000	176666
Others	26666	NA	33333	NA	NA	75000	NA
Net Average Income	26666	78957	68186	200000	99857	567633	69029

Source: Primary Survey, 2014.

Table 6.7: Responses for Changes in Costs and Returns over the Years by Farm Size & Level of Education (in percentages).

Size of Holding	Responses	Level of Education							*Total %*
		Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	
	Increasing Cost & Decreasing returns	88.73	92.45	83.78	79.17	53.33	35.71	100.00	*81.66*
	Increase in cost & increase in returns	0.00	0.00	0.00	6.25	46.67	28.57	0.00	*35.00*
	returns same	2.82	0.00	16.22	0.00	0.00	28.57	0.00	*5.00*
	No response	5.63	1.89	0.00	8.33	0.00	0.00	0.00	*3.75*
Marginal	Any other reason	2.82	5.66	0.00	6.25	0.00	7.14	0.00	*3.75*
	Increasing Cost & Decreasing returns	100.00	87.50	50.00	23.08	0.00	20.00	50.00	*40.00*
	Increase in cost & increase in returns	0.00	0.00	33.33	46.15	100.00	80.00	50.00	*6.00*
	' " returns same	0.00	0.00	8.33	15.38	0.00	0.00	0.00	*2.00*
	No response	0.00	0.00	8.33	0.00	0.00	0.00	0.00	*6.00*
Small	Any other reason	0.00	12.50	0.00	15.38	0.00	0.00	0.00	*25.00*
	Increasing Cost & Decreasing returns	NA	100.00	NA	25.00	0.00	16.67	0.00	*58.33*
	Increase in cost & increase in returns	NA	0.00	NA	75.00	100.00	50.00	0.00	*16.66*
Medium	' " returns same	NA	0.00	NA	0.00	0.00	33.33	0.00	*13.33*
	Increase in cost & increase in returns	NA	NA	NA	100.00	NA	80.00	100.00	*90.90*
Large	Any other reason	NA	NA	NA	0.00	NA	20.00	0.00	*9.09*

Source: Primary Survey, 2014.

Table 6.8 : Distribution of Farmers on the basis of Changes Made in Cultivation by Size of Land Holdings (in percentages).

Size of holding	Changes made	Level of Education							
		Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	***All level***
Marginal	Started using HYV seeds	92.96	98.11	98.3	100	100	100	50.00	*96.66*
	Started using Modern implements	74.65	56.6	81.08	95.83	100	100	50.00	*78.75*
	Planted other crops	0.00	7.55	0.00	6.25	6.67	21.43	0.00	*4.58*
	Pesticides &Insecticides	7.04	60.38	81.08	83.33	100	100	100	*57.5*
	No change	49.3	32.08	18.92	4.17	0.00	0.00	0.00	*25.41*
	Any other	0.00	3.77	0.00	0.00	0.00	0.00	0.00	*0.83*
Small	Started using HYV seeds	75.00	100	91.67	92.31	100	100	50.00	*90.00*
	Started using Modern implements	0.00	50.00	100	27.08	100	100	50.00	*80.00*
	Planted other crops	0.00	12.5	8.33	16.67	100	40.00	0.00	*32.00*
	Insecticides & Pesticides	0.00	25.00	100	22.92	100	100	50.00	*64.00*
	No change	25.00	25.00	0.00	2.08	0.00	0.00	0.00	*8.00*
	Any other	0.00	12.50	0.00	0.00	0.00	0.00	0.00	*1.00*
Medium	Started using HYV seeds	NA	100	NA	100	100	100	NA	*91.66*
	Started using Modern implements	NA	0.00	NA	100	100	100	NA	*91.66*
	Planted other crops	NA	0.00	NA	75.00	100	33.33	NA	*50.00*
	Insecticides & Pesticides	NA	0.00	NA	100	100	100	NA	*91.66*
Large	Started using HYV seeds	NA	NA	NA	100	NA	100	100	*100*
	Started using Modern implements	NA	NA	NA	100	NA	100	100	*100*
	Planted other crops	NA	NA	NA	0.00	NA	20.00	0.00	*9.09*
	Insecticides & Pesticides	NA	NA	NA	100	NA	100	100	*100*
	Any other	NA	NA	NA	100	NA	20.00	0.00	*27.27*

Source: Primary Survey, 2014.

Table 6.9: Awareness about Sources of Finance by Level of Education and Size of Holdings (in Percentages).

Level of Education	Size of Holding									
	Marginal		Small		Medium		Large		All Size	
	Aware	Not aware	Aware	Not aware	Aware	Not aware	Aware	Not aware	Aware	Not aware
Illiterate	28.17	71.83	100.00	0.00	NA	NA	NA	NA	32.00	68.00
Primary	69.81	30.19	62.50	37.50	100.00	0.00	NA	NA	69.00	31.00
Middle	83.78	16.22	75.00	25.00	NA	NA	NA	NA	82.00	18.00
Secondary	83.33	16.67	84.62	15.38	100.00	0.00	100.00	0.00	85.00	15.00
Higher Secondary	80.00	20.00	100.00	0.00	100.00	0.00	NA	NA	85.00	15.00
Graduates and above	71.43	28.57	100.00	0.00	100.00	0.00	100.00	0.00	97.00	03.00
Others	100.00	0.00	75.00	25.00	NA	NA	100.00	0.00	90.00	10.00
All level	*63.33*	*36.36*	*82.00*	*18.00*	*100*	*0.00*	*100*	*0.00*	*86.33*	13.59

Source: Primary Survey, 2014.

Table 6.10: Farmers Obtaining Finance by Level of Education & Size of Holdings (in Percentages).

Level of Education	Size of Holding									
	Marginal		Small		Medium		Large		All Size	
	Obtaining	Not obtaining	Obtaining	Not obtaining	Obtaining	Not obtaining	Obtaining	Not obtaining	Obtaining	Not obtaining
Illiterate	12.68	87.32	25.00	75.00	NA	NA	NA	NA	13.33	86.67
Primary	28.30	71.70	50.00	50.00	0.00	100.00	NA	NA	30.65	69.35
Middle	32.43	67.57	75.00	25.00	NA	NA	NA	NA	42.86	57.14
Secondary	41.67	58.33	61.54	38.46	75.00	25.00	50.00	50.00	47.76	52.24
Higher Secondary	33.33	66.67	75.00	25.00	100.00	0.00	NA	NA	45.00	55.00
Graduates and above	57.14	42.86	80.00	20.00	66.67	33.33	80.00	20.00	66.67	33.33
Others	50.00	50.00	75.00	25.00	NA	NA	100.00	0.00	80.00	20.00
All level	*29.16*	*70.41*	*64*	*36*	*66.66*	*33.33*	*81.81*	*18.18*	*60.40*	*39.48*

Source: Primary Survey, 2014.

Table 6.11 Farmers Obtaining Finance from Various Sources by Level of Education & Size of Land Holdings (in Percentages).

Size of Holding	Sources of Borrowing	Level of Education							
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	*All level*
	Commercial banks	28.57	60.00	58.33	55.00	80.00	100.00	0.00	*60.29*
	Co-operative Societies	71.43	40.00	25.00	45.00	20.00	0.00	100.00	*36.76*
Marginal	Any Other	0.00	0.00	16.67	0.00	0.00	0.00	0.00	*2.94*
Small	Commercial banks	0.00	100.00	77.78	37.50	100.00	75.00	50.00	*66.52*
	Co-operative Societies	100.00	0.00	22.22	62.50	0.00	25.00	50.00	*34.48*
Medium	Commercial banks	NA	NA	NA	100.00	100.00	60.00	NA	*77.77*
	Co-operative Societies	NA	NA	NA	0.00	0.00	40.00	NA	*22.22*
Large	Commercial banks	NA	NA	NA	100.00	NA	0.00	66.67	*37.50*
	Co-operative Societies	NA	NA	NA	0.00	NA	50.00	33.33	*37.50*
	Any Other	NA	NA	NA	0.00	NA	50.00	0.00	*25.00*
	Commercial banks	25.00	46.43	66.67	51.72	88.89	76.19	42.86	*56.82*
	Co-operative Societies	75.00	53.57	23.81	48.28	11.11	19.05	57.14	*41.13*
All Size	Any Other	0.00	0.00	9.52	0.00	0.00	4.76	0.00	*2.04*

Source: Primary Survey, 2014.

Table 6.12 Reasons for Obtaining Finance from Particular Source by Level of Education and Size of Holdings(in Percentages).

Size of Holding	Level of Education								
	Reasons for obtaining finance from particular source	**Illiterate**	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Oths**	***All Level***
Marginal	Less formalities, easy availability &low interest rate	42.86	100.00	0.00	100.00	100.00	100.00	100.00	*76.47*
	Less formalities	57.14	0.00	16.67	0.00	0.00	0.00	0.00	*8.82*
	Easy availability	0.00	0.00	83.33	0.00	0.00	0.00	0.00	*14.70*
Small	Less formalities, easy availability &low interest rate	100.00	100.00	100.00	75.00	100.00	100.00	100.00	*93.10*
	Low interest rate	0.00	0.00	0.00	25.00	0.00	0.00	0.00	*6.89*
Medium	Less formalities, easy availability &low interest rate	NA	NA	NA	100.00	100.00	100.00	NA	*100.00*
Large	Less formalities, easy availability &low interest rate	NA	NA	NA	100.00	NA	100.00	100.00	*100.00*
All Size	Less formalities, easy availability &low interest rate	50.00	100.00	42.86	93.75	100.00	100.00	100.00	*83.80*
	Less formalities	50.00	0.00	9.52	0.00	0.00	0.00	0.00	*8.50*
	Easy availability	0.00	0.00	47.62	0.00	0.00	0.00	0.00	*6.80*
	Low interest rate	0.00	0.00	0.00	6.25	0.00	0.00	0.00	*0.89*

Source: Primary Survey, 2014.

Table 6.13 Payment of Rate of Interest on their Loan by Level of Education and Size of Holdings (in Percentages).

Size of Holding	Rate of interest Paid on loans	Level of Education							
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others	*All level*
Marginal	4%	57.14	6.67	0.00	5.00	0.00	12.50	0.00	*10.29*
	7%	42.86	86.67	83.33	85.00	100.00	87.50	100.00	*82.35*
	12%	0.00	6.67	0.00	5.00	0.00	0.00	0.00	*2.94*
	Any other	0.00	0.00	16.67	5.00	0.00	0.00	0.00	*4.41*
Small	4%	0.00	0.00	0.00	12.50	0.00	0.00	50.00	*6.89*
	7%	100.00	100.00	100.00	50.00	100.00	100.00	50.00	*82.75*
	12%	0.00	0.00	0.00	37.50	0.00	0.00	0.00	*10.34*
Medium	7%	NA	NA	0.00	100.00	100.00	60.00	NA	*77.77*
	Any other	NA	NA	0.00	0.00	0.00	40.00	NA	*22.22*
Large	4%	NA	NA	NA	0.00	NA	25.00	0.00	*12.50*
	7%	NA	NA	NA	100.00	NA	75.00	66.67	*75.00*
	Any other	NA	NA	NA	0.00	NA	0.00	33.33	*12.50*
	4%	50.00	5.26	0.00	6.25	0.00	10.00	16.67	*12.59*
	7%	50.00	89.47	90.48	78.13	100.00	85.00	66.67	*79.96*
	12%	0.00	5.26	0.00	12.50	0.00	0.00	0.00	*2.53*
All Size	Any other	0.00	0.00	9.52	3.13	0.00	5.00	16.67	*4.90*

Source: Primary Survey, 2014.

Table 6.14: Repayment of Loans by Level of Education and Size of Land Holdings (in Percentages).

Size of Holding	Repayment of loans	Level of Education							
		Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	***All level***
Marginal	After harvesting	100.00	93.33	100.00	95.00	100.00	87.50	100.00	*95.58*
	Monthly installments	0.00	6.67	0.00	5.00	0.00	12.50	0.00	*4.41*
	Any other way	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*0.00*
Small	After harvest	100.00	100.00	100.00	87.50	100.00	25.00	50.00	*82.75*
	Monthly installments	0.00	0.00	0.00	12.50	0.00	75.00	50.00	*17.24*
	Any other way	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*0.00*
Medium	After harvest	NA	NA	NA	33.33	100.00	80.00	NA	*66.66*
	Monthly installments	NA	NA	NA	66.67	0.00	20.00	NA	*33.33*
	Any other way	NA	NA	NA	0.00	0.00	0.00	NA	*0.00*
Large	After harvest	NA	NA	NA	0.00	NA	25.00	33.33	*25.00*
	Monthly installments	NA	NA	NA	100.00	NA	50.00	66.67	*62.50*
	Any other way	NA	NA	NA	0.00	NA	25.00	0.00	*12.50*
All Size	After harvest	100.00	94.74	100.00	84.38	100.00	61.90	50.00	*84.43*
	Monthly installments	0.00	5.26	0.00	15.63	0.00	33.33	50.00	*14.88*
	Any other way	0.00	0.00	0.00	0.00	0.00	4.76	0.00	*0.68*

Source: Primary Survey, 2014.

Table 6.15. Farmers Selling their Produce by Level of Education and the Size of Land Holdings (in Percentages).

Size of Holding	Places of sale	Level of Education						
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others
Marginal	Co-operative society	50.00	65.38	76.47	68.00	50.00	76.92	100
	Market yard	3.85	0.00	11.76	12.00	50.00	15.38	0.00
	Local shops	46.15	34.62	11.76	20.00	0.00	7.69	0.00
Small	Co-operative society	75.00	100	66.67	61.54	50.00	100	100
	Market yard	0.00	0.00	8.33	15.38	50.00	0.00	0.00
	Local shops	25.00	0.00	25.00	23.08	0.00	0.00	0.00
Medium	Co-operative society	NA	100	NA	100	0.00	33.33	NA
	Market yard	NA	0.00	NA	0.00	100	66.67	NA
Large	Co-operative society	NA	NA	NA	0.00	NA	80.00	100
	Market yard	NA	NA	NA	0.00	NA	20.00	0.00
	Any other	NA	NA	NA	100	NA	0.00	0.00

Source: Primary Survey, 2014.

Table 6.16: Reasons for Selling Agricultural Produce at a Particular Place by Level of Education & Size of Holdings (in Percentages).

Size of land holdings	Reasons for selling in a particular place	Level of Education							
		Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	***Total %***
Marginal	Right price, Nearby market, Support price	96.15	92.31	88.235	100	100	100	100	*95.68*
	Any other reason	3.84	7.69	11.76	0.00	0.00	0.00	0.00	*4.27*
Small	Right price, Nearby market, Support price	75.00	100	75.00	69.23	50.00	100	100	*80.00*
	Any other reason	25.00	0.00	25.00	30.77	50.00	0.00	0.00	*20.00*
Medium	Right price, Nearby market, Support price	NA	100	NA	100	100	100	NA	*100*
Large	Right price, Nearby market, Support price	NA	NA	NA	100	NA	100	100	*100*
All	Right price, Nearby market, Support price	93.33	94.29	82.76	90.7	84.62	100	100	92.24
	Any other reason	6.67	5.71	17.24	9.3	15.38	0.00	0.00	7.75

Source: Primary Survey, 2014.

Table: 6.17: Response for Getting Right Agricultural Price or not by Level of Education and Size of Holdings (in Percentages).

Size of land holdings	Response	Level of Education							
		Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	***Total %***
Marginal	Yes	100.00	100.00	100.00	100.00	100.00	100.00	100.00	*100.00*
	No	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*0.00*
Small	Yes	100.00	100.00	100.00	100.00	100.00	100.00	100.00	*100.00*
	No	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*0.00*
Medium	Yes	NA	100.00	NA	100.00	100.00	100.00	NA	*100.00*
	No	NA	0.00	NA	0.00	0.00	0.00	NA	*0.00*
Large	Yes	NA	NA	NA	100.00	NA	100.00	100.00	*100.00*
	No	NA	NA	NA	0.00	NA	0.00	0.00	*0.00*

Source: Primary Survey, 2014.

Table 6.18: Awareness About Schemes by Level of Education and Size of Holdings (in Percentages).

Size of Holdings	Response	Level of Education							*Total %*
		Illiterate	**Primary**	**Middle**	**Secondary**	**Higher Secondary**	**Graduates and above**	**Others**	
Marginal	Aware	9.86	28.3	45.95	39.58	40.00	57.14	100	*30.83*
	Not aware	90.14	71.7	54.05	60.42	60.00	42.86	0.00	*69.16*
Small	Aware	50.00	25.00	33.33	46.15	75.00	80.00	100	*50.00*
	Not aware	50.00	75.00	66.67	53.85	25.00	20.00	0.00	*50.00*
Medium	Aware	NA	100	NA	75.00	0.00	66.67	NA	*66.66*
	Not aware	NA	0.00	NA	25.00	100	33.33	NA	*33.33*
Large	Aware	NA	NA	NA	50.00	NA	60.00	100	*63.63*
	Not aware	NA	NA	NA	50.00	NA	40.00	0.00	*27.27*
Al l	Aware	29.33	64.52	61.22	82.09	95.00	93.33	80.00	72.18
	Not aware	70.67	35.48	38.78	17.91	5.00	6.67	20.00	27.78

Source: Primary Survey, 2014.

Table 6.19 Obtaining Benefits of Schemes by Level of Education and Size of Holdings (in Percentages).

Size of Holdings	Response	Level of Education						
		Illiterate	Primary	Middle	Secondary	Higher Secondary	Graduates and above	Others
	Obtaining	9.85	28.30	45.94	39.58	40.00	57.14	50.00
	Not obtaining	90.14	71.69	54.05	60.41	60.00	42.85	50.00
Marginal	**Total**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
	Obtaining	50.00	25.00	33.33	46.15	75.00	80.00	50.00
	Not obtaining	50.00	75.00	66.66	53.84	25.00	20.00	50.00
Small	**Total**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
	Obtaining	NA	NA	NA	75.00	50.00	66.66	NA
	Not obtaining	NA	NA	NA	25.00	50.00	33.33	NA
Medium	**Total**	**NA**	**NA**	**NA**	**100.00**	**100.00**	**100.00**	**NA**
	Obtaining	NA	NA	NA	50.00	NA	60.00	100.00
	Not obtaining	NA	NA	NA	50.00	NA	40.00	0.00
Large	**Total**	**NA**	**NA**	**NA**	**100.00**	**NA**	**100.00**	**100.00**
	Obtaining	12.00	29.03	42.85	43.28	47.61	63.33	72.72
	Not obtaining	88.00	70.96	57.14	56.71	52.38	36.66	27.27
All	**Total**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Primary Survey, 2014.

Annexure II

Questionnaire

1. Name of the farmer :

   A. Address:

   B. Age: C. Sex:

   D. No of family members: E. Languages spoken at home

   F. Languages Known: G. Type of family: joint /nucleate:

2. Information regarding family members:

Sr. No.	Sex	Age	Education Formal	Education Informal	Relation with the farmer	Occupation	Nature of employment Job /work/study
1.							
2.							
3.							
4.							
5.							
6.							
7.							

3. What is the size of landholding?

- Below 1 hector
- 1 hector to below 4 hector
- 4 hactor to below 10 hector
- Above 10 hactor

4. What is the type of ownership of land?

a) Ancestral b) Bought c)Tenancy (Share cropping / fixed rent)

d) Leased

5. Are you cultivating without any break. Yes/ No.

6. How many crops do you cultivate during a year?

7. What is the total area available for cultivation?

8. Pattern of cultivation and use of vital inputs in farms by three different generations of Sample farmers

	Education level	Area under cultivation	Type of seeds used	Use of irrigation facilities	Use of fertilizers	Use of Manures	Use of human labour	Use of modern machines	Farm management system
Father									
Son									
Grand son									

9. How long are you there in farming activity?

10. Have you taken up farming with a passion or as a default/compulsion?

11. Are you trying for any other job?

12, Will you continue farming if you get a job.

13. Information about the use of vital inputs and cost of inputs in case of non food crops by Sample farmers.

Pattern of cultivation and the cost of inputs incurred by sample farmers in case of cultivation of non foodgrain crops.

		Types of input used and cost incurred on inputs									
Name of the Crop	Area under cultivation	seeds	irrigation	fertilizer	manuers	Human Labour	Pesticides & insecticides	Traditional equipments	Modern Equipments	Electricity	other
1.sugercane											
2.cashewnut											
3.coconut											
4. Aracanut											
5. Mango											
6. Banana											
7. pineapple											
8.Vegetables											
9.Other fruits											
10. oil palm											

Note: Cost incurred on various inputs is shown in brackets.

14. Information about use of vital inputs used and cost incurred on inputs by sample farmers in case of food crops.

Pattern of cultivation and the cost of inputs incurred by sample farmers in case cultivation of food crops.

Sr. No	Inputs used										
		Paddy		**Ragi**		Pulses		Groundnut		Others	
		Kharif	rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
1.	seeds										
2.	water										
3.	fertilizers										
4	manuers										
5.	Human labour										
6.	Traditional equipments										
7.	Modern equipments										
8.	Insecticides & Pesticides										
9.	Area under cultivation										

Note: Cost incurred on various inputs is shown in brackets.

15. What is your net monthly income from farming activity?

16. What are the other allied activities you undertake along with farming?

17. What is the income from allied activities?

18. What is the gross yield per hector?

19. What is the net return per hector?

20. Do you obtain finance for farming from any sources?

21. If yes what are the sources of finance?

a) Money lenders b) Commercial banks c) Co-operative societies

d) Any other sources.

22. What is the rate of interest charged by the different sources?

23. When and how do you make the repayment of loans?

24. Where do you sell your agricultural output?

a) Co-operative societies b) Market yards c) Local shops d) Money lenders e) Open market f) Contractor / Corporate Buyer.

25 Do you get the right price for your product.

26. Do you find any changes in cost and returns from farming over the years? If yes what are those changes.

27. Are you aware about the schemes provided by the government for the farmers from time to time.

28. Have you taken any benefit of such schemes? If yes specify.

29. Have you introduced any changes in farming over the last twenty years? If yes What are those changes?

30. Are you making use of internet to obtain information pertaining to farming?

31. Do you cultivate food crops**?**

32. If no why you do not cultivate food crops.

33. Do you cultivate non- food crops?

34. If no why you do not cultivate non-food crops.

35. What are your views about practicing agriculture as an occupation?

36. What are your suggestions for improving agriculture?