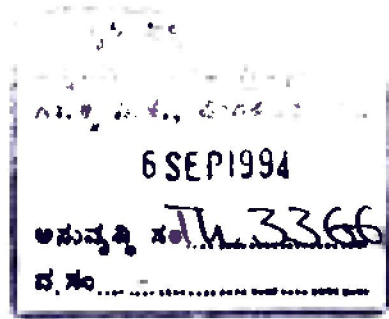


FARMERS PURSUING ORGANIC FARMING : SOME CASE STUDIES

RAMESH K. S.

**DEPARTMENT OF AGRICULTURAL EXTENSION
UNIVERSITY OF AGRICULTURAL SCIENCES
BANGALORE**

1994



FARMERS PURSUING ORGANIC FARMING : SOME CASE STUDIES

RAMESH K S.

Thesis submitted to the
University of Agricultural Sciences, Bangalore
in partial fulfilment of the requirements
for the award of the Degree of
Master of Science (AGRICULTURE)
in
AGRICULTURAL EXTENSION

BANGALORE

JULY 1994

DEDICATED AFFECTIONATELY TO

MY

BELOVED PARENTS

AND

SISTER SEEMA

DEPARTMENT OF AGRICULTURAL EXTENSION
UNIVERSITY OF AGRICULTURAL SCIENCES, BANGALORE.

CERTIFICATE

This is to certify that the thesis entitled "FARMERS PURSUING ORGANIC FARMING: SOME CASE STUDIES", submitted by K. S. RAMESH for the degree of Master of Science in Agriculture in Agricultural Extension of the University of Agricultural Sciences, Bangalore, is a record of research work done by him during the period of his study in this University under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.


(K. M. Jayaramaiah)

Bangalore

PROFESSOR OF AGRICULTURAL EXTENSION

&

Date: 20.7.84

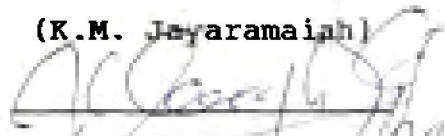
Chairman, Advisory Committee

Approved by

CHAIRMAN


(K.M. Jayaramaiah)

MEMBERS: 1.


(V. Veerabhadraiah)

2.


(H. V. Nanjappa)

3.


(Venkataram)

"ACKNOWLEDGEMENT"

It is out of my knowledge to express in words my deepest sense of gratitude and indebtedness to **Dr. K. M. Jayaramaiah**, Professor of Agricultural extension, Department of Agricultural extension; co-ordinator, National center for wasteland development and Ecological board and Administrative officer, **G.K.V.K., U.A.S,** Bangalore and the Chairman of my advisory Committee for timely advice, critical comments, constant encouragement, valuable guidance and suggestions which were the source of inspiration in successfully completing my study. I feel it was a great privilege to associate him during my Post-graduate programme.

I'm equally thankful to **Dr. V. Veerabhadraiah**, Professor of Agricultural extension, Department of Agricultural extension, **Dr. H.V. Nanjappa**, Associate Professor of Agronomy, **Mr. Venkataram**, Associate professor of Statistics for their keen interest and valuable suggestions as members of my advisory Committee.

I'm grateful to the kind of co-operation and valuable information given by the farmers pursuing organic farming namely **Mr. Narayana Reddy**, of Bangalore, **Mr. A.P. Chandrashekar** of Mysore, **Mr. Ramesh Joshi**, **Mr. Bharna Gaudra**, **Mr. Pradeep Tapas** of Gadag, **Mr. Purushottama Rao** of Thirthahalli, Shimoga, without whose help the thesis would have been a dream.

I'm extremely thankful to my friend **Mr. Dinesh** for having spared his Camera through out my study period.

I'm equally thankful to my friends **A.S. Anand** and **ArunKumar** for accompanying me to Gadag during my study and sparing valuable time and literature regarding organic farming.

I'm very much thankful to my friends N. Harish, B.C. Nagendra, Purushottam, Dr. Srinivasa, Smt. Patamma and members of the family and others who have extended all their co-operation in completion of this thesis being the main source of motivation to complete the work soon.

I owe all my success to my father Sri. Srinivasamurthy, mother Smt. K.S. Jayalakshmi, brother Sri. K.S. Venkatesh, sister-in-law Smt. Seethalakshmi and special sister Seema whose kind co-operation and valuable suggestions made me to aspire for and achieve the goal.

I also thank Mr. Arvind of Fastrack Computers, Rajajinagar, Bangalore-10, for having typed this thesis neatly.

Bangalore.

Date 21.7.1994.


(RAMESH K. S.)

CONTENTS

CHAPTER	TITLE	PAGE No.
I	INTRODUCTION	1
II	REVIEW OF LITERATURE	7
III	METHODOLOGY	25
IV	RESULTS	30
V	DISCUSSION	129
VI	SUMMARY	181
VII	REFERENCES	200
	APPENDICES	204

LIST OF PLATES

PLATE NO.	TITLE	BETWEEN PAGES
1.	FARMING AMIDST WEEDS :MR.NARAYANA REDDY INTERCROPPING CURRY LEAVES AND COFFEE UNDER COCONUT. NO WEEDING DONE.	36-37
2.	CROP RESIDUEMANAGEMENT :CROP WASTES PUT BACK TO PLANT'S BASE.	36-37
3.	MR.PURUSHOTHAMA RAO SHOWING KRISHINIVAS-I COMPOST PIT.	65-66
4.	A LABOURER DEMONSTRATING HOW TO PREPARE LIQUID MANURE.	65-66
5.	INTERCROPPING OF COCONUT-BANANA-TURMERIC IN A.P. CHANDRASHEKAR'S FARM.	80-81
6.	CATTLE-MAIN SOURCE OF ORGANIC MANURE THROUGH COWDUNG. VERMICOMPOST PIT- AN ALTERNATIVE ORGANIC MANURE SOURCE.	80-81
7A.	MR. SAMEERA, SON OF VITTALARAO SHOWING THE FERTIGATION DRUM DESIGNED BY HIM.	103-104
7B.	METAL DRUM ATTACHED TO FERTIGATION DRUM TO FILTER CROP RESIDUES.	103-104
8.	MIXED CROPPING OF CHILLY AND COTTON IN DRYLAND FARM OF MR. RAMESH JOSHI.	123-124

INTRODUCTION

I. INTRODUCTION:

"Kritam naasti Churbhiksham ("Famine vanishes through farming") thus said the Vedas. Since ages agriculture has been the life of the Indian people, meeting the main basic need of food, clothing and shelter. Agriculture has been the back bone of our economy. Our Country has a golden history of ancient agriculture and has the credit of having contributed ancient agricultural practices to other parts of the world. Over the years, with the advancement in science, a number of changes have been introduced in the farming system per say. Changes are evident at the various production levels of agriculture from sowing to harvesting. With rapid industrialisation and urbanisation, problems of population explosion too increased. In order to meet the food needs of the alarmingly growing population, "Green revolution" came as an answer, with the introduction of high yielding varieties of various kinds of crops. The objective of increased food production was emphasised through increased mechanisation, increased water exploitation through major dams and ground water exploitation by irrigation schemes, use of large amount of chemicals as fertilizers and pesticides and encouragement of cash crops to meet the market need.

The major achievements of the Green revolution were increased production and productivity in a shorter duration. People engaged in agribusiness reaped high profits and

burcaucrats gained more powers. But the farmers were forced to become heavily dependant on purchased external inputs like seeds, fertilizers, pesticides, fungicides, weedicides, fossilfuels, electricity, machinaries and technical knowledge of the experts. As a result, farmers were entangled to go in for capital intensive agriculture which went beyond the control of the farmers due to excessive dependency on outside factors.

Over the years, increased use of pesticides has adversely affected the environment and has caused serious ill effects to man-animal and plant health. Research reports show that the residual contents of pesticides in various food items are above the permissible limits. Some of the ill effects perceived in modern agriculture over the years were :

1. Loss of sustainability of Soils
2. Increased costs
3. Increased resistance of weeds and insects to weedicides and pesticides
4. Environmental hazards
5. Loss of plant genetic viability
6. Acid rains, green house effect, ozone layer depletion
7. External dependency of farmers to technology and loans

The limitations of modern agriculture have been recognised by farmers and scientists all over the world.

Efforts are being made to identify alternative farming methods which are ecologically sound, viable and sustainable. Such efforts made by farmers abroad, to identify alternative farming methods, which are less dependant on purchased inputs has lead to what is called "organic movement". It is being reported that farmers who have adopted such alternative farming methods abroad are getting yields on par with the modern agriculture with out the major inputs of modern agriculture namely chemical fertilizers and insecticides and use of machinery.'

'Efforts made by Fukuoka of Japan (1978) to develop natural farming principles by his experiments in his farm over a number of years needs special mention here. Similar such efforts have been made by a number of farmers in different parts of the country to develop alternative farming methods of their own in their farm. Experiments and success of such farmers is unique and number of such farmers is only a few. Their efforts are being named differently as, 'organic farming', 'natural farming', 'eco-farming', 'ecological agriculture', 'sustainable agriculture', 'permanent agriculture', 'permaculture,' 'bio-dynamic agriculture' and the like.

There is no regular and clear documentation of the efforts made by such farmers. Not much literature is available to farmers about such practices. Farmers lack

ready-made packages to jump in to such alternative methods. Their fear and doubts about such efforts are largely unanswered.

Proper efforts are not being made to study the experiences of such farmers, the pros and cons of the alternatives adopted by them.

Thus an effort is being made to study and report the experiences of selected farmers in different parts of Karnataka who have pursued organic farming over a number of years.

This study was conducted with the following specific objectives.

1.1 Specific objectives:

- (1) To identify the factors which motivated the farmers to take up organic farming,
- (2) To know the different alternative farm practices adopted by the farmers pursuing organic farming,
- (3) To understand the constraints faced by the farmers during transition.
- (4) To observe the benefits of organic farming, and
- (5) To elicit suggestions from practicing farmers for initiating organic farming with other farmers.

1.2 Scope of the study:

The present investigation is a study which reports the experiences of selected farmers pursuing organic farming in different parts of Karnataka. This is of help to gain some understanding about the farmers experiences with respect to organic farming practices they have adopted. It may serve as a good source of information for further research and extension work.

1.3 Limitations of the study:

Due to the limitations of time and money, the study was confined to only five farmers in different parts of Karnataka. As participant observation method is used to collect the information, the data gathered were limited to the informal discussion with the farmers during the study period.

1.4 Definitions of the terms used in the study:

1.4.1 Traditional Agriculture:

A method of farming which emphasizes on the use of traditional and age old agricultural knowledge and technology in the given locality.

1.4.2 Conventional or Modern agriculture (green revolution):

A method of farming which emphasizes on maximisation of production through the use of external inputs such as seeds, fertilizers, pesticides and herbicides, mechanisation and exploitation of ground and other water sources.

1.4.3 Organic Farming: A method of farming which emphasizes on the use of organic products devoid of the use of chemicals, minimum tillage, selective weeding, crop rotations and crop diversification.

1.5 PRESENTATION OF THE STUDY

A brief introduction, objectives of the study, scope and limitations of the study and the definition of the terms used in the study are dealt in first chapter - 'Introduction'. Chapter two deals with review of literature pertaining to the study. Third Chapter is devoted to the methodology used in the process of investigation. Fourth chapter deals with reporting of the results of different cases studied. Chapter five deals with discussion of the results. Chapter six deals with summary of the findings followed by references and appendices.

REVIEW OF LITERATURE

II REVIEW OF LITERATURE

The review of literature is presented in this chapter under the following headings.

- 2.1 Concept of organic farming and related aspects
- 2.2 Factors motivating farmers to shift over to organic farming
- 2.3 Constraints encountered by farmers during transition
- 2.4 Adoption of alternative farm practices by farmers
- 2.5 Benefits of organic farming
- 2.6 Economics of organic farming
- 2.7 Suggestions by practicing farmers for promotion of 'organic farming

2.1 Concept of organic farming and related aspects:

According to a report of Agriculture Man-Ecology (1991) "Biodynamic agriculture emphasizes biological process as well as dynamic process (example: rhythms) form the basis for agriculture and should be stimulated accordingly."

According to a study conducted by Agriculture-Man-Ecology programme (1991) on the transitional experiences of twelve organic farmers in Tamilnadu, Kerala and Karnataka revealed that, on an average, the farmers had seven to ten years of experience with organic farming. Soil fertility improved, yields increased during transition and even surpassed conventional levels. Changes in soil fertility management were well prepared and all at once or gradually

chemical fertilizers were replaced by nitrogen fixing crops, green manures, animal manures, tank silt, agro industrial by products or wastes. Pest control measures were mainly derived from traditional farming.

The study conducted by Agriculture-Man: Ecology programme (1991) reported on the relative characters of system variables of three farming systems in India. Productivity of ecological agriculture is higher as that of conventional agriculture where as it is medium in case of traditional agriculture. Sustainability of both ecological and traditional agriculture are high but low in case of conventional agriculture.

A report by Agriculture-Man-Ecology (1992) defined, Ecological agriculture as that which seeks to optimise the use of local resources through creating complex and diverse farms, aiming at a stable, growing and long lasting production level."

"Biological agriculture is a system of farming based on the principle that agriculture is, first and foremost a biological science, that it is applied biology. The main principles behind it are, (i) it concentrates on building up the fertility of the soil so that crops take the nutrients they need from the steady turnover with in the soil, (ii) relations with the natural biological system are almost entirely cyclical, (iii) where the loss of nutrients from a farm requires the use of imported fertilizers, these are

usually applied in the form of relatively insoluble compounds, such as crushed rock phosphate, which are slowly broken down by the natural process within the soil. The principle is "to feed the soil" and its life rather than to present the crops with large amounts of soluble nutrients, (iv) there is an indivisible connection between the health of the soil and that of the crops grown on it and of the animals and people who consume these crops (Anonymous, 1978).

"Sustainable agriculture is one which makes use of low cost inputs, less amount of chemical fertilizers, maintain soil fertility and ecological harmony. Further, these practices should maintain or increase the biological productivity" (Anonymous, 1991).

The following are the basic tenets of organic farming :

- (a) Nature is capital, (b) Soil is the source of all life,
- (c) Feed the soil not the plants (d) Diversify the systems rather than go for monocropping. (e) Total independence from energy intensive inputs and (f) Ensuring ecological harmony and encouraging antimaterialism (Anonymous, 1992).

Bill (1991) reported "Permaculture is the conscious design and maintenance of agriculturally productive ecosystem which have the diversity, stability and resilience of landscape and people providing their food, energy, shelter and other material and non-material needs in a sustainable

way. The philosophy behind permaculture is one of working with rather than against nature".

Edwards (1987) stated that "sustainable agriculture is integrated system of agricultural production that is less dependent on high inputs of energy and synthetic chemicals and more dependent on intensive management rather than conventional monocultural systems"

The Food and Agricultural Organisation (1989) stated that "sustainable agriculture should involve the successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of the environment and concerning natural resources.

Fukuoka (1978) developed four principles of natural farming : (1) no cultivation (2) no chemical fertilizer or prepared compost (3) no weeding by tillage or herbicides and (4) no dependence on chemicals.

Gunjal (1991) reported that organic farming is very much native to our country, who ever tries to write a history of organic farming will have to refer to India and China. The farmers of these two large countries are known as farmers of forty centuries and it is organic farming that sustained Indian agriculture. Organic farming is our own product and contribution to the world.

Lawrence (1977) reported that "organic gardening is practiced by a gardener who has given up chemical

fertilizers, pesticides, fungicides & herbicides, some change an ethical grounds to stop pollution harmful to birds, businessmen, others to save money".

The National Research Council of the United States (1985) cites the following practices as components of alternative agricultural system:

- (1) Crop rotations that mitigate weed, disease, insect and other pest problems increase available soil nitrogen, reduce the abuse of fertilizer and in conjunction with conservation tillage practices, reduce soil erosion
- (2) Integrated pest management that reduces the need for pesticides through crop rotations, weather monitoring use of resistant cultivars, timing of planting and biological pest control
- (3) Management system to control weed and improve plant health
- (4) soil and water conservation and
- (5) animal production system with stress on disease prevention

Oelhaf (1978) reported four main types of organic agriculture are represented on commercial scale farms in U.S.A. and Europe namely, 'organic or biological', 'biodynamic, french intensive' and 'ecological'. The term "natural" is often suggested but is associated with unprocessed food, not with the farming method, perhaps the

word "biological" would be better. In practice, these words are used interchangeably with commonly used term "organic".

Ramamurthy (1990) pointed that modern organic farming had its origin in England where a type of agriculture emphasising feeding the soil through compost was introduced by Sir. Albert Howard in the 1930's. The work has been carried on by Lady Eve Balfour and the soil association of India.

Stanhill (1990) reported that there are thirteen different names for organic agriculture and there are eight different ideologies, each with its specific cultivation methods.

Stinner (1987) reported that "sustainable agriculture is a management strategy which helps the producer to choose hybrids and varieties, soil fertility programmes and the cultural practices, packages including crop rotations, tillage and crop sequences to reduce the cost of purchased inputs, minimise the impact of the system on the immediate and of off farm environment and provide a sustained level of production and profit from farming."

According to Swaminathan (1991) there are nine basic principles promoting ecological agriculture namely, Land, Water, Energy, Nutrient supply, Genetic diversity, pest management, post harvest system, system approach location specific research and development.

Swaminathan (1991) indicates a number of suggestions for small farmers to practice sustainability, 1) Research (A synthesis between traditional and modern), 2) Extension (Small farmers should see results), 3) Improved seeds (production at local level), 4) Credit, 5) Market and prices (Government role is more here), 6) Improvement of infrastructure (irrigation, road, storage), 7) Integrated pest management, 8) Releasing water, 9) Tree planting, 10) Livestock and 11) Education and training.

The United States Department of Agriculture (1980) defined organic farming as a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock additives. To the maximum extent possible, organic farming system relay on crop rotations, crop residues, animal manures, legumes, green manures, off farm organic wastes, mechanical cultivations, mineral bearing rocks and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects, weeds and other pests.

The United States National Academy of Science (1985) stated that natural farming is not a single method rather a variety of techniques which are aimed at maintaining and preserving the environment by protecting the animal health by preventing or decreasing the use of toxic farm chemicals.

Venkataramani (1991) reported that "sustainable agriculture is that form of farming which produces sufficient food to meet the needs of the present generation without eroding the ecological assets and the productivity of the life supporting system of the future generation."

Venkataramani (1991) reported that the shift from chemical to biological agriculture should be gradual. A sudden switch over could spell disaster and discourage farmers from taking to this course. At least seven years will be needed for the transition and during the transition, and during interim years the farmers could build up a sufficient organic base to fertilize the fields and improve the productivity of the soil. Once the state of ecological balance has been attained and there are a good number of organisms to check the expression of pests and pathogens, crop yields of higher order can be ensured. Cost of cultivation could be brought down substantially as many farm grown inputs can be integrated efficiently in the farming system. The adoption of ecological farming is not as simple as one may presume. It is highly knowledge intensive, labour oriented and complex system of integrating several organic recycling processes. A high degree of motivation a firm commitment and innovative ability seem to make successful ecological farmers.

2.2 Factors motivating farmers to shift to organic farming.

Bafna (1991) said, "I started farming in 1960. In the initial years yields were high as I used more and more of fertilizers and chemicals. But yields gradually reduced. Many Sapota trees collapsed. Extension workers suggestions too failed. I stopped applying chemicals and fertilizers completely and shifted to natural farming".

Bharmagoudra (1991) reported "After my studies I practiced modern Agriculture. In the beginning yields were high. But crops suffered from disease insect and pest attack. Income drastically got reduced. At that time I got inspired by observing the crops grown by children at backyard free from insect attack and diseases. Later, I read, about Masanobu Fukuoka's farming in "Sudha" a local weekly magazine and took guidance from practicing farmers".

Bhaskar and Ashok (1993) shifted to natural farming because modern agricultural practices had some defects (i) dependence on external input (ii) all types of insects are killed by chemical spray (iii) lesser gross profits (iv) no guarantee of yield (v) time consuming because of various cultural practices (vi) chemical fertilizer, usage reduced soil fertility, and (vii) low cost benefit ratio.

Fukuoka (1978) of Japan stated: "I was aiming at a pleasant natural way of farming. How about not doing that? How about not doing this"- that was my way of thinking. I

ultimately reached the conclusion that there was no need to plow, no need to apply fertilizer, no need to make compost, no need to use insecticide. When you get right down to it, there are few agricultural practices that are really necessary."

Nagaraj (1991) reported, "when I stated practicing modern agriculture resigning medical officer post, I thought I would be a model progressive farmer. But my DCH-32 cotton crop failed due to pest attack in spite of chemical control & fertilizer application. Mulberry crops too failed. My crop loans mounted. I was influenced by Fukuoka's "one straw revolution" and made visits to practicing farmers".

Raju (1991) was influenced by the practicing farmers & the writings of Mr. Fukuoka, the author of the book-"one straw revolution."

Shantimoole (1991) was inspired by his father to go in for green manuring areca, when his areca, cocoa crops failed inspite of following modern practices. In the due course he was influenced by Fukuoka's writings.

Vivek and Julie (1991) reported that there should not be dependence on factories for seeds and fertilizers. To get out of the strong fist of industries one should plan to go for natural farming.

2.3 Constraints encountered by farmers during transition:

Shantimoole (1991) reported that he has not found alternative solution organically to control Bunchy top of Banana.

Shivaram (1991) felt that farmers basically lack information about organic or natural farming. There are no ready packages for growing crops, applying manure, controlling insects, pests and diseases. Organic farming is not a method. It is a way. It has no strict obligations and formalities. Here, there are different formulae for different crops. Farmers must learn it from their own experience and examination. Even Fukuoka has warned that imitation won't find place in natural farming. Before one takes up organic farming, he needs to know the pros and cons of both chemical and organic farming methods. He should make visits to practicing farmers, exchange ideas and also make efforts to read relevant literature.

Vivek and Julie (1991) reported that they are not getting seeds suitable to local situation. They lack good markets to their produce. They face problem of termites. They also lack native seed drills. Initially they received lot of comments and blames from neighbours.

2.4 Adoption of different farm practices by farmers

Baphna (1992) reported about his organic farming experiences in growing sapota: "I started using chemical fertilizer in 1950 along with insecticides. My whole plantation became very weak and about fifty trees collapsed. On the Contrary the yield decreased year after year. The cost of cultivation increased many folds. I stopped completely using any chemical fertilizer or insecticide from 1977 onwards. I stopped any kind of cultivation further and started giving only organic fertilizers such as oil cakes and more organic materials as mulching to trees. The transition period in my case was six years. After 3-4 years a change in plantation appeared. Gradually the plantation became more healthy and fungus totally disappeared.

Bhaskar and Ashok (1993) reported: "In 14 acres of Kalpavriksha farm and 23 acres of Sangvi farm we grow wheat, rice, vegetables, coconut, papaya, banana, groundnut, guava, pepper and other seasonal crops from twenty years. I left applying chemicals gradually. Apply Cowdung, poultry manure, home and town compost to maintain soil fertility. We do not use any external inputs to control insect pests and diseases and are 100 percent successful in controlling them. Weeds are not uprooted as they protect the moisture in the soil by preventing strong sunlight to fall on soil and decompose to become additional manure. Use natural biocontrol methods to control pest attack. Every pest would be a prey to another and

not all such pests would be harmful to the plants. Pests like spiders, red ants, some birds, etc... do not harm the plants but they eat away harmful pests and rodents.

Casmir (1991) felt that vermicastings gave good results in controlling quick-wilt disease of black pepper.

Nagaraj (1991) Substituted N:P:K. with compost from cowdung, grass and dry leaves. Biospray of Neem, Glyricidia are successful against pests. Cow's or Ox's urine Spray has served as a good source of growth promotor or control of insect and disease. Application of decayed material of Glyricidia, touchme not weed and transplanting paddy on fullmoon day, spraying 10 percent cow's urine solution once in fifteen days has helped to get 680 kgs of paddy.

Raju (1991) allowed earthworm to grow in his soil by stopping application of chemical fertilizers. He stopped plowing, weeding, application of insecticides and started using local varieties instead of high yielding Varieties.

Shantimoole (1991) reported that his main crops are Areca, coconut, cocoa, pepper, vegetables, applied gliricidia for vegetables and got good crop. He dumped dry leaves at plant base. Grass is not up rooted but cut and applied to plant's base, similar to crop residues of areca and coconut. Mud from forest and tanks were mixed and applied to plants. Applied neemcake for slow wilt of pepper. Mixture of garlic, sesame

helped to control yellow leaf disease of areca. Grow's vegetables as mixed intercrops

Shivarama (1993) applied lime solution to wilt disease of black pepper and beetle leaves and found that yields were better than his neighbouring farmers.

Vivek and Julie (1991) reported about number of alternatives they have experimented in their farm. They have tried garlic solution against aphids, fungal and bacterial attack on turmeric. (2kgs garlic crushed and dipped in kerosene. Add one fist of chilly seeds and Coriander seeds and leave it overnight, prepare soap solution using half 50l bar soap in half litre water. Mix it with earlier preparation and filter it to get mother solution. one litre of this can be diluted for spraying with 60-70 litres of water), garlic solution is successful against Cotton and fruit trees curl but growing protective crop is much better. Nutrients are supplied using Cowdung, leaf compost, grass crushed and dried sugarcane, Glyricidia, neem leaves, pulse plants and mulch crops such as-red gram. horse gram. and Ground nut. Growing of oliander, garlic, jowar, tomato, Red gram controlled rotting and large problem in turmeric. Growing intercrops such as Coriander, garlic, onion controls many insects and diseases. Seeds for propagation are mixed with 300 gms of sand (for 1kg of seeds) and one inch larger of sand is spread over it.

2.5 Benefits of organic farming

Ganapathi (1991) reported that though it took some years to give steady returns and it is economically more advantageous than conventional agriculture which relies more on purchased inputs. we have the gratifying feeling that the produce we get are not poisoned by the use of fertilizers and pesticides.

Kate (1991) of Wardha has measured the requirement of water by coconut trees shows, one coconut tree requires 140 to 150 liters of water a day in the conventional method compared to 40 to 50 liters in drip irrigation method and 15 to 20 liters in natural farming method.

Manindrapal (1991) manager of Gloria land, the 40 hectare organic farm of Sri Aurobindo Ashram, Pondicherry reported "Ecological farming is a self reliant method and it has to be an integrated system. It is a knowledge practice, and one has constantly to keep pace with dynamics of nature to increase the biological productivity of the soil. Highly efficient method of organic recycling and crop protection using indigenous practices of using natural products have been yielding good results."

Prafullachandra (1992) reported that he has been raising twenty fifth ratoon sugarcane crop by allowing sugarcane trash to be converted into rich organic manure in the field it self,

instead of burning, he feels that this type of organic farming, (i) Saves yearly cultivation (ii) Spreading of trash over the field and converting it as manure provides a natural cover to the soil, increases soil profile of land, prevents soil erosion, develops rich earthworm population which is rare in tropical soil. (iii) It has reduced intake of water and avoids water evaporation, (iv) Thus helps to promote plant growth and reduce weed growth, (v) Over the years percentage of organic carbon and organic matter has increased in the field from 40-80 percent.

Raju (1991) reported that with little experience I can say that natural farming provides better health and happiness to those who practice it. This paves way for better life".

Shivarama (1993) Says "Now my farm pleases your eyes and mind. There is naturality in my farm. My areca and coconut sustain inspite of delayed rains, water holding capacity of soil has increased. Number of trees have increased. Earthworms are plenty in my soil yielding productive and healthy crop.

Tangaswamy (1991) reported that Organic farming yields results comparable to conventional agriculture. It has improved the soil health and the crops grown with rich organic manure resist pest and disease attack. It is an ecologically sound and sustainable way of growing more food.

Vivek and Julie (1993) reported that the average yields of ragi in the initial year of switching over to organic farming was two quintals per acre and it increased upto four quintals in the fourth year. Paddy Yields increased to fourteen quintals from five quintals in the Second year and got reduced to four quintals in the third year.

2.6 Suggestions by practicing farmers for promotion of organic farming by other farmers

Bhaskar and Ashok (1993) would like to appeal to the government with the following suggestions. (1) Stop wasting crores on subsidies for fertilizers and pesticides. (2) Save precious foreign exchange by doing away with plants producing fertilizers and pesticides and stopping import of hybrid seeds. (3) Propagate use of natural seeds of local varieties. (4) Give subsidy for biogas plants, water pumps, electricity and pipes. (5) Popularise biogas plants in cities and towns too which will (a) reduce load on sewage system (b) meet requirement of domestic cooking gas and (c) supply rich slurry as manure for farming. (6) Stop breaking of food chain by banning slaughter of cow, an important link in this chain.

Shantimoole (1993) opened that in natural farming incidence of pest is only 25 percent We can control them by biosprays. In the initial years it may be difficult but later expenses are less. A wise farmer should invest less and get more. If the crop fail, the farmer may not be in a position to repay debts if he invests more.

Vivek and Julie (1993) felt that every farmer should allocate some part of their lands to non-chemical farming. He should make use of his common sense & experiment. (for those who suspect it) If you can sustain reduced crop yields, for 2-3 years, if not in sequence, can completely switch over to organic farming".

METHODOLOGY

III METHODOLOGY

The present investigation is an explorative study which reports the experiences of selected farmers persuing organic farming in different parts of Karnataka. This is of help to gain some understanding with respect to organic farming practices they have adopted. It may serve as a good source of information for further research and extension work.

3.1 Locale of the Study:

The study was conducted in the State of Karnataka during 1994. A list of 25 farmers persuing organic farming for more than five years in different districts of Karnataka was prepared with the help of magazines and a voluntary organisation called CHINTANABALAGA, an organisation formed by students and teachers of the University of Agricultural Sciences, G.K.V.K. Bangalore., who are interested in alternative farming technologies like organic farming. Letters were sent to each of the farmers address requesting them to co-operate for non-participant observation in their respective farms. Five farmers who were willing to allow for non-participant observation responded communicating dates to visit. These five farmers were located in five different districts namely Bangalore, Mysore, Dharwad, Shimoga and Dakshina Kannada.

The farmers who expressed their willingness to Co-operate were selected for the study and they are as follows.

- (1) Mr. Narayana Reddy L.
Sorahunse Village
Bangalore South taluk
- (2) Mr. Purushothama Rao
Melina Kuruvalli Village
Thirthahalli taluk
Shimoga district
- (3) Mr. A.P. Chandrashekar
Kālalvadi Village
Udubur Post
Mysore taluk
Mysore district.
- (4) Mr. Vittala Rao. E.
Kinya Village
Ullal Post
Mangalore taluk
Dakshina Kannada district
- (5) Mr. Ramesh Joshi
Yalavatti Village
Shirahatti taluk
Dharwad district

3.2 Tools Utilized For Collection of Information:

As case study method was used, non-participant observation technique was used in collecting the information.

No structured schedule was used for collecting the information. Keeping the objectives in mind, data were collected by informal discussion with the farmers on selected dimensions. Appropriate photographs were taken.

3.3 The Dimensions Proposed to be Studied:

Information was collected on the following main and sub dimensions apart from collecting general information about farmers.

A. Motivation

(i) Economic factors

- (a) Cost of inputs
- (b) Financial resources
- (c) Cost benefit ratio

(ii) Situational factors

- (a) Soil condition of the farm
- (b) Farm environment
- (c) Availability of inputs
- (d) Influence of friends
- (e) Mass media influence

(iii) Psychological factors

- (a) Achievement orientation of farmers
- (b) General attitude towards modern agriculture
- (c) Deferred gratification

(iv) Personal factors

- (a) Aspiration of farmers
- (b) Value orientation of farmers
- (c) Scientific orientation of farmers

B. Cropping pattern

- (a) Crop variety
- (b) Mixed crops
- (c) Intercrops
- (d) Cropping sequence

C. Farm practices

- (a) Method of soil fertility maintenance
- (b) Pest control measures
- (c) Choosing other farm practices

D. Constraints during transition**(i) Economic Constraints:**

- (a) Financial assistance
- (b) Reduction in income
- (c) Crop loss
- (d) Delayed yields
- (e) Marketing problems

(ii) Technical Constraints:

- (a) Difficulty in selection of appropriate alternatives
- (b) Lack of timely information
- (c) Co-operation of Scientists

(iii) Other Constraints:

- (a) Confidence loss
- (b) Newness of practice
- (c) Discouragement from family members and others

E. Benefits

- (a) Input cost reduction
- (b) Soil fertility improvement
- (c) Labour saving
- (d) Employment generation
- (e) Yield improvement
- (f) Quality of output
- (g) Income

Since case study approach was utilized in this study, only descriptive analysis is resorted to in the investigation, in addition to percentages.

RESULTS

IV RESULTS

4.1 CASE-1: L. NARAYANA REDDY

4.1.1 General Information

Mr. Narayana Reddy is a 57 years old farmer practicing organic farming at sorahunse Village, near Varthur, Bangalore South taluk of Karnataka State. He has completed intermediate education. There are eight members in the joint family of Mr.Reddy. Mrs. Saroja is his wife. He has three sons namely Manjunath, Nityananada and Sairam. Mr. Manjunath and Mr. Nityananda are married.

Mr.Reddy is found to have developed strong love for nature and great concern for ecological sustainability. He found to having developed philosophical attitude of looking at farm. He believes in interdependence of various factor in nature. He feels that for a farm, soil, plants, animals and human beings are like four pillars of a table, all are being equally important. He reports that he cares for the totality of the farm ecosystem and takes care to see that the various farm activities he takes up do not bring about any imbalance in the ecosystem.

He seems to possess low levels of economic aspiration. He reports that he cares much for soil and plant health than maximising crop yields. He strongly emphasizes that he would never try using just a small quantity of inorganic

fertilizers to see if he could get an yield increase to gain monetary profits. He feels that organic farming has taken him closer to religion, that has made him feel less selfish. He has great respect for Indian culture. He has faith in making a living free from hateracy, jealousy and other bad qualities which demoralise the human beings. He believes in hardwork and dedication to farmwork.

Mr. Reddy has good mass media exposure. He is a life member to various Agricultural journals like Adikepatrike, spice India and Raita horata. He is a regular reader of daily news' paper. He listens to radio programme and watches T.V. programmes often.

He has good organisational participation. (1) He is a consultant for Krishna Krihshi an alternative agricultural teaching center at Gadag. He makes regular visits to give consultation for two ~~d~~ays every month. (2) He is a member of "Dharitri", a study circle of organic farmers at Dharwad. It is situated near Hulikoti, close by to 'Krishna Krishi.' (3) He attends the workshops organised by A.M.E. (Agriculture-Man-Ecology) programme of Pandicherry regularly to share his experience. A.M.E. is an organisation serving the purpose of training agricultural extension workers, non-governmental organisations and grossroots workers about ecological agriculture. (4) He holds workshops on organic farming at the training Center for youth run by Dharmasthala Temple of

Dakshina Kannada district. (5) He is an active member of organic farmers group called 'Kutumbum' of Tamilnadu, which works for wasteland development and afforestation and also acts as network of organic farming families.

He attends many Conferences and Seminars abroad on Sustainable agriculture. Mr.Reddy has participated as a resourceperson in the Seminar on low external input agriculture held at Netherlands being invited by A.M.E. during December 1990. He was also invited to European countries as a resource person by a group of NGOs to present a Seminar on sustainable development during April 1992.

Mr. Reddy started farming independently from 1975 onwards in two acres of land which he received as ancestral share from his father. In the beginning, Mr.Reddy was greatly influenced by Green Revolution. He was soon recognized by the farming community for his achievement in getting highest yields in what ever the crop he use to grow. Even state Government honoured him with Rs.3000 cash prize for growing 23 quintals of ragi in dryland. But Reddy was not happy with all his achievements. He felt farming was not economical. He was thinking of selling off his lands as expenses for tractor plowing, fertilizers and pesticides were too high and net returns remained low, though he was successively elected as the most progressive farmer in the surrounding villages for continuous three years.

Mr.Reddy gave a detailed information on why he left use of chemical and switched over to organic farming. Mr.Reddy use to receive a number of guests before he switched over to organic farming too. This is in part, due to nearness of his farm to Sri Saibaba's Ashrama at Whitefield. The Asharam is popular with foreigners. An American man named Alwin Drucker who works with the Eslan institute in California and who came to India to visit Saibaba's Ashram. became his friend in 1982 and became his guest. When Mr.Reddy told Mr.Drucker that, he was planning to give up farming as it was not profitable, Mr.Drucker advised him to go for farming with out fertilizers and pesticides ie., do farming organically. Mr. Reddy said he switched over to organic farming to honour the friendship in 1982. Mr.Reddy remembers Mr. Drucker a lot, for the kind of advice and financial help given to him in the initial years of transition where yields were suddenly lowered due to reduced application of chemical fertilizer and insecticides.

Mr. Reddy reported that many philosophical, theoretical and economic reasons motivated him to switch over to organic farming. "Economy" is an important factor that motivated him to continue with organic farming.

Economy alone, however, do not account for all that motivated him. Mr.Reddy does farming on some theoretical

framework also. When he looks for the ways to improve yields He strongly emphasises that he would never try using just a small quantity of inorganic fertilizers to see if he could get increase in yields to get monetary profits. He strongly believes that inorganic fertilizers are not good for plants and total nutrition of soil. The theory which he strongly believes is, plants fed by organic source will have glossy appearance of leaves, which only truly healthy plants will have. Plants fed with inorganic fertilizers may look dark green but lack that glossy appearance of health. He feels, adding inorganic fertilizers would cause imbalances which might temporarily improve yields, but would decrease the population of beneficial micro organisms and earth worms and make the plant susceptible to pest and disease attack.

4.1.2 Specific information

Mr. Reddy owns and cultivates ten acres of land at Sorahunse village, In the mainpart of 7.5 acres of land. He presently grow sapota, coconut and guava fruit trees. Bananas are grown as cash intercrop with the sapota trees. pulses (mainly redgram and soyabean), groundnut, maize, ragi, potatoes, tomatoes, gourds and sometimes cabbage, carrots and beets are grown as intercrop for household consumption. In the newly cleared up two acres land, he has taken up teak plantation, mulberry, banana, vegetable and sunhemp.

4.1.3 The existing cropping pattern in Mr.Reddy's farm is as follows:

A. 1 acre

Mulberry intercrop

40 Coconut (Spaced 28 feet apart)

B. 1.5 acres

165 guava plants

Mango nursery

22 Coconut palms on borders.

(tank for fish)

C. 1.5 acres

Mulberry intercrop

58 Coconut palms (Spaced 30' apart).

D. 1.5 acres

29 Sapota trees per 1 and 1/2 acres

600 banana plants

Sweet potato for fodder

18 Coconut palms on two borders

Erythrina and Glyricidia species for green manuring

E. 1.5 acres

63 Coconut plants

500 coffee plants

500 curry leaf plants

turmeric

various intercrops
(Ragi, soyabean etc.)

F. 40 cents

Paddy

G. 2 acres

250 teak plants

400 mulberry cuttings

Vegetables

Banana

Sunhemp

4.1.4 Alternatives choosen with respect to different crops

4.1.4.1 Coconut

Selection of the Seedling: Suitable local variety nuts from a healthy mother palm free from disease is selected. Mr. Reddy has choosen west coast tall variety for planting Coconut seedling. A one cubic meter sized (large) pit is opened. 20 kgs compost or 30 kgs of green manure is added to this and mixed with the top soil. The material in the pit is allowed to decompose for two to three months and watered occasionally. During mansoon, the saplings were transplanted into the pit.

Mr. Reddy does not plough between the rows of Coconut plants. He has left intercultivation totally and has taken number of intercrop with coconut like mulberry, coffee, curry leaves, ragi, soyabean, etc.,

PLATE 1 : FARMING AMIDST WEEDS : MR. NARAYANA REDDY
INTERCROPPING CURRY LEAVES AND COFFEE UNDER COCONUT. NO
WEEDING DONE.

PLATE 2 : CROP RESIDUE MANAGEMENT : CROP WASTES PUT BACK TO
PLANT'S BASE.



Mr. Reddy does not follow intercultivation under coconut plants. When the weeds grow taller than the main inter crop, they are cut and fed to cattle and sheep. Sheep are allowed to graze under the coconut trees. Intercrops are drenched with the cowdung slurry solution which prevents the sheep from feeding, due to bitter taste of cowdung slurry solution.

Mr. Reddy didn't stop application of inorganic chemical fertilizer suddenly. He stopped using them in a phased manner. Every year, from the year of switching over to organic farming, he reduced the application of N:P:K fertilizers by 17 percent of the total. Over the years, with in a duration of 4 years, he completely stopped using chemical fertilizers

Mr. Reddy adopted composting method called Nadep method of heap composting for supplying plant nutrients. Apart from this he makes use of cowdung slurry & crop residues of each coconut plant is put back to the base of the same plant and allowed to decompose. Preparation of compost is by heap method. Each heap measures twelve meters long, two meters wide and one meter height with stone slabs placed on both sides along the length. A centimeter gap is left between the slabs to allow for ventilation. A variety of crop residues (Mulberry snatches, banana stumps left over from cattleshed, etc.,) form the bottom layer of the heap. Dung slurry and slurry from the biogas plant are spread uniformly over this

layer, with the final layer consisting of eight centimeter silt. This layering is repeated seven to eight times and eventually the heap becomes half a meter higher than the stone slabs, with a layer of mud completing at the top. Every ninety days, the heap is ready for application. This method of composting requires less labour, as it requires no turning.

Mr. Reddy has stopped using fungicides and insecticides too. He stopped using plant protection chemicals in a phased manner. Every year he stopped using about 17 percent of the total chemical applied and completely stopped applying chemical from the fourth year of switching over to organic farming. To substitute plant protection chemicals, Mr. Reddy has tried out decoction of several plant leaves mixed in cow's urine as antifeedant. The purpose of the infusion is to discourage the pest from feeding on the foliage or fruit, thus making it weak and vulnerable to predation without harming the predator of the pest.

Mr. Reddy gives out the formulation of the cow's urine antifedent infusion: For each acre of coconut orchard to be treated, collect about 20 liters of cow's urine. Urine freshly collected from one day is best, but urine collected over longer period of time can also be used. Crush the foliage of one of the following plants

- (a) Neem leaves. seed or cake (Azadirachata indica) (b) Custard apple (Annona squamosa) (c) Bull's heart (Annona

reticulata) (d) Datura (e) Oleander (Nerium species) and (f) Vasaka (Adhatoda zeylamica). Add it to the cow's urine at the rate of 15kg of the plant material per 20 liters of cow's urine.

Allow the plant material to soak in the urine over night. In the morning, decant the plant material and other particulars out of the urine. About 18 liters of solution, each part of this solution should be diluted with 10 parts of water before application. The diluted solution should be sprayed on orchard every 15-20 days. The preparation has best effect when used immediately after preparation. One person should be able to spray, two acres in an eight hour work day, using a sprayer. Regular spraying of the cow's urine antifeedant infusion has helped coconut plants be free from disease, insect pests.

At present the 12 years old coconut plants are yielding an average of 125 nuts per plant per year where as the neighbouring farmers are getting an average of 100 nuts per plant.

4.1.4.2. GUAVA:

Mr. Reddy has taken up 'Allahabad Safed' variety of guava. Healthy grafts or seedling of guava were selected. They were planted in a cubic meter sized pit. About 20kg compost manure or 30 kg of green manure is added to pit and

mixed with the top soil. The material in the pit is allowed to decompose for two to three months and watered occasionally. During monsoon, the saplings were transplanted into the pit. Mr. Reddy follows minimum weeding. He does not uproot the weeds. When they grow too tall, they are cut to the ground level and fed to cattle. Mr. Reddy has not taken up intercropping with guava.

Cow's urine antifeedant infusion, as in case of coconut is sprayed, by mixing about 15 kgs of plant material with 20 litres of cow's urine. The preparation is found to have best effect when used immediately after preparation.

The average yields of the Guava plants, which are seven years old has been around 150 kgs per plant. The fruits are free from scab or canker.

4.1.4.3. SAPOTA: Sapota is another main crop which Mr. Reddy has taken up. The varieties chosen are 'cricket ball' and 'kalapatti'. Mr. Reddy has intercropped Banana, sweet potato Erythrina and Glyricidia plants with sapota. Healthy grafts or seedlings of Sapota were selected. They were planted in a cubic meter sized pit. About 30 kgs green manure or 20kgs compost manure is added to the pit, mixing with top soil. The material in the pit is allowed to decompose for two to three months and watered occasionally. During monsoon, the saplings were transplanted into the pit. In case of grafting, care is taken to see that the graft is visible above the soil.

Weeding is done manually but minimum weeding is followed. Weeds are not uprooted. But they are cut to the ground level when they grow too tall and fed to the cattle. He has raised mango seedlings under Guava for propagation. He has also constructed a fish tank amidst the Guava trees. Mr. Reddy does not train or prune the branches of Guava. They are allowed to grow wildy. The leaves and other plant residues that fall at the bottom of the plant are allowed to decay there it self. They are not removed for keeping the bottom clean.

Against scale insects, mealy bug and scab bug found on sapota, regular spraying of cow's urine infused with decoction of neem, neem seeds or neem cake has been found effective. Regular spray using a sprayer once in 10-15 days is a must.

Cow's urine infusion with decoction of various plants leaves such as custard apple (Annona squamosa), Datura Bull's heart (Annona reticulata) Oleander (Nerium species), Vasaka (Adathoda zeylamica) are found to have similar effect as that of neem.

Mealy bugs and scale Insects are common insects found on sapota. Mr. Reddy takes up dusting of wood ash on the plants foliage at a rate of 100 gms per cubic meter of leaf space. Sometimes he mixes about 10 milliliter of Kerosene with

woodash, to make it more effective. They find that dusting in the early morning is most effective, because, the ash clings to the dew on the leaves. The average yield per plant aged 12 years has remained at 300 kgs per plant over the years.

4.1.4.4 OTHER CROPS: Mr. Reddy takes up number of field crops on a small scale for domestic consumption as intercrops. Generally he takes up ragi, maize or soya as intercrops with coconut.

For ploughing the land Mr. Reddy has left using tractors. Earlier Mr. Reddy use to prepare land for planting in a way similar to his neighbours prepare the soil now. The plot to be planted was plowed three times, then clumps were broken up with a wooden mallet or a roller. After the ground was made even with the cultivator, the furrows were formed and the seeds were sown, or the seedlings were transplanted. When he takes up field crops he weeds the area throughly, then carry compost manure in baskets and spread it over the soil. Usually he supplies ten tons per acre. If the seeds are small like Ragi, he spreads it over the soil. Then he makes furrows with pick axe.

If the seeds are large like Maize, then the furrows are made first using pickaxe and then seeds are sown in the furrows.

The average yield level of the various field crops he grows have been comparatively very less than what he use to get earlier in modern agriculture. Earlier he use to take up field crops as (pure crops) sale crops. Now, he is taking it up in a small area, as intercrop with coconut. Due to the problem of shade, light is a limiting factor for the growth of crops.

Mr. Reddy said, any plant species which can give out smell, like the curry leaves garlic, ginger, turmeric can be interplanted with the main crop which serve as deodorants to repel many of the insects.

Mr. Reddy has taken up growing of vegetables on a small area. He grows vegetables at the base of the teak and banana plants planted in the newly cleared lands.

He covers the base of the banana or teak plant with 2-3 baskets of compost and makes a small heap at the base. He cover up it with a smear of mud. He will sow 2-3 seeds of carrot, beatroot, radish and bean inside the compost heap.

Spraying of cow's urine antifeedant infusion (once in 15 days) with neem leaves or oleander has helped to get healthy vegetables free from insect or diseases problem. Spraying of root sap of tobacco is found effective against root nematodes. Marigold planted as companion plant with solanacious species are found controlling root nematodes. It

is better to have a companion planting of chilly, potato, tomato in fixed ratio to avoid insect pests on them.

4.1.5 The average yield level of various other intercrops are as follows.

- (a) Banana: Varieties grown-Robusta, Yalakki, Chandra and Raja bale. average bunch weight has been around 20 kgs.
- (b) Coffee (Variety-Kaveri) - 2 years old plants yield 0.75 kgs dry seeds per plant.
- (c) Curry leaves (four harvests per year) -2 kgs per plant on an average.
- (d) Pepper (four year vines) yield about 0.25 kgs per plant.
- (e) Paddy (variety-Masuri & Jaya) an average of 30-35 quintals per acre.

4.1.6 OBSTACLES FACED DURING TRANSITION:

The main obstacle faced by Mr. Reddy during transition was sudden drop in cereal & pulse crop yields by over 50 percent which was very much discouraging during the first year. Getting subsidies or loan facility for organic manures was also a problem (from the banks). He had to receive financial assistance and guidance to continue with organic farming from his friend, one Mr. Drucker.

He lists a number of obstacles his fellow farmers are facing to go in for organic farming.

(1) The propaganda from the media, government extension workers and politicians pushing chemical inputs. Popular advertisements catch the lay farmers soon. (2) most of the farmers are ignorant of the science behind their profession, microbial process in the soil and the vulnerability of water tables are unknown mysteries to those for whom such knowledge would be most valuable. (3) farmers have accustomed to easy application method of synthetic pesticides & inorganic fertilizers, chemical farming is much less labour intensive. Mr. Reddy feels many farmers don't want to do more work. (4) It is difficult to get loans for the purchase of organic manures purchased from other farmers as it is difficult to get a receipt. (5) subsidies given to chemical inputs forces farmers to go for it. (6) farmers who wish to go for organic farming, because of previous soil depletion, they may get reduced yields for 2-3 years during transition. Farmers must make alternative sources of organic fertilizer before they switch over to organic farming.

Mr. Reddy feels that more research and documentation of organic farming method would be of great assistance both to farmer and policy makers. He emphasizes on the publicity to be given to such studies through media. Efforts also should be made in the direction of educating the public on the dangers associated with using pesticides on their health.

4.1.7 BENEFITS OF ORGANIC FARMING

'Economic benefit' is the major benefit Mr. Reddy has received after switching over to organic farming. Mr. Reddy feels that fertilizer and pest control costs before and after are significantly different. Mr. Reddy no longer spends any money on fertilizer and pesticides, where as before he spent a total of Rs.3,000 per acre per year on fertilizers and pesticides.

Secondly, the farm environment has become pollution free from the use of poisonous inorganic chemicals. Over the years Mr. Reddy feels that the fertility of the soil has increased which can be reflected in terms of the increased number of earthworm population in soil and improved yields over the years. Practicing minimum weeding has helped the soil to gain more water holding capacity as the roots of the weeds penetrate deeply into the soil.

Farm produce is free from poisonous chemical residues and even children can pluck and eat any fruit or vegetable even without washing. Birds and non-targeted insects are not harmed and ecological balance in the farm is maintained. The quality of the fruits, vegetables and grains in terms of taste has increased over the years. The plant health has improved which is reflected by decreased incidence of diseases, and pest attack and glossy green appearance of plant leaves.

4.1.8 ECONOMICS OF FARMING:

Mr. Reddy explains that economic viability of the farm was the primary consideration for Mr. Reddy to switch to organic farming methods and it continues to drive his decision and farming practices. Mr. Reddy has not kept account books on paper to workout the economics. His memory serves him to tell about the expenditures and revenues of the farm.

When Mr. Reddy switched over to organic farming, there was about 50 percent reduction in yields compared to what he was getting earlier using fullest dosage of chemicals in case of cereal and pulse crops.

During the second year, crop yields were comparatively better and the yield was reduced by about 25-30 percent than earlier yields. By third year the yields were almost normal and by fourth year yields have sustained their original levels and from fourth year onwards yields have sustained the original level. plantation crops are yielding better what his neighbouring farmers do get.

Mr. Reddy reported that during 1991, he earned a gross income of Rs.1.75 Lakhs from various major farm outputs like coconut, sapota, banana, guava, milk, cocoons, sale of sheep and fishes.

The only significant input on the farm is electricity. Mr. Reddy estimates that together they would cost 4,000 - 5,000 Rs. each year and the house uses 100 - 150 Rs. per month of electricity for house consumption.

Regular farm expenses include (i) Seeds - approximately - 300 - 400 Rs. per year. (ii) Cloth, Oil, Soaps some food for family - Rs. 800 per month. (iii) Labour - Rs. 25,000 per year. Apart from this, family labour worth Rs. 60,000 per year is put to the farm.

He feels that it is difficult to compare the economics of the farm before and after transition because of inflation, changes in government policies, different crops planted, and different farm conditions. (Eg:- they have drip irrigation now where as before the farm was entirely rain fed.) Labour expenses are also difficult to compute and compare because of the variation in the number of hired labourers through out the year. The major input cost reduced is cost on fertilizer and pest control chemicals Mr. Reddy no longer uses any fertilizers or pesticides. Earlier he use to spend Rs. 3,000 per acre per year on fertilizer and pesticides.

Mr. Reddy said that he employs (hires) less people than he did when he used chemical inputs because there are now more family members able to work. Mr. Reddy pays Rs. 15/- for woman labourers and Rs. 30/- for men per day. Mr. Reddy do

not pay the labourers full labour in cash. To encourage savings habit, he gives the employees 50 percent of their wages in cash and deposits the other 50 percent directly into the savings account. During rainy season. When the rain starts, he would employ more labourers to do the extra farmwork. During rest of the year, he would employ one to five people to work on the farm.

As for as the income levels are concerned, during initial years of switching over to organic farming, there was heavy drop in the gross and net income, compared to what he use to get in the modern agriculture, this continued up to fourth cropping year of switching over to organic farming. From the fifth cropping year onwards the gross and the net income sustained the original levels. From the sixth cropping year onwards, marginal increase has been found in the net income and is found to continue then onwards.

4.1.9 Suggestions to prospective adopters

Mr. Reddy suggests the farmers to maintain cattle or make arrangements for organic source of nutrient before switching over to organic organic farming. To avoid greater reduction in crop yields, reducing use of inorganic fertilizers in a phased manner and stopping the application completely over the years is a better process. Understanding the science behind each operation the farmer does is very important. Farmers should try out their own experiments and

should not copy whatever the other farmer does. Farmer should go in for diversification of the crop instead of monocropping. A farmer, can initially start with a small portion of the lands being switched over to organic farming and over the years can switch over entire holdings to organic farming.

4.1.10 Future plans:

Mr. Reddy has completed the construction of a small school near his house. He intends that young people from near by high schools could come to on the weekends or during school vacations. Every student attending will be expected to work on the farm for about four hours a day, so that Mr. Reddy can run the school without relying on external funds. Group of students from various high schools are provided opportunity to learn through discussion and by practice.

The other future plan is to construct a new sericulture shed modeled after a Japanese shed. He estimates that the new shed will enable him to cut the cost of labour by one fifth. He is also planning to build a check dam along the big ravine that runs adjacent to his farm. He is also planning to build a compost heap and three circular beds with three meter diameter for producing worm filled compost. Mr. Reddy is planning to operate a consumer society at Bangalore by uniting the farmers to grow food organically and supply them to consumers at Bangalore. He is even planning to make a door delivery of organically grown produce to the intended consumers at Bangalore.

Mr. Reddy is also planning to open and operate a grain bank to preserve the traditional old varieties of seeds of all varieties of crops available. For this he is seeking the financial assistance of the Dutch Stitching Ecology foundation. He plans to lease out part of the lands of farmers to grow traditional varieties for its multiplication. He also hopes to bring various voluntary organisations like Dharithri and Kudumbam together as a forum for organic farmers from Karnataka and Tamilnadu to exchange ideas and methods and to Co-ordinate a joint news letter.

4.2 CASE- 2: Purushothama Rao

4.2.1 General Information

Mr. Purushothama Rao is a very experienced farmer of 61 years age, who has been practicing organic farming over five years at Melina Kuruvalli village of Tirthahalli taluk, Shimoga district. Mr. Purushottama Rao has named his farm as "KRISHINIVAS" which is situated on the banks of the river Tunga at a distance of half a kilometer away from the Tirthahalli taluk center.

Mr. Rao is a B.Sc. graduate. There are seven members in the 'joint family. Mrs. Shantamma-wife (51 years old); Mr. Ramachandra- son of Mrs. Shantamma's Sister. (24 years); Mr. Gopal- Adopted son (21 years); Mrs. Revati- Sister of Gopal (23 years); Shruti- Daughter of Revati (7 years); and Subbu- Son of Revati (5 years).

Mr. Rao has got very high organisational participation.

- (1) He is the vice-president of the Bharatiya Kissan Sangh
- (2) He was the organiser of "Kissan vartha," a local monthly magazine which he closed down due to financial and other problems.
- (3) He is the council member of the Bharatiya Agro-Economic research center, New Delhi.
- (4) He is the Director of Malnad Areca growers Society.
- (5) He is the ex-president of Tirthahalli Township corporate.

- (6) He is the ex-president of Shimoga district reelers association.
- (7) He is a member of the Tunga College Vidyavardhaka Sangha of Tirthahalli (ex- Founder Secretary).

Mr. P. Rao. is a life member to the following Agricultural journals. (1) Adikepatrike (2) Jenupatrike (3) Madhuprapancha (4)Coconut bulletin (5) Spice India (6) Spices journal (7) Krishilokha (8) Negilayogi and (9) Rytahorata. He is a regular reader of various local newspaper, like Sahyadhri varthe, Tunga varthe, chalagara, Kodachadri & Brihaspathivani.

He has high extension contact & extension participation too. He has contact with all the officials of the Agricultural department of the district. He makes him self free to go with the officials of the Agricultural department to make crop visits/field visits. He attends to any extension activity of the Agricultural department when ever he is invited. Mr. Rao deeply loves his profession." The Agriculture". He has great respect for soil. He has developed a philosophical attitude towards looking at nature & soil. He argues that farmers must be hard workers & must never neglect their duties. He feels that there must be a strong binding that must develop between the farmer-his plants & animals. Farmers must understand the language of plants & animals, they should touch & feel them & talk to them.

There are some questions he puts forth to farmers when ever he attends Seminars, meetings or workshops.

- (1) Have you touched all the plants, animals in your garden or field?.
- (2) Has your feet touched all the parts of your field?.
- (3) At last on any one occasion have you noted down on a white paper what has not been done to plants?. and
- (4) As a farmer how much time you will spare for farming?.

Mr. Rao has 10 acres of farm. As the farm is located on the 'river banks, there is no water problem through out the year. Pumpset is used to lift water from the river.

Mr. Rao has a very rich experience in modern agriculture. Earlier he use to grow crops like Areca, coconut, paddy, turmeric & chilly. Since beginning, he used to apply more of organic manures to crops and less of inorganic fertilizer. He use to get around, 100-125 nuts of coconut per tree, 23-27 quintals of paddy per acre, and 11 quintals of chilly per acre. He has conducted every year field day by raising bivoltine cocoon-on his farm. He was raising mulberry crop & rearing bivoltine worms & getting on an average 20-28kg cocoon per 100 dfls.

In the mean time during 1988 due to heavy winds, entire areca trees in the farm collapsed this made him deeply think about why did the trees collapse? he was able to judge that the trees had become very weak & the soil structure had been lost due to continuous application of inorganic fertilizers. He started thinking not to apply inorganic fertilizers to any plant in future. He had to spend lot of money to keep the areca plants erect by tying metal wires. In the mean time he had come to know about some small farmers in his surrounding villages having switched over to organic farming. From then, he started attending seminars on organic farming at Bombay, Delhi & Hyderabad. he was greatly influenced by the talks of one Mr. Pradeep Tapas, a specialist in organic farming from Dharwad. He developed strong interest in organic farming then on wards & switched over to organic farming.

4.2.2 Specific Information

After switching over to organic farming Mr. Purushottama Rao has brought about number of changes in the cropping pattern and farm practices followed. He has found many alternatives with respect to many farm practices which he was following in Modern Agriculture.

Mr. P. Rao has planned his crops in his 10 acres farm in such a way that at least one crop comes to harvest each month so that he gets regular income through out the year from at least one crop.

Month wise crops harvested are, January-paddy, areca; February-coconut; March-mulberry; April and May-coconut; May and June-paddy; July-no crop due to heavy rains; August-cardamom; September-cocoa; October-mulberry; November and December-banana. He grows all varieties of Vegetables for home consumption on a small scale.

4.2.3 Alternatives choosen with respect to different crops

4.2.3.1 ARECA: Areca is one of the main crops he grows. Banana, Cocoa, Pepper & Vanilla are inter cropped with Areca. The Varieties grown are Indawara, Ramachandra pura, Baklapura and Deshavargenes. When Mr. P. Rao Switched over to organic farming the Areca trees were already yielding. They had collapsed due to heavy winds. They were kept erect by tying metal wires to each plant. Mr. Rao has left ploughing or intercultivation between the rows of plants.

Mr. Rao did not stop the application of chemicals at once. He left urea application in the first year and from second year on wards he left applying super potash totally and from third year onwards he left inorganic chemical fertilizer application totally. He has developed his own method of composting and named them as Krishinivas- Kuruvali method of composting I, II and III. Apart from this he also prepares compost using the composting method developed by one Mr. Pradeep Tapas. He adds about one basket of compost prepared by any one of the methods of composting to the base

of each plant. Weeds, particularly grass, are allowed to grow in between the rows of plants. They are cut out and fed to cattle but not up rooted.

Kole Roga or fruit rot is a common disease in case of Areca. For this, about one kilogram of suvarnadde cut (Elephant foot corm) into small pieces, is taken in a wooden or plastic bucket (not iron bucket). About 10 litres of boiling water is added to this and left it for 24 hours. (If possible keep it under sun.) Later decant the solution and the Insecticide is ready. Depending on the incidence level of attack, mix water to solution in 1:10 ratio and drench the entire plant with this solution. (While preparing the solution take care was taken to see that the tuber pieces were not boiled with water instead boiling water is added to the pieces.). Drenching of Areca plants with this solution has been successful in checking kole roga or fruit rot in case of Areca. The yields level in case of Areca has been more than five quintals per acre

4.2.3.2 Coconut:

When Mr.Rao switched over to organic farming. The trees were already yielding at an average of 100-125 nuts per plants. The trees are around 25 years old. (as on the study date).

Mr.Rao inter crops Areca, Cocoa, Banana, Vanilla, Cardamom and Coffee with Coconut. Mr. Rao does not make

inter cultivation between the rows of plants. Weeds are allowed to grow. They are not uprooted, but cut and fed to cattle.

After switching over to organic farming. in the first year Mr. Rao did not apply urea totally to any plant. From second year onwards, he left the use of super potash too. So from second year onwards, Mr. Rao was not making use of any inorganic chemical to plants. He supplemented these nutrients with one basket of compost prepared by his own method of composting. (KRISHINIVAS-KURUVALLI Method I or II or III). Apart from this crop residues of each plant is put back to the base of the same plant.

In case of Coconut Mr. Rao came across problem of stem borer, stem bleeding, bud rot or bleeding. For Stem borer attack Mr. Rao has found decoction of Ekka (Calotropis gigantea), mixed with 50 gms of lime (without water) as a successful solution. About one kilogram of Ekka (calotropis gigantea) leaves are collected in a wooden or plastic bucket (not iron). About 10 litres of boiling water is added to this and left for 24 hours. Later solution is decanted. Depending on the incidence of pest water is mixed in the ratio of 1:10. Care is taken not to boil leaves with water but water is added to this. Plants are drenched with above decoction mixed with 50 gms of lime. The stem borers are found to be completely controlled.

The problem of stem bleeding was controlled by mixing 50 gms of asafoetida with 50 gms of turmeric in cold water and preparing a paste out of it. The paste is smeared on the bleeding part of the plants. Bleeding is found to be controlled. To overcome the problem of rats and squerrels, Mr. Rao suggests a method. Catch hold of a rat or squirrel. Stitch its anus after filling some cotton inside and let it go. It becomes mad and Kills its own race by biting and it will also die.

As for as the yield levels are considered, there was no reduction in the yield levels after switching over to organic farming. Over the years the yield level has sustained at an average of 100-125 nuts per tree. He is expecting the nut yields to go up in the years to come.

4.2.3.3 Paddy:

After switching over to organic farming, Mr. Rao has left growing of high yielding varieties of paddy. He has switched over to growing of local varieties like Kumara olaga (which needs no transplantation), Impani and Coimbatoor Sanna.

Mr. Rao has left puddling of paddy fields using tractors. He puddles paddy fields traditional way using wooden plough and bullocks. The various materials which he has made use for treating paddy seeds are, (1) Amniotic

liquid of cows (one that is obtained at the time of giving birth to a calf), (2) Pure rain water collected (with lightening and thunder), (3) Pregnant cow's urine, (4) Cowdung solution, and (5) Solution of Anthill mud (6) Wood ash.

The one that has been found to give better germination percentage was with Amniotic liquid of Cow's, followed by pregnant cow's urine and cowdung slurry. Paddy transplanting is done adjusting with the phases of the moon. He feels that planetary motion has influence on growth and development of plants. He undertakes transplanting of paddy on a full moonday (which he feels develops plant's disease resistance). While transplanting he takes care to see there is a balance between the growth of root and shoot.

Sufficient compost prepared by Kuravalli method I or II or pradeep Tapas's method are applied to field before and after transplantation.

Mr. Rao has been experimenting on using decoction of many plant leaves as liquid manures for promoting plant growth. For this he has selected four plants namely, (1) Eupatorium weed, (2) Stinging nettle, (3) Glyricidia plant and (4) Khaki fruit plant. About one kilogram of leaves are collected in a wooden or plastic bucket. About 10 litres of boiling water is added to it. The leaves are crushed. The

leaf material is allowed to decay for a day or two. Then the solution is decanted and the liquid manure is ready for spray. Based on the area or number plants on which it has to be sprayed, it can be diluted with water and sprayed on crop using a sprayer. Stinging nettle decoction sprayed on paddy crop has been found to be a better growth promoter which has been reflected in term of better yields.

When Mr. Rao. Switched over to organic farming he first tried coimbatoor sanna variety. The yield level came down from average of 22 Q/ac. to 16 Q/ac. During the second year and third year he tried Kumara olaga- a local variety- which yielded average of 20 and 22 Q respectively. Later, in the fourth and the fifth year, he obtained an average yield of 22 Q and 25 Q respectively.

4.2.3.4 Banana:

Banana is grown as an inter crop with Coconut and Areca. The variety that has been in larger number is Yalakki bale. The viral disease (Mosaic) which was found in case of some banana plants has been controlled by spraying the decoction of Bouganvillae leaf mixed with one litre of boiled milk. The viral infection is under check after drenching the plant with the above decoction. No solution has been found organically to control bunchy top of banana. The plants are cut and used for composting. The banana yields have been around 10-12 quintals per acre. The yield level has shown not much variation. And has remained the same over the years.

4.2.3.5 Pepper:

The pepper vines have been allowed to climb coconut and Areca plants and is grown as a mixed intercrop. Compost prepared from his own method of Composting is the main source of nutrient to the plants. (About one basket per vine). When he started with organic farming, the vines were already yielding.

In the first year of switch over to organic farming he had completely stopped applying urea and in the second year he stopped applying superpotash too. He stopped applying chemicals totally from third year onwards. He had left taking up chemical plant protection measures too.

In case of pepper, there was wilt disease incidence. Mr. Rao tried spraying decoction of Bouganvillae leaf (about 1kg of leaf collected in a plastic or wooden bucket to which 10 lts of boiling water is put and left for 24 hours and decanted), mixed with one litre of boiled milk on pepper vine. The infection is found to be under control.

4.2.3.6 Other Crops

Turmeric grown organically, the plants grew up to nearly 6 feet height. The yield of Rhizome was about more than four quintals per acre. (Turmeric grown as pure crop only once). Chilly grown twice yielded on an average of 11 quintals of dry chilly per acre. Cocoa plants had started yielding when

he switched over to organic farming. They were yielding around 80-90 nuts per plant initially. over the years the average yield per plant has been around 90-100 nuts (30 Kgs/plant) per plant. No incidence of pest or disease has been reported. Mr. Rao reported that he was not successful in growing Ginger, coffee and cardamom.

A number of coffee plants planted as intercrop under coconut used to die before they started bearing infested by bacteria. Bacterin chemical was recommended, on application of which the plants use to bear leaves. But the chemical was very costly. There was also problem of Boost, leaf curl and leaf spot. Generally all the plants use to die by bronzing of leaves which use to shed after bronzing. Against Boost formation, leaf curl and leaf spot diseases of coffee, Mr. Rao has sprayed decoction of various plant's leaves like Neem, Seethaphal, beetle leaf. jute, Marigold flower. (Decoction prepared using 1 kg leaf taken in a bucket to which 10 lts boiling water is added, left for 24 hrs and then decanted)

For Bacterial attack on coffee, Mr, Rao has tried the decoction of stinging nettle leaves. Each of the plant is drenched with the above decoction. The plants which use to die every year have survived that year with green sprouting leaves. They are of Robusta variety. Some plants of cauvery variety have shedded all most all the leaves even after

spraying but have survived bearing flowers. The plants which use to die every year, after spray with stinging nettle plant leaves' decoction, has survived without death but the plant bears new flower buds all over the plant with no leaves.

Mr. Rao has taken up a new Commercial crop vanilla on a large scale. Vanilla planifolia a creeper which needs hand pollination and lot of labour. It is a geotrophic plant which bears beans when the vines grows towards earth. Vanilla is a three years gestation crop. When Mr. Rao purchased vanilla cuttings he paid Rs. 35/-per each cutting. At present Mr. Rao has developed a vanilla nursery, where he is selling each seedling at Rs. 15/- per cutting.

A healthy vanilla cutting of about $1/2$ - $3/4$ of a feet with 3-4 nodes is selected. It is planted in a small polythene pocket filled with compost. When the vine grows taller in the pocket, it can be planted at a suitable place where wooden staking is provided for the plant to climb-up. Instead of wooden staking it can also be allowed to creep up a tall tree also. Care must be taken to see that apex of the creeper grows towards earth which can be adjusted by bending it down. Each plant is supplied with one basket of compost regularly. The crop is yet to yield and yield details are not available. The plants have been grown under only organic nutrient supply.

For the seed treatment of any cucurbitaceous plant, seed apart from using cow's amniotic liquid, cowdung solution, pregnant cow's urine, wood ash and coconut water, a sticky substance found on the leaves, plants and pods of Red gram (called Kadale huli) is collected on a white cloth early in the morning before the mist dries up. The powder thus collected is stored in the cloth itself or a separate box free from dust and moisture. Any cucurbitaceous seed to be sown is mixed with the powder and sown germinates effectively after this treatment. Best time to make hand pollination in case of following plant is forty minutes after blossoming of the flower.

While sowing any seed, Mr. Rao says, seeds must be sown on such a day so that it germinates on a newmoon day. Mr. Rao says. Moon has gravitational effect on earth and inturn of the plants. During KRISHNAPAKSHA (fortnight between fullmoon day to newmoon day) the activity of shoots is high and during Shuklapaksha (fortnight between Newmoon day and fullmoon day) the activity of the roots are high.

There will be problem of snakes in Malnad areas in the farm Mr. Rao has sprayed 100gms of asafoetida mixed with water in the areas where the snakes are usually found.

He grows vegetables on a very small scale for home consumption. Mr. Rao says that companion planting of many

**PLATE 3: MR. PURUSHOTHAMA RAO SHOWING KRISHINIVAS - I COMPOST
PIT.**

**PLATE 4 : A LABOURER DEMONSTRATING HOW TO PREPARE LIQUID
MANURE.**



combinations has a natural control effect on insect & pest attack. He has tried successful combinations of one tomato plant for 10 brinjal plants. One garlic plant for 10 tomato plants. One mustard plant for 10 cauliflower plants.

4.2.4 Soil fertility maintenance: (composting) Mr. Rao has tried several methods of composting. He has developed now his own method of composting and named it as "Krishinivas-Kuruvali Method" I, II and III.

4.2.4.1 Method I: (Large size & quick method).

Dump 250 baskets of forest mud, or farm mud, 250 baskets of cowdung slurry, 250 baskets of saw dust, 250 baskets of poultry manure, 250 baskets ash, in a pit, layer wise and mix it well. Allow it to decompose for 15 days. (After 1 week add sufficient water and turn it upsidedown). Now make a heap of 4 feet width and 4 feet height. Mix one liter of Bacteria Mix. No. 4 mixed in 100lts of water by stirring. Allow it for eight days. A rich manure with microbes develops. Add one basket of this compost the base of each plant.

4.2.4.2 Method II:

250 baskets of forest or farm mud, 250 baskets of pressed mud (sugar cane waste from factory), 250 baskets poultry manure, 100 buckets of cowdung Surry mixed in 150 buckets of water are dumped in a pit, layer after layer and mixed well and covered. After one week, mix 100 buckets of cow's urine in 150 buckets of water, and stir it well. Later

make a heap of 4feet x4feet & mix 1 litre of Bacteria mix No. 3 and 4 in 100 litres of water. Leave it for 15 days.

4.2.4.3 Method III: Compost decoction

Fill one third of a long drum with compost prepared from method I & method II. Add amniotic liquid of cow (collected at the time of parturition mixed with one litre of water. Add sufficient water and stir with a stick. Collect the mixed water at the top. Repeat stirring and collect the water three times. When sprayed on Vegetables good yields were observed. It can be applied to soil. (Note: He has named bitter butter milk as bacteria mix No. 3 and Honey as bacteria mix No. 4)

4.2.4.4

He has also tried Pradeep Tapas's method of composting (Krishnakrishi-Hulikoti) Prepare 6 feet by 3 feet by 3 feet pit or tank. Add 3 inches dry leaves, 3 inches Farm yard manure, 3 inches mud, layer by layer to fill the pit. Spray 15-20ml of Honey mixed in 20lts of water all over the pit. Place five stinging nettle plant on each corner of the pit and in the middle. Add 200lts. of water to make the pit uniformly wet. Add one feet soil layer to close the pit. If the layer breaks open cover it with soil. Compost is ready within 90 days.

Mr. Rao is planning to prepare Vermicompost following the method developed by the Scientists Dr. Radha D. Kale and

Dr. Kubra Banu, Department of Zoology, of the university of Agricultural sciences, Bangalore.

Mr. Rao explains in detail the multipurpose uses of the role of cows in Agriculture. If Milk serves as a good source of income from dairy as an enterprise, the by-products of dairy are having a vital role to play in Agriculture.

1. Cow's Urine has got insecticidal properties.
2. Pregnant Cow's Urine has growth promotional effect, can be used for seed treatment-mixing with water in 1:10 ratio.
3. Amniotic liquid of cows: Plant growth promoting effect. Effective on seed treatment, vegetables, Nursery and flowering plants. (used mixing with water in 1:10 ratio).
4. Milk: Washing hands in milk has got disinfectant property. 10 Litres Bouganvillae plant solution (crushed & prepared) when mixed and sprayed with one liter of milk is effective against virus attack on Cardamom.
5. PANCHAGAVYA: (a. mixture prepared using (cow's urine, cowdung, curds, Ghee and milk) is also found to be effective on viral attack.
6. Hair, hooves and horn of cows can be used for smoking which kills many harmful insects.

4.2.5 Constraints faced during transition:

Searching out suitable alternative organically to all the farm practices was the main constraint. He had to try whatever that strikes to his mind. he had to try out various combinations to achieve the success. As there were no ready packages he had to search out various alternatives in books available and discuss with practicing farmers and think for himself a lot before he tried it. He had to experiment for many years. before he could standardize an alternative practice. In the initial years. yield levels got reduced and it took nearly 3 to 4 years to sustain the original Yield levels.

4.2.6 Benefits of Organic Farming :

Mr. Rao has observed the following main benefits after switching over to organic farming.

(1) Reduction in input cost on inorganic chemical fertilizers insecticides, pesticides & weedicides, (2) freedom from poisonous chemical residues, (3) increased quality of the farm produce in terms of taste. (4) increased soil fertility status reflected by increased yield level, over the years and increased earthworm population in soil.

4.2.7 Marketing of the farm produce:

Mr. Purushothama Rao has made arrangements for direct sales of the organically grown produce under the arrangement called DIRECT SALES (Neramarata Yojane). He markets his farm

produce at consumex exhibition conducted by Rotary club every year. In the exhibition all the farm produce are sold with the label "No-pesticides, insecticides & Fertilizers used" "Pure-wholesome food", Produce is sold at one third of the prevailing market price to popularise the organically grown produce.

4.2.8 Future proposal:

Mr. Rao has an idea to experiment the effect of the decoction of various weeds on the plant growth. He was hypothesising that, the factors (harmones!) promoting vigorbus growth of weeds when allowed to decay and decoction is sprayed on plants after extraction may promote the growth of main plants too.

The other experiment which Mr. Rao proposes to conduct is to build, disease resistance in plants by supplying plant origin poison in minute quantities through roots. (He was explaining about the concept of "Vishakanye"- Who were fed poison daily in their food in smaller doses who develop resistance to poison in long run)

4.2.9 Suggestions to Prospective adopters :

In modern agriculture knowledge of the farmer is very much limited. Whatever the operation he does , he does it blindly. Whatever the extension worker says he follows it blindly with out thinking about long run losses & ill-

effects. Farmer need not worry to go to organic farming because there is ready made information available to guide the farmers. He is ready to guide the needy farmer. AT present farmers have enough literature and knowledge source go to organic farming. It is better that farmers reduce use of chemicals gradually & prepare soil bread like & make it a living soil. With in three years he can be free from chemicals. At least 3-5 years range is necessary for sustainability.

4.3 CASE 3 : A. P. CHANDRASHEKAR.

4.3.1 General Information.

Mr. A.P. Chandrashekar is a 35 years old farmer practicing organic farming at Kalalvadi Village of Mysore district, Karnataka, a tiny village about 13 Kms. away from the Mysore city. He is a B.E. (Mechanical) graduate. He switched over to farming with the optimistic idea of applying whatever the engineering knowledge he possessed as an engineering graduate.

Mr. Chandrashekar hails from agricultural family where his parents and brothers continue forming in Dakshina Kannada district of Karnataka. His father is Mr. A.P. Thimmappaiah and Mother Smt. A.P. Ramadevi. The main and the subsidiary occupation of Mr. Chandrashekar is farming. After the completion of his Engineering degree, he underwent practical training in his study field and rendered his service in a Motor Company. This practical knowledge in the Engineering field has helped him to apply the same in the Agricultural field too.

There are four members in his nuclear family. Mrs. Nirmala Chandrashekar; wife, Abhijit; son (studying in the fourth class) and Shilpa; daughter (studying in L.K.G.)

Mr. Chandrashekar likes the fresh, simple and non-diplomatic living at villages. He hates congested, polluted-

difficult city life. He found to posses deep love for nature and farming, lot of concern for ecological balance and development of forests. His basic nature to stay away from the conjusted city life and to live in an isolated village has made him have least Organisational participation. He is neither a member nor an office bearer in any Organisation. He feels that he finds no enough time to take part in the activities of various organisations.

He is a regular reader of many Agricultural journals like AdikePatrike, Spice India, Ksheera sagara, Tengupatrike which publish articles on organic farming regularly. He is a regular reader of daily news papers. He is a writer too and writes articles to Agricultural journals and dailies. He has even written a book on "the use of tractors in Agriculture" which has been published by Karnataka Vigyan Parishad.

He listens to agricultural programmes in Radio regularly and often takes part in the Radio talks. He reports that he has very little contact with any office bearers of the State Agricultural department. He has least extension participation too. He feels that progressive Agricultural technologies should reach the doors of the (busy) farmers as they cannot take part in extension activities neglecting or stopping all his farm and allied activities.

Mr. Chandrashekar emphasises, believes and practices "SELF DEPENDENCE" in his personal and farm life. He has a rare collection of different types of tools in a garage like room, using which he repairs his vehicles, pumpsets, sprinklers and other things for himself. He has a smithy where he makes tools like sickles and other agricultural implements for himself.

Mr. Chandrashekar believes in hardwork and he feels that he has realized there is no substitute for it. He believes in the search for the truth through experimentation and never he feels that he will accept any thing blindly. He feels that he thinks of the cons much than the pros of any thing which he wants to adopt. He feels that if one worships and has high respect for the "general values" and practices it in life, it is the real worship of the God.

Mr. Chandrashekar has named his farm as "Indraprastha". Indraprastha is a 13 acres 20 Guntas farm and the entire farm has been under non-chemical/organic farming.

Indraprastha is not an ancestral property of Mr. A.P. Chandrashekar. He purchased it from Mr. A.N. Nagaraj, who was practicing or experimenting organic farming in his fields. Disgusted by the city life and with the idea to make a self dependent life, Mr. Chandrashekar purchased the lands to persue agriculture as his profession in 1984.

Initially, when Mr. Chandrashekar purchased lands from some one who practiced organic farming, he had no belief in the concept of organic farming or the like. He believed using fertilizers.

In the begining, Mr. Chandrashekar strongly believed in the modern agricultural package-recomendations for growing crops, based on soil test report.

When Mr. Chandrashekar purchased lands, there were already some yielding coconut trees of around 20 years age. The other main crops he was growing were banana, turmeric, paddy, jowar and pulse crops. He had taken up, new planting of sapota, mango, orange, papaya fruit trees in a smaller numbers. (He was growing vegetables in a small scale for house hold consumption only).

There were around 500 Yielding Coconut trees of (mainly) Tipatur long variety, of around 20 years age. Initially there was only one variety of Coconut he had in his farm. He was applying inorganic chemical fertilizers based on the soil test report. He use to take up ploughing in between the rows of plants using tractors to remove the weeds. There was no mixed intercropping followed under the main trees. Irrigation source was (pumpset) well.

For the control of Rhinoceros beetles, weevils and root grubs, BHC and Carbaryl were being made use. For the supply of Nutrients, inorganic fertilizers were the main source (as per package) and very less of organic manures were being made use. He was getting on an average 80-90 nuts per tree.

The other main crop he has taking up was banana. Initially he had planted only dwarf cavendish variety which yield around 100-125 fruits per bunch. Land was to be prepared by tractor plowing and digging pits for planting suckers, after bringing the soil to fine tilth. Here too intercultivation was being taken up to remove the weeds. Fertilizers were applied as per package based on soil test.

The problem of wilt, leaf spot, mosaic and bunchy top were prevalent, and the use of chemicals like Bordeaux, Carbofuron existed.

Chandrashekar had a bitter experience with growing turmeric, where he got very less yields due to insect and disease problem inspite of the control measures. There was problem of severe rhizome rot and the plants needed excessive plant protection care. Even in case of paddy, jowar and pulses too, the agricultural practices were as per the University recommendations based on the soil test requirements. In case of paddy the land preparation was made using powertiller for puddling. He was growing high yielding

varieties of paddy and getting yields as per package. The same was true in case of jowar and pulses too. Mr. Chandrashekar continued this type of farming for nearly three cropping years. It can be generally said about the earlier farming situation that, the farm practices were as per the recommendations of the university coupled with farmers experience and thinking. There was use of inorganic chemical fertilizers and pesticides and other disease controlling chemicals. There was use of tractor for ploughing land, total removal of weeds and very less use of organic manures.

Mr. Chandrashekar had noticed several things out of his three years experience in his own farm. The first thing he recognized was that input requirement was increasing year after year, per acre, for getting the same level of yields in any of the crops he grows. This he attributed to the use of highly fertilizer responsive high yielding varieties which depleted natural soil reserves along with the applied chemical fertilizer dosage, making it necessary to apply more and more dosage of fertilizer per unit area. He had recognized that the marginal cost of fertilizer as input was increasing year after year. Similarly the incidence of pest and diseases for high yielding varieties compelled to use more of plant protection chemicals each season the cost of which increased every season. Secondly, he observed that, when he applied inorganic chemicals to check the targeted insects, many non-targeted beneficial insects, which does

help in pollination, were also found killed. This made him develop a strong aversion for the use of chemicals in agriculture.

Added to this, the bitter experience he had growing turmeric, getting very less yields, inspite of use of chemicals, made him think not to use chemicals in future. More over, from the begining he had developed a philosophical mind towards nature and this made him think that use of inorganic chemicals in farming was polluting the farm environment. As he had persued agriculture as his profession to become self dependent, he developed a thinking to do farming without the use of much of purchased inputs. He thought of not to make use of inorganic chemical fertilizers, chemical pesticides/ insecticides in farming. This idea made him to switch over to organic farming from the fourth cropping year onwards.

The Major changes that were brought about in the farming system, taking farm as a unit were,

- (a) to leave the tractor usage
- (b) stop use of chemical fertilizers, insecticides, pesticides and go in search for the organic sources of nutrient supply and pestcontrol and inset and disease control sources.
- (c) stop monocropping of high yielding varieties and go in for wide diversification of plant species to keep the

farm like forest.

- (d) to increase the number of cattle in the cattleshed.
- (e) switching over to perrinnial plantation crops from seasonal/annual crops.
- (f) go in for minimum weeding.

4.3.2 Specific Information :

The entire 13 acres, 20 Guntas of the farm, at present has a plant wealth of more than 825 species, which gives the farm: an appearance of forest, with all wide varieties of species. He has got an enormous interest in the collection, preservation and propagation of plants which are distinct with respect to appearance, quality and price. He has made a long list of the different plant species he possesses in his farm at present.

I COCONUT

Yielding trees 500 (6-30 years), Small trees 200 (3 years).

Tiptur tall varieties are more in number. There are some dwarf varieties also. There are 30 west coast tall varieties plants 30 TXD varieties plants, 5 Gangapani variety plants and 5 Cylonia gigantic nut varieties.

II Areca

Yielding trees 800 (6 years old), Small trees 200 (2 years old), Very small 120 (1 year old) and Yet to be planted 500 (6 months old) (Varieties existing are South Canara local variety, Ratnagiri, Mangala, Sreemangala, Sumangala, Mohitnagar, Dwarf varieties, Singapoor variety)

III Banana

There are around 17 varieties The major one are, Yalakki, paccha, Nanjangud Rasabale, South Canara Rasabale, Selam, Poojebale, Rajabale, Chandrabale, Maduranga and Kallubale.

IV. He has maintained 69 varieties of fruit trees. Some of them are

- a) Sapota-60 trees (varieties Big round, small round, oblong)
- b) Mango- 16 varieties
- c) Lime- 26 plants
- d) Orange- 6 plants
- e) Musambi- 35 plants
- f) Butter fruit- 25 plants
- g) Seethapal- 20 plants
- h) Cauvery coffee variety- 500 plants
- i) Pomogranate- 50 plants
- j) Papaya- 30 plants
- k) Vanilla- 20 plants
- l) Fig- 10 plants

PLATE 5 : INTERCROPPING OF COCONUT-BANANA-TURMERIC IN A.P.
CHANDRASHEKAR'S FARM.

PLATE 6 : CATTLE - MAIN SOURCE OF ORGANIC MANURE THROUGH
COWDUNG. VERMICOMPOST PIT - AN ALTERNATIVE ORGANIC MANURE
SOURCE.



- V. Tuber crops- 13-14 varieties
- VI. Vegetables- 38 types
- VII. Aromatic plants- 24 types
- VIII. Ornamental plants- 51 types
- IX. Grass- 3 types
- X. Flowering plants- 57 types
- XI. Forest plants- 65 types

4.3.3 Alternatives choosen with respect to different crops :

4.3.3.1 Coconut: When Mr. Chandrashekar wanted to switch over to organic farming, the first thing with respect to cropping pattern change he did was to increase the number of coconut trees in the farm. Instead of growing only one variety of coconut, Mr. Chandrashekar has gone for growing a number of plant varieties to maintain diversification. At present there are around 500 yielding trees of 6-30 years age and 200 small trees of about 3 years age. The Tipatur tall varieties are more in number followed by dwarf varieties, west coast long variety plants, 30 TXD variety plants, 5 gangapani and 5 Cylonia gigantic nut variety plants.

Seed selection criteria used for coconut is that the plant should yield a minimum of 100 nuts, each bunch should have at least 25 nuts, it should be a regular bearer, bunch should not hang over and nut should stay firm in the fibre. The plant should be tall and fast growing. The seed treatment

procedure for coconut followed was to buy the coconut seedlings in sand before planting.

After switching over to organic farming, the plant nutrients were supplied through applying about 10-12 tons of Farm Yard Manure per acre of plants. Apart from this, every plant is provided with about 3 kgs of Neem cake. Crop residue of each plant is allowed to be decomposed at the plant base itself.

Apart from this cement channels have been constructed from cattleshed to feed the plants with water used to wash the cattles and the cattleshed, which contain traces of cowdung and cow's urine. PVC pipes have been fitted to flood the plants with cowdung slurry that oozes out of the Biogas plant. This method of plant nutrient supply is being called as "FERTIGATION." Also green leaves from the forest plants are cut and put back to plant's base now and then. At present, he has started to prepare compost using earthworms (vermicompost) on a small scale in cement pits.

To make maximum utilization of space, radiation capture, and water with out competition, many intercrop combinations have been planned with coconut. One part with a combination of coconut-areca-banana Pepper-Beetle vine-turmeric-pumpkin and wildgrass. Second part with a combination of coconut-lime-coffee-tumeric and ginger. Third part with coconut-forest trees and banana. Fourth part with coconut-pomogranate

and Banana and the fifth with coconut-seethaphal-banana and areca. Sprinklers have been used to increase the water use efficiency.

After switching over to organic farming, Mr. Chandrashekar has been following minimum weeding. He does not uproot the weeds but takes care to see that they do not grow taller than the main plant. He feels that weeds are the gifts of nature just like any other plant. They are not problematic as they give cool coverage to soil and prevent soil erosion. They serve as manure when they get decayed and increase waterholding capacity by deep penetration of soil by their roots.

Due to wide varieties of species planted in the farm, the incidence of insect and pest attack was reduced in the initial years. But in the recent years, there has been severe attack by black headed hairy caterpillar in a part of his farm. Many plants are about to die and no solution has been found organically.

Decoction of Calotropis gigantea (Ekka) and Neem leaves crushed in 50 lts water and 25 lts cow's urine, 25 lts soap solution, half a kg. of Neem oil spray has been a failure to control the pest. Even the root injection treatment with chemical has also been a failure. At present he is awaiting to see the results of the biocontrol measure of using natural

enemy which is under trial. Some of the trees have been suffering from the problem of Gummosis even for which alternative has not been found originally.

Due to the sudden stoppage of application of inorganic fertilizers, there was not much variation in the yields of the already existing coconut plants. In the first year of stoppage of chemical fertilizer, the average nut yield was around 80-90 nuts per plant. The yield level sustained with out much variation reaching up to 90-100 nuts per tree. The new plants which were planted when he switched over to organic farming also started yielding about 90-100 nuts per tree and many of the plants are yet to yield.

4.3.3.2 Areca Areca has been planted as a inter crop with coconut. Areca was introduced as a new crop after switching over to organic farming. The varieties choosen for planting areca were south canara local variety, ratnagiri, mangala, sreemangala, sumangala, mohitnagar, dwarf variety and singapore variety.

There are about 800 yielding trees of 6 years age and 200 small trees of 2 years age, 120 very small trees of year age and 500 plants of 6 months age (to be planted). Here, importance is given to selection of local varieties while planting. Care is taken to select nuts for seedlings from mother plants which are healthy and disease free. The farmer has raised his own nursery to get the seedlings for Propagation.

The nutrient supply schedule for Areca is the same as that of coconut. Plants are provided with 10-12 tons of FYM per acre, along with about 3 kgs of Neemcake per plant, dumping crop residues of the same plant at its base and use of green leaves of forest plants. At present he has started developing compost using earthworms (vermiculture) on a small scale. There is arrangement of Sprinklers and drip facility to each Areca plant. Biogas slurry is allowed to be flood to each plant to supply dung in liquid form through PVC pipes, from the biogas plant.

Spraying of decoction prepared using the leaves of Ekka (Calotropis gigantia), neem leaves in 50 lts of water mixed with 25 lts of cow's urine plus 25 lts. of Soap solution and half kg. of Neem oil has found to control many insect mites, bugs, caterpillars on areca. The weeds are not removed by intercultivation. They are allowed to grow in between the plants. The grass that grows is cut and used for feeding cattle weeds are not uprooted. The average yields of the Areca has remained at around 4-5 quintals per acre and there has been not much variation in the yields since they started yielding.

4.3.3.4 Banana:- There are around 4000 plants of Banana with 17 varieties. The important varieties are yalakki paccha nanjangud rasabale, south canara rasabale, budabale, selam, poojebale, rajabale, chandrabale, madhuranga and kallubale. Banana is grown as an inter crop with coconut. The nutrient source made use in Farm Yard manure (around 10-12 tons) per acre, crop residues of the banana plant are put back to its own base.

Spraying of the decoction of Calotropis gigantia and Neem leaves crushed in 50 lts water mixed with 25 lts of cow's urine and 25 lts soap solution and half kg of Neem oil has been found effective against banana rhizome weevil, leaf spot and mosaic diseases. No solution has been found originally to control stem rot and Bunchy top. Chandrashekar cuts and buries the infested plant at other healthy plant's base as a control measure for stem rot and bunchy top. Many plants are exclusively meant for supplying Banana leaves as eating plates. They are cut and sold at around 40 paise per leaf on farm itself. It is very difficult to record the yield of the different varieties of Banana grown in the farm. Each variety has a different maturity time and yield levels are also different. Comparatively, the average bunch yields over the years have been the same as that what he was getting earlier. In some varieties he has recorded increase in bunch weight and increase in number of fingers per bunch. He has

noticed the change in quality of the fruits in terms of taste and sweetness.

4.3.3.5 Paddy: M. Chandrashekar is growing paddy on a small scale. He prepares the paddy field traditional way by using wooden plough and bullocks. Paddy seeds are treated with a coat of cowdung slurry as a seed treatment procedure. The variety that he is using is "Gandhasale" a local variety, which is resistant to blast and many insect and pest attack. High yielding varieties are rejected. Nutrient supply is through Farm yard manure (about 10 Tons per acre), cowdung slurry, Neem Cake, greenleaves of forest trees, Glyricidia and Pongamia. Weeds are removed by hand if they grow taller than the main crop. Weeds are cut and put in the field itself. The Gandhasale paddy is said to have a very good flavor and good keeping quality. The average yields of Gandhasale paddy has been around 15-16 Quintals per acre over the years.

For most of the other crops that he grows in his farm, he does not take up any special seed treatment procedure. For most of the seeds he allows to germinate naturally. He has a nursery to raise areca seedlings and a separate nursery to raise other fruit and flower cuttings or seedlings.

He has raised a number of green leaf manure trees and forest trees all around the farm, including for fencing. In the initial years of switching over to organic farming, When there was shortage of nutrient supply, the Neem cake and

poultry manure had to be purchased from outside. From the second year onwards, as the number of cattle in the cattleshed increased and there was enough dung supply to the entire farm. Apart from this, the concrete Vermicompost pit constructed supplies ready made compost to supply nutrients to plants. Crop residues of each plant i.e., dried leaves dried branches, green branches and leaves are put back at the plant base itself.

Most of the insect pests are left to be controlled naturally as special plant protection measures are not taken up. A biospray that has worked out successfully to control most of the insect pests on all the crops is decoction prepared out of the leaves of (Calotropis gigantea) Ekka and Neem leaves in 50 lts of water mixed with 25 lts of cow's urine plus 25 lts of soap solution with half kg of Neem oil. Hand packing and killing of many insects, bugs is done in case of citrus plants. Wide varieties of plants grown have helped to reduce the incidence of pest and diseases on most of the plants to a larger extent by providing alternative host.

As most of the other crops have been planted after switching over to organic farming, there are no figures to compare with the earlier yields. Most of the plants have started yielding. The yields have been on par with any other average farmer getting in the locality. Over the years,

there has been marginal increase in the yields of different varieties of crops but not reduction.

A well planned cattleshed has been constructed by Mr. Chandrashekar. There are as many as thirteen cross bred cows (Holstein freizen) and four bulls (used for ploughing, transportation and for the propogation of the breed). He says that each cattle is a mini manure factory, supplying the basic material for organic farming--cowdung. Cross bred cows which prefers stallfeeding are ideally suited to organic farming. Apart from the grass and fodder crops grown on farm, they had to be fed from feed purchased from outside. Arrangements have been made to store the fodder at the attick of the shed. Water pipe arrangements have been made to wash each cattle where it stands. Fan arrangement is made to keep away flies and other insect pests.

4.3.4 BENEFITS:

Mr. Chandrashekar has observed many benefits in the farming system after switching over to organic farming.

- 1) Increased efficiency of the farming system as the cost of major inputs over the years is almost nil-(of chemical fertilizers, hybrid seeds and insecticides) with yield levels over the years remaining the same with respect to each crop.

- 2) There is freedom from the external costly chemical inputs.
- 3) Increased soil fertility status over the years reflected in terms of the decreased input supply, sustained yields and increased earthworm population in soil.
- 4) Sustained yield levels (increase with respect to some crops) over the years.
- 5) Increased quality of the farm produce mainly free from poisonous chemicals.
- 6) Most of the crops have developed disease resistance and the incidence of pest and disease has reduced over the years.
- 7) The main advantage is that he has been able to gain self sufficiency in farming system over the years.

Mr. Chandrashekar said that, in any efficient farming system, output should be more per unit of input made use. So, in terms of efficiency, Organic farming is more efficient than modern farming in the sense that the major inputs of modern agriculture namely chemical fertilizers, hybrid seeds, insecticides, pesticides, weedicides are not at all made use in organic farming but, the local alternatives made use are efficient to sustain the yield levels on par with that of the yields obtained in Modern Agriculture. While stressing on the need to increase the yields, efficient and balanced use of crop residues must be made use along with animal wastes.

In organic farming, if a farmer proceeds in a planned way, making preparations for organic nutrient source first and with diversification of plant species, he is pretty certain to get sustained yields over the years or even the marginal increase in yields year after year.

If the farmer becomes self dependent from the external purchased inputs, over the years, the cost of inputs gets reduced heavily. But the yields sustain. This makes the farmers net income per acre or unit area to increase year after year. Thus organic farming is economical too.

As there is no use of poisonous chemicals in the farm, the farm environment is pollution free and beneficial insects are not harmed, thus it is ecologically sound too.

Chandrashekar presents a number of arguments to say that organic farming is far better than modern agriculture.

- 1) Agriculture has thousands of years of history where as Modern agriculture has decades of history. With the decades, unknown diseases, insect attacks have increased, due to increased use of high yielding varieties, chemical fertilizers and insecticides.
- 2) Over the years agricultural yields have decreased or have become stagnant.
- 3) In the name of increased food production we have harmed and killed many animals, birds, insects and broken food chains and poisoned environment.

- 4) No plant can yield beyond its maximum potential. The increased food production statistics can be attributed to increased land area, irrigation facility and full time participation of labourers (management).
- 5) If the food production drops in the initial years, it is not the duty of the farmers to feed the mouths of the growing population. He argues that, one who cannot lift up the farmers above the poverty line has no right to ask them to feed their stomach.

4.3.5 Constraints encountered during transition

In the initial years he faced the problem of timely information on what to do and how to do it, at each and every step. At the same time he lacked any technical information or assistance from the Scientists too. There was problem of grazing cattle which use to destroy the crop. There was also problem of boarder dispute when he wanted to put the fence round the farm and there was also non-cooperation from the government officials and often there were problem of theft too. He had to think a lot and try out decoction sprays of several plant leaves in several combinations against several insect pests. Many of the plant pests and diseases got no organic remedies like the Black headed hairy caterpillar for Coconut and bunchy top in case of Banana.

It was a big problem to plan roads with in the farm and also approach roads to farm. Even today there is no tar road to his farm from the main road. During rainy season, it is very difficult to travel in the 3 kilometers approach road to his farm.

4.3.6 suggestions to prospective adopters :

Mr.Chadrashekar suggest the fellow farmers who would like to take up organic farming, many things. First thing he suggests is not to believe whatever he says or the scientists say. He asks the farmers to think several times before they act ,and asks to observe the longterm records in nature. He asks the farmers to use commonsense and question themselves before each act and try to get satisfactory solution. He asks not to copy blindly what one has tried outsuccessfully and try out experiments independently if not suddenly, gradually one can shiftover to organic farming where one must be prepared to loose something initially to gain a lot in the near future so that one finds the light of truth for himself. For this one should observe and learn from the forests and try to raise fruitful trees. Farmer should discourage tractor use and start using wooden ploughs. Before switching over to organic farming, one should develop efficient stall feeding of animals.

Weeds should not be totally removed but must be allowed to grow in the fields. But their growth should not exceed that of the main crop. Top soil is saved by creating environment needed to increase the earthworm population. Efforts may be made by farmers to collect townwaste from cities in the form of vermicompost. Farmers should think about becoming self dependent and switchover to "organic farming" as "organic farming" is like "swimming along the stream."

4.3.7 Future plans of Mr. A.P. Chadrashekar:

Mr.A.P.Chadrashekar has idea to experiment the effect of various combinations of organic sources composted separately in different cement pits or dug pits on the growth of the plants.

4.4 CASE 4 : Mr. VITTALA RAO.

4.4.1

Mr. E. Vittala Rao is 67 years old farmer who has been pursuing organic farming at a tiny village named Kinya of Mangalore Taluk, dakshina kannada district. Mr. Rao has passed intermediate in Arts. He is pursuing agriculture as his profession since 1945.

There are six members in the joint family of Mr. Rao. Mrs. Tara Wife; Mr. Sameera- first son; Mrs. Lalitha- (daughter in law)- wife of Sameera. Mr. Showri- Second son. and a grandson (son of Sameera).

Mr. Rao has a holdings of 6 acres wetlands, 3 acres areca garden, 8 1/2 acres dryland and a small area of hilly land with many forest trees as a source of green leaf manure along with wood.

Mr. Rao has a very good organizational participation

- (1) He is the convenior of a Farm experience club at Mangalore.
- (2) He is the district organizer of the "save western ghats" movement.
- (3) He is a member of the district consultative committee of the Zillaparishad.
- (4) He is a member of the subject committee of the federation of NGOs.

- (5) He is a member of SCAD- South Canara Agricultural Development society.
- (6) He is also a member of areca marketing society and taluk agricultural produce marketing society.
- (7) He is the ex-member of the block development advisory committee and the village committees.

Mr. Rao is a regular reader of newspaper. He listens to radio often. He has no Television set at his farm house. He is a regular reader and a life member of many agricultural journals like Adikepatrike, Spice India, Kissan World and science for villages.

Mr. Rao has very little extension participation with respect to the extension activities conducted by the Department of Agriculture. He reports that he is receiving less invitations compared to early, after switching over to organic farming, as he opposes the various government policies when ever he attends such functions.

Mr. Rao is a very strong supporter of the "Save Environment" movement. He makes himself free from farm work to create awareness among the farmers about the environmental hazards caused by the continuous injudicious use of poisonous chemicals in farming. He actively takes part in conducting workshops to educate farmers about the principles of organic farming and about practices that can be followed.

Mr. Rao has great respect for our ancient Indian tradition and appreciates all the good practices that exists in our culture. He feels pity that in the name of "modern" Indians are neglecting their rich values and culture. He particularly points out that farmers are neglecting those rich ancient traditional agricultural technologies which are ideally suitable to Indian condition, in the name of modern agriculture.

Mr. Rao pursued agriculture as his profession as early in 1945. He loved nature and the natural beauty of his locality. Added to this he had the skill, ability and desire to design something new. Being impressed by the pleasant beauty of the nature, he decided to become an Agriculturist after his studies. As he was put up at city for his studies he had little farming experience.

As his area basically belonged to the category of low fertility, he used more and more of chemical fertilizers to get maximum yield in any crop he use to grow. He was following the directions and packages given by the government Agriculture department very strictly. When the Japan method of farming was introduced in Agriculture, he was also one of the farmers to initially adopt it.

In the initial years of switching over to modern agriculture, he was getting almost double the yields than what his neighbouring farmers use to get. He had taken up

high yielding varieties of paddy like Thaichung-65, Thaichung native-1, IR-8. He was getting on an average 25-28 quintals paddy per acre. Areca yields were 18-20 quintals per acre, Coconut yields were 80-90 nuts per plant, Banana yields were 10-15 tons per acre, 10-15 kgs raw cashew nuts per tree. But, over the years, all the high yielding varieties of crops suffered from many diseases and pest attack. Extension workers of the Agricultural department recommended the use of chemicals like D.D.T and Endrin. In the first incidence when Mr. Rao applied D.D.T and endrin on crops, he was able to see along with targeted insect pests many butterflies, frogs, snakes too were dead in the field. Due to the chemical spray, he lost two honey bee families as well. In spite of this, Mr. Rao continued the use of chemicals for some more years. One day he happened to see all the fish in a well in the farm dead. The next day he saw many cats and birds dead. He happened to notice that one of his labourers had washed the chemical spraying equipment in the well. In the due course of time, Mr. Rao was able to observe that many insects had developed resistance to popular chemical and were never killed inspite of application of chemical in strong dosages. In the mean time, the Agriculture department workers were giving many directions to use nitrogenous fertilizers, potash, phosphate and compound fertilizers along with emphasizing on the use of growth regulators. The increased death of many beneficial animals made Mr. Rao to think

seriously about how to overcome the problem. He was able to notice that Government was emphasizing only on the usage of HYV's fertilizer and chemicals and giving least emphasis to activities like processing, transportation, storage fencing and other agricultural developmental activities. Least emphasis was given to soil health or avoiding environmental pollution. In the mean time he happened to read books namely "Silent spring" and "Hidden persuaders" which greatly influenced him to think about nature and the ill effects of the use of agricultural chemicals. He developed a strong aversion over the government policies which he thought had become a middleman for multinationals. In 1965 when the Government introduced permit system to distribute the inorganic fertilizers due to supply problem, he rejected to apply for the permit. He thought of not to apply any chemical fertilizer to crops. From 1967 on wards, he stopped applying plant protection chemicals totally.

From 1968 onwards, Mr. Rao is not at all making use of any chemical fertilizer or plant protection chemicals in his farm. He suddenly stopped the usage of chemicals as an act of opposition against the government policies.

When Mr. Rao stopped using inorganic fertilizers, insecticides, pesticides, initially, there was heavy incidence of pest and disease on all crops. For many years he did not try to take any control measure and left the pest and

diseases to be controlled naturally. There was reduction in the yield levels over more than 50% of the previous yield levels.

Over the years, Mr. Rao started searching out various organic sources as alternatives to chemical fertilizers insecticides and pesticides. When Mr. Rao switched over to organic farming, he had a healthy wealth of 30 cows. He experienced that dairying was not profitable in the locality. To start with, to supply Organic source of cowdung they were very much helpful to improve soil fertility. Now he has sold almost all the cows and he meets nutrient requirement from green leaves and crop residues.

4.4.2 Alternatives chosen with respect to different crops

Paddy:

4.4.2.1

For the preparation of land or for puddling the land, for many number of years, he made use power tiller. Now he makes use of Bullock power to puddle the paddy fields. Mr. Rao has left growing of high yielding varieties of paddy which he used to grow earlier. Now he has switched over to agricultural departmental improved local varieties like PTB-20m MGL 1 and 2 and Shakti. Shakti is used for first crop (kharif) PTB-20, MGL 1 and 2 are grown as rabi crops. Intermediate patta or much crop is grown between Kharif and Rabi. Seed rate has been reduced with respect to local

variety. It is 20 kgs per acre (whereas others make use of 40 kgs per acre).

About 3 lts of cow's urine is mixed with 10 lts of water and the seeds to be sown are drenched in it. After 12 hours of drenching, seeds are washed in fresh water and allowed to be kept in shade overnight. Next day the seeds are given a thick layer of cowdung slurry and a press of basket is kept over the seeds. Standing water Nursery is practiced for paddy. Land is puddled four times and then leveled. At the time of puddling Organic manure is applied and allowed to regenerate by rest. In the initial years he has made use of about 10 tons of farmyard manure per acre of paddy field. At the time of puddling, he incorporates green leaves of many forest trees collected from the hilly area. He cuts them and puddles them with FYM or compost. He has also supplemented the nutrients with poultry manure in the initial years and made use of rock phosphate for the preparation of compost.

Presently he is making use of a method called Nadep method of composting- a quick method of composting where compost gets ready within a duration of 3 months. The local varieties used are resistant to many diseases and pest attacks. The incidence of pest and disease has come down over more than 75 percent when compared to the earlier incidence. He reports that in the recent years, the incidence of disease and pest attack is very less.

Mr. Rao explains that as the lands of his area belong to low fertility category basically, after switching over to organic farming the yields were very bad for years together. The yields got reduced over more than 50 percent of what he was getting earlier in modern agriculture. It remained at an average yield level of 10-11 quintals per acre. In the recent 5-6 years, there has been improvement in the yield levels from 11 quintals per acre to average of 14-15 quintal per acre. This he attributes it to the increased use of poultry manure and rock phosphate used for composting.

Mr. Rao said that, even though the yield levels are less, he says that the quality of rice in terms of taste has improved over the years and the food is free from poisonous chemical residues.

Apart from paddy, the other main crops of the farm are areca, coconut, banana, cashew, tapioca, pepper and cardamom. A number of fruit trees like chikoo, guava, mango have been intercropped with main crops. A number of forest trees and fruit trees are found on the hilly lands.

4.4.2.2 Areca: At present there are about 1300 yielding trees and 600 non-yielding trees. When Mr. Rao suddenly switched over to Organic farming, as he stopped applying nitrogenous fertilizers, the yield levels came down to as low as 10 quintal per acre in the initial year. Earlier he use to

remove the weeds grown under the trees by intercultivation. Now, after switching over to Organic farming he does not uproot weeds when they grow tall they are cut and fed to cattle.

Mr. Sameera, son of Mr. Rao has designed a weed cutter which can cut the weeds just on to the surface level without much strain. The 'L' shaped iron blade tool, has a smooth edge on one side and serrated edge on the other side. A person can casually walk in the garden and just swing the tool at ground level over the weeds. Weeds get cut easily. pepper, cardamom, banana, jack have been intercropped with areca.

In the initial years Mr. Rao supplied nutrients only through FYM. Over the years he adopted Nadep method of composting and he started applying about a basket of compost to each plant base. Apart from this he started putting the crop residues of each areca plant to its own base.

There was incidence of "Kole" disease or fruit rot for which Mr. Rao could not take up any control measure organically. He allowed it to be controlled naturally.

Mr. Sameera has designed a iron drum device for feeding plants with cowdung in liquid form through irrigation pipes. The process is being called as fertigation. The drum selected is an ordinary large kerosene drum (barrel). A layer of

PLATE 7A : MR. SAMEERA, SON OF VITTALA RAO SHOWING THE
FERTIGATION DRUM DESIGNED BY HIM.

PLATE 7B : METAL SEIVE ATTACHED TO FERTIGATION DRUM TO
FILTER CROP RESIDUES.



cement upto an inch in convex shape is put at the bottom of the drum with a hole at the centre of the bottom. An inlet connected to a water pipe (source) is attached to it. A half feet height, 1/4 inch bottomed seive which exactly fits in the drum is designed. A clamp which holds the seive at the top of the drum is fitted. The seive when kept inside the drum exactly fits to the brim of the drum. Cowdung collected once in 15 days is dumped into this seive. Drum is placed at an elevated place. Water is allowed to drum both from the top and bottom of the drum simultaneously. This process mixes the cowdung thoroughly with water. An outlet at the bottom of the drum on one side is connected to pipes which run down the elevated place connected down to the irrigation channels made to each plant. Cowdung in solution form is made to be supplied to each plant in this way. There is a valve to the outlet to regulate the flow of solution. The mesh helps to filter the crop residues and other dust mixed with cowdung which may block the main supply pipes. Each plant is fed with calculated amount of solution regulated through channels.

In the recent 5-6 years, apart from cowdung source, Mr. Rao has been making use of poultry manure and rockphosphate to be supplied to each plant. Jack and teak plants have been put on the borders of areca garden to act as wind breaks.

4.4.2.3 Coconut: There are about 160 trees out of which 110 are yielding. Due to the sudden stoppage of inorganic chemical fertilizer, the crop yield levels came down below 80 nuts per tree, in the initial year. After switching over to organic farming he left inter cultivation between the rows. He has intercropped banana, jack, pepper and teak with coconut.

For nearly 10-15 years the main plant nutrient source was FYM (One basket to each plant) crop residues of the same plant cut and buried at its own base. Later on he started applying compost prepared using Nadep Method. In the recent 4-5 years he has started using poultry manure and rockphosphate along with compost. Apart from this he makes use of green leaves from forest trees cut and put at the plant base. He also feeds the plants with cowdung in liquid form through irrigation channels (called as fertigation). Over the years the yield levels sustained at around 100 nuts per tree. In the recent 4-5 years, the nut yields have increased upto 125-150 nuts per tree.

4.4.2.4 Pepper: Pepper vines have been intercropped with areca and coconut. The nutrients supplied to areca or coconut plant will be the nutrient source for pepper too. Even after switching over to organic farming there was severe incidence of disease in case of pepper.

In the initial year of switching over to organic farming the pepper yields got reduced over more than 50percent compared to earlier yields. Nearly for 10-15 years there was 30-40percent yield reduction and in the recent 3-4 years the yields are getting sustained with original yield levels.

There was problem of slow wilt for which Mr. Rao sprayed 10-12 litres of fresh cow's urine to each plant. The disease has been under control. For controlling leaf curl disease, Mr. Rao has used decoction prepared out of Kamakasturi leaves. Even decoction prepared out of Marigold plant leaves was also effective. About one kg of leaves are crushed using a pestle and mortar and the concentrated leaf extract is collected and diluted with ten litres of water. Each plant is sprayed with such prepared decoction. There is problem of fast wilt also. Spraying of decoction of many plant leaves mixed with neem oil and soap water has been tried. But the disease could not be controlled. Use of Bordo mixture has been the only remedy.

4.4.2.5 Banana: Banana has been intercropped with areca and coconut. Shade is a problem to grow many banana varieties.

Earlier he was growing high yielding varieties recommended by the agricultural department. There was problem of wilt and bunchy top. More over they were not shade tolerant. Now he has switched over to varieties like kadal and puttabale which are shade tolerant and resistant to

panama wilt and bunchy top. Weeds are allowed to grow but not taller than the main plant. Nutrient source is cowdung supplied to plants through fertigation, one basket of compost (prepared using nadeb method), Poultry manure and Rockphosphate. Over the years, the bunch weight has sustained a weight of 10-12 kgs.

4.4.3 Other Crops :

Due to wide varied activities, he was not able to pay much care to tapioca and cashew. Tapioca has been intercropped with cashew in dry land. There was severe growth of weeds. Plants were left with out much care.

Mr. Rao grows wide varieties of vegetables in a small plot of 10 cents for home consumption. Mr. Rao says that as monocropping is not ideal for organic farming, there would be marketing problem for vegetables grown in mixture organically and thus he has not tried vegetables on a large scale.

Vegetables seeds are treated with a layer of cowdung slurry before sowing. Particularly, the Gourd seeds are kept in small clods of mixture of cowdung and anthill mud filled with little prepared compost inside. Seeds are allowed to germinate in the clods and then transplanted at the right place. He does hand picking of tics, mites, borer on vegetables and crushes them.

Mr. Rao has a small hilly land where he has planted many multipurpose forest trees. (which just looks like a thick forest.) He has opened about 400 pits to plant teak.

Trees serve as a source of fuel for boiling paddy, bathroom fuel, wood for making different tools. A number of small wild animals have started making living in this mini forest. Green leaves from forest trees have served as green leaf manure.

Mr. Rao explains in detail about the basic principles and philosophy which he believes in and based on which he is trying to build his farming techniques. The basic principle of his philosophy, which he believes in is that, "soil is a living organic entity." The living soil is produced on the surface of the mother earth at most a meter in depth. For sustenance of "LIFE", the upper one meter surface of the earth is of utmost importance. It is in this layer the primary inorganic material, which makes up to the rest of the Earth, is being continuously brought into organic chain and finally into life forms. A number of agents like Heat, Cold, rain, wind, thunder lightening aid along in this formation of organic substance from inorganic primary stuff of the earth. This transformation from the inorganic chain into the organic chain cannot be speeded up more than at a certain rate, without violent or negative reactions taking place. It is very difficult to measure this rate of change of nature by

human time scale. The final organic form of change over from the inorganic primary stuff in evolution of life. It is this living organic part of the earth is what is being neglected by the farmers and scientists.

There is need to maintain diversification of species of plants and animals which due to economic motivation is being neglected in Modern Agriculture mainly due to profit motive. He says that, it is important principle to understand the production cycles of nature and her methods of recycling matter. This will lead to efficient use of energy and maintenance of diversity of life health and vigour. Farming in co-operation with nature and not domination of nature should be the aim. His main principle of farming is to feed the soil with healthy and living organic matter instead of unhealthy inorganic food directly to the plants. He tries to return as much of harvest back to the soil. Selection of season bound crops with resistant varieties is another important principle.

Mr. Rao feels that due to wide diversified activities he was not able to pay too much of attention to farming. He does not feel that his farm is the ideal one in all respects. He said that basically soils of his locality are of poor fertility category one, the soils needed more number of years to regain their fertility status through the supply of organic nutrient source. Yield levels are increasing and

there is no decrease in the yield levels has been overcome by the decreased input costs on inorganic fertilizers and plant protection chemicals and high yielding variety of seeds. As most of the crops are of perennial nature the labour requirement has been less over the year. When he suddenly stopped using fertilizers and insecticides, initially, there was heavy incidence of pest and diseases on all crops. He did not try to take any control measure.

4.4.4 Constraints encountered during transition :

Mr. Rao lists a number of constraints he faced and has been facing after he switched over to organic farming.

- 1) Basically there was problem of correct and suitable information about the farming methods
- 2) Transition phase is very difficult as farmer must be prepared and must be capable of bearing heavy losses
- 3) There is problem of suitable varieties of seeds
- 4) Forced to buy seeds from other farmers who apply inorganic fertilizers and chemicals
- 5) Economic gains are not on par with what he was getting earlier
- 6) Training the labourers who are not used to the new methods needs more attention and time
- 7) Soil was hard and water holding capacity of soil had come down there was need for heavy liming. It took 4-5 years to sustain soil

8) Harvesting season has been extended

Mr. Rao gives a big list of constraints our farmers have to switch over to organic farming.

1. Our hereditary rules and regulations.
2. Problem of illiteracy of farmers.
3. Greedyness of the agribusiness people.
4. Ignorance of the users of agricultural inputs.
5. Heavy dependence and faith in Money.
6. Belief that all costly items are of good quality.
7. False belief that man is independent and is master and superior to nature.
8. Lack of unity and integrity among farmers in the name of cast, religion, crop, wealth, education etc.,
9. Exploitation of small and marginal farmers by the rich.
10. Rich and educated farmers lack professional thinking and responsibility.
11. Lack of publicity and proper recording of the alternatives technologies that exist and are under usage.
12. Lack of correct knowledge about the real problem in agriculture for the educational and research institutions.
13. Lack of promptness among the government officials and beurocrats.
14. Swinging government policies.
15. Problem of organically grown seeds and seedlings

16. Problem of market for organically grown produce.
17. No proper protection for the consumers.
18. Lack of investment and courage to fulfil the probable losses during the initial years.
19. Organic or natural farming has not received much recognition it needs as an alternative farming methods.

4.4.5 Benefits of Organic farming :

Mr. Rao mentions many advantages he has accrued after switching over to organic farming. Basically he has become free from external supplier of agricultural inputs. He is now free from expenditures on inorganic fertilizers and plant protection chemicals. Secondly, he feels that there is reduced tension on his body and mind as the wholesale killing of insects and other animals by chemical usage was against his nature.

After switching over to organic farming his mind is unhooked from the idea of "drug" of chemical usage in Modern Agriculture. He feels that he has begun to look more closely at nature and work has become more interesting, less taxing and more relaxed. The violence of harvest has been observed to be more steady, consistent than in modern agriculture.

4.4.6 Practicing organic farming had many disadvantages too added to the constraints listed above

(1) to get basic knowledge about organic farming he had to search many books and adopt it. He had to gain the fundamental knowledge of Natural Science like Biology and others. Using the textual knowledge he had to form his own techniques. He faced many failures and disappointments during trying his own methods.

(2) He had to develop physical, mental and moral courage and capacity to with stand the economic losses and develop strong patience to wait for a long time to get encouraging results.

(3) When he wanted to buy seeds and planting material he was forced to go to people who practiced modern agriculture.

(4) He reports that he has not been able to leave out chemical methods for eradicating household pests and insects like mosquitoes flies, cockroaches, weevils, rats, mice etc.,

(5) In terms of financial returns, organic farming has not yet given him the complete return which many farmers currently are getting in modern agriculture.

(6) Farm labourers are unable to grasp the main principles of organic farming. Thus his instructions are not translated into action. He had to give lot of personal attention.

(7) He was side lined always in many general farmers meetings being termed as anti-establishment. Many farmers discouraged him with statements like organic farming is not a farming technique.

(8) Many times he was discouraged by farmers groups thinking that he is an intellectual dreamer with only ideas and no practicality.

(9) It was difficult in the initial years to cope up with organic farming, as all his neighbouring farmers continued with Modern Agriculture. Pest, attacking the crops of neighbouring farmers were sure to attack the crops in his field.

4.4.7 Suggestions to Prospective Adopters :

Out of several years of experience in organic farming, Mr. Vittala Rao gives out some suggestions to his fellow farmers.

- (1) If a farmer can not avoid use of chemical fertilizers, then let him bring the chemical fertilizer into organic chain before applying to main crop.
- (2) Keep the soils healthy and full of organic matter.
- (3) Do not disturb the soils unless absolutely necessary.
- (4) Think of alternatives to ploughing.
- (5) Avoid chemical insecticides completely.
- (6) Reduce monocropping and develop multiple intercropping.
- (7) Try to market fully processed and value added items from the farm which will be high in value and low in volume. Supply all the byproducts and waste materials obtained in processing on the farm back to soil.

(8) Tryout the use of Bio-fertilizers (azolla, BGA, Rhizobium, Azatobactor, etc.,) earthworm (vermi-composting) and other methods to build up the soil fertility.

Organic farming, to cope up with the future needs of food supply, Mr. V. Rao feels that many attitudinal changes are essential among both farming and consumer communities. Basically people should stop going in for luxury foods, meat and learn to eat greens and prevent wastage of foods. Sea and inland water bodies have to be properly utilized. Fullest use of compostable urban waste, drainage water and sludge must be made.

4.4.8 Future ideas:

Mr. Rao is planning to process coconut on farm and extract coconut oil from the nuts in near future.

4.5 CASE 5: Mr. RAMESH JOSHI

4.5.1 General information

Mr. Ramesh Joshi is a young organic farmer of 28 years age who has been pursuing organic farming at Yalavatti village of Shirahatti taluk of Dharwad district. Mr. Joshi has passed out I.T.I. (Mechanical draftsman) course. He has been practicing organic farming since six years.

Mr. Joshi hails from an agricultural family. After completion of his studies he settled down at his native to pursue Agriculture as his profession. There are seven members in the joint family of Mr. Joshi. Umesh Joshi (30 years); brother, Mrs. Uma (28 years) wife of Umesh Joshi, Mrs. Rekha (19 years) wife of Ramesh Joshi, Mrs. Parvathi Bai (60 years)-Mother, Pradeep (4 years) son of Umesh Joshi and Prathibha (2 years) daughter of Umesh Joshi.

Mr. Joshi is a member of voluntary organisations which works for spreading organic farming technologies namely, "Dharitri" and "Krishnakrishi". He takes part regularly in the activities of Dharitri and Krishnakrishi. Radio listening is restricted to only farm programmes and T.V. viewing is restricted to U.G.C and farm based programmes. Joshi is a subscriber and a regular reader of the farm journals like Adikepatrike, Spice India, Eleia & New farmer and Grower.

Mr. Joshi has little extension contact and extension participation too. He has developed philosophical attitude of looking at nature. He loves and worships soil and nature. He is a strong believer of the God and offers daily prayers. He aspires to lead a pious life free from jealousy, hateracy and other bad human qualities that hinder human development.

When Mr. Joshi finished his studies, he joined hands with his elder brother to pursue agriculture as his profession. When Joshi showed active interest in farming his brother started guiding him- keeping him self off from much of the farm work. He assisted him wherever he had any difficulty.

Mr. Joshi has 32 acres of dryland situated a Kilometer away from the village in the outskirts. The entire 32 acres land has no irrigation facility and purely dependent on rains for farming.

When Joshi started with farming, his brother was practicing modern agriculture. Even Mr. Joshi too followed what his brother practiced. He had a strong conviction that crops cannot be grown without the use of inorganic chemical fertilizers.

In modern agriculture Mr. Joshi used to take up crops like, Groundnut, chilly, cotton, mulchcrops, cowpea during kharif rains & wheat, hybrid maize, groundnut, fodder maize

during Rabi rains. During Kharif about 4-5 acres were allotted to Groundnut and 2 acres during Rabi. Tractor was made use to plough the land inorganic nutrients were supplied as per package. The average ground nut yields were about 4-5 quintals per acres. Hybrid maize was grown in about 6 acres with an average yield of 3 quintals per acre. Spreading variety of groundnut was grown in about 6-7 acres with an average yield of 6 quintals per acre. Wheat was grown in about 6-7 acres with an average yield of 6 quintals per acre. Chilly was grown in about 3 acres of land with an average yields of 2 quintals per acre. Hybrid cotton was grown in about 6 acres with an average yield of 4 quintals per acre. Various crops like cowpea, coriander horsegram, castor, fodder maize etc., were grown in mixture in the rest of the area. About an acre of land was left vacant for water capture.

Mr. Joshi was farming happily with whatever the yields he was getting out of modern agriculture. The farming practices were as per package and there was not much problem with respect to growing any crop. The soil is black and used to crack heavily. There was problem of top soil erosion along the slopes during heavy rains. The main constraints was that of gambling with timely rains.

Mr. Joshi, when he started with farming, he was not at all aware of anything about organic farming. He even did not

attend talks arranged on organic farming in his own village. He had an idea to pursue Dairying as profession as he had developed interest in it as a prospective enterprise. He wanted to get loan from local commercial bank. Bank officials suggested him to undergo some practical training in dairying. When he went for practical training he happened to meet one, Mr. Pradeep Tapas, a specialist in organic farming, who has gained name by conducting a number of experiments in this fields at home and abroad. Mr. Pradeep Tapas's words were instrumental in making him realize the hazards caused by modern agriculture and the benefits of farming organically. He was told about the effects of continuous use of inorganic fertilizers on the soil health and the ill-effects of continuous application of chemicals on the environment plants, animals, insects, soil & food.

After getting convinced about organic farming, Mr. Joshi consulted a number of his friends and relatives for suggestions whether or not to go in for organic farming. Most of them discouraged him.(to go for organic farming).

In the mean time he happened to read the book "One straw revolution" of Mr. Masanobu Fukuoka of Japan which documents his experiments in natural farming. Later he made visits to a number of practicing farmers and discussed about the pros and cons. He also seeked suggestions from various voluntary organisations. He attended seminars & exhibition conducted on

organic farming at G.K.V.K, UAS. Bangalore, by voluntary organisation "Chintanabalaga" - an association formed by students and teachers interested in organic farming.

4.5.2 Specific information

After switching over to organic farming, Mr. Joshi has not made any changes in the original cropping pattern. The major changes have been brought about in the nutrient supply method and plant protection chemical usage. Tractor usage has been left totally.

4.5.3 Alternatives with respect to different crops:

4.5.3.1 Wheat:

Land preparation is made by making use of wooden plough as in traditional way by using bullocks. As local variety of seeds are not available, the same high yielding varieties, which was used earlier are made use. Seeds are treated with cowdung slurry for seed treatment. Local seed drills namely kodala (for 2 rows), savadatti koorige (for 4 rows) and Muggarige (for 3 rows) are made use for sowing. Sowing time is noted down from local panchanga or local calendar (astrological calendar). The sowing time is adjusted in such a way that seeds germinate on the day of amavasya or newmoon day. Before sowing, the field is cleared off completely from weeds and weeds are pooled and allowed to decay in farmyard manure pits.

Cowdung is the main source of manure made use and no special method of composting is followed. Initially, Mr. Joshi had to purchase various organic inputs from fellow farmers like farmyard manure, sheep manure, poultry manure. He use to apply about 13-14 cart loads of Farm yard manure to one acre of prepared land. He use to apply 1-2 card loads of poultry manure or sheep manure per acre once the crop grows for about one to one and a half month - per acre of land. On the successive years, he use to grow legume mulch crops in the off season like cowpea, redgram, horsegram and use to mix the entire crop in to soil in the main season by plowing the land together with the mulch crop. Wheat was grown as a single crop (not mixed crop)

There was no severe incidence of pests & diseases as such reported by Mr. Joshi over the years of switching over to organic farming. Most of the insect pests are allowed to be controlled naturally. He has not taken up any special plant protection measures to control any pest or disease. He has sprayed the decoction of Lantana leaves (Lantana camera) on wheat against mites and has been successful in controlling it by hundred percent. Hand weeding is followed to remove weeds. Weeds are not uprooted but cut and pooled and allowed to decay in compost pits.

In the first year of switching over to organic farming, even though the incidence of pest or disease did not exist,

there was about 40 percent reduction in the original yields. As against the original yields of 8 quintal per acre, in the first year he got around 5 quintals per acre. Over the years, the yields have increased upto 6-6.5 quintals per acre.

4.5.3.2 Ground nut:

Two varieties of ground nut are grown one is the general high yielding variety and the other one is the spreading variety (called as Habbushenga). Groundnut too is grown as a sole crop and not as a mixed crop. Healthy seeds are selected and treated with cowdung slurry before sowing. Land is prepared by making use of wooden plough and soil is brought to fine tilth. Weeds are totally removed. Sowing is done manually seed drills are not used. Ground nut is grown in about 5 acres during kharif and 2 acres during Rabi. Spreading variety is grown in about 7 acres during Kharif rains. Sowing of seeds during Kharif or rabi rains is tried to be adjusted so that the seeds germinate on the day of Amavasya or Newmoon day.

Farm yard manure prepared by dumping cowdung and fodder residues daily in a large pit is supplied to field well prepared by plowing. About 13-14 cart loads of FYM is applied to one acre of prepared land. The additional nutrient requirement was met through using one to two cart loads per acre of sheep manure or poultry manure and Neem

cake leguminous crops like cowpea, horsegram, redgram soya are grown as mulch crops to be incorporated into the soil during the main season.

Hand weeding is followed to remove weeds. Weeds are removed only if they grow taller than the main crop only. The weeds are not uprooted but are cut to the ground level. Over the years Mr. Joshi has not recorded any incidence of pest or disease. No special plant protection efforts have been taken up over the years.

The Yield of Ground nut drastically came down to average of .3 quintals per acre from earlier 4-5 quintals yield per acre. Nearly for consecutive four years the yield levels remained at around 3 quintals per acre. From the 5th year onwards the yields have increased upto 4 quintals per acre and the current yields are about 4 quintals per acre. Spreading variety of Ground nut yield came down to 2.5 quintals per acre in the initial year and in the sixth year, the yield level has remained at 3.5 quintals per acre.

4.5.3.3 Hybrid jowar: The various cultural operations followed are almost on par with Ground nut. Line sowing of seeds is followed manually in well prepared land using wooden plough. Land is completely kept free from weeds before sowing. Regular intercultivation between two rows is followed using local cultivators namely dummante, iragakunte or pilagunte.

**PLATE 8 : MIXED CROPPING OF CHILLY AND COTTON IN DRYLAND FARM
OF RAMESH JOSHI.**



Plant Nutrients are supplied through FYM (about 13-14 cart loads per acre of land). Sheep or poultry manure and Neem cake are supplemented. Insect attack on the crop is allowed to be controlled naturally and over the years there has been no economic loss due to either insect-pest attack or disease incidence.

In the initial year, the yield of jowar came down to 2.5 quintal from 3 quintal and the same yield level of 2.5 quintals has been obtained up to fifth year and during the sixth year the yield has increased up to 3 Quintals per acre.

4.5.3.4 Other crops

Cotton-Chilly-Onion are grown as mixed crops in an area of 9-10 acres.

There is incidence of flower falling and fruit rot in case of chilly. No remedy has been found organically. He has put coriander and Garlic as companion plants (odorants) with Chilly-Cotton and Onion mixed crop. He has left the disease to be controlled naturally.

The average yields of chilly has come down to 1 quintal per acre in the first year. The yield level has increased up to 1.5 quintals during the fifth and the sixth year of farming.

Cotton yield during the initial year was 2 quintals per acre which increased upto 3,5 quintals per acre during the 5th and 6th cropping year.

Another mixed cropping combination practiced by Mr. Joshi is Pea-Jowar and castor. The yield and other details not reported.

Mr. Joshi has an animal wealth of a pair of bullocks, 3 local cows and calf. He has a bullock cart and many wooden ploughs. He has many local seeds drills like kodala (for 2 rows) savadatti kcorige (for 4 rows) and muggarige (for 3 rows)

They make use of many local cultivators like (1) harago kunte (2) menasina kunte (3) dummante (4) hattigunte (5) irakagunte and (6) pilagunte.

The major expenses during a cropping year are made on purchase of Farm Yard manure poultry manure or sheep manure and Neem cake. (During the cropping year 992, Mr. Joshi has paid Rs. 25/- per cart load of FYM and purchased Neem cake worth Rs. 2500/-. The produce from farming, after sparing for meeting the home requirements are either sold within the village or near by Taluk Market.

4.5.4 Benefits of organic farming

After switching over to organic farming Mr. Joshi has noticed benefits like

- (1) freedom from major chemical inputs (inorganic inputs) as he has left the use of inorganic chemicals totally after switching over to organic farming.
- (2) there has been drastic reduction in the cost of major inputs over the years (inorganic fertilizers and plant protection chemicals.)
- (3) over the years there has been noticeable changes in the quality of the farm produce particularly increase in taste and wholesomeness of the food.
- (4) In spite of no special plant protection measures there is no severe incidence of disease and pest attack on any crop over the years.
- (5) over the years the yield levels are getting sustained and increasing too.

4.5.5 Constraints encountered during transition

The main constraints faced by Mr. Joshi during transition was reduced yields during the initial years. The crop yields got reduced by more than 50 percent in case of some crops. Nearly 3-4 years he repented for having switched over to organic farming. In the initial year he had lost hope of getting even a single grain from the field. Added to this, he received blames and scholdings from the family members and neighbouring farmers. He developed confidence from the fourth cropping year onwards when the yield levels started increasing. Also, there was no any special

incentives to the produce grown organically (i. e., special market facility) in terms of price.

Mr. Joshi feels that, switching over to organic farming has helped him to develop a philosophical approach of looking at soil. He feels that stopping application of chemicals helps to give life to soil. Now, he cares to increase soil health rather than to maximize yields. He feels that like a healthy man resists diseases, healthy soil stands diseases.

Organic farming has helped Mr. Joshi to feel that he should expect only the lively hood from farming and not to aim at peak yields.

Mr. Joshi feels that organic farming has helped him not to worry about uncertain yields and think only about preparing healthy soil which in turn helps to grow poison free-healthy and wholesome food.

4.5.6 Suggestion to prospective adopters

Out of his six years experience in organic farming, Mr. Joshi feels that it is highly difficult to change any farmer easily. He has failed to convince his very close friends to switch over to organic farming. Right ways or efforts are needed by Scientists and extension workers to make farmers to realise the real benefits of organic farming. Farmers are afraid of loss of crop over the years but not aware of the indirect long term loss in terms of fertility loss, health

and environmental hazards. Farmers must develop thinking in this direction and gradually shift over to organic farming to save the precious natural resources.

Mr. Joshi has no special ideas to implement in near future. He wants to adopt quick composting methods followed else where instead of just making use of farm yard manure. He is even thinking of taking up Vermicomposting on a larger scale.

DISCUSSION

V DISCUSSION

The discussion of the results of the cases studied are presented under the following headings:

1. General Information about farmers.
2. Motivation for farmers to switch over to organic farming.
3. Alternative farm, practices adopted by the farmers.
4. Constraints encountered by the farmers during transition.
5. Benefits of organic farming.
6. Suggestions of the practicing farmers for promotion of organic farming.

5.1 CASE 1: Mr. Narayana Reddy

5.1.1 General information about farmer

Mr. Narayana Reddy is 57 years old farmer. The farmers age has a relation with the number of years of experience the farmer has practicing farming. Mr. Reddy practiced modern agriculture for more number of years before he switched over to organic farming, which he has been practicing for the last ten years.

Mr. Reddy has passed intermediate education. As reported by Shivaram (1991), as there are no ready packages for growing crops and there is lack of information about organic farming or natural farming, the educational level of

the farmer has helped him to think and search the alternatives for himself, search the alternatives reading concerned books, magazines and gain information discussing with resourceful persons.

Mr. Reddy lives in a joint family with a family size of 8. As all the adult family members engaged themselves in the farm activity, the size of the family can meet the labour requirement for various operations on the farm.

5.1.1.1 Organisational participation:

Mr. Reddy has a very good organisational participation. He is a member and a consultant to various voluntary organisation. He has a regular participation in the activities of these organisations. The organisations in which Mr. Reddy takes part are the one which work for spreading sustainable agricultural technologies. Mr. Reddy is interested in sharing his knowledge and experience by actively taking part in the activities of the organisations like Dhariti, Kutumbam A.M.E. and the like. Also he has participated in seminars and workshops abroad, being invited as a resource person by various organisations.

5.1.1.2 Extension contact and participation:

Mr. Reddy has contact with all the extension workers of the department of Agriculture. Now, he no longer consults them for any suggestion or assistance. As Mr. Reddy was a very progressive farmer before switching over to organic

farming, many extension workers do contact him and consult him for suggestions, even now.

Mr. Reddy takes part in various extension activities like Exhibitions, Krishimela and other activities of the agricultural department, if only invited. As, Mr. Reddy no longer practices modern agriculture, he no longer feels that he has interest in taking part in such extension activities.

5.1.2 Motivation

5.1.2.1 Economic factor

(a) Cost of inputs: Mr. Reddy reports that, economics of farming, particularly, the high cost of purchased inputs namely fertilizers, plant protection chemicals and seeds motivated him. Of course, it is evident that, the prices of all the agricultural inputs are increasing every day which is making farming a difficult profession. This has been thus one of the factor motivating factor to go in for organic farming.

(b) Cost benefit ratio: Mr. Reddy reported low cost benefit ratio in modern agriculture as one of the factors motivating him to go for organic farming. He was not happy with the returns he was getting as the benefits were very ~~m~~agre when compared to the increased input cost in modern agriculture. Even Bhaskar and Ashok (1993) reported that low cost benefit ratio as one of the factors motivating him to go for organic farming.

5.1.2.2 Situational factors

(a) Soil condition of the farm: Mr. Reddy reports that decreased soil fertility over the years in modern agriculture, reflected in terms of the the increased nutrient requirements, in order to get the same level of yield in case of all the crops he use to grow. High yielding varieties are highly fertilizer responsive. Apart from the applied inorganic nitrogen as fertilizers, the high yielding varieties of crops must have removed the reserve nutrient deposits in the soil too, leading to decreased soil fertility status over the years, inturn leading to increased nutrient requirements.

(b) Influence of friends: Mr. Reddy reports that he was motivated and assisted financially by one of his foreign friend, Mr. Alwin Druker, who also practiced organic farming abroad. When Mr. Reddy was planning to give up farming and sell out his lands, the words of his friend were instrumental in making him go in for organic farming. He even reports that he pursued organic farming to honour his friendship.

5.1.2.3 Psychological factors

(a) Attitude towards modern agriculture: Mr. Reddy reports that he had developed a strong aversion about modern agriculture that it was a non-profit enterprise. So, he wanted to switch over to organic farming. The negative

attitude towards modern agriculture was a motivating factor for him to go in for organic farming.

(b) Deferred gratification: Mr. Reddy reports deferred gratification as a factor motivating him to go for organic farming. He felt he would get benefits in future and switched over to organic farming.

5.1.2.4 Personal characters:

(a) Aspirations: Mr. Reddy has low level of economic aspirations. Mr. Reddy aspires to continue with organic farming which is ecologically sound, inspite of any difficulty he is going to face. He reports that he would never try using a single grain of inorganic fertilizer to see if he gets any increase in monetary returns. He aspires to create a healthy soil and healthy farm environment.

(b) Value orientation of farmer: Mr. Reddy has reported that philosophical attitude that he has developed motivate him to continue with organic farming Mr. Reddy believes in interdependence of things and feels that it makes him become less selfish and develop love for nature.

(c) Scientific orientation of the farmers:

Mr. Reddy has developed scientific orientation of looking at nature, farm, plant or soil. The educational level of the farmer has helped firm to gain an understanding about the scientific aspects of nature, soil, plant nutrients and other aspects about which he talks about in detail.

5.1.3 Cropping pattern:

a) Crop Variety: Results show that Mr. Reddy has taken up plantation crops as the main crop in his farm. The varieties used by Mr. Reddy are, west coast tall in case of coconut, robusta, yalakki, chandrabale and rajabale in case of banana, alhabad safed in case of guava. Cricket ball and kalapatti varieties in case of sapota. Kaveri variety in case of coffee. Masuri and Jaya varieties in case of paddy.

As local varieties are not available in case of all the crops, it is evident that high yielding varieties are bound to be used.

b) Intercrops: Results reveal that, Mr. Reddy has intercropped curry leaf plants, coffee, mulberry with coconut. Banana and sweet potato intercropped with sapota. Guava is not intercropped with any crop. Vegetables, banana, mulberry cuttings have been mixed cropped at teak seedlings base.

Planting curry leaf plants as intercrop, as a odourant plant may have advantage repelling insect pests. Shade is a problem in case of intercrops grown. In spite of water and nutrient supply, yield levels can not be expected as that can be obtained when grown as sole crops due to deficiency of sunlight. Growing intercrop helps to utilize space that is being left over between the rows of trees.

5.1.4 Alternative farm practices choosen:

5.1.4.1 Land preparation: Mr. Reddy does not make use of tractor or wooden plough for preparation of land. Mr. Reddy makes use of pickaxe to prepare land to grow ragi, maize, soyabean and other such crops. The belief is that, deep ploughing of land destroys soil structure.

5.1.4.2 Method of soil fertility maintenance:

Mr. Reddy makes use of compost prepared out of a method called, "Nadep's Method" to supply nutrients to all the crops. In addition, in plantation crops, he puts back the crop residues of each plant to its own base. In addition, he has made use of Gobargas slurry, green leaf manures like Glyricidia and pongamia to supply plant nutrients.

Mr. Reddy reports that he did not stop using inorganic fertilizers suddenly. He left the use of inorganic fertilizers in a phased manner. Annual reduction in total quantity of fertilizer applied was about 17 percent of the total each year with respect to each crop. The results of Mr. Reddy's study is in agreement with the results of the study conducted by Anonymous (1990) and Bhaskar and Ashok (1993).

It can be observed that, Mr. Reddy did not stop application of inorganic chemical fertilizers suddenly. Sudden stoppage of use of inorganic fertilizer may cause

stress to soil and yields may get drastically reduced as organic sources of nutrients are slow releasers of nutrients.

5.1.4.3 Pest and disease control measures:

Mr. Reddy has sprayed infusion of cow's urine with decoction of foliage of Neem, custardapple, Bull's heart, Datura, oleander, Vasaka on all orchard crops, which is found to be effective against many insects when used immediately after preparation. He reports that dusting of wood ash on orchard crops checks aphids and scales.

Mr. Reddy has made use of locally available plant materials to check the insects and pests and had less problem of insect and pest attack in his farm. The plant materials and cows' urine must have some inherent insecticidal, pesticidal and germicidal properties.

Similar such disease and pest control measures made use have been reported by Anonymous (1990), Bhaskar and Ashok (1993), Nagaraj (1991), Shivarama (1993) and Vivek and Julie (1991).

Mr. Reddy reports that he made use chemical plant protection measures in the initial years of switching over to organic farming, which he left using gradually by reducing 17 percent of the total chemical applied every year and completely stopped applying from the fourth year of switching over to organic farming. To be on the safer side, in the

initial years, until the organic alternatives are found to control insects and pests, it is better to leave the applications of inorganic chemicals gradually.

5.1.5 Other alternative practices:

Mr. Reddy does not uproot the weeds. He cuts them to ground level and feeds them to cattle, if they grow too tall. He considers that weeds are the gift of nature. They serve as a cool cover or mulch to soil. Their roots penetrate deep into the soil and draw the nutrients up. When they grow too tall, they can be cut and fed back to soil which adds back the nutrients they draw up. He reports that, he has trained his cattle to eat weeds, even parthenium, along with main feed. When the weeds are not up-rooted, they help to increase the water holding capacity of soil.

5.1.6 Constraints during transition:

5.1.6.1 Mr. Reddy reports that he faced financial constraint when he switched over to organic farming. He could not receive bank loan for the purchase of organic sources of nutrients. He was given financial assistance by his friend in the initial years.

5.1.6.2 Reduction in income. During the initial years, Mr. Reddy reported reduction in farm income. This may be attributed to reduced crop yields in the initial years, as he reduced the use of application of inorganic fertilizers

5.1.6.3 Crop loss:

Mr. Reddy reports that in the initial year of switching over to organic farming, there was 50 percent reduction. When compared to previous crop yields. It has taken nearly ten years to reach up to the original yield levels.

5.1.7 Benefits

5.1.7.1 Input cost:

Mr. Reddy reports that he no longer uses any fertilizer or pesticide. Earlier, he use to spend around Rs. 3000 per acre per year on fertilizers and pesticides, the cost has been nil on these inputs over the years Input Cost on fertilizers, Pesticides and high yielding varieties of seeds has been very high over the years. If the cost on these major inputs are reduced, it is a real savings to the farmer.

5.1.7.2 Employment generation:

Results reveal that, Mr. Reddy does not make use of tractors or wooden ploughs to till his lands. He uses pick axe to dig the soil and sow the seeds. This activity may require more number of labourers. The activities like maintenance of cattle shed, preparation of compost, applying compost to crops, crop residue management are the areas which need more labourers to be employed.

5.1.7.3 Soil Fertility:

Mr. Reddy reports that there is improvement in the soil fertility status as observed by the increased number of earthworm population per unit area of the soil and increased yield levels over the years.

5.1.7.4 Yield:

Mr. Reddy reports that yields levels of various crops have improved over the years after switching over to organic farming. Results reveal that, yield levels of cereal and pulse crops which got reduced by over 50 percent in the initial year, after a duration of four years sustained original yield levels. But due to the shade problem, when grown as intercrop, yield levels do not cross the levels of what he use to get when they are grown as sole crops.

The yield levels of various plantation crops like coconut, guava, sapota are comparatively more than what his neighbouring farmers practicing modern agriculture are getting. The average yield level of 12 years old coconut crop has been 125 nuts over the years. Where as his neighbours do get around 100 nuts. Average guava yields have sustained at 150 kgs per tree where as sapota yields have sustained at 300 kg per plant. Bunch weight of banana has shown improvement over the years.

Results reveal that, in the initial year of switching over to organic farming, yield levels of cereals and pulse

crops he was growing got reduced by 50 percent. It took nearly 4-5 years for Reddy to sustain original yields. As Mr. Reddy reduced using inorganic fertilizers in a phased manner it has taken a long time to sustain the yield levels.

Vivek and Julie (1993) reported that similar yield trends with respect to different crops. It is a known fact that organic manures are slow releasers of plant nutrients. When quantity of inorganic nutrients were reduced, and substituted with organic nutrients, in the initial year plants are devoid of the organic nutrients, which gets available to the crops of the succeeding year, leading to decreased yields.

5.1.7.5 Gross Income:

Mr. Reddy reported that, during 1991 he got a gross income of 1.75 lakhs from the various income sources of his farm. During the initial years, up to 3-4 years, when the crop yields got reduced by over 30-50 percent, even though input cost got reduced, due to reduced income, both net and gross income got reduced. From the fifth year onwards, when the yield levels started improving, catching up with the original levels, both gross and net income started showing marginal improvement over the years.

5.1.7.6 Other Benefits: Mr. Reddy reported that, improved farm environment, increased quality of the farm produce in

terms of taste are the other main benefits he has observed over the years, after switching over to organic farming.

As Mr. Reddy has completely stopped using poisonous chemicals, and uses organic sources of plant protection materials, the farm environment is free from the ill-effects that may be caused to plants, animals, birds, insects or human beings due to the continuous use of poisonous chemicals.

5.1.8 Suggestion of the farmer:

Maintenance of cattle or making arrangement for organic source of plant nutrient before switching over to organic farming, reducing the use of inorganic fertilizers and plant protection chemicals in a phased manner, trying out independent experiments by farmers are the important suggestions given by Mr. Reddy to potential farmers who wish to go in for organic farming.

Unless farmers make arrangements for organic source of plant nutrients, if the farmer suddenly wants to switchover to organic farming, the yields may get reduced heavily. To overcome this difficulty, the farmers suggestion to switchover to organic farming in a phased way would be a better method.

5.2 CASE 2: Mr. Purushothama Rao

5.2.1 General information about the farmer

Mr. Purushothama Rao is 61 years old farmer. The farmers age has a relation with the number of years of experience the farmer has practicing farming. Mr. P. Rao practiced modern agriculture for more number of years before he switched over to organic farming, which he has been practicing for over five years.

Mr. Rao is a B.Sc., Graduate: As reported by shivaram (1991) as there are no ready packages for growing crops and there is lack of information about organic farming or natural farming, the educational level of the farmer has helped him to think and search the alternatives for himself, search the alternatives reading concerned books, magazines and gain information discussing with resourceful persons.

Mr. Rao lives in a joint family with a family size 7: Adult male members of the family take part in the activities of the farm and contribute to family labour.

Mr. Purushothama Rao possesses a land holding of ten acres. Major portion of the land holdings is under garden lands. categorically, the farmer is said to posses a big land holding. Cows form an integral part of organic farming in the initial years. To substitute inorganic fertilizers, cowdung is the most commonly, available organic source of

input to farmers. As a matter of livestock possession, Mr. P. Rao has ten cows.

5.2.1.1 Organisational participation:

Mr. Rao has a very good organisational participation. He is an office bearer and a member of various organisation. Majority of the organisations in which Mr. Rao takes part are all concerned with agriculture.

5.2.1.2 Mass media contact:

Mr. Rao is a life member to as many as nine agricultural journals, which publish a number of features/articles, success stories of farmers pursuing organic farming and matter related to organic farming. He is a regular reader of various news papers. This helps him to keep in touch with the activities going on around the world. He listens to Radio programmes and watches T.V. programmes often as the gets engaged himself in farm work and the activities of various organisations.

5.2.1.3 Extension contact and participation:

Mr. Rao has contact with many officials and extension workers of the department of agriculture. At present, he no longer consults them for any suggestions or assistance. Mr. Rao takes part in various extension activities like exhibition, Krishimela, Demonstrations and other activities of the agricultural department. He makes himself free to go with the officials of the department of agriculture to make

crop or field visits. As he does not practice modern agriculture, he no longer feels that he has interest in taking part in such extension activities.

5.2.2. Motivation:

5.2.2.1 Results reveal that, Mr. Rao was not motivated by any of the economic factors like high cost of inputs, lack of financial resources, or low cost benefit ratio to go in for organic farming.

5.2.2.2 Situational factors

(a) Farm Environment: Results reveal that Mr. Rao was motivated to switch over to organic farming by the changed farm environment that resulted practicing modern agriculture. During 1988, due to heavy winds, when entire areca trees in his farm collapsed, he was able to judge that the trees had become very weak due to continuous application of the inorganic fertilizers. He then decided not to make use of inorganic fertilizers in future.

(b) Influence of friends: He was influenced the talks of one Mr. Pradeep Tapas, a specialist in organic farming. His friend's words were instrumental in realizing the benefits of organic farming and made him switch over to organic farming.

5.2.2.3 Psychological Factors:

Mr. Rao seems to having developed strong aversion towards modern agriculture as it was not an ecologically

sound system of farming. When he came to know about organic farming, the negative attitude that he had developed towards modern agriculture was a motivating factor for him to go to organic farming.

5.2.2.4 Personal Characters of the farmer:

(a) Aspirations: Mr. P. Rao aspires to continue with organic farming inspite of any difficulty he is going to face. He aspires to search out alternative practices organically to all the practices that he followed in modern agriculture. He aspires to create a healthy soil and healthy farm environment rather than care for maximisation of yield by any means. and thus has low economic aspirations.

(b) Value orientation : Mr. Rao has a philosophical mind of looking at nature and soil. He treats plants, animals and soil as men. He feels that there must be a strong binding that must develop between the farmer, his plants and animals. He reports that farmer must understand the language of plants and animals and should touch and feel them and talk to them.

(c) Scientific orientation : Mr. Rao has developed scientific orientation of looking at nature, farm and plant. As a science graduate, the farmer has gained knowledge of the scientific aspects soil, plant, nutrients, nature and other aspects of farming.

5.2.3 Cropping pattern: (a) Crop variety: He emphasises on the use of local varieties. The varieties of coconut grown

are Indawara, Ramachandrapura, Buklapura and Deshavergence. In case of paddy he has switched over to local varieties like Kumara olaga (which needs no transplantation), Impani and Coimbatore small. Yalakki bale is the banana variety grown. It can be observed that, local varieties have been used wherever available. Availability of suitable local variety is a problem in organic farming.

(b) Intercrops: He has intercropped pepper, cocoa, banana and vanilla with areca. Areca, cocoa, banana, vanilla, cardamom and coffee have been intercropped with coconut. Shade is a problem in case of intercrops grown. To make maximum utilization of space and sunlight, intercrops are planned to overcome the problem to the maximum extent.

5.2.4 (c) Alternative farm practices chosen:

5.2.4.1 Preparation of land: For the preparation of land, Mr. Rao has left tractor plowing. But, in case of paddy, he puddles the field as in traditional way. In organic farming, the principle is that, there is no need for deep ploughing of land using tractor which disturbs the soil structure. His practices agree with Bafna (1992).

5.2.4.2 Methods of soil fertility maintenance: Mr. Rao makes use of compost prepared out of the methods developed by himself, which he has named them as Krishinivas compost method I, II and III. In plantation crops, he puts back the crop residues of each plant like coconut, areca and cocoa to

its own base. In addition, he has made use of Composts slurry, green leaf manures and liquid manure prepared out of different weeds.

Results reveal that, he did not stop using inorganic fertilizers suddenly. He left the use of Urea in the initial year and super potash in the second year and he was not making use of any inorganic fertilizer from third year onwards.

The results of the Mr. Rao's study is in agreement with the result of the study conducted by A.M.E. (1990). It can be observed that, Mr. Rao did not stop application of inorganic fertilizers suddenly, which may cause lot of stress to soil and yield level may get drastically reduced as organic sources of nutrients are slow releasers of nutrients.

5.2.4.3 Pest and disease control measures.

Drenching of areca plants with the decoction of Suvarnagadde (Elephant foot corm) has been successful in checking Koleroga of areca. Decoction spray of Ekka (calotropis gigantia) mixed with lime has been found successful against stem borer attack in coconut stem bleeding problem was controlled by smearing turmeric paste prepared, mixed with asafoetida. Viral disease in case of Banana and wilt in case of pepper has been checked by spraying decoction of Bougainvillea mixed with boiled milk. Against blotch formation, leaf curl and leaf spot disease of coffee he has

found decoction spray of various plant leaves like Neem, seethaphal, beetle leaf, Jute and marigold flower effective for the control of rats and squirrel problem in the garden. He reports that catching up a rat or squirrel and stitching up its anus after filling in same cotton and letting it go makes it mad, which kills its own race by biting. Bunchy top of banana has not been found controlled by organic methods.

Various alternative pest and disease control measures have been found by him are all from locally available plant materials, which helps to reduce the cost of pest control chemicals to a greater extent. There is also use of natural enemy technique by him. Similar such pest and disease control measures made use have been reported by Anonymous (1990). Bhaskar and Ashok (1993), Nagraj (1991), Shantimoole (1991), Shivarama (1993) and Vivek and Julie (1991).

It can be observed from the results of the reviews and the result of the case study that for the control of insect attack and diseases, farmers have made use of either natural control measure, biocontrol measure, decoction spray of various plant leaves or cow's urine spray.

5.2.5 Other alternative practices: (a) Weeding: Mr. Rao does not uproot the weeds. He cuts them to the ground level when ever they grow too tall. He treats weeds as gift of nature. He is making use of some of the weeds to prepare liquid manures.

(b) Sowing: Mr. Rao reports that, while sowing any seed, seeds must be sown on such a day so that it germinates on a new moon day. The reason he gives to such an activity is that, Moon has gravitational effect on earth and in turn on plants. During Krishnapaksha, fortnight between fullmoon day and newmoon day, the activity of the shoots is high and during shuklapaksha, fortnight between newmoon day and fullmoon day, the activity of the roots are high. Thus, if the seeds germinate on a newmoon day, they may have better growth, during the next fortnight.

(c) Seed treatment: For the seed treatment of paddy and seeds of cucurbitaceous species, cow's amniotic liquid, cowdung solution, pregnant cow's urine, woodash, coconut water have been made use. Cowdung and cow's urine, particularly must have some germicidal character which favour germination.

5.2.6 Constraints during transition:

5.2.6.1 Economic Constraints: In the initial year, Mr. Rao reported reduction in farm income, which is attributed to the reduced yields, due to the reduction in the quantity of inorganic fertilizer made use.

5.2.6.2 Technical Constraints: Mr. Rao reports that he faced the difficulty in selection of appropriate alternative to various farm practices organically. He had to search the alternative for himself, or search out the alternative in available books or find it out discussing with practicing

farmers. He had to try out the experiments several times before he could get a favourable result. For many diseases, like the Bunchy top of Banana no alternative has been found organically.

Similar such constraints have been reported by Shantimoole (1991) and Vivek and Julie (1991).

For the farmers who would like to go in for organic farming, thus, there are many difficulties that they will have to face in selection of the appropriate alternative.

5.2.7 Benefits

5.2.7.1 Input cost: The cost on the materials used for preparation of the compost or decoction spray of plant materials is less than that of the cost on inorganic fertilizers and plant protection chemical that were made use. Mr. Rao reports that there was reduction in input cost in organic farming.

5.2.7.2 Employment generation: Results reveal that, Mr. Rao maintains a number of cattle in cattleshed, prepare compost by various methods and prepares decoction of plant leaves. Activities like maintaining of cattle, adding compost to Crops, crop residue management are areas of potential employment generation.

5.2.7.3 Soil Fertility: Mr. Rao reports that Soil Fertility status of farm has improved over the years. The reasons which Mr. Rao attributes to increased soil fertility status is that, over the years yield levels of various crops have improved and there is increased earthworm population in soil.

5.2.7.4 Yield: Mr. Rao reports that yield levels of various crops have improved over the years after switching over to organic farming. The average yield of Areca have sustained original yield levels and show marginal improvement over the years.

The average yield of coconut has been 100-125 nuts per tree, where as it was 100 nuts per tree in the initial year. Paddy yield levels have improved from an average of 16 quintals per acre in the initial year to 25 quintals in the fifth year.

The banana bunch yields have sustained at 10-12 quintals per acre. Pepper yields have sustained over the years on par with original yield levels.

Results reveal that, in the initial years even though the yield levels decreased up to 30-40 percent, with in a span of 3-4 years, yield levels sustained the original levels.

Similar yield trends have been reported by Vivek and Julie (1991).

It is a known fact that organic manures are slow releasers of plant nutrients, application of which, in the initial years, reduces crop yields due to its non availability to the crops and gets available to the succeeding crop.

5.2.8 Suggestions to prospective adopters:

Results reveal that, Mr. Rao suggests the fellow farmers, that it is better that the farmers reduce use of chemicals gradually and prepare the soil bread like and make it a living soil with in a span of three years one can be free from chemicals. At least 3-5 years range is necessary for sustainable. When farmers have no capacity to bear the initial crop loss by completely stopping the usage of inorganic fertilizers or plant protection chemicals, it is better that they stop the application by reducing it in a phased manner.

5.3 CASE 3: A.P. Chandrashekar

5.3.1 General information about the farmer

Mr. Chandrashekar. A.P. is a 35 years old farmer. The farmers age has a relation with the number of years of experience the farmer has practicing organic farming. He Practiced Modern agriculture for less number of years and has been practicing organic farming from over ten years.

Mr. Chandrashekar is a B.E. (Mechanical) graduate. As reported by Shivaram (1991), as there are no ready packages for growing crops and there is lack of information about organic farming or natural farming, the educational level of the farmer has helped him to think and search the alternatives for himself, search and adopt alternatives reading concerned books, magazines or gain information discussing with resourceful persons.

Mr. Chandrashekar lives in a nuclear family of family size four. As such, the other members of the family are found not contributing towards family labour except the farmer. Mr. Chandrashekar possesses a land holding of 13 acres 20 guntas. Major portion of the holdings are under garden lands. Categorically the farmer is said to possess a big holding. Cow forms an integral part of organic farming in the initial years. To substitute inorganic fertilizers, Cowdung is the most commonly available organic source of input to farmers. As a matter of livestock possession, he has 10 cows.

5.3.1.1 Organisational Participation:

Mr. Chandrashekar has least organizational participation. He is not a member or office bearer of any of the agricultural organizations. He reports that agricultural technologies should reach the doors of the farmers and he finds no free time off the farm work to take part in the activities of any voluntary or other organizations.

5.3.1.2 Mass media contact:

Mr. Chandrashekar has good mass media contact. He is a life member to a number of agricultural magazines which publish a number of features/articles success stories of farmers pursuing organic farming and matters related to organic farming.

He is a regular reader of newspaper. This helps him to keep in touch with the activities going on around the world. He listens to Radio programmes and watches T.V. programmes often, as he gets engaged himself in farm work and the other personal activities.

5.3.1.3 Extension contact and participation:

Mr. Chandrashekar has least extension participation. He keeps least contact with the officials and extension workers of the department of agriculture. At present he no longer consults them for any suggestion or assistance.

He does not take part in various extension activities like exhibition, krishimela, demonstration and other activities of the agricultural department. As he does not practice Modern agriculture, he no longer feels that he has interest in taking part in such extension activities.

5.3.2 MOTIVATION:

5.3.2.1 Economic factors (a) Cost of inputs: He reports high cost of inputs as one of the economic reasons motivating him to go for organic farming.

He had recognized that input requirement was increasing year after year, per acre, for getting the same level of yield in any of the crops he was growing. Incidence of pest and diseases on high yielding varieties compelled him to use more and more of plant protection chemicals, the cost of which increased every season.

It is a known fact that the prices of all the agricultural inputs are increasing every day which is making farming a difficult enterprise to pursue. Thus, it has been a motivating factor to go in for organic farming. (b) He reports low cost-benefit ratio as one of the economic reasons motivating him to go in for organic farming. Even though, the cost of various farm inputs increased every year, simultaneously, yield levels were not found to increase. But additional dosages of inputs were needed to get the same level of inputs were needed to get the same level of yield, thus keeping the cost benefit ratio low, every season.

5.3.2.2 Situational Factors:

He reports disturbed farm environment as a factor motivating him to go for organic farming. He found that application of plant protection chemicals not only killed the targeted insects, but also the beneficial non-target insects, which does help in pollination.

5.3.2.3 Psychological Factors:

Low Achievement Motivation has been a factor motivating him to go for organic farming. Mr. Chandrashekar wanted to achieve "Self dependence" in farming, free from external purchased inputs. He found organic farming as an alternative to meet his idea. He cares for better farm environment and soil health rather than maximizing Yields.

The negative attitude developed towards modern agricultural practices was a factor motivating him to go for organic farming. He developed negative attitude towards modern agriculture because, inspite of good plant protection measures, there was heavy incidence of pest and diseases. He had a very bitter experience with growing turmeric where he got almost no yields. He never cared for any loss he would come across in the initial years and switched over to organic farming. He belied that he would get the benefits in the years to come.

5.3.3 Cropping pattern

5.3.3.1 Crop Variety:

He emphasizes on the use of local varieties in organic farming. Varieties of areca he grows are, Dakshina Kannada local Variety, Ratnagiri, Mangala, Sreemangala, Sumangala, Mohitnagar, etc.

Variety of coconut he grows mainly is Tipatur long. Banana varieties grown are, yalakki, paccha, nanjangud

rasabale, budabale, selam, poojebale, rajabale, nendrabale maduranga and kallubale. "Gandhasale" is a local variety of paddy grown by him. Apart from this he has a good collection of many local fruit, flowering and other plant species.

5.3.3.2 Intercrops:

In one part of the garden, banana, pepper, beetlevine, turmeric, pumpkin and wild grass are grown as intercrops with coconut. In second part of the garden, lime turmeric and ginger are grown as intercrops with coconut. In third part of the garden some forest trees and banana have been intercropped with coconut. In the fourth part, pomegranate and banana and in the fifth part seethaphal, banana and areca have been grown as intercrops.

Planning intercrops helps to make maximum utilization of space and sunlight. There will also be the crop diversification, which serves as an alternative host for insect pests, reducing the severe incidence as we can find in case of monocropping.

5.3.4 Alternative farm practices chosen:

5.3.4.1 Preparation of land:

He has left preparation of land using tractor or wooden plough. But in case of paddy, he puddles the field as in traditional agriculture.

In organic farming, the principle is that, there is no need for deep ploughing of land using tractor which disturbs the soil structure.

5.3.4.2 Method of soil fertility maintenance:

The various sources made use to maintain soil fertility are farm yard manure, neem cake, crop residue of each plant put to its own base, green leaves of forest plants and supplying cowdung slurry in liquid form through irrigation channel (called by the name fertigation). The results of the study are in agreement with the results of the study conducted by A.M.E. (1990) on the transitional experiences of twelve organic farmer in Karnataka, Kerala and Tamilnadu.

It can be observed that, the farmer suddenly stopped application of inorganic fertilizers, which may cause lot of stress to soil and yield levels may get drastically reduced as organic sources of nutrients are slow releasers of nutrients.

5.3.4.3 Pest and disease control measures:

Spraying decoction of calotropis gigantea, neem leaves and cow's urine with neem oil and soap solution has been found to control mites, bugs, caterpillars on areca, banana rhizome weevil, leaf spot and mosaic disease in banana. Biocontrol, Natural control and hand picking are the other techniques made use to control pest and diseases. Severe

problem of black headed hairy caterpillar on coconut has found no solution organically.

It can be observed from the results and the reviews that, for the control of insect attack and diseases, farmers have made use of natural control measures, bio-control measures, decoction spray of various plant leaves or Cow's urine spray.

5.3.4.4 Other alternative farm practices choosen: He does not up root the weeds. He cuts them to ground level if they grow too tall and uses them to feed the cattle. He tries to see that weeds do not grow taller than the main plant.

5.3.5 Constraints during transition:

5.3.5.1 Difficulty in selection of the appropriate alternative:

He reported "difficulty in selection of the appropriate alternative" as a main constraint he faced during transition. He had to think a lot and try out various combinations of decoction sprays of several plant leaves against several insects and pests. He could not find out control measures against many insect and diseases organically, particularly for Black headed hairy caterpillar on coconut.

5.3.5.2 Lack of timely information:

He reported that lack of timely information as "what to do"? was a constraint he faced during transition. As there

are no ready packages for organic farming practices, he faced the difficulty in getting timely information as to what to do.

5.3.7 Benefits:

5.3.7.1 Input Cost:

The farmer reports that he no longer uses any chemical fertilizer or plant protection chemical purchased from outside. As the farmer uses locally available materials in the farm to supply plant nutrients and take plant protection care, the cost on the major inputs namely chemical fertilizers and plant protection chemicals has been nil over the years.

5.3.7.2 Soil fertility:

The farmer reported that over the years the soil fertility status has improved. The reason that farmer attributed as the indicator of increased soil fertility status is increased number of earthworm population in the soil, which can be found only with soils with rich organic manures and the increased yield levels of the various crops that he grows.

5.3.7.3 Yield:

The farmer reports that yield levels of various crops have been improving over the years, after switching over to

organic farming. The yield level of coconuts have sustained at an average of 90-100 nuts per tree.

The average yield of Areca has sustained over the years at about 4-5 quintals per acre. Paddy yields have remained at an average of 15-16 quintals per acre. Yields of other crops have shown marginal improvement. yield levels.

5.3.7.4 Income:

The farmer reported that over the years as expenditure on various farm activities take place in a mixed way and income comes from wide varied sources, it is difficult for him to exactly workout the economics of farming. Logically, it can be said that, expenditure on major inputs like HYVs of seeds, fertilizers and plant protection chemicals has been nil. And even in the absence of use of these inputs, yield levels have sustained their original levels showing that farming is economical.

5.3.7.5 Other benefits:

Mr. Chandrashekar reported that, freedom from poisonous chemical residues, increased quality of the farm produce in terms of taste are the other benefits he has observed after switching over to organic farming. As the farmer has completely stopped using poisonous chemicals the farm environment is free from the ill-effects that may be caused to plants, animals, birds, insects or human beings due to continuous use of poisonous chemicals.

5.3.8 Suggestion to farmers:

Mr. Chandrashekar suggested the farmers not to copy blindly what one has tried successfully and asks to try out experiments independently. If not suddenly gradually one can shift over to organic farming, where one must be prepared to loose something initially to gain a lot in the near future so that he finds the sight of truth for himself.

He suggested the farmers to discourage tractor ploughing and switch over to using wooden ploughs, adopt efficient stall feeding of animals, weeds should not be totally removed, but must be cut when their growth exceeds the main plant. Top soil should be saved by creating the environment needed to increase the earthworm population. Farmers may plan to make use of town wastes from cities in the form of Vermicompost. Farmers should think of becoming self dependent.

Out of several years experience in organic farming, the farmer has suggested several things to farmers. It is true that, one should not copy blindly what one has tried out successfully and try out experiments independently. The results that are recorded at one place may not be suitable exactly at the other place.

But it may be difficult for the farmers with small and marginal holdings to try out experiments as they may lack the

capacity to bear the initial monetary loss of course, it is a better idea that efforts can be made to supply the farmer with vermicompost by making use of townwaste in cities.

5.4 CASE 4: Mr. Vittala Rao. E.

5.4.1 General information about farmer Mr. Vittala Rao E. is 67 years old farmer. The farmers age has a relation with the number of years of experience the farmer has practicing organic farming. He Practiced modern agriculture for less number of years and has been practicing organic farming from over more than twenty years.

Mr. Vittala Rao has passed out intermediate (arts). As reported by Shivaram (1991), as there are no ready packages for growing crops and there is lack of information about organic farming or natural farming, the educational level of the farmer has helped him to think and search the alternatives for himself, search and adopt alternatives reading concerned books, magazines or gain information discussing with resourceful persons.

Mr. Rao lives in a joint family with a family of size six. The adult male members of the family take active role in the activities of the farm and contribute to family labour. Mr. Rao. possesses a land holding of 17 1/2 acres. Major portion of the holdings are under wetlands followed by dryland and gardenlands. Categorically the farmer is said to possess a big holding.

Cow forms an integral part of organic farming in the initial years. To substitute inorganic fertilizers, Cowdung

is the most commonly available organic source of input to farmers. As a matter of live stock possession, at present he has only one Cow whereas he practiced dairying with more number of cows in the initial years.

5.4.1.1 Organisational participation:

Mr. Rao has good organisational participation. He is an office bearer and a member to various voluntary organisations. Majority of the organisations in which Mr. Rao takes part are all concerned with agriculture or with environment concerned one.

5.4.1.2 Mass media contact:

Mr. Rao has good mass media participation. He is a life member to a number of agricultural magazines which publishes a number of features/articles success stories of farmers pursuing organic farming and matters related to organic farming. He is a regular reader of newspaper. This helps him to keep in touch with the activities going on around the world. He listens to radio programmes and watches T.V. programmes often, as he gets engaged himself in farm work and the activities of various organisations.

5.4.1.3 Extension contact and Participation:

Mr. Rao has good extension participation. At present he has less contact with the officials and the extension workers of the Department of Agriculture. At present he no longer

consults them for any suggestion or assistance. He reports that, he receives less invitations to the extension programmes, as he opposes the government policies when ever he finds a fault. He does not take part in various extension activities like exhibition, krishimela, demonstration and other activities of the agricultural department. As he does not practice Modern agriculture, he no longer feels that he has interest in taking part in such extension activities.

5.4.2 Motivation

5.4.2.1 Economic Factors

(a) **Cost of inputs:** He reports high cost of inputs as one of the economic reasons motivating him to go for organic farming. He had recognized that input requirement was increasing year after year, per acre, for getting the same level of yield and severe incidence of pest and diseases on high yielding varieties compelled him to use more and more of plant protection chemicals, the cost of which increased every season.

It is a known fact that the prices of all the agricultural inputs are increasing every day which is making farming a difficult profession to pursue. Thus, it has been a motivating factor to go in for organic farming.

(b) He reported low cost-benefit ratio as one of the economic reasons motivating him to go in for organic farming. Even though the cost of various farm inputs increased every year,

simultaneously, yield levels were not found to increase. But additional dosages of inputs were needed to get the same level of yield thus keeping the cost benefit ratio low, every season.

5.4.2.2 Situational factors:

5.4.2.2.1 Disturbed Farm Environment

He reports disturbed farm environment as a factor motivating him to go for organic farming. He found that application of plant protection chemicals not only killed the targeted insects, but also the beneficial non-target insects, which does help in pollination. He also found many fishes, cats and birds dead in a well, when one of his labourers had washed the chemical spraying equipment in the well. In the due course of time, he found that many of the insects had developed resistance to popular chemicals and were never killed inspite of strong dosage application.

5.4.2.2.2 Non-availability of inputs:

He reported non-availability or lack of timely supply of inorganic fertilizers as a strong reason to switch over to organic farming. In 1965, when the government introduced permit system to distribute the inorganic fertilizers due to the supply problem, he rejected to apply for the permit. He thought of not to apply chemical fertilizers to crops. He suddenly stopped the usage of chemicals as an act of opposition against the government policies.

5.4.2.2.3 Mass media influence:

He reports that "reading books" on organic farming as a factor motivating him to go for organic farming. Mr. Rao happened to read the books namely "silent spring" and "Hidden persuaders" which highlighted him the dangers of continuous use of agricultural chemicals.

5.4.3 Cropping Pattern:

5.4.3.1 Varieties:

He emphasises on growing local varieties. But, due to the non-availability of local varieties suitable to his place, in case of the most of the crops he had to make use of the high yielding variety of seeds. Paddy varieties used by him are PTB-20, MGL 1 and 2 and Shakti.

5.4.3.2 Intercrops grown

Pepper, cardamom, banana and jack have been intercropped with Areca. Banana, jack, pepper and teak have been intercropped with coconut. Shade is a problem for intercrops grown in case of plantation crops. To make maximum utilization of space & Sunlight, suitable intercrops have been choosen.

5.4.4 Alternative Farm Practices Chosen:

5.4.4.1 Preparation of land.

He has left preparation of land using tractor or wooden plough. But in case of paddy, he puddles the field as in

traditional agriculture. In organic farming, the principle is that, there is no need for deep ploughing of land using tractor which disturbed the soil structure.

5.4.4.2 Method of Soil Fertility Maintenance.

The various sources made use to maintain soil fertility are, farm yard manure, compost prepared by a method called NADEP's method, green leaves from forest trees, crop residues put back to its own base, rock phosphate, neemcake and feeding cowdung through irrigation water through a cement drum from an elevated place called by the name fertigation).

The results of the study are in agreement with the results of the study conducted by A.M.E (1990). It can be observed that, the farmer suddenly stopped application of inorganic fertilizers, which may cause lot of stress to soil and yield levels may get drastically reduced as organic sources of nutrients are slow releasers of nutrients.

5.4.4.3 Pest and disease control measures:

Spraying 10-12 litres of fresh cow's urine to each plant of pepper has controlled slow wilt problem. Decoction spray of marigold, Kamakasturi leaves was effective against leaf curl disease of pepper. Fast wilt of pepper has found no solution organically. Whenever the finds some insect mites, ticks or bores on plant, hand pricking and crushing is followed.

Similar such pest and disease control measures have been reported by A.M.E. (1990), Bhaskar and Ashok (1993), Nagaraj (1991), Shantimooole (1991) and Shivaram (1991).

It can be observed from the results and the reviews that, for the control of insect attack and diseases, farmers have made use of natural control measures, bio-control measures, decoction spray of various plant leaves or cow's urine spray, the cost of which is very low.

5.4.6 Constraints during transition:

5.4.6.1 Economic Constraints:

5.4.6.1.1 Financial Assistance

There was no agency to give any financial assistance in the initial years to bear the loss in yields or for buying organic nutrient source. He himself had to bear the financial burden over the years.

5.4.6.1.2 Reduction in Income:

Reduction in income has been a constraint faced during the transition. As the yield levels got reduced by over more than 50 percent it took decades to sustain the original yield levels. In case of some crops yields are yet to sustain. This inturn has influence on reduced income level.

5.4.6.3 Crop loss and delayed yields:

Crop loss and delayed yields were other constraints faced by him during transition. There was heavy incidence of pests

and diseases when he stopped using plant protection chemicals. Yield levels drastically got reduced as he suddenly stopped applying chemical fertilizers. Over the years, harvesting seasons have been found delayed by months in case of many crops.

5.4.6.2 Technical Constraint:

He faced the difficulty in selection of appropriate alternative. He had to think for himself or search out related books for alternative as there were no ready packages to guide him. He could not get native seed material suitable to his area.

5.4.6.3 Other constraints:

He faced discouragement from other farmers and extension workers being branded as anti establishment. He was being invited to all extension programmes in his area when he practiced modern agriculture. In the recent years he is receiving very less invitations.

5.4.7 Benefits:

5.4.7.1 Input cost:

The farmer reported that he no longer uses any chemical fertilizer or plant protection chemical purchased from outside. As the farmer uses locally available materials in the farm to supply plant nutrients and take plant protection care, the cost on the major inputs namely inorganic chemical

fertilizers and plant protection chemicals have been nil over the years.

5.4.7.2 Soil Fertility:

The farmer reported that over the years the soil fertility status has been improved. The reason that farmer attributes to the indicator of increased soil fertility status is increased number of earthworm population in the soil, which can be found only with soils with rich organic manures and the increased yield levels of the various crops that he grows.

5.4.7.3 Yield:

The farmer reported that yield levels of various crops have been improving over the years, after switching over to organic farming, which had got reduced heavily in the initial years. But many crops are yet to sustain the original level.

5.4.8 Suggestions to other farmers:

Out of several years experience in organic farming, the farmer suggests several things. He suggests the farmers to reduce monocropping and develop multiple cropping and suggests to market fully processed produce and value added items from the farm which will be high in value and low in volume and Supply all the by products back to soil.

Switching over to multiple cropping has an advantage that they provide alternative hosts for the pests. This may

help to reduce the problem of severe pest attack as we can see in case of monocropping. But, multiple cropping has the problem of marketing associated with it. It is a better suggestion that farmers market fully processed and value added items from the farm. But the farmers must have adequate financial support and technical knowledge to process the produce on farm. Government may take a role in assisting farmers in this respect.

5.5 CASE 5: Mr. Ramesh Joshi.

5.5.1 General information about farmer

Mr. Ramesh Joshi is a 28 years old farmer. The farmers age has a relation with the number of years of experience the farmer has practicing organic farming. Practiced Modern agriculture for less number of years and has been practicing organic farming from over six years.

Mr. Ramesh Joshi has passed I.T.I. (mechanical draftman) Course. As reported by Shivaram (1991), as there are no ready packages for growing crops and there is lack of information about organic farming or natural farming, the educational level of the farmer has helped him to think and search the alternatives for himself, search and adopt alternatives reading concerned books, magazines or gain information discussing with resourceful persons.

Mr. Joshi lives in a joint family with a family size. The adult male members of the family take active role in the activities of the farm and contribute to family labour.

Mr. Joshi has a land holding of 32 acres. The entire land holding is under dryland cultivation. Categorically the farmer is said to possess a big land holding. Cow forms an integral part of organic farming in the initial years. To substitute inorganic fertilizers, cowdung is the most

commonly available organic source of input to farmers. As a matter of live stock possession at present he has four cows.

5.5.1.1 Organisational participation:

Mr. Joshi has a good organisational participation. He is a member of various organisation which are concerned with spreading alternative agricultural technologies like organic farming.

5.5.1.2 Mass media contact and participation

Mr. Joshi has good mass media participation. He is a life member to a number of agricultural magazines which publish a number of features, articles and success stories of farmers pursuing organic farming and matters related to organic farming.

He is a regular reader of newspaper. This helps him to keep in touch with the activities going on around the world. he listens to Radio programmes and watches T.V. programmes often, as he gets engaged himself in farm work and the activities of various organisations.

5.5.1.3 Extension contact and participation:

Mr. Joshi has less extension participation. At present he has less contact with the officials and the extension workers of the Department of Agriculture. At present, he no longer consults them for any suggestion or assistance.

He does not take part in various extension activities like exhibition, Krishimela, demonstration and other activities of the agricultural department. As he does not practice modern agriculture, he no longer feels that he has interest in taking part in such extension activities.

5.5.2 Motivation

5.5.2.1 Economic factor

He reported high cost of inputs as one of the economic factor motivating him to go for organic farming.

He had recognized that input requirement was increasing year after year, per acre, for getting the same level of yield in any of the crops he was growing. Incidence of pest and diseases on high yielding varieties compelled him to use more and more of plant protection chemicals, the cost of which increased every season. It is a known fact that the prices of all the agricultural inputs are increasing every day which is making farming a difficult profession every day which is making farming a difficult enterprise to pursue. Thus, it has been a motivating factor to go in for organic farming.

5.5.2.2 Situational factors

Mr. Joshi reported that influence of friend, and neighbours motivated him to go in for organic farming. Mr. Joshi wanted to pursue dairying as a profession and went for undergoing practical training to get bank loan. There he

happened to be strongly influenced by the ideas of one, Mr. Pradeep Tapas, a specialist in organic farming. Who has conducted number of independent experiments home and abroad and gained popularity. He was told about the effects of continuous use of inorganic fertilizers and plant protection chemicals on the soil health, on the farm environment, plant, animals and food.

5.5.3 Cropping pattern

5.5.3.1 Crop variety: Ramesh Joshi has not been able to get suitable local varieties to grow and he continues to grow high yielding varieties in organic farming.

5.5.3.2 Mixed cropping: Cotton, Chilly, Onion are grown as mixed crops, where as Wheat and Groundnut are grown as sole crops.

5.5.4 Alternative farm practices chosen

5.5.4.1 Preparation of land:

For the preparation of land, he has left tractor ploughing. He makes use of wooden ploughs and bullock power to prepare the lands as in traditional farming. This is not in agreement with what Bafna (1992) practices called as "no cultivation or zero cultivation".

5.5.4.2 Methods of soil fertility maintenance:

Mr. Joshi makes use of Farmyard manure, sheep manure and poultry manure to replace inorganic fertilizers whose

application he stopped it suddenly. He also grows mulch crops or green manure groups (insitu) and ploughs it back to field.

5.5.4.3 Pest and disease control measures.

Mr. Joshi reported that there was no severe incidence of pest and disease attack in case of any crop he grows. He allows the pests and diseases to be controlled naturally. He has sprayed decoction of Lantana camara leaves on Wheat against mites. He has not found solution for fruit rot of chilly organically.

Due to the use of organic plant nutrients, the plants are found to have developed disease resistance as the soil health must have improved over the years.

5.5.6 Constraints during transition

Mr. Joshi reported that confidence loss was a main constraint he faced during transition. As he suddenly stopped application of inorganic fertilizers totally, he had lost the confidence that he would get some yield.

Mr. Joshi reported that he received blames and scholdings from his family members and neighbouring farmers, when he switched over to organic farming. There is a belief among the farmers that, crops won't yield, if the inorganic fertilizers are not applied. This is disproved in organic farming.

5.5.7 Benefits

5.5.7.1 Inputs cost:

The farmer reported that he no longer uses any chemical fertilizer or plant protection chemical purchased from outside.

As the farmer uses locally available materials in the farm to supply plant nutrients and take plant protection care, the cost on the major inputs namely inorganic chemical fertilizers and plant poisonous protection chemicals has been nil over the years.

5.5.7.2 Soil fertility:

The farmer reported that over the years, the soil fertility status has been improved. The reason, that farmer, attributes to the increased soil fertility status indicator is increased number of earthworm population in the soil, which can be found only with soil with rich organic manure and the increased yield levels of the various crops that he grows over the years.

5.5.7.3 Yield:

The farmer reported that yield levels of various crops have been improving over the years, after switching over to organic farming. The wheat yields have improved from a lowered yield of 5 quintals to 6-6.5 quintals per acre in the forth year of transition. The Ground nut yields have improved from 3 quintals in the initial year to 4 quintals

per acre in the fifth year. Spreading variety of ground nut yields increased up to 3.5 quintals per acre from 2.5 quintals per acre. Hybrid jowar yields have sustained at an average of being increased from 2.5 quintals in the initial year.

Chilly yields have remained at an average of 1.5 quintals per acre, where as the cotton yields have improved up to an average of 3.5 quintals per acre from 2 quintals per acre. Increased yield levels may be attributed to increased Soil Fertility status and reduced incidence of pest and disease.

5.5.8 Suggestions to farmers:

Mr. Joshi suggested the fellow farmers to think of the long term benefits they can get rather than the immediate benefits they receive.

The farmer points about the deferred gratification that the farmers should look for as an important feature to be observed in organic farming.

SUMMARY

VI. SUMMARY

The modern agriculture has been successful in meeting the increased food needs of alarmingly growing population. But, the problem associated with modern agriculture like, the high cost of inorganic chemical fertilizers and plant protection chemicals, stagnated yield levels over the years and the mounting health and environmental hazards have forced many farmers and scientists to focus attention on ecologically sound, viable and sustainable alternative non-chemical farming systems like "Organic farming" or "Natural farming". But such farming systems lack the approval of agricultural scientists and serious attempts to develop package of practices for large scale adoption. Only a few practicing farmers and private institutions stand testimony to the unity of such farming methods in our country. This necessitates to make a detailed study of the practicing farmers to understand the concept the pros and cons of the organic farming methods better. Therefore a study entitled "farmers pursuing organic farming ; Some case studies " was conducted with the following objectives:

Specific objectives:

1. To identify the factors which motivated farmers to take up organic farming,
2. To know the farm practices adopted by the farmers pursuing organic farming,

3. To understand the constraints encountered by the farmers during transition.
4. To observe the benefits of organic farming,
5. To elicit suggestions from practicing farmers for initiating organic farming with other farmers.

Case study of the selected farmers is made. The study is conducted in selected villages of Bangalore, Mysore, Dharwad, Shimoga and Dakshina Kannada districts of Karnataka State. Five farmers out of the 25 farmers pursuing organic farming over mere than five years were selected purposively as respondents for the study. Non-participant observation method was followed for collecting the data in addition to informal discussion with the farmers on selected dimensions.

Mr. Narayana Reddy from Bangalore, Mr. Purushothama Rao from Tirthahalli, Shimoga, Mr. A.P. Chandrashekar from Mysore, Mr. Vittala Rao from Mangalore and Mr. Ramesh Joshi from Dharwad are the respondents for the case study.

6.1 CASE-1: Mr.Narayana Reddy

6.1.1 High cost of purchased inputs and lowered cost-benefit ratio were the economic factors; decreasing soil fertility over the years in modern agriculture and influence of his friend were the situational factors, the negative attitude towards modern agriculture and deferred gratification were the factors motivated him to go in for organic farming.

6.1.2 Mr. Reddy discontinued the use of inorganic chemicals and fertilizers in a phased manner.

6.1.3 Coconut, sapota, guava, mulberry, curry leaves, coffee and teak are the major crops in his farm.

6.1.4 Change in cropping pattern from annual crops to perennial crops, minimum tillage, mulching, crop residue management, composting use of decoction of infusion of cow's urine with various plant leaves to control many pests and insects, minimum weeding are the main alternative farm practices adopted.

6.1.5 Lack of bank financial assistance reduction, in income and yield reduction were the economic constraints faced by the farmer during transition.

6.1.6 Reduced input cost, improved soil fertility status, improved yields, improved farm environment and increased quality of the farm produce in terms of taste are the main benefits observed during transition.

6.1.7 Maintenance of cattle or making arrangement for organic source of plant nutrient before switching over to organic farming, switching over to organic farming in a phased manner were the important suggestions given by the farmer to potential adopters of organic farming.

6.2 CASE-2: Mr Purushotham Rao

6.2.1 Deteriorated farm environment, influence of friends and negative attitude towards modern agriculture motivated farmer to switchover to organic farming.

6.2.2 The use of inorganic fertilizers and plant protection chemicals were left in a phased manner. Areca, Coconut, Banana, Paddy, Pepper, Vanilla, Cocoa & Mulberry are the important crops grown.

6.2.3 Minimum tillage, crop residue management, own method of composting, use of liquid manures, use of cow's urine and dung for seed treatment and as antifeedant, milk as a disinfectant in silk worm rearing and use of decoction of infusion of cow's urine with various plant leaves to control many pests and diseases, intercropping are the main alternative farm practices adopted.

6.2.4 Reduction in farm income in the initial years was the economic constraint and difficulty in selection of appropriate alternative was the technical constraint faced by the farmer during transition.

6.2.5 Reduced input cost, improved soil fertility status improved yield levels increased quality of the farm produce and improved farm environment are the main benefits observed by the farmer.

6.2.6 "To switch over to organic farming in a phased manner" is one of the suggestion given to the potential by the farmer.

6.3 CASE-3 Mr. Chandrashekar A.P.

6.3.1 High cost of inputs, low cost benefit ratio, disturbed farm environment, low achievement motivation and unfavourable attitude towards modern agriculture were the factors motivated farmer to go in for organic farming.

6.3.2 Stress on local varieties, plant diversification, change over to perennial crops, minimum tillage, crops residue management, use of organic nutrient sources, fertigation, use of vermicompost, spraying decoction of various plant leaves to control pests & disease, minimum weeding are the important alternative farm practices adopted by the farmer.

6.3.3 Difficulty in selection of appropriate alternative, lack of timely information, lack of scientist's assistance are the technical constraints faced by the farmer during transition.

6.3.4 Reduced input cost, improved soil fertility status improved yield levels, freedom from poisonous chemical residues, better quality of the farm produce are the major benefits observed by the farmer.

6.4 CASE-4: Mr.Vittala Rao. E.

6.4.1 Main crops grown by the farmer are Areca, Coconut, Paddy, Banana and Pepper.

6.4.2 High cost of purchased inputs, low cost benefit ratio, disturbed farm environment, non-availability of inputs, mass media influence motivated him to go in for organic farming.

6.4.3 Stress on local varieties, increasing number of plant species, minimum tillage, crop residue management, composting, fertigation, spraying decoction of various plant leaves to control pests and diseases, minimum weeding are the important alternative farm practices adopted.

6.4.4 Difficulty in selection of appropriate alternative, lack of financial assistance, reduction in income, low crop yields and delayed yields and discouragement from others constraints faced by the farmer during transition.

6.4.5 Reduced input cost, improved soil fertility status, sustained yield levels are the major benefits observed by the farmer.

6.4.6 Farmer suggests the fellow farmers to switchover to multiple cropping and on farm processing of farm produce if they want to switch over to organic farming.

6.5 CASE-5 : Mr. Ramesh Joshi.

6.5.1. High cost of inputs, and influence of friends motivated him to go in for organic farming.

6.5.2 Minimum tillage, use of organic sources of nutrients for soil fertility maintenance, mulching, mixed cropping, companion planting are the few important alternative farm practices adopted by the farmer.

6.5.3 Confidence loss and discouragement from family members and neighbours are the major constraints faced by the farmer during transition.

6.5.4 Reduced input cost, improved soil fertility status, gradual improvement in yield level are the major benefit observed by the farmer after switching over to organic farming.

Implications and Recommendations :

The following implications emerge from the results of the different cases of farmers pursuing organic farming.

1. Farmers pursuing organic farming are innovative in their adoption pattern. It can be observed from the results that the educational level of the farmers pursuing organic farming is well above above the educational level of any average Indian farmer. "Organic farming" as it is being defined by various authors today, lacks definite package of practices or guidelines with respect to any crop the farmer wishes to grow. When such is the situation, the educational level of the farmer will definitely help to search out the available alternatives from various sources of literature or copy what the other farmer is practicing in his farm with suitable modifications to his own situation. This needs lot of independent thinking and creativity or innovative ideas. So, it may be easy for an educated farmer to switch over to organic farming than an illiterate farmer under the present situation.

2. Many economic and personal characters of farmers pursuing organic farming differ widely from that of an average Indian farmer. It is difficult to assess from the experiences of only five farmers, the prospects of organic farming being adopted by the other farmers in Karnataka or in any other part of India. Efforts to document the experiences of farmers pursuing organic farming under various socio-economic and agro-climatic conditions would be of very much help in this respect.

3. The farmers pursuing organic farming have larger holdings and are economically sound to bear any loss that initially occurs in their experimentation. Whereas an ordinary small or marginal farmer without proper guidance and exposure as how to go about in organic farming, with no proper packages cannot sustain during his experimentation. Extension efforts must be made to spread the available technologies to small and marginal farmers by developing suitable packages for them with adequate support of research efforts.

4. The farmers pursuing organic farming have philosophical ideas of looking at nature and soil and have developed a pattern of value orientation in life. Orientation of farmers towards organic farming would need such philosophical ideas to be developed in them for looking at nature. The farmers in general, Love and worship nature. They care for soil and plant health rather than the crop yields. They care for

natural food chain and would never like to break it by the use of poisonous chemicals.

The determination of Mr. Narayana Reddy or other farmers not to make use of a single gram of inorganic fertilizer to testify whether he gets any monetary benefits, is of course needed by those farmers who wish to switchover to organic farming. The approach of Mr. Purushotama Rao to get acquainted with all the parts of the field by walking, touching, feeling and talking to plants and animals may have to be developed by other farmers, which helps to observe and understand the secrets of nature with open eyes.

5. The farmers pursuing organic farming have practiced modern agriculture for several years and are found to have negative attitude towards it. The farmers provide scientific explanation for giving up modern agriculture apart from quoting several economic, situational, psychological and personal factors motivating them to go in for organic farming.

Mr. Purushotama Rao has experienced that continuous and injudicious application of chemical inorganic fertilizers destroy soil structure and reduce the microbial population in the soil. Indiscriminate use of Nitrogen and Phosphorous will have negative impact on plant cells. This leads to vigorous plant growth, less flowering and fruiting and more incidence of pests and diseases and decreased output quality.

Mr. Narayan Reddy finds that, in modern agriculture, only 5-6 plant nutrients are supplied directly to plants and not to the soil. Due to the continuous accumulation of salts and deficiency of micronutrients, soil structure gets destroyed, soil water holding capacity decreases and soil becomes useless for cultivation.

Mr. Kinya Vittala Rao said, use of poisonous chemical pesticides and insecticides not only kills the targeted insects and pests but also the beneficial insects which helps the pollination are killed and thus leading to breakup in the natural food chain creating ecological imbalance.

Mr. Chandrashekar said, any system to be efficient, input should be less and output should be more. Over the years, in modern agriculture, for the same level of output, input cost kept increasing, which proved modern agriculture an inefficient production system.

So, the farmers who wish to pursue organic farming need to understand the pros and cons of modern and organic farming clearly. They need to understand the scientific principles behind each operation they carry out. They need to develop love for nature and think of deferred gratification rather than immediate economic benefits.

6. Organic farmers lay emphasis on the use of local varieties which are disease resistant and yield good quality output.

But due to the non-availability of such suitable varieties, the farmers have continued to use high yielding varieties.

Mr. Narayana Reddy says "High yielding varieties are boon to farmers and it is a misconception that they are not suitable to organic farming. They develop disease resistance if grown organically." So efforts must be made to preserve and multiply old disease resistant varieties

7. Organic farmers emphasize on minimum tillage or no tillage if the soil is fertile, rich with humus, there will be no need for ploughing of soil using tractors, which destroy the soil structure, unnecessarily. Researches to know about the benefits of minimum tillage or no tillage on soil structure, texture, fertility status and water holding capacity must be taken up by the Agricultural Universities.

8. Farmers pursuing organic farming emphasize on minimum weeding. Farmers perceive that weeds are the gift of nature. They have vigorous growth capacity than that of main crops. Their roots penetrate deep into the soil and draw the nutrients up from the bottom layers of the soil. If the roots of the weeds decay, they help to increase aeration and water holding capacity of soil. They can also be used to feed the cattle.

9. The organic farmers have left the use of inorganic chemical fertilizers and plant protection chemicals in a phased manner and a few suddenly. If the farmer wants to

switch over his entire lands to organic farming, it would be better that, he gives up the use of chemicals in a phased manner. But, if he plans to begin with a small portion of the land and gradually switchover to entire land holdings, he may stop the use of chemicals suddenly or even in a phased manner.

The farmers who left the use of chemicals in a phased way, reduced a minimum 10-15 percent to maximum of 25-50 percent of the total dosage they use to apply each year. This dosage has helped the farmers to totally stop the chemical usage totally with in a duration of 3-4 years. So, farmers with any holding size can plan to switch over to organic farming preferably in a phased manner.

10. The farmers pursuing organic farming advice that to begin with organic farming, the farmers need to make arrangement for organic source of plant nutrient. They may have to maintain cattle/cows for supplying cowdung. They will have to increase the number of fodder trees & green leaf manure trees to meet the food requirement of cattle and soil. As many as 30 organic nutrient sources have to be identified and used by farmers. In most of the farms, the main nutrient supplements that have been made use by the farmers are: Farm yard manure, compost, green leaf manures, oil cakes, poultry manure and rock phosphate.

The farmers have come out with various combinations of organic sources, which can supply more plant nutrients. They have come out with their own methods of compost making, which helps the nutrients to be released quickly to be available to plants.

To farmers namely Chandrashekar, Vittala Rao have come out with creative ideas like 'fertigation', a technique of feeding plants with cowdung through irrigation system.

Even though organic fertilizers are bulky and comparatively slow acting and maximum yield requires a support of nutrients, use of organic fertilizers have many long term benefits. The micro nutrients are generally and adequately supplied through organic fertilizers. The humus developed has an ability to hold the nutrients needed by plants. Humus also serves as an effective buffer, regulating the balance between acid and base in soil solution. Humus absorbs large quantities of water in comparison to its weight. Humus improves soil tilth making the soil easier to plow and also regulates soil heat. Mainly, the decaying organic matter includes many biologically active substances such as enzymes, vitamins, auxins and aminoacids. High humus content in soil helps to check the growth of plant pathogenic fungi. Thus soil health improves which in turn reflect in terms of healthy plant growth.

Research efforts to find out the best combinations of different organic sources to suit different situations will have to be carried out.

11. The various plant protection measures taken by the farmers can be classified as:

a. Cultural control measures- like use of organic nutrients in place of inorganic chemical nutrients and plant protection chemicals, use of local resistant varieties, appropriate cropping sequence or rotation and companion planting.

By breeding resistant varieties, pest damage can be minimized. Benefits are substantial to farmers environment and consumers. Pests are eliminated without any increased efforts on the farmers part and probably with decreased input cost.

It is evident that in majority of the cases of farmers, selection of seeds have been primarily for yield rather than for pest resistance, and thus contribute to increased pest damage to crops despite higher levels of pesticide usage.

b. Use of plant source materials like the decoction spray of various plant leave having insecticidal properties and

c. Biocontrol: Use of natural enemy to control the insect pests.

It is important to note that inspite of many alternatives found to control pests and diseases many plant pests and diseases have not found solution organically like the bunchy top of Banana.

Research efforts to examine the insecticidal properties of various plant sources such as leaves, seeds, bark, etc., of different plants must be done. Farmers can try out combination of all the measures to control insects and pests to the maximum extent.

12. Efforts have not been made by the farmers to grow vegetables, flowers and oilseeds and other crops. Research efforts must be made to grow all kinds of crops to know its suitability to organic farming.

The benefits that the farmers have obtained by switching over to organic farming can be categorized into the (i) direct quantifiable benefits. like yield and income (ii) indirect benefits like improved soil fertility status, improved farm environment, improved quality of the output in terms of nutritive value and taste of the farm produce.

As for the yield levels are concerned, they have differentiated with respect to:

1. Plantation crops that were already established in farm which were yielding.
2. Newly planted plantation crops after switching over to organic farming.
3. Intercrops with

plantation and 4. Other main crops. The general average yields with respect to already yielding plantation crops have sustained their yield levels over the years of switching over to organic farming and farmers expect the yields to go up.

Newly planted plantation crops with organic farming which have started yielding, are yielding on par with what they use to get by applying chemical fertilizers.

The average yields of various intercrops have been found to be decreased during the initial years of switching over to organic farming and have taken a minimum of three years to sustain their normal yields. Of course due to the problem of sunlight the average yields of intercrops have been comparatively low than when they are grown independently.

Yields of cereals and pulse crops have been found reduced to minimum of 30 percent to the maximum of 50 percent for initial 2-3 years. Yield levels have been catching up the original yield levels over the years.

The other economic gains like reduced water requirement, milk from cows, cowdung as a source of manure and biogas useful for running water pumps and domestic stove of the farmer. Slurry from the biogas is an excellent organic manure. Also cow's urine amniotic liquid are useful as plant protectors.

Research efforts must be made to reduce the time taken to sustain the original yield levels.

13. The various suggestions given by the farmers imply that any farmer with marginal, small or large holding can plan to go in a systematic way to switchover to organic farming by leaving out the use of chemicals in a phased manner to sustain the yield levels.

So it can be observed that at least a minimum of 2-3 years transition period is required to sustain the original yield levels.

14. Various intercrop and mixed crop combinations have been tried out by the farmers belonging to different regions.

Research efforts to examine the most economical and suitable mixed and intercrop combinations must be worked out with respect to each crop.

15. The farmers are not getting any price incentive for the produce they grow organically. It can be seen that, in cities like Bombay increased awareness among the consumers to eat chemical free organic produce have facilitated opening of special marketing units for organically grown produce and the farmers are getting special price incentives. If such arrangements are made, even at karnataka, farmers pursuing

organic farming would be greatly favoured and more and more farmers would come forward to take up organic farming.

16. Farmers pursuing organic farming report about the quality improvement of the various output. Research efforts are needed to examine the nutritive values of various farm produce its keeping quality and other aspects. If the nutritive value of the organically grown produce proves to be comparatively higher than that of those food items grown in organic farming, it would definitely suffice the food gap that is created due to reduced yields in the initial years.

Suggested areas of further research:

- a. Studies to document the experiences of all the farmers pursuing organic farming in all the agro-climatic regions of Karnataka can be taken up for detailed information and generalizations of the experiences.
- b. Studies to document the experiences of farmers pursuing organic farming under different socio-economic levels and different sizes of land holdings can be taken up.
- c. Similar efforts to document the experiences of farmers in different states of India may serve as a best investigation to make a detailed study about the organic farming, taking Indian situation into consideration.

d. Systematic efforts must be made to take up a detailed study of the Economics of Organic farming, taking farm as an unit. Research must be carried out by the agricultural universities or State Department of Agriculture regarding this aspect.

e. A systematic study can be made about the reasons hindering farmers to switch over to organic farming.

f. Studies can be conducted in the villages where the farmers are practicing organic farming, to know the diffusion effect among the fellow farmers.

g. Studies can be conducted to analyze the knowledge, perception and attitude of farmers, extension workers and scientists towards organic farming.

h. Efforts to document the traditional low cost Agricultural technologies which are very useful to farmers can be taken up to help the farmers.

i. Systematic research must be conducted by the scientists in the field of organic farming with respect to searching out various alternatives and working out the economics.

REFERENCES

VII. REFERENCES

- 、 Agriculture-Man-Ecology, 1991, Ecological farming principles, A.M.E. programme, P.O. Box No 11, PONDICHERRY, INDIA, PP:3.

- 、 Agriculture-Man-Ecology, 1991, Sustainable Agriculture-Intensive research will pay off, The Hindu Survey of Indian Agriculture, PP: 17-20.

- 、 Agriculture-Man-Ecology, 1992, Ecological Agriculture in South India Agricultural Economics research institute, The Hague, The Netherlands, PP: 70.

- Anonymous, 1978, Who wants fertilizers any way? A case for Biological Agriculture, Organic farmers and growers limited. Abascus house, Station yard, Needham market, Ipswich, England. PP: 3-7. Anonymous, 1991, Sustainable Agriculture-Intensive research will pay off, The Hindu survey of Indian Agriculture, PP: 6-7.

- Anonymous, 1992, Seminar report on relevance of Organic farming in India, Department of Agronomy, U A S, Bangalore-65, PP: 16.

- Baphna, 1991, Organic farming in Sapota, Proceedings of the national seminar on organic farming, Poona, India PP:55-56. Baphna, 1991, Savayava Krishi-Hejjeiduva munna, Spice India, 4 (8): 21-27.

- Bharmagoudra, D. D., 1991, Raasayanikagalinda Saavayava dedege, Spice India, 4 (6): 19-21.

- Bhaskar, A.S. and Ashok A.S., 1991, Economic Viability of Sustainable Agriculture, Spice India, 4 (10): 2-4.

- Bill, M., 1991, Organic farming to make the nature smile, Spice India, 4 (8): 21-27.

- Casmir, 1991, Sahaja Krishi-Hejjeiduva munna, Spice India, 4 (8): 2-7.

*Edwards, 1987, The concept of integrated systems in lower input/sustainable agriculture, American journal of Alternative agriculture, 2: 148-152.

*Food and Agricultural Organisation, 1989, Sustainable agriculture; Production implications for international agricultural research, F.A.O. Research and technology paper-4, Rom, PP: 131.

Fukuoka. M., 1978, The one straw revolution, Rodale Press, Emmus, PP: 33-40.

Ganapathi, 1991, Sustainable Agriculture, Intensive research will pay off, The Hindu survey of Indian Agriculture, PP: 17-20.

Gunjal, S.S., 1991, Organic and national farming, Kissan World, (6): 10-11.

Nagaraj, H., 1991, Aadhunika Krishige Vidaaya anivaarya, Spice India, 4 (7): 22-23.

*National Research Academy of the United States, 1987, Role of ecology in lower input, Sustainable Agriculture: An introduction. American journal of Alternative Agriculture, 2: 146-147.

*Oelhaf, 1978, Organic Agriculture. Economic and Ecological Comparisons with Conventional methods, Allanheld, Osmun and Co. Pub. Inc., PP: 271.

Profullachandra, D.R., 1992, Seminar report on Organic farming in ratoon management of sugarcane. A case study, Seminar report, Dept. of Agril. Extn., U.A.S., B'lore-24. PP: 1-8.

Raju. T., 1991, Fukuoka Prerane, Spice India, 4 (8): 24.

Ramamurthy. V., 1990, Seminar report on relevance of Organic farming in India, Dept. of Agronomy, U.A.S., Bangalore-65. PP: 1-20.

Kate, 1991, Economic Viability of Sustainable Agriculture in India, Spice India, 4 (10): 2-4.

Lawrence, D.H., 1977, Organic gardening, Penguin books Ltd., Harmonds worth, Middle Sex, England, PP: 9-15.

Manindrapal, 1991, Sustainable Agriculture-Intensive research will pay off, The Hindu Survey of Indian Agriculture, PP: 6.

Shantimoole, 1991, Saavayava Krishi-Uddesha Siddhanta, Spice India, 5 (8): 19-20.

Shivaram. H., 1993, Raasayanikagalinda, Saavayava dedege, Spice India, 6 (3): 19-20.

Shivaram. P., 1991, Organic farming. To make the nature smile, Spice India, 4: (8): 2-7.

Shivaram. P., 1993, Sahaja Krishi-Hejjeiduva munna, Spice India, 4 (8): 21-27.

* Stanhill, G., 1990, Comparative productivity of Organic Agriculture, Agril. Ecosystem and Environment, 30 (1-2): 1-26.

*Stinner et al, 1987, Role of ecology in lower input Sustainable Agriculture: An introduction, American journal of Alternative Agriculture, 2: 146-147.

Swaminathan. M.S., 1991, Sustainability beyond the economic factor, The Hindu Survey of Indian Agriculture, PP: 10-16.

Swaminathan. M.S., 1991, Agriculture for the 21st Century, Kissan World, PP: 1-12.

Tangaswamy. P., 1991, Sustainable Agriculture-Intensive research will pay off, The Hindu Survey of Indian Agriculture, PP: 17-20.

United States Department of Agriculture, 1990, Comparative productivity of Organic Agriculture, Agriculture-Ecosystem and Environment, 30 (1-2): 1-26.

Venkataramani, G., 1991, Crop production consolidation immediate goal, The Hindu Survey of Indian Agriculture, PP: 4-7.

Venkataramani, G., 1991, Sustainable Agriculture-Intensive research will pay off, The Hindu Survey of Indian Agriculture, PP: 17-20.

Vivek and Julie, 1991, Savayavabesayadalli Arisina, Spice India, 4 (10): 24-25.

Vivek and Julie, 1993, Manushya mattu mannina bhavishya, Rytara Kaiyalli, Adikepatrike, (4): 18-21.

(* Originals not seen.)

APPENDICES

APPENDICES.**APPENDIX-I****FARMERS PURSUING ORGANIC FARMING : SOME CASE STUDIES :**

(Unstructured Schedule)

I. General Information

1. Name of the farmer
2. Farmers age
3. Educational Qualification of the farmer
4. Farmer's family background
5. Details of Location of the farmer
6. Particulars of land holding.
7. Details of Organisational, extension and mass media contact of the farmer.
8. Organisational, extension and mass media contact of the farmer
9. Personal characters of the farmer

II Specific Information :

1. Farming situation before switching over to organic farming.
2. Details of factors motivating farmer to switch over to organic farming with reference to different economic, situational, psychological and personal characters

III Cropping Pattern :

1. Crop variety
2. Inter crops
3. Cropping sequence

IV Farm Practices :

- a. Method of Soil fertility maintenance
- b. Pest and disease control measures
- c. Others

V Constraints during Transition :

List economic, technical, and other constraints

VI Benefits of Organic Farming with reference to

1. Input cost
2. Soil fertility
3. Labour cost
4. Yield
5. Quality of farm output
6. Income

VII Suggestions of the farmer to initiate Organic farming with other farmers.

VIII Future proposals of the farmers, if any.

APPENDIX-II

LIST OF SOME OF THE FARMERS PURSUING ORGANIC FARMING

1. Mr. Narayan Reddy, Sorahunse Village, Varthur, Bangalore-87.
2. Mr. Purushotama Rao, Krishinivas, Melina Kuruvali Village, Thirthahalli Taluk, Shimoga District.
- 3&4. Mr. Jois and Mr. Subramanya, C/o Krishinivas, Melina Kuruvali Village, Thirthahalli Taluk, Shimoga District.
5. Raghurama, S/o B.M. Ganapathi bhatta, Heggadaekoppa, Thirthahalli post, Shimoga District.
6. N. H. Manjunatha, Anaveri, Bhadravathi Taluk, Shimoga District.
7. H.R. Srinivas, Hissiasana, Araga Post, Thirthahalli Taluk, Shimoga District.
8. Dharmappa. K, Holehonnur, Bhadravathi Taluk, Shimoga District. Pin 577227.
9. Vittala Rao, Kinya Village, Mangalore Taluk, Dakshina Kannada District.
10. Gangadhara, Pedakala house, Vamanapadavu Post, Bantval, Dakshina Kannada.
11. K. Shivarama Hemmanna, Hosangadi, Dakshina Kannada.
12. Vivek & Julie, C/o Post Master, Birwal Post, H.D. Kote, Mysore-571121.
13. Shilendra Bandagadde Post, Keladi, Sagar, Shimoga-577401.
14. M.T. Shantimoole, Savayava, Kukkujadka, Dakshina Kannada.
15. K.P.Suresh, Kanjarpane, Pilaru Post, Sulya, Dakshina Kannada-574248.
16. Shivananjaiah Jayachamarajapura, Chikkanayakanahalli, Tumkur District.
17. K.S. Dinesh, Koppalu, Aralapura, Thirthahalli, Shimoga District.

18. R. Shivaji Rao, Kerebeeranahalli, Badravathi, Shimoga District.
19. A.P. Chandrashekar, Indraprastha, Kalalvadi Village, Post Udbur, Mysore District.
20. Ramesh Joshi, Yalavathi Village, Shirahatti Taluk, Dharwad District.
21. Bharmagowdra, Yalvatti Village, Shirahatti Taluk, Dharwad District.
- 22- Pradeep Tapas, D.R. Patil, Kori, R.S. Patil,
24. C/o. Krishna Krishi, Hulikoti, Dharwad Dist.
25. Purnachandra Tejasvi, Hand Post, Mudigere, Shimoga District.

ಶ್ರೀ ಮಹಾದೇವ
ಮಹಾದೇವ ಮಠ
ಗ. ಪು. ಕೆ., ಬೆಂಗಳೂರು-55.

6 SEP 1994

ಅನುಪ್ರಾಸ ಸಂ. 3366

ಪ. ಸಂ.