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Themes

I : Market Oriented Agri Business Management

A] Agri business Management

1] The agricultural input sector
2] The production sector
3] The processing - manufacturing sector
4] The distribution-marketing sector

B] Agricultural Marketing in the context of Globalization in agriculture

1] Role of Indian Institutions Management and Scope for Export Markets
2] Economics of Agriculture Commodities in Export Market
3] Advances in Agricultural Marketing

II : Pricing of Agriculture Commodities

III : Market Intelligence and price volatility

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1. Market Oriented Agri Business Management

A] Agri business Management

The concept of agribusiness have a great importance for developed as well as developing countries. Agribusiness professionals play a crucial role in development of agriculture sector. Orientation of agriculture towards business plays a significant role in generating income and employment throughout the development process. Agribusiness provides a assured market for raw materials and value added products, thus helps the farming community.

Today, Agribusiness professionals need a dynamic vision which stirs imagination and incubates a spirit of constant innovation for their survival in the competitive world. It is an essential step in building exemplary careers in agribusiness management. The Agribusiness professionals must identify the potential risks and bottlenecks and bring about possible remedies in order to mobilize their efforts in focussed manner.

Within the agriculture industry, agribusiness is widely used simply as a convenient portmanteau of agriculture and business, referring to the range of activities and disciplines encompassed by modern food production.

Recent trends in globalization and integration of international consumer market offer further opportunities for development of agribusiness and food industry across the world which would also benefit developing countries, provided they could suitably manage their resources to tap the emerging opportunities. However, the prospective opportunities are also likely to be accompanied by several challenges, which need to be addressed.

The Agribusiness system includes all the firms involved in manufacturing and supplying inputs and / or services to agriculture produce or that handles or process farm output until they reach the final consumer. The agribusiness production system consists of (I) The agricultural input sector (II) The agricultural production sector (III)The processing - manufacturing or agro-processing sector and (IV) The marketing - distribution sector.

1] The agricultural input sector

This sector produces and supply farm inputs such as seeds, feeds, FYM fertilizers, plant protection chemicals, electricity, farm machinery, farm credit etc. used by production sector of agribusiness.

2] The production sector

The production sector has been at the center of changing scenario of agribusiness. The farmers are increasingly buying yield increasing farm inputs from the market, agriculture is fast getting commercialized and farm production is getting increasingly transferred to manufacturing - processing sector, domestic consumers as also to growing global market. Several organizations provide facilities for the storage and warehousing of the agriculture commodities including cold storage etc. An entire industry survives just on the transportation of agriculture commodities from one place to another.

3] The processing - manufacturing sector

The processing involves value addition to the agricultural or horticultural produce and also includes processes such as grading, sorting, packaging etc. The processing or manufacturing sector includes all the individuals and firms that process raw agricultural commodities and manufacture food products for making these available to the final consumer.

4] The distribution-marketing sector

The distribution-marketing sector contributes at each level of agribusinesses development i.e. from input supply to production to processing and to consumption. Packaging industry, transport companies, warehouses, advertising companies, insurance companies, wholesale firms, retail outlets etc. are all parts of this sector.

The studies related to the agribusinesses system (input, production, processing and distribution) may be included under this theme. Research papers on various aspects of these themes are invited.

B] Agricultural Marketing in the context of Globalization in agriculture

The success of hi-tech agriculture depend on efficiency of marketing system in selling products (the products should include agricultural, horticultural and animal products) both in domestic and foreign markets for higher prices. In order to examine the present marketing systems and suggest remedial measures to overcome its weakness, the theme is selected.

The Research Papers on following aspects are invited.

I] Role of Indian Institutions Management and Scope for Export Markets

1) India's existing and future growth of agricultural commodities in export market.
2) India's share in international trade under changed scenario.
3) Identification of export oriented products and marketing.
4) Exploring possibilities of promoting new product for export.
5) Estimation of export potential of agricultural products.
6) Role of financial institutes in exporting agricultural Commodities.

II] Economics of Agriculture Commodities in Export Market

1) Relative economics and marketing of agriculture products in international markets.
2) Comparative economics of agriculture products among competing countries.
3) Estimation of economics benefits from export trade.
4) Infrastructure facilities requirements and its economics for export of agriculture Products.
5) Constraints in the export of major agriculture commodities.

III] Advances in Agricultural Marketing

1) Market Intelligence
2) E-Marketing or Digital Marketing
3) E-Commerce E-Business
4) Marknet
5) Agmarknet

2. Pricing of Agriculture Commodities

The basic aim of agricultural price policy is the intervention in the agricultural produce markets to influence the price levels and their fluctuations, particularly from farm gate to retail level. Price policy is directed to bring about growth and equity in the country; therefore it is occupying a prime place in economic and political debate. It involves conflicting objectives. The price policy and its instruments are constantly being reviewed because, the majority of the population is affected by the price policy. The GDP is calculated on monetary value of a commodity and it indicates the low value of Agriculture production and its share in GDP

The Central Government announcing Minimum Support Prices every year at the beginning of the sowing season for certain crops on the basis of the recommendations of the Commission for Agricultural Costs and Prices (CACP).The MSP is the price fixed by Government of India to protect the producer-farmers-against excessive fall in price during bumper production years. In case the market prices for the commodity falls below the announced minimum price due to bumper production and glut in the market, Government agencies purchase the entire quantity offered by the farmers at the announced minimum price. But there is variation in productivity between state to state, region to region and also within the region. Therefore, cost of cultivation is also different. Those state having less productivity do not get much benefit of the Minimum Support Price, there is gap between the cost of cultivation and Minimum Support Prices (MSP) declared by Central Government. Maharashtra state is also one of the state suffering from this type of problem for majority of the crops.

Prices are largely determined by supply and demand. The prices of agriculture goods fluctuate significantly, even during one single day. If large quantities of certain product suddenly arrive on the market, a typical situation during the harvesting period, prices will fall. When there is a shortage of supplies in the market, prices will rise. Also climatic condition affects the prices. Favourable weather conditions, results into a good harvest and therefore have a positive impact on supply, while drought or floods will have the opposite effect. An increase in the production cost of a certain commodity may lead farmers to shift to other commodities with better returns. The variation in area and productivity and perishable in nature, etc affect the prices.

Pricing of agriculture commodities are important from farmer's point of view. To control the supply in the market, it needs to regularize the production, availability of storage facility are one side problems and another to increase the productivity within the available 17 per cent irrigated land in case of Maharashtra. In view of this, **pricing of agriculture commodities** theme is selected.

The theme can be further explored to point out the –

Cost of production and pricing of cereals, pulses, oilseeds and cash crops over period of time.

3. Market Intelligence and price volatility

The changing market environment in agriculture emerging on account of globalization, liberalization and the post WTO regime makes it imperative that the stake holders in agriculture should have through market awareness and a grasp of the intricacies of market oriented production techniques to be able to handle the new challenges. Market Intelligence has become vital for taking production and marketing decisions. Unequal access to this type market related intelligence inputs lead to unequal playing grounds for farmers and traders. In the past the farmer's ignorance was the traders gain.

THEME - I

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Theme I : Impact Assesment of Agricultural Technology on Farm Economy

Impact of Technology on Productivity of Cotton in Maharashtra

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In Maharashtra, cotton is a main cash crop. This crop has occupied 14.62 per cent of total cropped area in the state. The area under cotton in Maharashtra was 3253.9 thousand hectares in 1999-2000 with the productivity of 1.62 qtl (lint) ha. Though, the area under cotton is increasing steadily, the productivity showed a disappointing picture during the recent past. In the era of globalization, the Indian farmer can withstand only if he adopts the sustainable agricultural technology i.e. cost minimizing and profit maximizing approach. In the State, little efforts are made to study the impact of technology on crop productivities, employment, income etc. in case of some crops and in some parts of the states. The present topic entitled "Impact of Technology on Productivity of Cotton in Maharashtra" is taken up to examine the extent of technology adoption, changes in resource use and costs and share of technology in the increased productivity of cotton.

The data were analyzed with the help of technology adoption index, decomposition model and the site index for arriving at the meaningful conclusions. The study brought that the technology adoption index over a period of 20 years was found increased to the extent of 31.26 per cent in cotton crop. All the resources under study, excepting seed have showed increasing trend in their utilization. Per hectare use of seed was declined during the period by 23.79 per cent. The use of manure was relatively low in cotton. The productivity of cotton was increased considerably (i.e. by 77.56 %). Similarly, per hectare cost of cultivation and gross returns were increased substantially. The crop was in loss during both the periods, in fact, the loss was minimized by 21.14 per cent. The productivity was considerably increased and the share of technology in this increased productivity was only 9.21 per cent. At the same time, the sustainability index in terms of yield was about 89

per cent. It indicated that present technology adopted by the farmers is not sustainable.

The findings of the study have policy implications to lay emphasis on evolution of short duration, photo insensitive, high fertilizer responsive, disease resistant, high yielding varieties of crops, improvement in cultural practices, speedy and effective diffusion of new crop production technologies, increased supplies and use of new forms of inputs, effective conservation of soil and water and exploitation of additional water resources which have remained yet to be developed. The research efforts aiming at evolution of low cost technologies are expected to contribute for increased production in the state.

Impact of Agricultural Technology Management Agency in Ahmednagar District of Maharashtra State

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The location specific, need based and compatible technologies to socio-economics and cultural environment of different farming communities, the ICAR has launched the National Agricultural Technology Project in India with the Word Bank Assistance at the total cost of Rs. 861.3 corer on 20th November 1998. In the history of the Word Bank, it is the first project of this kind for agricultural research and extension in a single country prepared by the National Agricultural Research Scheme (NARS) to solve the problems of production systems.

Under this programme Indian Council of Agricultural Research, New Delhi has launched the programme of ATMA at Ahmednagar district on trial basis. As per the methodology the same 4 blocks and 12 villages, which were covered during the baseline survey, were selected for the meaningful comparison under this study. The total of 180 households comprising of 90 beneficiaries from ATMA district-

Ahmednagar and 90 non-beneficiaries i.e. 45 households from non-ATMA district-Solapur formed the sample for the present study.

The study revealed that the majority of the households were belonged to the general caste category. The sample households from backward class were also covered under ATMA activities. The marginal and small marginal farmers received a good coverage under beneficiaries and 2.56 hectare in non-beneficiaries of non-ATMA district Solapur. The proportion of irrigated land was more than 50 per cent in both beneficiaries and non-beneficiaries. The cropping intensity showed an increase over base year and it was more on the farms of beneficiaries as compared to non-beneficiaries. There was an overall improvement in the resource bases the beneficiaries and non-beneficiaries over the base year.

The ATMA intervention was found to be effective as the beneficiaries could diversity farming system with introduction of new enterprises. In all, 5 types of farming systems were observed in which Agriculture + Horticulture +Dairy was predominant. The beneficiaries were found to be more efficient in combination of enterprises for diversification of farming system as compared to non-beneficiaries. The ATMA activity helped to bring about structural changes in farming system with emphasis on high value enterprises.

The diversification in cropping pattern was noticed to a large extent in case of beneficiaries as compared to non-beneficiaries. The crop enterprises like cereals, pulses and sugarcane etc. were replaced for new enterprises like vegetables, fruit, fodders and oilseed crops based upon the resource endowment. The diversification towards high value crops was observed to a large extent after coverage under ATMA.

The average per household annual income was increased by Rs. 30110.98 in beneficiaries. Rs. 10451.69 declined it in non-beneficiaries of ATMA district Ahmednagar and by Rs. 15020.07 in non-beneficiaries of non-ATMA district Solapur over base year due to severe drought conditions during the year 2003-04. The increase in annual income was observed in beneficiaries mainly due to diversifying their cropping pattern and inclusion of high value fruit crops. The various demand driven/farming related problems were solved through the better linkage adopted

under ATMA activities. This was possible only due to coverage of services at grass root level, and there was clear impact of coverage of services. The training, demonstration and exposure visits created the awareness about new technology amongst the beneficiaries and motivated them to adopt the same. Also, ATMA activity found to be most effective in dissemination process and improving the adoption behavior of stakeholder.

Optimal Use of Irrigation water Through Sprinkler Irrigation System for Selected Crops in Ahmednagar District of Maharashtra State

K.R. Waykar, Y.C.Sale, and D.V. Kasar

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The sprinkler irrigation system is imperative for optimal use of irrigation water and thereby improving its efficiency especially in the areas where water is a scare input. The economic studies for assessing the impact of such type of irrigation system on different parameters of cultivation of seasonal crops and thereby an influence on farm economy deserve importance. The study is based on the sample of 45 each for adopters and non-adopters of this system in Ahmedangar district.

The study revealed that the intensity of irrigation was higher by 29.61 per cent on sprinkler adaptor farms than the non-adopters farms. The per hectare investment cost made on sprinkler irrigation system was Rs. 15,208/- in which the share of subsidy provided to the cultivators was 44.64 per cent. The per hectare maximum saving in the use of human labour (10.94 man days) was seen in case of irrigation operation of onion crop, while that of electric motor labour (26.09 hours) was in respect of wheat crop for such operation on sprinkler farms. The per quintal maximum saving of water (7.04 HP hours) was reported in respect of wheat followed by gram (6.94 HP hours), whereas it was noticed minimum in case of wheat (5.28

Kwh) and it was lowest for onion crop (0.85 Kwh). The sprinkler system showed a highest yield gain of 37.65 per cent in case of gram followed by groundnut (33.51 per cent), onion (26.54 per cent) and wheat (25.64 per cent) than the surface method. Per hectare net returns were found highest (Rs. 30,241/-) in respect of onion crop on sprinkler farms, which were higher, by Rs. 11,268/- than the non-sprinkler farms. The net returns accrued from the crops on sprinkler farms such as gram, groundnut and wheat were observed higher by Rs. 6,639/- Rs. 5,026/- and Rs. 2,765/- as compared to non-sprinkler farms, respectively. B:C ratio at additional costs was seen highest (3.26) in case of onion followed by bajra (3.15) and gram (2.11), while it was observed lowest for wheat crop (1.62) on sprinkler farms. The investment made on sprinkler system found to be economically viable since BCR was more than unity and IRR was observed more than the prevailing market rate of interest. Financial assistance not in time, high investment and changing nature of subsidy pattern were the foremost problems in the operation of sprinkler system.

Impact of Biofertilizer Use on Crop Productivity in Ahmednagar District of Western Maharashtra

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The present study has been undertaken to assess the impact of biofertilizer use on productivity of corps and also to identify the constraints in biofertilizer use at the farm level. The study is based upon the primary data collected from a sample of 120 farmers comprising 60 each of biofertilizer users and 60 non-users, drawn randomly from the five villages of Rahuri tahsil in Ahmednagar district. The data pertained to the reference year 2002-2003.

The study reveals that the use of biofertilizers leads to increase in crop productivity. Per hectare 40.77, 31.30, 31.12,21.69,19.00 and 15.63 in case of

soybean, sugarcane, bajra, tur, groundnut and chilli, respectively has increased productivity.

The constraints regarding the utilization of biofertilizers reported by the farmers were high costs of liquid biofertilizers, lack of availability of biofertilizers in time, lack of technical know-how, not showing instant response like chemical fertilizers and inadequate popularity in the area under study. The constraints such as high cost of liquid biofertilizers, lack of availability of biofertilizers in time and lack of technical know-how about their use need to suitably remove in order to popularize its use for agriculture production.

Impact of the Selected Dryland Technologies on Productivity of *rabi* Sorghum in Solapur District.

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The adoption of dryland technology is a production syndrome encompassing the use of its different components. The study, therefore, was undertaken to examine the level of adoption of dry land technology, its impact on resource use efficiencies/ productivities along with cost and return structure for the *rabi* sorghum. Three villages each from Barshi and Madha tahsils were randomly selected. From a village, 15 farmers each of technology adoptors and non-adoptors amongst small (<2.00ha), medium (2.01-4.00 ha.) and large (4.01 ha. And above) holdings were selected randomly. A sample thus, comprised of 90 adoptors and 90 non-adoptors. Data pertained to the year 1999-2000 was utilized. Besides tabular method of estimation, the functional analysis was also carried out.

The results of the study revealed that the adoptors were aware of various components of dry land technology and their adoption index was more than the non-adoptors. The cost and return structure of rabi sorghum was higher in adoptors category than the non-adoptors. Productivity was considerably higher in former case

as against the latter. B:C ration was 1.43, 1.34 for adoptors and non-adoptors farm, respectively. The estimated production elastic ties of inputs for *rabi* sorghum showed that the human labour, bullock labour and other working capital were important variables influencing output of *rabi* sorghum. The resource use efficiency estimated for *rabi* sorghum indicated that human labour, bullock labour and other working capital were underutilized by adopters, whereas area, human and other working capital were underutilized by non-adoptors.

This clearly shows the impact of adoption of dryland technology on resource use efficiency/productivity, which helped to create more employment opportunity and thereby increased income level in dryland agriculture. Therefore, the study suggests intensifying the extension efforts at micro level with result and method demonstration in participatory mode. Besides this, the efforts are made to create service centers to provide labour / other inputs at affordable rates.

Impact of Cultar (Paclobutrazo) Application on Production of Alphonso Mango in Sindhudurg District of Maharashtra State

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Increasing alphonso mango production and increasing per hectare profit from mango production. Mango growers from Sindhudurg district use Cultar chemical. The present study was carried out during August-September 2004 to know about impact of cultar application on alphonso mango production. Data from 24 prize-winning farmers of Sindhudurg district were collected during September 2004. Out of 24 farmers 17 farmers were using cultar and 7 farmers were not using cultar. Data were analysed and findings are as follows.

Analysis of data revealed that cultar users started harvesting of mangoes since the month of March and fetched a price of Rs. 640 per crate of six dozen mangoes. Similarly, cultar non-users harvested their mangoes during April-May and fetched a price Rs. 535 per crate of six dozen mangoes. Thus, use of cultar is profitable proposition. It gives additional net per hectare profit of Rs. 48930/- as well as consumers get mangoes one month earlier i.e. in the month of March. The per hectare yield of mango fruits for cultar users and non users were 39.6 quintals and 16.80 quintals, respectively i.e. because of cultar, per hectare mango production has been doubled. Thus, cultar has significant positive impact on alphonso mango production in Sindhudurg district.

Agricultural Marketing: Role of Information Technology

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In India, marketing has gone and is been undergoing a significant metamorphosis because of economic liberalization and globalization. Infrastructure development is the critical factor for determining the success of market-oriented strategy and macro-economic policies in developing countries.

Market information is an important aspect of Agricultural Marketing. The importance of sound agricultural marketing policies for ensuring fair returns to the farmers can hardly be over emphasized. It, therefore, becomes necessary on the part of regulatory agencies to ensure remunerative prices to the farmers for the sale of their produce, to boost up their efforts for increasing and sustaining the agricultural production.

Information technology gives different types of information for the development of states. It covers agricultural development, watershed development, women development, and weather section development and marketing development

in the state. The dissemination of data through network to any distance with the help of communication system will enable the producers to know about probable markets where they can send their produce and sell more profitably. The traders and consumers can also derive maximum advantage out of their purchases at low communication cost. The modernization of market information system will lead to the efficiency in the markets and increase participation of the farmers. The efficiency of the markets and the farmer's participation in the markets The efficiency of the markets and the farmer's participation in the markets will be increased. This will increase the income of the farmers, which in tune will activate them to increase agricultural production.

An Analysis of Adoption of Technology in the Cultivation of Gram in Ahmednagar Disrtect

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The average productivity of pulses in India was reported to be at 533 kg/ha during the year 2000-01, among the lowest in the world. World's average productivity of pulses was 797 kg/ha in the year 2000-01. Several pulse improvement programmes/ projects have been carriedout, even though we are not self-sufficient in production of it. There may be several reasons behind it. To have an idea about the present status of technology adoption in gram and to know what are the constraints in the respect, a little effort has been carried out in the article. Kopargaon thhsil in Ahmednagar district was sleeted for the present study purposively as it occupies highest average under this pulse. Five villages were selected as a primary unit for the study. From each village, 12 cultivators were selected randomly. Thus a total sample of 60 cultivators for gram was selected. Technology adoption index (TAI) was worked out. In gram, the TAI was the highest

in seed treatment (94.44 per cent) followed by spraying i.e. plant protection (84.44 per cent) and application of phosphorus (65.66 per cent). In case of fertilizer application 50 per cent of the sample farmers were unaware about the recommended dose of fertilizers while in chemical control measures 43.33 per cent farmers were unaware about recommendation. More than 51 per cent of sample farmers use the less seed rate due to high cost of seed. This indicates that the extension services should create awareness among the farmers about the new options and development of efficient crop management skills, especially in the case of gram to realize the maximum potential yields of the gram and increase the production.

Impact of Modern Irrigation Methods on Input use and Sustainability in Ground water Exploitation

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The impact on input use and ground water exploitation was studied with a cross sectional data of 90 farmers selected from Thane district (M.S.). It was analysed separately for Traditional Method of Irrigation (TMI) viz.Flood method and Modern Method of Irrigation (MMI) viz. Drip method on dugwell (DW), bore well (BW) and dug cum bore well (DCBW) farms, for the year 2001-2002. The irrigation intensity was 146.92 per cent for TMI and 150.66 per cent for MMI. The annual cost of irrigation for TMI and MMI was Rs. 10575 and Rs. 15391 respectively and quantity of water used was 29.18 HCM and 24.78 HCM in the same order, resulting into Rs. 355.10 and Rs. 621.22 cost of irrigation per HCM respectively. The per cent increase in water use efficiency was 130.26 over TMI. The quantity of input saved for MMI was 24.61 human labour (days), 0.11 bullock labour (pair day), 4.68 manure (C.L.),

1.49 fertilizer (bags) 19 plant protection chemical (lit) and 5.00 water (HCM) per hectare over TMI.

The quantity of per hectare of water used was excess in TMI over MMI and substantially higher net returns per HCM in MMI (Rs. 804.49) over TMI (Rs.617.60). It revealed that the farmers in MMI group of farms showed greater sustainability in groundwater utilization.

Evaluation of Intigrated Dairy Development Programme in Parbhani District

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Milk productions in India during 1950-51 were 17 million tonnes, which has reached to 78 million tonnes in 1997-98. Presently India ranks first in the world in milk production. The Operation Flood Programme was an instrumental in dairy development activities. However, the milk development in all the states and districts was not uniform. Hence, in order to increase the milk yield, the Government of Maharashtra selected six districts, which were not covered under the Operation Flood Programme and were backward in nature under Integrated Dairy Development Programme. The districts namely Thane, Raigad, Jalna, Akola Washim and Parbhani were selected for Integrated Dairy Development Project during 1998-99 to 2001-2002 with fully financial assistance of Central Government. The brief objectives of the IDD Project were:

1) to increase the existing milk production and distribution of hybrid cows/high yielding cows/buffaloes which were on the route of milk collection center. 2) to revise routs of milk collection center in order to strengthen the milk co-operative society and to improve milk there of . 3) to establish milk processing and distribution

centers in the districts. 4) to provide technical services such as, health/hygene artificial insemination of animals to the milk producers from Animal Husbandry Department. 5) to provide feeds and fodder with suitable rates to the selected farmers with encouragement to undertake forage development programme. 6) to increase the knowledge level of farmers by arranging extension activities.

Technology and Application for Alternative Uses of Sorghum

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Study on technology and applications for alternative uses of sorghum production was undertaken during the year 2001-2002 with the following objectives 1) To study the economics of sorghum production in selected sample farmers. 2) To study the functional relationships between the test factors and yield of sorghum under varying levels of technology and 3) To study the economics of alternative use of sorghum in selected sample farms in Marathwada region. The study based on farm level information's collected for the year 2001-2002 by survey method from 20 farmers adopted the new technology of sorghum production and 20 farmers did not adopt the technology. The required data were collected from two villages of Parbhani tahsil with the help of questionnaire. The data were used and results were drawn. The study reveled that, on an average, yield obtained in case of technology adopted farmers was 29.65 and it was 17.83 quintals in case of non adopted farmers. The net profit on cost 'C' was Rs. 1747.18 and Rs. 538.75 per hectare in case of adopted and non-adopted farmers. The contribution of technical individual factors such as use of recommended variety, effect of timely sowing, optimum use of fertilizers gave highest value of output at Rs. 10,125=00 in case of adopted farmers as against, Rs. 3900=00 in case of non adopted farmers.

The study on alternative uses of sorghum value addition indicated that, sorghum production was found more profitable than that, of selling of sorghum in open market. The net price received was Rs. 300=00 per quintal, but the same produce is converted into value addition i.e. alcohol production the income received was Rs. 560=00. Therefore, value addition due to alcohol production received was Rs. 260=00. Thus, study revealed that, alternative uses of sorghum incurred substantial increase in income as compared to selling the sorghum in the market.

Technology Adoption and Constraint Analysis in the Cultivation of Redgram in Ahmednagar District of Western Maharashtra.

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Pulses occupy an unique position not only Indian agricultural, but also in the diet of Indian people. Several pulse improvement projects have been carriedout, even though we are not self-sufficient in production of it. There may be several reasons behind it. To have an idea about the present status of technology adoption in redgram and to know what are the constraints in the respect, a little effort has been carried out in the article. Shevgaon tahsil in Ahmednagar district was selected for the present study purposively as it occupies highest acreage under this pulse. Five villages were selected as a primary unit for the study. From each village, 12 cultivators were selected randomly. Thus a total sample of 60 cultivators for redgram was selected. Technology Adoption Index (TAI) was worked out.

In the case of redgram sample farms the use of nitrogen was highest than the demonstration plots where use of the rest of the resources viz. human, bullock labour, seed, manures and phosphorus were found minimum. The average productivity of redgram was observed 10.17 quintals / ha on sample farms, which

were 45 per cent, less than on demonstration plots. In the redgram, the TAI was the highest in case of seed treatment (78.83 per cent) followed by spraying (63.33 per cent), application of phosphorus (62.22 per cent), nitrogen (54.44 per cent) and manures (52.22 per cent) however, the TAI was less than 50 per cent in seed rate and sowing time. Thus, there exists a wide extension gap in the adoption of improved technology in case of seed rate and sowing time.

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Economics of Integrated Farming System in Marathwada (Maharashtra State)

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The paper is based on the results of experiment conducted under the Ad-hoc research project viz., Study on integrated farming system in Marathwada region, sanctioned by the ICAR, New Delhi with the objectives to develop intensive, sustainable cropping system, to utilize effectively the family labour to generate employment and to work out economics of cropping systems and other enterprises. The experiment was laid out with three treatments and those were 1) crop sequences on 0.40 ha area, II) crop sequences on 0.40 ha area + dairy cow and III) crop sequences on 0.40 ha area + dairy cow + sericulture. The experiment was conducted for three years and a non-replicated nature. The economics of different enterprises along with employment generated were worked out. The results revealed that, among the different cropping systems, the sequence of sorghum-maize (fodder) - okra has given maximum net income of Rs.2,861 where as, the dairy enterprise has given a net income of Rs. 4,356. The sericulture enterprise was observed to be the best in respect of net income (Rs.5,121) and employment generation (98 man days) for family labour. Maximum income and employment was

generated where crop, dairy and sericulture enterprises were taken together. The integration of these enterprises forms the most stable and viable farming system.

Resource Productivity and Resource Use Efficiency in Sonaka Grape Production

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Grarpe (*Vitis Vinefera*), is commercially important fruit crop and its cultivation is widespread through out the world. In India, the area under grape is 0.60 lakh hectares with production of 7.30 lakh tones. Among the states, Maharashtra has the highest area of 0.23 lakh hectares under grape with production of 5.60 lakh tones. Sonaka grape variety was derived from Thomson – seedless by farmer named Nanasaheb Sonaji Kale in 1980. It is suitable for table purpose and making raisin. In order to know the impact of various resources and to determine their economic efficiencies in Sonaka grape production, the present study entitled resource productivity and resource use efficiency in Sonaka grape production has been undertaken.

Multistage sampling technique was used in selection of Solapur district, Pandharpur tahsil, eight villages and 48 Sonaka grape growers. Cobb-Douglas type of production function was found to be the best fit to the data. The value of R^2 was 0.930, which indicated 93.00 per cent of variation in the yield of Sonaka grape due to variation in the independent variables. On the basis of elasticities of production, there was much scope to increase the use of manure (0.103), growth regulators (0.032), nitrogen (0.034) and fungicides (0.131) in Sonaka grape production. On the basis of resource use efficiency, use of manure was found to be the most profitable resource followed by nitrogen, fungicides and growth regulators. On the contrary, the use of insecticides was found in loss. The existing size of Sonaka garden was

0.82 hectare while optimum size of Sonaka garden was found to be 0.90 hectare. Thus, optimum use of nitrogen, manure, fungicides and growth was 814.12 kg, 503.31q, 113.15kg and 6.53 liters respectively.

Assessment of High-Tech Agriculture on Production and Income of Rose Cut flowers in Maharashtra

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Polyhouse technology is a good example of high-tech agriculture. The producers in Pune, Sangli, Nasik and other districts of the State constructed large numbers of polyhouses, where in roses and other cut flowers are grown. However, there are no major studies which have evaluated the comparative picture of open field cultivation and that in polyhouse. Therefore, in the present study, attempt has been made to estimate the cost of production of roses produced under open and polyhouse conditions and to compare the production and profitability of roses under both conditions. As far as methodology is concerned, that has been followed in the I.C.A.R. Ad-hoc research project is used. The total 85 open rose cut-flower producers and 94 polyhouse owners spread over in three districts namely Pune, Sangli and Nasik districts were selected randomly. The data pertained to the year 1999-2000.

Findings of the study revealed that the per hectare cost of cultivation of roses in open field conditions is Rs.4.89 lakhs, while that in polyhouses, it is Rs.37.00 lakhs, which is seven times higher than the former technology. However, per unit production is substantially higher with best quality flower in polyhouses than those of unprotected cultivation. As regards the per hectare income, it is Rs.0.51 lakhs in open cultivation and Rs. 20.01 lakhs in polyhouse. Alongwith income, B:C ratio is also higher in polyhouse (1.54) than that of open cultivation (1.39) so as to adopt this technology by majority of small and marginal farmers on large scale, adequate

finance will have to be provided. Similarly, at-least in domestic markets direct sale of cut flowers will have to be developed for receiving the better net prices to the producers. Also, for increasing the domestic demand, awareness of use of cut flowers will have to be increased.

Tissue Culture is New Era in Banana Production

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The area, production of banana in the Maharashtra State was 29.8 thousand hectare and 779 thousand tones during 2002. Banana is available throughout the year but August to October and December to March seems to be the periods of brisk trading in Maharashtra. It is study on comparative picture of traditional method and tissue culture methods of banana cultivation. For the specific objectives like to estimate the per hectare cost of cultivation of banana and the cost of returns and profitability of banana. Jalgaon and Sangli districts of Western Maharashtra are leading in growing of banana and therefore, these two districts have been selected purposively. A sample of 30 banana growers each from traditional methods and tissue culture method growers was selected from these two districts. The data on various aspects of cultivation were obtained for the year 2001-02 with the help of a specially designed schedule by survey method.

The major share of seed, fertilizer, irrigation, labour, and machinery together contributed 43.75 per cent in the cost A respectively. The major share of fertilizer, seed, labour, manure and irrigation together contributed 62.15 per cent in the cost A, in tissue culture method respectively. In tissue culture method the highest share goes on fertilizer and seed due to use of water-soluble fertilizer and tissue culture plant. Which are costly than the traditional method. The per hectare yield of traditional and tissue culture method was 533.14 and 780.33 qtl respectively. As compare to traditional method 59.40 per cent yield was more in tissue culture method. The per quintal cost of banana in traditional and tissue culture method was

Rs. 180.90 and Rs. 387.01 respectively. The per hectare profit at cost C was higher in tissue culture method (Rs.28156) than the traditional method of banana cultivation. It is seen that the tissue culture method of banana cultivation is superior to the traditional method due to increase in yield and harvest the crop at a time. The coefficient of multiple determination (R2) was 0.68 in traditional method and 0.74 in tissue culture method. The F value is highly significant, indicates that the goodness of fit in the variables. The regression coefficient of tissue culture method total human labour (man days), Seed, Manure, Fertilizer and irrigation charges were positive and significant at 1, 5 and 10 per cent level. The other independent variables like seed, manure was positive but not significant influence of the banana production. It is observed that tissue culture method is superior to the traditional method of banana cultivation.

Variety-wise Impact of Grape Production in Western Maharashtra

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Maharashtra is leading in grape cultivation among the states in India. The area and production of grapes in this state is estimated 27 lakh ha and 7.63 lakh MT respectively, accounting for per cent of the area 52 per cent of the production in the country. Different varieties, of grapes leads to differences in costs and returns estimates are required therefore, cost and return structure of grape (variety wise) cultivation in Western Maharashtra need to be analysed to ascertain the profitability. For the following specific objectives like per hectare item wise cost of cultivation of grape in Western Maharashtra and work out the profitability of grape. The present study was taken in Sangli, Pune, Nasik, Ahmednagar and Solapur district of Western Maharashtra. The data were collected from 9 clusters of grape comprising 90 grape growers in the cpmcc scheme for the year 2001-02 and it was utilized for the study. The data relating to various inputs used, costs and returns obtained were tabulated

and analyzed by averaging them, and the functional analysis was carried out using the Cobb-Douglas type of production function to estimate the factor share in the production.

The per hectare and per quintal cost of production of grape was Rs.212519.72 and Rs.1075.08 respectively. The important items of cost in cultivation of grape were total human labour (15.70 per cent) insecticides (12.31 per cent) and irrigation charges (4.86 per cent). The benefit cost ratio of Sharad and Manik Chaman varieties was highest (1.74 to 1.76) than the all other varieties of grape. The per hectare margin was highest in Sharad (Rs.162232) and Manik Chaman (Rs.180205) variety of grape. The coefficient of total human labour days, insecticide and growth regulator and fertilizers are highly significant and positive relationship with the output of grape. The overall observation of the grape stated that the Sharad seedless and Manik Chaman variety of grape was profitable variety than the other variety of grapes.

Impact Assessment of IPM Technology for Cotton Production

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Vidarbha region of Maharashtra is well known for cotton crop, where it is mostly cultivated as a dryland cash crop. The present study evaluates the input use pattern and economics of IPM practices followed by cotton growers in Goregaon village of Akola Tahsil. There was a significant difference between the two categories of farmers (IPM and Non IPM adopters) with respect to the input use. Adoption index of two categories (IPM and Non IMP) were 65.45% and 35% respectively, even though impact is lower than assumed i.e., 10.89 q/ha is obtained as against 13 q/ha, this gap is need to be filled through intensive extension activities for adoption of IPM technologies.

Technical and Allocative Efficiency in Rice Production

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The specific objectives of this study were as follows.

To estimate technical and allocative efficiency in rice production data for this study were collected by survey method. Economic efficiency f rice crop production was estimated using stochastic frontier production function. It is shown that the coefficient of the variable seed was significant. The sigma value was also significant. The mean technical efficiency of the farmer was estimated and it was 0.94 i.e. 94 per cent. The specific allocative efficiency was estimated to be 0.67 i.e. 67 per cent. The economic efficiency was calculated and it was found to be 0.629 i.e. 62.90 per cent.

The result showed that the output loss due to allocative efficiency 33 per cent was higher than the loss due to technical efficiency 6 per cent. The study implied that the rice output of average farmer could be increased by 6 per cent by adopting the technology followed by the best practice farmers. By optimum resource allocation these existed a scope to raise output by 33 per cent.

The economic inefficiency revealed that the production could raised by 37.1 per cent if the technology gaps between average farmer and best practice farmers were narrowed and by optimum resource allocation by all farmers.

CONCLUSIONS:

1. The economic efficiency of rice crop was found to be 62.00 per cent where as the technical efficiency and allocative efficiency was 94 per cent and 67 per cent respectively.
2. The result shows that 33 out of 66 farmers have a technical efficiency more than 95 per cent. It is to be mentioned that application of fertilizer at appropriate time is more important than totala level of fertilizer used in rice cultivation.

3. The mean technical efficiency was computed as 94 per cent, which indicates that on an average the realised output, can be increased by 6 per cent without any additional resources.
4. The economic inefficiency revealed that the production could raised by 37.1 per cent if the technology gaps between average farmer and best practice farmers were narrowed and by optimum resource allocation by all farmers.

Economic Impact of Water Harvesting and Recycling on Crop Production

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Agriculture is a principle sector of the Indian economy, which contributed over one third of the National Income, supplies bulk of wage goods raw material to non-agricultural sector. This objective can be accomplished only by providing assured irrigation that proper stage of crop. Timely availability of soil moisture in the soil has been accorded a high priority on agricultural production. Therefore, artificially made availability of soil moisture through irrigation, water harvesting and recycling techniques leads to more efficient use for agricultural land in areas of inadequate rainfall. Thus the development of water harvesting and recycling technique is crucial important for increasing agricultural production in the Yeotmal district of central vidarbha zone with the following aims.

1. Study the cropping pattern of the adopter and non adopter farmers of the selected area.
2. Study the impact of technology on crop production.
3. Study the to farmers opinion about the technology for future potential and adoption.

4. Constraints faced by the farmers for adoption of technology.

The survey was monitored at the proposed area to study the impact of technology developed by RCPS-5 implemented by Sawargadh National Watershed Project of Yeotmal and required information has been collected with the help of well-structured questionnaire for agricultural year 2001-02 purposively. For the study total 40 respondents (20 adopter farmers and 20 non-adopters farmers) were selected. The technologies implemented by the farmers are

1) Integrated nutrient management through balanced use of organic and inorganic fertilizers.
2) In site soil moisture conservation by ridges and furrow layout in cotton and cotton based cropping system.

Economic Evaluation of Integrated Watershed Development Programme in Warud Tahsil of Amravati District

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Watershed development programme plays an important role in increasing agricultural production. The present study deals with the economic evaluation of integrated watershed development programme located in Warud Tahsil of Amravati district with an objective to examine the impact of watershed management activities on income, consumption, saving, employment, other benefits and capital formation.

Five villages were purposively selected for the study. A sample of fifty beneficiary and fifty non-beneficiary farmers were selected for the study. The data for the study from the selected farmers were collected for the agricultural year 2001-02 in a specially structured schedule by survey method. Simple tabular analysis

method was used to examine impact of watershed management activities on income, consumption, saving and employment.

The analysis revealed that, the gross return from crops on beneficiary farms was more than non-beneficiary farms. The net income in case of beneficiary farm was more than non-beneficiary farm. The number of labour employed on beneficiary farm was higher as compared to non-beneficiary farm. The average male labour employment (days) on beneficiary farm in case of Soybean was 10.01 male and 14.88 female as against 9.55 male and 14.27 female on non beneficiary farm per acre. In case of Soybean + Tur per acre labour employment (days) on beneficiary farm was 9.87 male and 14.64 female while 9.79 and 14.51 female on non-beneficiary farm. In case of Cotton + Tur, per acre labour employment (days) on beneficiary farm was 15.06 male and 26.38 female against 14.32 male and 25.48 female on non beneficiary farm.

Study on consumption pattern of beneficiaries and non-beneficiaries revealed that, the consumption expenditure of beneficiary farmer was more than on beneficiary farmer. Annual consumption expenditure of beneficiary farmer was Rs.15, 056.80 against Rs. 14,840.00 on non-beneficiary farms.

Study also reveals that the saving of beneficiary farmer was more than non-beneficiary farmer. Saving of beneficiary farmer was 11.72 per cent of the gross annual income while that of on non-beneficiary farms was 10.87 per cent of the gross annual income.

Economics of Sericulture unit – A case study

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Sericulture functioning as a rural cottage industry in our state. In India women constituted 48% of the country's population, which can be engaged effectively in this industries. India has reached third position among the silk

producing countries with regard to quantity but qualitatively much behind in the world market. India with its annual production of about 15857 tonnes during 2000-01 is the largest producer of raw silk. However, 96 per cent of the mulberry raw silk produces in the country is of multivoltive variety, which is lower in productivity and quality as compared to countries like China and Japan. In our country Karnataka is the state where trading on large scale occurs. At present in Amravati district 197 sericulture units are functioning. Hence the present study was undertaken and asses the value of product.

The study is based on the primary data collected from the viable unit of a village Gopalpur Tal. Dist. Amravati Vidarbha Region. An analysis of the data revealed that the per acre total cost of mulberry leaves cultivation per cycle was Rs. 4,200/- and receipt of Rs.5000/- obtained by selling the cocoons per cycle. Based on the production and net benefits receiving Rs. 800 per cycle. It concluded that the sericulture unit has a positive impact to improve the economic status of the farmer.

Economics of Soybean Based Cropping Systems in Amravati District

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In Indian agriculture the basic issue, which help to promote agricultural development, is technological investment. The adoption of new technology, though aims at increasing the production and income of the farmers require more capital investment. It is therefore, necessary to make effort to reduce the cost of cultivation of crops and yield variability in dry farming. This can be achieved through adoption of appropriate cropping systems. It is in this context that the present study was undertaken. The data collected on Soybean based cropping systems i.e. Soybean – Wheat, Soybean – Gram, Soybean – Safflower etc. from the total 75 rrespondent-farmers were analysed to accomplish the objectives of the study. Five villages from

Amravati tahsil of Amravati district were purposively taken into consideration. 25 cultivators for each system were selected randomly and the data was collected by personal interview method pertaining to the year 2001-2002.

Cobb-Douglus production analysis (step down) indicates that the seeds, fertilizers and plant protection can increase the productivity of crops and enhancing their use. As the mean levels were much lower than the recommended levels. In general, it was observed that the soybean is emerging as an important cash crop in Amravati district and from the point of view of income and employment generation, soybean the cultivators may follow based double cropping systems. From the above discussion, it is concluded that the soybean – gram systems are more profitable than soybean – wheat and soybean – safllower croping systems and may be preferred to order soybean based cropping system.

Economics of Production of Important Vegetables In Hingoli District of Marathwada Region

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Evaluation of improved, HYV's of vegetables, developed infrastructure facilities in the form of roads, electricity, markets, transport and remunerative prices due to increased demand, farmers are attracted towards vegetable growing. Considering these aspects, study was undertaken with the objectives to study per hectare physical input utilization, cost of production, gap in input use and problems faced by vegetables growers in Hingoli district of Marathwada region.

Pimpla Chaure, Khandarban, Jawla and Babulgaon villages, which are in the vicinity of Basmath city in Hingoli district were the highest area is under the vegetables, viz, Ladies finger, brinjal, fenugreek and cauliflower were selected for the study. Data were collected by survey method in a specially designed questionnaire

for the above vegetables from the 200 cultivators (50 for each vegetables) during 2002-03.

Analysis revealed that per hectare human labour employment was found more in ladies finger, brinjal and cauliflower, while it was low in fenugreek cultivation. The use of FYM and fertilizers was below than the recommended level. Per hectare cost of cultivation worked out was Rs.28.58, 34.65, Rs. 14.37 and Rs.31.58 thousands, respectively for the ladies finger, brinjal, fenugreek and cauliflower.

The highest net returns as well as cost benefit ratio was recorded in cauliflower cultivation followed by brinjal and ladies finger. High risk in prices, high marketing charges and non-availability of FYM was the major problems faced by the vegetable growers, in the study area.

Production Economics of Watermelon in Parbhani District of Marathwada Region

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Watermelon, which is locally called as "Tarboj" or "Kalingada" in Marathi is one of the most important widely cultivated cucurbitaceous crops grows in summer season throughout the State. Due to development of production technology of watermelon and its good profit yielding quality in short period, farmers are attracted to grow this crop on large scale in Parbhani district. Considering this aspect, it was felt necessary to study physical input utilization, production cost, gap in input use and constraints in cultivation of watermelon. Data on these aspects was collected for four villages in Gangakhed taluka of Parbhani district in a specially designed questionnaire by survey method during 2002-03.

Results of analysis revealed that, per hectare 95 human labours were engaged in watermelon cultivation. On an average cost A, B and C was worked out to the tune of Rs.14.99, Rs.24.86 and Rs.25.44 thousand per hectare, respectively. Average yield recorded was 222 quintals with gross returns of Rs.55.50 thousand. Benefit cost ratio indicated that watermelon growers received net returns of Rs.2.70 and Rs.1.18 by spending a rupee at cost A and Cost C, respectively. Showing thereby that watermelon cultivation is profitable. Gap analysis of input use indicated that farmers have not used recommended levels of inputs, particularly FYM, which directly affected on yield reduction to the extent of 50.47 per cent. Among the different constraints, high cost of seed; high weight deductions (Kadta) by the commission agents, distress sale and low prices fetched by growers were the major constraints posed by watermelon growers.

Impact of Improved Sugarcane production technology in high recovery zone of Maharashtra

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The present study, undertaken with objectives viz; 1) To study the effects of improved sugarcane production technology on resource use, cost and return on sugarcane in high recovery zone and 2) To study the resource productivity of sugarcane. The sampling design adopted for the study was a three stage stratified random sampling with Tahsils as the primary unit, villages as the secondary unit and the sugarcane growers as the ultimate sampling unit. The sample of 90 farms compressed of 30 sugarcane growers of each selected village of Tahsils (Karveer, Shirol and Walva) selected randomly.

Technology adoption index (TAI) was used to measure the level of adoption of technology by the sample sugarcane farms under study. Considering TAI score centered between 40 to 60 per cent two groups based on extend of adoption of improved sugarcane production technology viz; up to 50 % adoption and above 51 % adoption were identified for analysis. The data for 155 harvested sugarcane plots consist of 32 plots (20.64 %) having up to 50 % adoption of technology according to technology adoption index and 123 plots (79.36 %) having above 51 % technology adoption. The factors influencing resource productivity of sugarcane were estimated by using Cobb- Douglas type of production function.

The resources used for preseasonal adsali and ratoon sugarcane in case of above 51 % technology adoption were higher than that for upto 50 % technology adoption except Bullock and manure for ratoon. The per hec. gross returns, farm business income, family labour income and net farm income in case of above 51 % technology adoption was higher the B-C ratio for preseasonal, adsali and ratoon sugarcane were 1.24, 1.40 and 1.48 respectively for above 51 % technology adoption which were 1.22, 1.39 and 1.47 for up to 50 % technology adoption. The variables included in Cobb- Douglas types of production function model for above 51 % technology adoption explained 81.05 %, 74.43 % and 84.07% variation for preseasonal, adsali and ratoon sugarcane respectively. The resource use structure indicated that the use of manuare and adoption of improved technology has potential of enhancing productivity of sugarcane. In addition to higher productivity the adoption of above 51 % technology in sugarcane cultivation lead to saving in cost of cultivation to the tune of Rs. 4.26 per ton for preseasonal, than that of below 50 % technology adoption. The productivity expansion could be achieved through adoption of soil testing based fertilizer use, use of Bio-fertilisers, Micronurients, growth promoters and Bio-cantrol measures to obtain higher productivity.

Export of Indian Rice

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The export potential of rice has enormously increased with the liberalization of trade. The study is conducted to measure impact of rice export using exponential growth function. The study revealed that basmati rice exports registered a growth of 2041 per cent while the total value and unit price realized increased at an annual rate 15.2 and 12.49 per cent, respectively. Regarding non-basmati rice exports, the growth rate observed was 25.52 per cent per annum in case of quantity. The export value of basmati rice grew at an annual rate of 41.63 per cent. The export unit value witnessed a growth rate of 16.92 per cent per annum. Considering rice as whole, the growth rate obtained was 12.17 per cent per annum while in value terms; the growth rate obtained was 20.48 per cent per annum.

The transition probability matrix of Indian basmati rice exports demonstrated the losses and / or gains over previous year market share to major importing countries. India could not retain it's previous years share to Baharain and Uk. But the retention was high in Saudi Arabia (87 per cent), UAE (59 per cent), Kuwait (36 per cent) and UAS (19 per cent).

Impact of IPM Technology on Productivity of Cotton

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An experiment was carriedout on farmers field at Ashta villege in Kinwat taluka of Nanded district on large scale in the year 1998-99, 1999-00 and 2000-01. Economics of cultivation, viz IPM technology and farmer's practices, was studied. The

findings indicated that 30-40 per cent of total expenditure of total expenditure was incurred on fertilizer application and plant protection. Under IPM technology the cost of cultivation was lowest (Rs. 11725 / ha) with maximum seed cotton yield (10.75 q/ha), whereas cost of cultivation under farmer's practices was Rs. 1
257 / ha with seed cotton yield 8.06 q/ha.

Average technological gap index if four important production variables were workedout as per the procedure given by Gomez and Gomez. The main factors responsible for the technological gap index in the cotton cultivation were application of excess fertilizer and non-proper application of plant protection measures. In regression analysis, it was observed that plant protection has strong positive impact on technological gap indicating the efficient and proper use of input.

Impact of TissuecultureTechnology on Banana Cultivation Under Drip Irrigation in Jalgaon District

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The study entitled 'impact of tissue culture technology on banana cultivation undar drip irrigation in Jalgaon distict. Jalgon district is well known for banana cultivation in Maharashatra state. Commercial varities of banana grown in the districts are Basrai and shrimanti. These are grown by conventional method means by plantation through sucker. Plantation by sucker has defects like non uniformity in maturity time and low yields. Tissue culture plantation generally has removed these defects hence on attempt was made to study impact of tissue culture technology on banana cultivation under drip irrigation in Jalgaon district

Objectives of the study was to compare cost and returns of banana under conventional and tissue cultuure methood of cultivation.

Present study is based on primary data collected from 60 conventional banana growers and 60 tissue culture banana growers of Jalgaon disrict

The required data was collected by personal interview method in specially designed schedule. Data pertains for the year 2001-02. The data were analysed by employing simple statistical tools like means, frequencies, ratios and percentages etc. , to arrive at meanigful conclusions.

CONCLUSION

1. Per hectare human labour and family labour use was 117.11 days and 79. 97 days respectively in case of conventional method of banana cultivation while in case of tissue culture it was 260.7 and 25.25 days respectively.
2. Per hectare cost of cultivation was Rs. 56,363.9 per convention method and Rs.1, 42,115.70 for tissueculture while in case of conventional method it was Rs.54, 976.

Information Resources in Agricultural Economics

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Information is an important resource, which is growing exponentially both in conventional and non-conventional forms. In order to keep agricultural educationist, researchers and extensions informed about latest developments in their field of specialization, a new breed of Information society or Information industry has emerged, a viable and an effective information system in the field of agricultural sciences at national level is envisaged, with emphasis on Agricultural statistics information system by integrating existing systems and services. A variety of information resources, their accessibility including primary, secondary and tertiary sources are identified and listed. Computerized databases, like AgECON, CABI, AGRICOLA and AGRIS are briefed including coverage of literature, their accessibility, On-line search etc.

Session - II

Diversification in Agriculture

CONTENT

Theme II : Diversification in Agriculture

Growth and Diversification in Agriculture - A Spatio Temporal Analysis

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With the development of agriculture, cropping pattern has been changed to cope with the changing scenario and to meet the ever-changing demands of growing population. Limited supply of land along with increasing population and declining yield, compelled the farmers to search for alternative ways of raising farm income and for the sustainability of growth. With the passage of time farmers became increasingly commercialized and started farming for maximizing their farm output. Now, farmers have realized the need for emphasizing more on the long-term net return. Due to economic importance, diversification studies have gained considerable interest.

In the present study an attempt was made to examine the diversification in Agriculture of Vidarbha. The performance of different crops was studied through compound growth rates of area using Exponential function. Kendall's Rank Correlation was used to study the dynamics of cropping pattern. A sample of 800 farmers was selected from Agricultural Prices Scheme of the Department to examine the changes in cropping pattern at different points of time viz. 1980-81, 1990-91, 2000-2001 on farmers field.

The results of the study are summarized below:

1. Area under *Kharif* jowar, bajra and wheat were found to be decreasing.
2. The growth rates of Pulses and Oilseeds increased substantially over the entire study period.
3. Analysis of overall agreement in cropping pattern was examined by coefficient of Concordance. The concordance coefficient (0.92) and Kendall's rank correlation coefficients were found to be significant indicating that there was no shift in the cropping pattern over a period of 19 years.

4. Analysis of cropping pattern at different points of time on farmer's field showed the crop diversification.
5. Soybean, horticultural crops and forest crops were found responsible in causing diversification in most of the districts of Vidarbha.
6. Agri-Horti system was found to be more profitable among the existing systems.

The study concludes that the area under cereals showed decreasing trend while the area under pulses and oilseeds were increased. If this trend continued for another decade coupled with two per cent population growth, we are likely to land in a situation of foodgrain shortage. The Agri-Horti system of crop diversification was found to be more profitable among the existing systems under study.

Diversification in Agriculture – Micro Level Approach

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Diversification can be examined in various directions right from crop, mix of crop, non-crop enterprise on farm, farm to non-farm sectors in rural areas. In present study crop diversification in Vidarbha was the main focus of the study. In consonance of this focus the objective were framed as given below.

1. To examine the extent of crop diversification of Vidarbha
2. To study the shift of acreage allocation of various crops

For the study secondary data published by Govt. and the primary data collected from 45 farmers from each zone of Vidarbha (Eastern Zone, Central Zone and Western Zone) for NATP project were used. To examine the extent of crop diversification in Vidarbha, Herfindahl and Entropy Index were used as the statistical tools. For study the shift of area allocation of various crops the Marko Probability Model was fitted to calculate Transition probability matrix for different crop areas.

It was observed from the cropping pattern at overall level that the cotton and paddy crops were dominating the area of crops grown in Vidarbha. It was also observed from Herfindhal and Entropy Index, were ranging from 0.24 to 0.55 and 0.46 to 0.76 respectively. A gradual decrease of Herfindahl and increase in Entropy Index in selected districts confirms the increase in diversification.

The transition probability matrix table revealed the retention of crop area from last year area in current year. In case of Western Zone the cotton, tur and other crops retained 52, 1 and 7 per cent area of previous year in current year. Mung showed no change in area and Jowar was observed fully diversified crop.

In Central Zone the percent-retained area was observed for the crop, i.e. jowar 19, cotton 51 and soybean 19 per cent. It was concluded that Cotton was the dominant crop of Central and Western Vidarbha Diversification was observed in case of jowar, tur, mung crop in Vidarbha. The Soybean was observed as a competing crop for area with Cotton in Central Zone.

Markov Chain Approach for Diversification in Agriculture

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With the passage of time the farmers are increasingly commercialized and have transformed their farming activity into agri-business entrepreneurship. In order to develop competitiveness in the global market, the farmers have become conscious in allocation of area under crops / enterprises. This has necessitated research workers to undertake in-depth studies related to the extent of diversification and identifying the crops responsible for diversification.

In the present study attempt was made to examine the diversification in Agriculture of Vidarbha. Markov Chain Approach was used to study the crops causing diversification while Harfindhal and Entropy index for the extent of crop-diversification. The results of the study are summarized below :

1. The results of Herfindhal and Entropy index confirm the existence of diversification in Agriculture of Vidarbha.
2. The transition probability matrix was estimated using "Markov Chain Analysis" which indicated that there is a shift in area under different crops over the previous year.

The study concludes that the results of Herfindhal and Entropy index confirm the diversification. On the basis of transitional probability matrix obtained under Markov Chain Approach *Kharif* jowar, paddy and cotton were identified as the most stable crops of Vidarbha.

Diversification of Agriculture in Maharashtra

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In this study, an attempt was made to explain the trends of diversification in the Maharashtra state and to explore future possibilities. It is observed that except jowar, wheat, and sugarcane, all other crops recorded significant growth in area over a period time. There has been decline in area under total cereals mainly due to decline in area under jowar and wheat. However, jowar, bajra, paddy, wheat, pulses, cotton and oilseeds are major crops in the state accounting more than 86 per cent of gross cropped area during TE 1999-2000. Study indicated that fanners of state were practicing diversification. However, growing of foodgrains is still predominant mainly due to their orientation towards food security. There has been relatively more diversification in the recent years of the study as compared to the initial years. However the extent of diversification was too small. The diversification in cropping pattern has taken place towards fruits and vegetables, sugarcane and maize at the cost of foodgrains. It may thus be concluded that farmers have shifted their cropping pattern from subsistence crops to the commercial crops. The diversification towards these crops could be utilized in a positive manner through the emphasis on

processing of these commodities for their value addition. This would create more jobs in the non-agricultural sectors and strengthen the linkages of the secondary activities with the agricultural stratum. The diversification of cropping towards specific crops also suggests that research institutions on the crops most suited to it should make the intensive research efforts. There are technological possibilities in the pipeline for other crops. It remains serious challenge for the scientists to improve and demonstrate the other possibilities for diversification. The potential areas where specific diversification can be encouraged need to be identified. The efforts need to be complemented by the appropriate policy and encouraging public and private infrastructure such as an agro-processing unit for various crops, vegetables and fruits. Research efforts therefore, need to be intensified further to develop high yielding varieties of the crops suitable to agro-climatic conditions of the region. Changes in cropping pattern through appropriate crop planning with high value crops and steady improvement in crop yield through scientific management is necessary to introduce an element of dynamism in the state agriculture for maximizing the crop output. The diversification of cropping pattern should be on the lines of yield-augmenting technology to increase the productivity so that the sustainability in foodgrains production can be ensured. In rainfed areas, the intensive use of rainwater should be ensured through appropriate means of watershed development programs. Regionally differentiated price policy should be followed. Improvements in irrigation and marketing facilities, which promote crop diversification and reduce yield and price risk. New varieties consuming less water need to be developed.

Employment Generation Through Goat Farming: A Diversified Enterprise

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Livestock is the backbone of Indian agriculture and piays a crucial role in the national economy. Livestock has remained as keystone of Indian farming since time

of immemorial. The utility of livestock for rural community is so high that they are considered as embodiment of divinity and without them no cultivation is possible. Agriculture and livestock are complementary as well as supplementary to each other. They have been contributing to the prosperity of rural India in more than one way.

India possesses the largest goat population in the world; it was about 121 millions in the year 2000-2001. In Maharashtra the goat population is 114:34 lakhs of which 2.89 lakhs are in Osmanabad district, alone which accounts for 2.53 per cent of the total population in the state. Goat is kept mainly for meat production and rarely for milk being used for consumption. Goat contributes 1.1 per cent of the total milk production. The goat remains as one of the most economic produces of meat among farm animals. India contributes about 50 per cent of the total goat meat production of the world.

The economy of Maharashtra is mainly rural based where 65 per cent of their populations are residing in rural areas. In the rural economy animal husbandry provides subsidiary means of livehood to the agriculturists and agricultural laborers. Thus, livestock rearing has become an integral part of agriculture in Maharashtra. Osmanabadi and Sangamneri breeds of goat are observed in Marathwada region.

Resource Management in Diversified and Arable Agriculture in Ahmednagar District of Maharashtra

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With a view to mitigate the risks and uncertainties of income from crop enterprises, it is essential that the farmers incorporate such enterprises, which yield regular income throughout the year. Ultimately the way out for increasing and stabilizing the income is to adopt the diversified farming on large scale. Major portion of the cultivated area in Maharashtra is dry which offers special advantage to

diversified farming. As such, present paper is an attempt to investigate the resource use levels and input-output relationship on diversified and arable farms.

The study was undertaken in twelve villages from the selected two tahsils of Ahmednagar district in Western Maharashtra. In all there were 120 sample farms comprising of 60 diversified and 60 arable farms. The results of the study indicated that the magnitude of human labour use was higher on diversified farms than that of arable farms because of maintenance of much animals and or allied subsidiary activities on these farms. The use of manure was higher in diversified farms. As the level of human labour, bullock labour and cash expenses on crop activity increased by 1 per cent respectively, in the case of diversified farms of unirrigated region. However, no significant effect was made by bullock labour and cash expenses on crop activities on the diversified farms of irrigated region. Thus, the results conclusively showed that the use of all the resources was higher on diversified farms compared to arable farms in both the irrigated and unirrigated regions.

Diversification for Sustainable Farm Productivity in Aurangabad District

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Agriculture in Maharashtra and particularly in Marathwada is highly dependent on monsoon. It is all rainfed farming. Average agricultural holding ranges between 1 to 2 ha and large numbers of small uneconomic holdings contributing about 18 per cent of the GDP are supporting 97 per cent of the population. The rural farmers with heavy population pressure and inadequate capital resources do not go for commercial farming. The yield levels of different crops are highly fluctuating and far below the National/State average. The productivity is marginally increased and in most of the crop it is stagnated. The farmers are worried and in search of new

technology which lead to increase in farm income. Any strategy of increasing the income of vast masses of farmers is possible only by diversification of farming and regular transfer of new technology. The diversification minimizes the risk and help to reduce expenditure keeping in view the study is undertaken in Auragabad district of CMP zone during season 2001-2002. The farming system has different components like vegetables, milk, fruits etc. Such farmings are practiced near the big cities in view of the marketing. The following types of farming systems are practiced in Aurangabad district.

Agriculture (Crops)
Fruit + Agriculture & Dairy
Agriculture + Vegetable
Agriculture + Animal husbandry
Landless + Animal husbandry

Agriculture (Crop) + Dairy + Fruit crop type of farming is found most profitable followed by crop + vegetable. The maintenance of sheep and goat by landless is also found economical but this has main constraints of grazing land. It is difficult to achieve sustained growth of rural production, income and employment unless the base of rural economic activities get extended beyond agriculture to cover allied agriculture activities, while farming itself offers room for intensive cultivation of land and diversification of crop enterprise.

A Study on Crop Diversification in Agriculture in South Kokan Region of Maharashtra state

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During last two decades agricultural scenario has changed drastically. These changes have resulted into the changes in the cropping pattern of the region. Crop

diversification serves as measure to overcome risk and uncertainty in agriculture. Konkan is West Coast region of Maharashtra State, dominated by mono-cropped farming with rice as the main crop. There is no adequate statistical research work especially in Konkan region on crop diversification. Therefore, present investigation is undertaken to study the extent of diversification, to quantify the contributions of each crop for diversification and to forecast the cropping pattern for the next five years. Secondary data on area under different crops grown in *kharif* season were collected for southern parts of the Konkan region for the period of 1982-2001. Further this data were divided into two periods each of ten years viz. 1982 to 1991 (Period I) and 1992 to 2001 (Period II). To study the extent of crop diversification Harfindhal index and Entropy Index were computed. Districtwise diversification was further analyzed by applying the Markov Chain model. The transition probabilities were estimated by MOTAD method.

Analysis of Harfindhal indices for Sindhudurg district reveals that all the indices were less than 0.5, indicating crop diversification in region. However, in Ratnagiri district all the indices were not less than 0.5 over a period of time. The per cent change in Harfindhal index over previous year was calculated which indicate that there is no specific trend in cropping pattern. Further, analysis of Transition probability matrix for Ratnagiri district reveals that the area under rice, ragi and coarse millet was found to be more stable than that of remaining crops in the district. In this district 95.21 per cent area was retained by common millet and only 4.79 per cent was shifted from common millet to other cereals. The 80.53 and 80.72 per cent area under ragi and rice was remained for ragi and rice. Out of the total area under rice in 1982, 8.02 and 11.44 per cent area was shifted to ragi and other cereals, respectively till 1991. In Sindhudurg district also the area under rice, ragi and common millet was found to be most stable. During period II more than 92 per cent area under rice was remained under rice, whereas 3.17, 0.6 and 3.28 per cent area under rice has been shifted to cereals, pulses and oilseeds, respectively. The analysis of future forecast for Ratnagiri and Sindhudurg districts reveals that the

proportion of area under rice, other cereals, tur, other pulses and oil seed will be 62.234, 28.81, 0.46,4.47,4.02, per cent of total area under foodgrain crops for year 2005, while for Sindhdurg district the proportions will be 81.20,6.25,0.0,6.85 and 5.69, respectively.

Sustainability of Farm Income Employment of Diversified Farming in the Scarcity Area of Western Maharashtra

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The present investigation has been undertaken to estimate the employment and income generated on mixed farms in the irrigated and rainfed regions in the scarcity area of Western Maharashtra. The study based on the primary data collected from 180 mixed farms i.e.90 each from the irrigated and rainfed regions by survey method for the agricultural year 1999-2000. The sample farms were categorised into the small (up to 2.00 ha), medium (2.01 to 4.00 ha) and large farms (above 4.00 ha). The results indicated that the relative share of employment from crop production activity in the total family employment was more in the irrigated region, while the livestock activity contributed more in the rainfed region. The proportionate share of employment from milch animals was higher in the livestock activity in both the regions. The share of income from crop production was more in irrigated region while share of income from livestock production was more in rainfed region. The share of income from crop production increased with the increase in the size groups of holding in both the regions, while the share of income from livestock showed reverse trend. There is a need for diversification of farming. Besides, more importance should be given to subsidiary enterprises like dairy in the rainfed region to sustain the farm families.

Agricultural Diversification in India

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Indian agricultural sector is diversifying during last two decades towards high value commodities like fruits, vegetables, milk, meat and fish products. The pace has been accelerated since 1990. A high value commodity accounts for a large share in the total value of agricultural production. Due to trade liberalization the diversification is one of the prime attention of policy makers. India, a country with diverse agro climatic conditions has comparative advantages for this sector too. Therefore, an attempt has been made to quantify the diversification of agriculture. The required data were collected from published sources and analyzed by simple tabular method.

The study indicated that the area allocation in the country is diverted from cereals and pulses to some extent in oilseeds, sugarcane and cotton. The major upward shift in other crops that is fruits, vegetables, etc which clearly indicates that due to liberalization the diversification of agriculture had been witnessed in the country to large extent. The possibilities of increase in area under fruits, vegetables and other export competitive crops should be explored.

Th diversification policies in agriculture should be given higher priority to shift from low value to high value crops to be considering domestic requirement and export demand too.

Diversifying Indian Horticultural Sector: An Over View

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Indian horticulture is catching the attraction policy makers due to its export potential and diverse Agro climatic conditions of the country. The fruits and vegetables are grown through out the country round the year. Diversification to

horticultural crops has found more lucrative and generates employment for rural and urban masses, which in turn acknowledged more profit in the sector. This sector contributes more than 10 per cent of agricultural export and employment opportunities to more than 19 per cent of labour force. India is the second largest producer of fruits and vegetables by contributing 9.44 per cent share of global production. The project aims to study the diversification of area, and export of horticultural produce from the country. The required data were collected from the published sources and analyzed by simple tabular method.

The study indicated that area portfolio has diverted to export oriented crops. However, increase in area was observed in fruits and vegetables during 1991-92 to 1998-99. Along with area the export basket of horticultural products has diversified and changed due to free trade. The basket consist of flowers, fresh fruits and vegetable and processed fruits and vegetables. In the contest of liberalization the share of fresh fruits and vegetables has declined to 42.44 per cent from 55.28 per cent during 1993-94 to 2002-03 and processed fruits and vegetables has increased from 38.50 per cent to 47.14 per cent during the same period. This increase has indicated importance of processing units in the country for its huge production. The increase in processed items may be due to taste preferences of consumers international market and along with keeping quality.

The study revealed that diversification in the context of globalization will prove to be a beneficial venture.

Diversification of Crops in Marathwada Region: A Review

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After critical examination of crop wise behaviour study revealed that cotton continues to occupy near about 78-98 per cent area of its previous years area in all the cotton growing districts. It is also seen that the diversification from cotton area to *kharif* jowar and bajra has taken place. *Kharif* jowar is the major cereal for

domestic consumption in the region. In traditional districts namely, Latur, Nanded, Parbhani, and Jalna this crop is retained area in a succeeding year in the range of 82 – 97 per cent. In the districts like, Beed, Aurangabad and Osmanabad the area under this crop is diverted to bajra, Sugarcane, tur and other pulses. Tur a major pulse crop is found to be grown consistently in all the districts. This is good sign of increasing total production of pulses.

While studying the benefits of diversification for achieving higher economic returns in comparison to other competing crops, it is recommended that, farmers should opt:

1. Sugarcane and soybean in Aurangabad, Beed, Nanded, and Parbhani districts.
2. Sugarcane and Tur in Osmanabad and Latur districts.
3. Sugarcane alone on Jalna district.

Tuberose cultivation: Way Towards Diversification of Agriculture

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Tuberose is one of the important cutflower used for vast decoration and bouques. The spokes of tuberose are used as a cutflowers due to its delightful applarance, sweet fragrance and good keeping quality. Besides the floral decoration, it is suitable for pots, beds and extraction of oil etc.

As the income generation from only crops is not sufficient to the farmers for his lively hood, the floriculture will provide additional income to the farmer wherever some irrigation facilities are available. Hence a study of tube rose cultivation was undertaken in the Ahmednagar district with the objetive to study the constant returns from tuberose cultivation and to determine the marketing costs, market margin and price spread.

Amultistage sampling procudure was adopted in all 32 respondents were selected for the study. A sample of 10 commission agents cum wholesalers and 10 retailers operating at Shirdi market (A wholy place) was drawn under randomly from the study of market aspects.

Results indicated that the per hectare cost of cultivation of tuberose wasRs 287970.The net income after deducting marketing cost was estimated as Rs181875 with the input ratio 1:1.87. In the marketing of tuberose producers- commission agent -retailers- consumer (channel I) producer- retailer- consumer (channel II) were the main channels of which channel II was found to be beneficial to the producer by giving higher net income.

The marketing cost per 100 flowers was Rs.42.29. The market margines taken away by wholesaler-cum- commission agent and retailers was Rs 9.03 and Rs 11.30 respectively in channel I.

The producers share in consumers rupee was also greater in the channel I and channel II was 51.40 and 64.40 percent respectively.

Diversification of Agriculture through farming system approach

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Diversification involves transformation of monocropped farm in to a multified enterprise. It achieves the stability of income become even if return from one crop in low, the return from another will be high. because of vagaries of monsoon the farmers are not sure situation farming system approach is advocated. Farming system includes the entire gamut of all farm activities and related decision regards to development, management and allocation of all the farm resources. Hence the

present study has been under taken with a view to examine the profitability of farming system in Marathwada region. Multistage sampling design had been used for the selection of district, tahasils and villages. Six farming systems namely crop + local cow, crop + buffalo, crop + cross bread cow, crop + goat, crop + Banana and crop + sweet orange were selected for the present study. Data were collected from 180 respondents (30 respondents for each farming system) farmers with the help of pre tested and well designed schedules by personal interview method for Agricultural year 2001-2002. The study revealed that the Crop + Banana farming system was most profitable than other farming systems on per farm and per hectare basis the crop enterprises gave highest net returns in crop + Banana farming system, while this enterprises sustained loss in crop + cross bread cow farming system. as regards to subsidiary enterprises, Banana enterprise gave highest net returns than other subsidiary enterprise in the selected farming systems. Among the livestock enterprise, the goat enterprise showed highest benefit cost ratio (1 : 1.44). Among the selected farming system, sweet orange enterprise having highest benefit cost ratio i.e. 1 : 1.53. it is also concluded that the crop + buffalo farming system generated higher man day employment than other farming systems.