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Maharashtra Society of Agricultural Economics

(2015-2017)

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PREFACE

Maharashtra Society of Agricultural Economics organised first National Conference and 18th International Conference of the Society at Dr. Balasaheb Savant Kokan Krishi Vidyapeeth, Dapoli, on 12th and 13nd February, 2016. The high lights of General body meeting are an independent website for MSAE conducting 19th Conference and Second International Conference of MSAE at Mahatma Phule Krishi Vidyapeeth, Rahuri. Dr. D.B. Yadav was nominated as Chairman organizing committee and Dr. V.G. Pokharkar nominated as organising Secretary. Themes for IInd International conference were decided as (1) Agricultural Production and Marketing including Export and Import : Food grains, horticultural crops and cash crops (2) Impact analysis of Agricultural Production by HOD and Local organising Secretary. One cash prizes Rs. 3000/- were sponsored by Dr. Dattatray Tulankar for Best Scientist.

I am glad to communicate the MSAE audit upto Feb. 2016 is cleared by CA and Society has no payment pending.

The 19th International Conference to be organised at MPKV, Rahuri will open new avenues to MSAE and members of MSAE.

I am thankful to research contributors, Referees and President MSAE who made possible to publish Journal and for suggestions, support provided by completing the task.

R.G. Deshmukh
Secretary

CONTENT

The following Awards and Cash Prizes were given in the 18th International Conference held at Dr. Balasaheb Savant Konkan Krishi Vidyapeeth, Dapoli - 2016

Sr. No.	Name of awards/prizes	Name of awarded	Purposes
1	Prof Ulemale memorial life time achievement award with trophy and manpatra	Dr. S.W. Jahagirdar Ex. Assoc. Prof. (Stat), Dr. PDKV, Akola	For Renowned Agricultural Statistician
2	Late Wamanrao Mahindre Sir Memorial Award (Trophy)	Ku. Poonam Pawar, Dr. A.S. Tingre, Dr. R.G. Deshmukh & R.K. Kolhe.	For Best Paper
3	Late Smt.Parvatibai Mahindre Memorial Silver Medal	Dr. Rachana Patil	For Best paper presentation by female Agril. Economist
4	Cash prize of Rs.1000/- and certificate in the memory of late Dr. V.D.Galgalikar	Dr. D.S. Nawadkar	For Best paper presentation by Male Agril. Economist
5	Cash prize of Rs.1000/- and certificate in the memory of late Dr. D.K.Sohani	Dr. D.B. Yadav Dr. A.C. Deorukhakar	For the Best Popular Article For the Best Book
6	Late Prof. Hiroji Ulemale Best Paper Presentation	Dr. Rajendra Deshmukh	For Best Paper Presentation
7	Smt. Venutai Ulemale Best Paper Award	S.T. Gore	For Best Paper Award
8	Special appreciation award with certificate	1)Dr. H.R. Shinde 2) Dr. G.G. Joshi 3) Dr. K.L. Jadhav 4) Dr. R.R. Nirgude 5) Ku. Radhika Bhongle 6) Dr. P.J. Kshirsagar 7) Dr. V.S. Desai	For best papers in each theme
9	Lt. Wamanrao Ramrao Jahagirdar Cash Prize for Best Poster Presentation (Male)	V.O. Bondhare	For Best poster presentation in male
10	Lt. Dr. Jagannath Ramchandra Kakde, Dean (Agri) Cash Prize for Best Poster Presentation (Female)	Miss. Tejsavi Nirmal	For Best poster presentation in Female
11	Lt. Sau. Jyoti Suresh Marawar Cash Prize for Best Poster Presentation	Ranjit S. Patil & Purushottam S. Deshmukh	For Best poster presentation
13	Special Appreciation Award with Medal & Certificate	Dr. Sudhir S. Wadkar Dr. B.S.K.K.V. Dapoli	For Best Organization of Conference
14	Lt. Rahul Surwase Memorial Award for Best Poster	1) S.D. Raut 2) B.R. Kuppanutte	For Best Poster

AGRICULTURE AND SUSTAINABLE ENVIRONMENT- MISMATCHES IN TECHNOLOGIES, POLICIES AND PRACTICES

Dr. P. Indira Devi,
Professor & Director, Centre for Excellence in Environmental Economics,
Kerala Agricultural University.

INTRODUCTION

The intensive growth strategies followed in agriculture has helped to achieve the goals of food security in the past, though most of them were environmentally costly.The negative externalities associated with green revolution technologies are discussed and documented world over (Van Der Hoek *et.al.,*1998; Wilson.,2000). In India the success of green revolution technologies were visible in the prominent irrigated rice- wheat growing regions,like Punjab, till early eighties.Later on the yields were stagnating, which were mainly attributed to the decline in soil health and externalities associated with technologies of green revolution .ie. HYVs,chemical fertilizers and pesticides*.The transformations in agricultural sector were created through a blend of technological and policy interventions that created an enabling environment.The farm level adoption of many of these chemical technologies deviated largely from scientific prescriptions which later started showing serious health damages to productive base. Coupled with this, the shift in social and economic behavior from primary sector to tertiary and secondary sectors has resulted in massive changes in land use pattern and agricultural behavior. This paper tries to assess the mismatches and gaps in policies, technologies and societal behavior towards practice of some of these technologies and the environmental impacts they have created. Further, we try to discuss some of the green agricultural technologies and the farm level constraints in its wider adoption,focusing on microlevel studies conducted in the state of Kerala, India.

Land use Changes and ecosystem damages

The socio-economic and demographic forces have acted as one of the strong drivers of change in land use pattern.The pattern of land use changes in Kerala for the past 50 years is analysed and presented in table.1.The analysis highlights the increasing trend in land kept as fallow and cultivable waste .land put to non agricultural uses has been increasing during 60s.Later on the pace has slowed down and stagnated as most of the land has already been utilised .The results reflects the tendency of the people to deliberately keep the paddy land fallow or one/ two seasons and then gradually shifting it as garden lands by growing seasonal crops (like banana or vegetables) and then coconut and gradually shifting it as garden land and later converting it for non agricultural uses (construction/services). This is evident in Fig. 1 which depicts the extent of decline of paddy lands in Kerala.The declining share of primary sector in GDP and corresponding increase in the share of service /manufacturing sector indicates the demand pull towards these conversions.

On the other side, the decline in cropped area, land under tree crops and permanent pastures and grazing lands causes concerns in the light of ecosystem health and food security. Rather than the provisioning services, the regulating, cultural and

supporting services (MA.2005) from these ecosystems are of more significance. The role of tree crops and pastures in soil/water conservation and climate regulation is well understood. The high gradient coupled with high rainfall in Kerala facilitate the runoff process and hence the service is vital for the sustenance of life systems in the state.

The shifts in cropping pattern in Kerala is mainly from the food crops to non food crops and from multicropped systems to monocropped commercial systems. (Devi.,2012, Viswananthan.,2014) .Viswanathan,2014 provides a detailed analysis of these trends and hypothesizes it as guided by the peasant rationality governed by social, technological and economic reasons. While discussing the pattern of cropping pattern changes in fragile ecosystem of Wayanad, Varghese *et. al*, 2013, confirms these macro level conclusions and highlights the responses of farmers on their choice of crop in view of the climate change challenges. A visible change in cropping pattern was observed among the sample respondents in wayanad. Coffee, one of the predominant crops of the homesteads in wayanad account for about 19 per cent of Gross Cropped Area(GCA). But the other important crops like black pepper and paddy show a steady decline. Black pepper occupies an area of 25.16 ha which was 55.06 ha in 2000, and for paddy the figures are 29.99 ha and 51.04 ha respectively. Paddy faces a serious threat from commercial crops like arecanut, banana, ginger, turmeric and rubber for which the paddy land was extensively converted. As a result, the area under these crops shows a steady increase. This large scale conversion of paddy lands has severely impacted the ecosystem of Wayanad. The existing crop specific promotion policies (for example rubber) do not consider the land capability classification and as on today there are no policies towards land use and cropping pattern that suggest scientific and sustainable prescriptions. Thus the existing subsidy policies promote unscientific land use practices.These analysis points out the need for ascientific land management /cropping pattern policy which is to be strictly implemented. The land use decision and crop choice is to be guided by scientific prescriptions and the subsidy policy and social support instruments are to be accordingly redesigned.

Farm practices in agriculture and ecosystem health

Seed Technologies and status of biodiversity.

High Yielding Varieties (HYVs) that triggered the green revolution was supported by policy and institutional interventions which has facilitated the spread of the technology, in a rapid manner In this process many of the Traditional Varieties(TV) lost its place .Later on, advancements in seed technology (Hybrids/genetic modifications) coupled with changes in seed policies facilitating the presence of private sector accelerated the pace of this replacement. In that process there has been erosion in the genetic diversity base.

India is known for its diverse ecosystems, and the country houses one of the twelve biodiversity hotspots of the world. Well known Indian rice researchers, Richharia and Govindasamy (1990), in their book 'Rices of India'provided Vedic and present day literature evidence to show that the country had been endowed with more than 2 lakhs rice varieties, a rich biodiversity that no other country on earth possess. Deb (2005) detailed the morphological aspects of 416 Indian folk (traditional) rice varieties, which are on the verge of extinction from farmers' field. Rajukannu *et al*. (2008) conducted studies on the diversity of traditional rice varieties in India, where a comparison on the economics of

cultivation of both traditional and high yielding varieties of rice are illustrated. It suggests the traditional rice varieties as a rescue to maintain linear growth of food production in the country.

Kerala is considered as one of the centres of diversity of rice and the antiquity of rice cultivation in the state dates back to 3000 BC (Manilal, 1990). It is reported that, nearly 2000 traditional varieties were predominantly cultivated in Kerala. Unique characteristics of these varieties are of great significance today. However, policy, demographic, social and climatic forces have triggered fast disappearance of many of these landraces, leading to fast erosion of the diversity base. Reports mention the current rice varietal diversity in farmer's field as less than 50 only. The extent of coverage of HYV of rice is nearly 93%, which is dominated by a few varieties.The trend ananlysis based on data for the past 14 years in Kerala is furnished in table 2.The very high rate of decline in area under cultivation is mainly observed in the case of local varieties (-17.21%), which is correspondingly reflected in the output as well (-17.79%). Obviously, the productivity has also been declining from 1842 t/ha to 1645 t/ha. It is to be noted that the entire decline in rice area is in local variety coverage during winter and summer seasons, whereas the HYV coverage is showing an increase over years, the rate of increase being highest during winter season. This behavior can be largely attributed to the subsidy policy currently followed as well as the economic gains through the cultivation of HYVs. The subsidy support is restricted to HYVs alone. The farming policy may be suitably modified to suit the conservation objectives in view of its ecosystem significance. The approach to conservation of crop diversity bring substantial economic benefits to farmers, because it requires low inputs and produces high outputs (Zhu *et al*., 2003). Sathya *et al.,* (2007) revealed some significant findings on the ability of native varieties to withstand many adverse conditions as well as display other important traits.

The loss of traditional varieties from agro-ecosystems hinders efforts to improve crop varieties further (Nevo, 1995). There are global efforts on conservation of traditional resources and wisdom. The public and private sector investment towards this goal is growing in India as well. India has made significant progress in recent years in setting up a regime for the management of its plant genetic resources (Biber-Klemm *et al*., 2005).There have been recent efforts on understanding on farm crop diversity by addressing farmers' participation and choices regarding morphological traits (Van Dusen and Tailor, 2005; Birol *et. al.,* 2007; Birol and Rayn-Villalba, 2009) across the globe.The efforts towards in situ conservation may also be there,in the larger interest of the society.

Chemical fertilisers

In spite of considerable primary success, indiscriminate use of mineral fertilizers have often led to deterioration of overall soil health of the country leading to a stagnation of food grain production (Abrol *et. al.,* 2000). Till 1997-98, strong positive correlation was noticed between fertilizer consumption and food grain production. Later on, many states show a faster pace in fertilizer consumption with a relatively slower pace of crop output. There are states where fertilizer consumption has increased without any conspicuous corresponding gain in production. Moreover, the impact of this unscientific use has created negative externalities of short term and long term nature. There are several reports on the imbalance on the use of major nutrients, from across the country. Some estimates show

the proportion as 6:2.4:1. as against the desirable level of 4:2:1. Acidification of soils, eutrophication of water bodies and decline in soil structure/ health and the long term acute human health effects are also linked to excessive chemical use in agriculture.

India is one of the leading countries in the production and consumption of chemical fertilizers.While South Indian states account for nearly one fourth of the consumption,Kerala consumes only 4% of that. Currently, 243623T fertilizer materials are applied in agricultural fields in Kerala which constitutes 55 % Nitrogen, 17 % Phosphorus and the rest Potassium. The intensity of consumption is to the tune of 52 kg per ha of N , 16 of P and 26 of K. Similar to the general trends, the consumption of nitrogenous fertilizers exhibit a fast pace of increase,compared to the other two nutrients, which has gained momentum, of late.

There are serious concerns on the inadequate level of micro nutrients in the soils of Kerala. The tendency of declining levels of Zinc and Boron in soils are attributed to excessive chemical fertilizer application (Siva,1990:Pogoli and Rosegrant,1994).

The elaborate scientific study conducted by the state Planning Board on the soils of Kerala has reported the chemical properties of the agricultural soils in the State.This study highlights the rising acidity levels across major agricultural systems .Sustained application of fertilizers like ammonium nitrate and urea may lead to increase in acidity of soils .This may also contribute to global warming process through the release of nitrogen dioxide.

Contamination of water bodies through nutrient leaching is a major area of social cost.Leaching of nitrates leads to eutrophication in water bodies(Sujatha *et al* ,2009). The social cost of such damages are mainly due to loss of livelihood to fishermen on account of reduced fish catch,additional costs in inland water transportationdue to aquatic weed growth and water treatment costs in water supply systems due to algal blooms in water bodies, to cite a few.KSSP,2012 has reported the case of Wembanad lake system in Kerala, wherein the algal blooms have substantially increased the purification costs of drinking water.The Total Economic Value(TEV) of such damages are to be assessed in detail,to estimate the level of damamge. Some scientific reports from US links the prevalence of blue baby syndrome to nitrate concentration in soil in prominent agricultural areas.Higher levels of acidity in soils as well as imbalance in nutrients also influence the efficacy of agricultural products and medicinal plants used in ayurvedic industry.

Chemical Pesticides

Pesticide use in most of the developing countries is reported to be unscientific and unregulated causing serious damages to the ecosystem and human health. The tradeoff between the health impacts and financial benefits of crop production have been reported by various researchers across the globe.(Rola and Pingali,1993:Pingali et al 1994:Antle and Pingali,1994,Crissman et al,1994).Despite this, the pesticide use policies and regulations are in their infancy in many developing countries and as a result pesticide misuse is prevalent.(Tjornhom *et al*,1997).Several instance of chronic toxicity or death have been reported among the exposed farm population due to occupational, accidental or intentional poisoning (Devi,2010,2012).Pesticides are reported as the major cause of suicides among farmers in distress in the state of Kerala ,India due to its easy access .

A visible parallel correlation between higher productivity, high chemical input use and environmental degradation and human health effects is evident in many countries

where commercial agriculture is widespread (Wilson, 2000). Pesticide use in agriculture and the value of negative externalities are well documented in Sri Lanka (Van Der Hoek, *et al* 1998; Wilson 2000),Lebanon (Salameh, *et al*., 2004), India (Gupta, 2004), China (Huang, *et al*., 2001), Bangladesh (Rahman, 2003), Philippines (Rola and Pingali, 1993), Mali (Ajayi, *et al*., 2002) Ecuador (Yanggen, *et al*. 2003), Zimbabwe (Maumbe&Swinton, 2003), and Vietnam (Dung & Dung, 1999).

Compared to global scenario the pesticide consumption in most of the developing countries is very low. But pesticide related externalities are reported to be very high in these parts of the world. (WHO, 1990: WRI, 1998 , Kishi *et al*, 1995). This is generally attributed to the unregulated and inadequate management systems at all levels (legal, monitoring, awareness) as well as the inherent social problems of poverty and illiteracy. Despite this many developing countries, including India, continue to use persistent pesticides in agriculture and public health programmes, and the contamination of different components of environment continues to be excessive and pervasive. Many of the studies question the economic rationale of pesticide use, when the cost of these externalities is taken into consideration (Rola and Pingali 1993,Pingali et al 1994,Antle and Pingali 1994,Crissman et al 1994, Pingali and Roger1995).The socio economic justification of current levels of investments in pest management is to be verified in this context

Despite these scattered attempts in this aspect, the pesticide policy is basically driven by productivity issues. The health impacts due to exposure to pesticides use have been omitted in analysis of returns to agricultural research or in evaluation of specific agricultural policies or programs because of lack of an appropriate methodology and data deficiencies .The decision in this regard is arrived at mostly based on expert opinions on alternate production systems and not on empirical information on pesticide use, productivity and demand. Most often such estimates are estimates of averages rather than the marginal concept, which is more appropriate in an economic sense.

Many studies underlies the prevailing situation of unduly high levels of investments in pesticides, while their marginal contribution to the net economic gains is unjustified. These studies show that the reduction in pesticide consumption levels in all the crop that are studied do not suggest a compounding decline in income as the MVP/MFC ratios are less than unity. On the other hand, the current level reduces the volume of profit with corresponding higher cost with no comparable gains. The results emphasis the need for relooking the chemical pest management strategies in view of the economic and environmental impacts.(Devi,2010).

The pesticide markets and retail practices and farmer behavior are reported to be poorly monitored and unscientific There are several reports on the social ,ecological and health consequences of the unscientific chemical pesticide use (Devi, 2010,Atreya,2012).

Water –The dwindling resource

Groundwater has played a key role in the success of Green Revolution in India especially in original Green Revolution states comprising Punjab, Haryana , and western Uttar Pradesh (UP). The three states (Punjab, Haryana and UP) account for 55 percent of the tube wells in India. Studies report the irrigated area in India as ranging from 60-80% of cropped area.The green revolution technologies supported by the public policies (energy subsidies, property rights) has created a situation of indiscriminate use and subsequent

massive decline in ground water resources in these areas. Water quality issues and resultant health concerns are the associated problems of this situation apart from the direct effect on agricultural production. Simultaneous to this, there is gradual decline in water quality which is caused by factors like overexploitation,(ex: Arsenic contamination),point (industrial pollution) and non point sources of pollution. Agriculture can be considered as a major source of non point pollution ,which include suspended and dissolved solids, salinity ,pesticide residues and heavy metals. The unscientific intensive agricultural practices (chemical fertilizers, pesticides, mechanization) often lead to pollution of surface and ground water through leaching and run off. The process is accelerated by the specialties of topography, rainfall pattern and cropping pattern. The social and economic costs of water scarcity and quality issues are both direct and indirect as well as short and long term in nature.

Green Technologies for Alternative growth model :

The sustainable technologies in agriculture are popularized as various technologies like Integrated Nutrient Management, Integrated Pest Management, Integrated Disease Management, Low External Input Sustainable Agriculture and Organic Farming, the underlying philosophy remaining almost the same. Policies, across the world are giving increased emphasis on promoting the concept in a big way. Government of Kerala, in its policy document on organic farming aims to fully convert the agricultural practices in the state to organic methods . The shift in production policy to eco friendly methods finds relevance not only in the light of environmental concerns but also due to the expanding realm of global agricultural trade, food security and safety. While this transition is appreciated, the inherent issues associated with these technologies are often poorly addressed.

Safe agricultural production policy warrens a strong supply chain management system to ensure the use of quality organic inputs in sufficient quantity, in right time. Microlevel studies highlight the lacunae in the current supply system of organic inputs in Kerala which is constrained by insufficient trade support. (Divya, 2007;Devi,2014). The level of organic manure use in present day farming is found to be less than the recommended level which has seriously affected the structural quality and life systems in the soil. The decline in livestock population in the state has constrained the local production of the organic manures leading to market dependence and resultant problems. The changes in, the land use and cropping pattern (homesteads) of Kerala and the erosion in biodiversity has dwindled the supply of green leaf manures.The market dependence for thses inputs has created several problems which are inherent to such conditions.

Bio Fertilizers (BF) are the technology to make use of the nutrients which are abundant in the nature for agricultural production with the help of micro organisms. The focus of plant protection research is also gradually shifting towards development of environmentally safe and economically feasible alternatives to chemical pesticides, using bio technological approaches (Bio Control Agents-BCA). Several micro-organisms and herbs have been identified for their pesticide properties.The micro level studies to assess the level of adoption of these green technologies and related aspects have yielded concerns in this regard.

The level of adoption of biofertilisers and biocontrol agents were found to be far less than the expected level and the method of application unscientific.There are serious concerns on the quality of these products and the marketing channels often do not ensure the effectiveness of the live organisms. (Devi, 2014).The quality of these materials which is available in the market is perceived to be medium or poor, by majority of farmers. The official statistics on quality testing also proves this doubt, as most of the samples collected from the market are found to be of lower quality than the prescribed standards (Divya, 2007). This necessitates a strong monitoring mechanism for the trade of organics in agriculture. The existing system of quality testing also needs scientific refinement to ascertain the source and level of nutrients and presence of anti nutrients.The marketing system of BF/BCA is constrained by many factors. The major public sector units have official support for marketing.

For the technological advancements to yield social gains, the infrastructural and social settings need to be properly designed and developed. Correspondingly, there needs several policy interventions to facilitate technological, infrastructural and social support development for promoting the field level adoption of these technologies. However, studies project supply side and demand side constraints in the wider adoption of these technologies. (Devi, 2014). The economic rationale for the application of bio-inputs in agriculture is more relevant on a social perspective than on a private financial level. Thus the economic value of positive externalities of these technologies are to be assessed, to highlight the economic rationality and choice of policy instruments.

CONCLUSION

Economic, social and technological transformations in agriculture sector cause environmental changes which are positive and negative. Environmental damages are often permanent and irreversible in nature and has emerged as one of the most important concern for global planning and policy making. The primary sector practices ,technologies and policies exert a direct impact on the natural resource base and hence invite more attention in its management. Agriculture, being the mainstay of people of India is to be managed not only for food security, but also for life security. The emergence of modern technologies necessitates its testing in a wider social perspective than the limited objective of food production or agribusiness.

**The signs of revival in the production performance since mid eighties is mainly attributed to rain fed field crops ,excepting rice and wheat.*

Table 1. Growth trends in land use categories in Kerala (1960-61 to 2009-10)

(percent per annum)

Land use category	Period I	Period II	Period III	Period 1V	Period V
	1960-69	1970-79	1980-93	1990-91-1998-99	2000-01-2009-10
	Kerala				
Total Geo.Area	-0.014	0.082	-0.004	0.00	0.00
Forest Area	0.61	0.032	0.19	0.00	0.00
Land put on non agri. Use	3.31	-0.15	0.90	1.71	-0.54
Barren, uncultivable land	-9.02	2.01	-2.54	-9.69	-4.81
Permanent and other grazing land	-0.92	-14.73	-11.50	-2.04	-5.21
Land under tree crops	-11.72	-3.16	-5.95	-7.27	-11.73
Fallow other than current fallow	-12.33	2.38	0.28	1.63	2.93
Current fallow	-11.98	8.17	-0.29	5.45	-0.12
Cultivable waste	-8.33	5.81	-2.15	-5.67	5.16
Net area sown	3.50	0.38	0.096	0.3	-0.12
Area sown more than once	8.32	-0.95	0.70	-1.76	-5.00
Total cropped area	2.90	-0.24	0.31	-0.33	-1.26

Table 2: Growth trends in rice production in Kerala (1995-2011)

	Area	Production	Productivity
HYV	1.20	1.59	0.39
Local	-17.21	-17.79	-0.70
Total	-4.84	-3.68	1.48

Table 3. Growth trends in fertilizer nutrient consumption in Kerala (1991 to 2010) percent per annum)

Year /ACGR	Fertilizer Consumption(%)		
	Nitrogen	Phosphrous	Potash
1991-99	0.47	-2.27	-6.67
2000-10	2.38	2.58	1.43
1991-2010	1.63	0.68	0.11

❄ ❄ ❄

BEST PAPER

ANALYSIS OF PRICE STABILITY OF SOYBEAN FOR AMRAVATI DIVISION OF MAHARASHTRA

Poonam Pawar[1], A.S. Tingre[2] , R. G. Deshmukh[3] and R. K. Kolhe[4]
Department of Agricultural Economics & Statistics,
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ABSTRACT

The present study aimed to study price movement of Soybean i.e. seasonal variations, price volatility and co-integration among the major Soybean markets in Amravati division of Maharashtra. For study purpose the data related to monthly average prices of Soybean were collected from major APMCs markets of Amravati division viz. Amravati, Akola, Washim, Yavatmal and Buldana for the period 2003-2013. Moving average method was used to study seasonal variations. The econometric tools like ADF test, ARCH-GARCH model and Johansen's Multiple Co-integration test were used to study price volatility and cointegration among different markets. The results of study showed that the prices of Soybean were higher in the month from April to August in all selected markets. Except Akola market the price series of other markets showed the consequences of unit root and were stationary at first difference. All the selected markets, showed that volatility shocks in Soybean prices are quite persistent in these markets. The selected markets showed long run equilibrium relationship and co-integration between them.

(Keywords: ADF test, ARCH- GARCH, Co-integration, Granger Causality Test, price volatility, seasonal variation)

INTRODUCTION

The major factors influencing on prices of Soybean are the arrivals in market, climatic conditions during the various growth stages, carry forward stocks, price movement over the period of time, crop condition throughout the country, export and import, global and domestic demand and supply, etc. Analysing the past trend in the price of commodities is useful in understanding the present scenario and to formulate appropriate strategies to improve the marketing system. Therefore the present study has undertaken to study the seasonal variations in prices of Soybean and to assess the price volatility and co-integration among the major Soybean markets in Amravati division.

METHODOLOGY

The present study "Analysis of Price Stability of Soybean for Amravati Division of Maharashtra" was carried out at the Department of Agricultural Economics and Statistics, Dr. PDKV, Akola during 2014-15. Secondary data consisting of monthly prices of Soybean were collected from selected Agriculture Produce Market Committees (APMC)'s and the website www.agmarknet.nic.in. The monthly time series data on the prices of Soybean were collected for the period 2003 to 2013.

TOOLS OF ANALYSIS

Estimation of seasonal indices of monthly data

To measure the seasonal variations in prices, seasonal indices were calculated by employing twelve months ratio to moving average method.

Testing of Stationarity in Price Series of Soybean

ADF unit root test are based on the following three regression forms:

1) Without constant and trend $\Delta Y_t = \delta Y_{t-1} + u_t$

2) With constant $\Delta Yt = \alpha + \beta T + \delta Yt\text{-}1 + ut$

3) With constant and trend

The hypotheses are: H0: $\delta = 0$ (Unit root)

H_1: $\delta \neq 0$

If t* > ADF critical value then accept the null hypothesis, i.e. unit root exists.

If t* < ADF critical value then reject the null hypothesis, i.e. unit root does not exists.

Presence of Price Volatility

To access the presence of price volatility the ARCH-GARCH analysis was carried out. Auto Regressive Conditional Heteroscedasticity (ARCH) models are specifically designed to forecast conditional variances. ARCH model introduced by Engel (1982) and generalized as GARCH by Bollersllev (1986). The ARCH model have two distinct specifications one for the conditional variance and the standard GARCH (1,1) specification is presented below:

$Yt = \gamma_0 + \gamma_1 X_{1t} + \ldots\ldots\ldots + \gamma_k X_{kt} + e$ ……1

$\sigma^2_t = \omega + \alpha e^2_{t-1} + \beta \sigma^2_{t-1}$ ……2

Equation (1) is the mean equation and equation (2) is the conditional variance equation. The ARCH component (α) indicate the lag of the squared residual from the mean equation and the GARCH term (β) the last period's forecast variance and the resultant sum of these co-efficient ($\alpha + \beta$) are presented. The sum of co-efficient very close to 1 would indicate that the volatility shocks are quite persistent in the series.

Market Co-integration

Johansen's Multiple Co-integration test was employed to determine the long run relationship between the price series of selected markets.

RESULTS AND DISCUSSION

Testing of stationarity in price series

The Augmented Dickey Fuller (ADF) test based on unit root test procedure is carried out to check whether Soybean prices are stationary in the selected markets.

Table 1 . ADF test Results of Soybean prices

Sr. No.	Market	Level (ADF)	First difference (ADF)	Critical value (1%)
1	**Akola**	-5.821232	-	**-4.031309**
2	**Amravati**	-3.228437	-9.088818	
3	**Buldana**	-3.009206	-9.013963	
4	**Washim**	-3.721940	-8.687893	
5	**Yavatmal**	-3.723794	-9.404827	

From table 1 it is observed that, at level with lag 1, the ADF values are above the critical value at 1% level of significance indicating the existence of unit root implied that

the price series in all markets are non-stationary except Akola market which recorded higher ADF value than that of critical value at 1% level. The table further showed that in first order difference with lag 1, the ADF values are lower than the critical value at 1% level. This implied that the price series becomes stationary at 1st order difference level.

Presence of price volatility

To assess the presence of price fluctuations in the prices of Soybean in selected markets ARCH-GARCH analysis was carried out and the results were presented in table 2.

Table 2. Results of ARCH-GARCH analysis for Soybean prices

Parameters	Akola	Amravati	Buldana	Washim	Yavatmal
Alpha (α)	0.433487	1.230678	0.048764	1.217427	1.276478
Beta(β)	0.586251	-0.198547	1.077293	-0.208131	-0.269939
Sum(α+β)	**1.019738**	**1.032131**	**1.126057**	**1.009296**	**1.006539**

It was observed from the table 2 that among the selected markets, the sum of Alpha and Beta is nearer to 1 i.e. 1.019738, 1.032131, 1.126057, 1.009296, and 1.006539 for Akola, Amravati, Buldana, Washim, and Yavatmal markets, respectively, indicated that the volatility shocks in the prices of Soybean are quite persistent in these markets.

Market Co-integration

Johansen's Multiple Co-integration test is employed to determine the long run relationship between the price series of Soybean. Co-integration is used instead of regular regression method because of its capacity in dealing with non-stationary series. The most popular co-integration method, developed by Johansen (1988) and Johansen and Juselius (1990), is applied. The test shows whether the selected Soybean markets are integrated or not. The results of the test were presented in table 3.

Table 3. Results of Multiple Co-integration analysis for Soybean prices

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	Critical value (5%)	Prob.**	Number of Co-integrating equation CE(s)
None *	0.404702	144.8804	88.8038	0	**Two**
At most 1 *	0.26554	80.04379	63.8761	0.0012	
At most 2	0.166546	41.46626	42.91525	0.0693	
At most 3	0.101303	18.6941	25.87211	0.2992	
At most 4	0.041843	5.342935	12.51798	0.5479	

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level

. The results of Co-integration test showed two co-integration equations were significant at 5% level of significance indicated that the selected Soybean markets having long run equilibrium relationship and there exists co-integration between them.

POLICY IMPLICATION

In order to minimize the price risk and to protect the price security of farming community in terms of soybean marketing it is suggested that long term concrete procurement policy should be adopted to maintain price stability throughout the year.

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GUAVA PROCESSING - AN ECONOMIC ANALYSIS

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ABSTRACT

The present study entitled guava processing and economic analysis in Maharashtra state with objective of estimation of growth performance of guava in Maharashtra state, an economic analysis of processing of guava products. The growth rate of area and production of guava crop was 2.83 and 5.05 per cent, indicates that the area and production of guava in Maharashtra state has been increased over the study period. Productivity exhibited non significant growth. The coefficient of variation for entire period in case of area, production and productivity were 9.94, 16.94 and 20.59 per cent respectively. From this, it is cleared that the instability in guava productivity was less and area increased over the entire period. The coefficient of concurrent deviation between arrival and prices of guava indicates that, prices and arrival are associated with each other. The gross returns from guava production was Rs. 34400/ha. B:C ratio at Cost 'C' was 1.30. The net profit obtained from the processed products of guava for jelly jam and toffee were Rs. 7860.82, Rs. 7934.56 and Rs. 10738.57 respectively. Amongst three, jam product processed from guava is profitable business.

INTRODUCTION

Guava (*Psidium guajava* L) is one of the most important fruit of India, it is considered to be poor man's apple. The guava tree (*pisidium guajava* L) is a native of tropical America, but now it is found in all parts of the tropics.

(**Key words**- Guava, B:C ratio, Processing)

Guava is cultivated in 268000 HA area with production 3668000 MT in India during 2013-2014. In Maharashtra the area under guava crop is 40000 HA with production 324000Mt during 2013-2014. It is a vital fruit crop of sub tropical and tropical areas of the world. It has yellow-orange skin. It has been consumed as a traditional medicine in numerous countries as anti-fungal, antibacterial, antimicrobial, antiviral, preservative and antioxidant.

Processing of fruit produces solid waste i.e. 50 % of raw material. Usually the wastes contain immature fruit, pomace, peel, discarded fruit, core, mechanically spoiled fruit etc. The major waste is peel since whole fruit is processed into preserves after peeling. Currently peel is either thrown into rubbish or served to animals. However, alternative and useful method of exploiting the peel waste is the production of pectin. Pectin is one of the key products reacquired chiefly from citrus and apple wastes. Other sources of pectin include peels of guava, mango and residues of sunflower. Processing increases the value of the fruit crops.

Guava fruit is also perishable in nature. So it is necessary to well handle or processing after harvesting for retention of its good quality. The post harvest handling, processing and management of the produce are necessary for avoiding losses. Value addition increases the income and profit of the producers as well as entrepreneurs because processed product selling gives higher price than that of selling fresh fruits. The investment in the processing industry for producing processed agricultural products is remunerative and it provides employment to rural peoples. Day by day area and production of guava fruit crop in Maharashtra state has been increased. So it is big scope to farmers and processors to receive high profit by selling processed products. Keeping this view in mind, the present study entitled "Guava processing and Economic Analysis" was carried out.

OBJECTIVES

1) To study the performance of guava in Maharashtra during last decade.
2) To study the benefit-cost ratio in guava production.
3) To study the relation between arrival and prices of guava.
4) To study the economics of guava processing.

METHODOLOGY

In relation to present study, Maharashtra state has been selected purposively. Primary data on cost of cultivation and processing of guava were collected from guava cultivators (40) and processors (10) by specially designed interview schedule. Secondary data on area, production and productivity of guava crop for the period 2003-2013 in Maharashtra state were collected from various government publications, books, papers and horticultural databases.

ANALYTICAL TOOLS

For the present study, following analytical tools were used.

1) Coefficient of Variation

$$C.V.(\%) = \frac{\sigma}{\bar{x}} \times 100$$

2) Compound Growth Rate

The compound growth rate of area, production and productivity of guava crop were worked out by fitting an exponential function as given below

$$Y = ab^t$$

3) Coppocks Instability Index

$$\text{Delta M} = \frac{\sum \log (X_t + 1) - \log (X_t)}{N-1}$$

$$V \log = \frac{\sum [\{\log X_t + 1 - logX_t\} - m]^2}{N-1}$$

$$C.I.I = \left[\text{Antilog}\left(\sqrt{V \log}\right) - 1\right] \times 100$$

4) Coefficient of Concurrent deviation

$$r = \pm\sqrt{\frac{\pm 2C - n}{n}}$$

RESULTS AND DISCUSSION

Growth Performance of Guava in Maharashtra State

At attempt was made to estimate the growth performance of Guava in Maharashtra state was presented in Table 1.

Table 1: Growth Performance of Guava in Maharashtra State

Sr. No	Particular	Compound growth rate	Coefficient of Variation	Coppocks Instability Index
1	Area	2.83***	9.94	2.20
2	Production	5.05***	16.94	6.19
3	Productivity	-2.53	20.59	19.11

Note: Significant at 1% ***, 5% **, 10% *

An attempt was made to estimate the growth rates of area, production and productivity of guava with the help of growth rates model explained in methodology. The results obtained are shown below

i) Area:-

It could be seen from table 1 that the growth rate of area under the guava crop was 2.83 per cent which is significant at the 1 per cent level. This indicates that the area under guava in Maharashtra state has increased.

ii) Production:-

Table 1 indicates that the growth rate of guava production for Maharashtra state was positive and significant at 5 per cent level over the entire period. The guava production is significant in Maharashtra state has been brought about by the increased yield in which the returns were made possible due to adoption of new technology.

iii) Productivity:-

Productivity is the most important criteria in measuring the growth of any crop output. The success or failure of any improvement in the art of agriculture is measured by resultant increase or decrease in the productivity.

As seen from the table 1 that guava productivity in Maharashtra state for a period registered growth of – 2.53 per cent which was non significant.

Instability in area, production and productivity:-

The growth rates of area and production of guava is significant over the entire period but the growth rate of productivity of guava crop was non significant. It was considered necessary to study the instability in area, production and productivity of guava. Coefficient of variation and instability were estimated for this purpose. The result obtained are presented in table 1.

i) Area:-

As seen from the table 1 that the coefficient of variation for guava crop for entire period was 9.94 per cent. From this, it is seen that the Maharashtra state exhibited low variation in area under guava.

ii) Production:-

As revealed from Table 1 that, the Maharashtra state witnessed very low instability of production as indicated by low co-efficient of variation of 16.94 per cent over the entire period.

iii) Productivity:-

Table 1 revealed that, the productivity of guava over the entire period showed high co-efficient of variation of 20.59 per cent.

From this it is cleared that the instability in guava productivity was less and area were increased over the entire period.

Coefficient of Variation:-

The coefficient of variation measures the relative variation including trend, while coefficient of instability index measures the variation around the trend. The instability index computed using Coppocks Instability Index presented in Table 1.

i) Area:-

It was observed from table 1 that the instability index of area under guava for entire period was 2.20 per cent.

ii) Production:-

It was observed from table 1 that the instability index of production under guava for entire period was 6.19 per cent.

iii) Productivity:-

It was observed from table 1 that the instability index of productivity under guava for entire period was 19.11 per cent.

Coefficient of Concurrent Deviation

Coefficient of concurrent deviation between arrival and prices of guava is presented in Table 2.

Table 2: Coefficient of Concurrent Deviation

Sr. No.	Year	Coefficient of Concurrent Deviation
1	2003	0.56**
2	2004	0.24*
3	2005	0.22*
4	2006	0.48**
5	2007	0.37**
6	2008	0.27**
7	2009	0.38**
8	2010	0.34**
9	2011	0.32**
10	2012	0.45**
11	2013	0.54**

Note: Significant at 1% **, 5% *

It is observed that arrival and prices of guava are associated with each other.

Costs and Margins in the Processing of Jelly, Jam and Toffee

Costs and margins in the processing of jelly, jam and toffee were presented in Table 3.

Costs and Margins in the Processing of Jelly

Table 3 revealed that the cost incurred in the processing of one quintal of guava for making jelly was Rs. 5169.38, which includes, cost of processing, cost of raw material, transportation charges, fuel charges, loss during processing, cost of ingredients (sugar, citric acid), packing and labeling charges, miscellaneous charges and interest on working capital, i.e. 5.48, 12.53, 0.33, 2.41, 0.22, 33.17, 1.28, 35.01, 0.49 and 9.10 per cent of the total cost respectively. On processing one quintal of raw guava, 1.45 quintals of jelly were recovered, and after value addition the net margin received by the processors in selling 1.45 quintals of jelly was Rs. 7860.82 and per kilogram net margin was Rs. 68.95.

Costs and Margins in the Processing of Jam

It was observed from Table 3 that the cost incurred in the processing of one quintal of guava for making jam was Rs. 4351.10, which includes, cost of processing, fuel charges, loss during processing, cost of ingredients (sugar, citric acid), packing and labeling charges, miscellaneous charges and interest on working capital, i. e. 6.51, 2.87, 0.26, 39.40, 1.52, 39.77, 0.58 and 9.09 per cent of the total cost respectively. On processing one quintal of raw guava, 1.38 quintals of jam were recovered. After value addition the net margin received by the processors in selling 1.38 quintals of jam was Rs. 7934.57 and per kilogram net margin was Rs. 72.80.

Table 3: Costs and Margins in the Processing of Jelly, Jam and Toffee

Sr. No.		Particulars	Jelly		Jam		Toffee	
			Amount (Rs./Qtl)	%	Amount (Rs./ Qtl)	%	Amount (Rs./ Qtl)	%
1		Cost of processing	283.08	5.48	283.08	6.51	283.08	2.67
2		Cost of raw material	647.70	12.53	0.00	0.00	647.70	6.11
3		Transportation charges	16.83	0.33	0.00	0.00	16.83	0.16
4		Fuel charges/ power input	124.71	2.41	124.71	2.87	124.71	1.18
5		loss during processing	11.43	0.22	11.43	0.26	10.80	0.10
		Ingredient cost						
6	a	Sugar @ 70-75 kg/qtl	1714.50	33.17	1714.50	39.40	1600.20	15.10
	b	Citric acid @ 200, gm/qtl	66.04	1.28	66.04	1.52	66.04	0.62
	c	Glucose @ 12 kg/ qtl	_	_	_	0.00	1219.20	11.50
	d	skimmed milk @ 15 kg /qtl	_	_	_	0.00	1143.00	10.79
	e	Butter @ 6 kg/ qtl	_	_	_	0.00	762.00	7.19
7		Packing and labelling charges	1809.75	35.01	1730.38	39.77	3733.80	35.23
8		Miscellaneous charges	25.40	0.49	25.40	0.58	26.67	0.25
9		Interest on working capital @ 10 % Total working cost	469.94 5169.38	9.09 100.00	395.55 4351.10	9.09 100.00	963.40 10597.43	9.09 100.00
10		Total quantity ready from one quintal of guava	1.45		1.38		1.78	
11		Total returns from one quintal of processed guava	13030.20		12285.66		21336.00	
12		Net margin from one quintal of processed guava	7860.82		7934.57		10738.57	
		(excluding marketing cost)	0.00		0.00		0.00	
13		cost/ kg of processed products	45.34		39.92		75.69	
14		Selling price / kg	114.30		112.71		152.40	
15		Net margins / kg (excluding marketing cost)	68.95		72.80		76.71	

Costs and Margins in the Processing of Toffee

Table 3 revealed that the cost incurred in the processing of one quintal of guava for making toffee was Rs. 10597.43, which includes, cost of processing, cost of raw material, transportation charges, fuel charges, loss during processing, cost of ingredients (sugar, citric acid, glucose, skimmed milk, butter), packing and labeling charges, miscellaneous charges and interest on working capital, i. e. 2.67, 6.11, 0.16, 1.18, 0.10, 15.10, 0.62, 11.50, 10.79, 7.19, 35.23, 0.25 and 9.09 per cent of the total cost respectively. On processing one quintal of raw guava, 1.78 quintals of toffee was recovered and after value

addition the net margin received by the processors in selling 1.78 quintals of toffee was Rs. 10738.57 and per kilogram net margin was Rs. 76.51.

Net Profit of Guava production in (Rs.) and B: C Ratio

Net profit of guava production and B: C ratio was presented in Table 4.

Table 4: Net Profit of Guava production in (Rs.) and B: C Ratio

Sr. No.	Particulars	Value in (Rs.)	Net Profit of Guava production in (Rs.)	B:C Ratio
1	Cost A	11083	23317	3.10
2	Cost B	17199	17201	2.00
3	Cost C	17899	16501	1.30
4	Gross Returns	34400 (34.40 qtl/ ha) @ Rs. 10/Kg		

The gross returns of guava cultivation were worked out Rs. 34400. The net returns at Cost 'A', Cost 'B' and Cost 'C' were Rs. 23317, Rs. 17201 and Rs. 16501 respectively. The B:C ratio at Cost 'A', Cost 'B' and Cost 'C' were 3.10, 2.00 and 1.30 respectively. The B:C ratio of guava production at Cost 'C' is 1.30.

Net Profit of Guava Processed Products and B:C Ratio

Net profit of guava processed products and B:C ratio is presented in Table 4.

Table 4: Net Profit of Guava Processed Products and B:C Ratio

Sr. No.	Paricular	Total Cost in (Rs.)	Total Returns (Rs.)	Net Returns (Rs.)	B: C Ratio
1	Jelly	5169.38	13030.2	7860.82	2.52
2	Jam	4351.1	12285.66	7934.56	2.82
3	Toffee	10597.43	21336	10738.57	2.01

It was observed from table 4 that total cost of processed products of guava for jelly, jam and toffee were Rs. 5169.38, Rs. 4351.1 and Rs. 10597.43 respectively. Net returns from jelly, jam and toffee were Rs. 7860.82, Rs. 7934.56 and Rs. 10738.57 respectively. The highest B:C ratio was observed in Jam product. Hence, jam product prepared from guava is profitable.

CONCLUSIONS

The area and production growth exhibited consistent performance, the in consistency was recorded by productivity. The coefficient of concurrent deviation concludes significant positive association amongst arrival and prices. The gross returns from the guava production was Rs. 34400 / ha. The B;C ratio of guava production at Cost 'C' was 1.30. Processed products from guava like jelly, jam and toffee, the B;C ratio was observed highest in jam product, so it is beneficial to farmers and processors to prepare jam from guava.

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CHALLENGES AND CRITICAL SUCCESS FACTORS IN RURAL ENTREPRENEURSHIP – A CASE STUDY OF DAHANU, MAHARASHTRA

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ABSTRACT

Many environmental and socio-economic factors limit the livelihood activities of rural people. Rural entrepreneurship is the key to overcome these challenges. In Dahanu area rural people migrate due to lack of availability of year-round employment opportunities. There are certain individuals who successfully overcome these barriers and develop entrepreneurial ventures within the given constraints. Primary data was collected through qualitative and quantitative observations in the areas of Dahanu taluka of Maharashtra. Various PRA tools such as transect walk, focussed group discussion, in-depth interview, resource mapping and ethnographic observations were used to gather relevant information from the individual rural entrepreneurs and various stakeholders. Poultry farming, Woman Entrepreneur in Chikoo processing, Fly-Ash Brick making, Warli art and Rice processing were the prominent entrepreneur ventures in the Dahanu area. However, there were some challenges and the critical success factors of these endeavours. This study will be useful to planners and policy-makers in the rural space to devise ways for scaling up the sporadic success to a wide-spread reality.

(Keywords: Rural entrepreneurship, Critical success factors, Dahanu)

INTRODUCTION

Many environmental and socio-economic factors limit the livelihood activities of rural people. Rural entrepreneurship is the key to overcome these challenges. Rural people migrate mainly due to lack of availability of year-round employment opportunities in rural areas. Particularly in Dahanu area, small land holdings, rice based cropping system, limited alternate irrigation facilities for agriculture as well as the demand for labour force from various industries in the nearby vicinity - appear to be the primary factors contributing to the trend of seasonal migration. Rural entrepreneurship is the key to reduce, if not reverse the migration of rural youth to cities. It is the sustainable way for rural development as it is based on the principles of use of locally available resources for wealth creation, creating employment for rural youth and creating value added products and services for utilization by rural or urban populations. Though agriculture remains the backbone of rural economy to a large extent, its transformation into agribusiness through participatory approach is a must if it has to benefit the rural folk in a qualitative manner. Risks involved in subsistent level agriculture have to be reduced by applying business risk management principles to agriculture. Further, the non-agriculture activities also offer tremendous potential for employment creation in rural areas, which need to be explored fully. Rural entrepreneurship encompasses both agriculture and non-agriculture based opportunities that the rural youth may take up, and result into wider spread of prosperity in rural areas.

OBJECTIVES

Our primary objective is to study the various alternate possibilities which the rural folk may consider for overcoming the problem of partial unemployment in the lean months of the year. We also have tried to bring out the challenges faced by these rural entrepreneurs and how they tackled these challenges. The objectives of the study can be visualized as-

1. To explore various rural entrepreneurial activities by studying the entrepreneurs in the selected area of Dahanu taluka.
2. To study the challenges faced by rural people while pursuing entrepreneurial projects.
3. To study the critical success factors for rural entrepreneurs.

METHODOLOGY

Study was predominantly based on Primary data collected from Dahanu district of Maharashtra, during 2014-15. Qualitative data was collected from different stakeholders including rural entrepreneurs involved in agricultural and non-agricultural activities by conducting extensive field visits and in-depth interviews with rural entrepreneurs. Agriculture based activities included horticulture-greenhouse / polyhouse cultivation of vegetables, poultry farming, chikoo processing, tissue culture banana cultivation, dairy farm, rice mill and poha mill. Non-agriculture based activities studied were brick making from fly-ash, warli art, ice-factory and cold storage. Various PRA tools such as transect walk, focussed group discussion, in-depth interview, resource mapping and ethnographic observations were used to gather relevant information. Qualitative and quantitative

observations about the individual rural entrepreneurs were compiled in the form of short caselets, highlighting their activities, the challenges faced by them and the critical success factors.

Profile of study area – Dahanu: Opportunities in challenges

Dahanu is a taluka located in western coastal part of Maharashtra state. Due to the typical tropical weather with high humidity, heavy rainfall during monsoon, the cropping system in the area is predominantly a rice-based one. However, seasonal fluctuations in the water availability often limit the possibility of a second crop of paddy. Coconut and toddy palm form the traditional horticulture component alongside vegetables. Besides these, fodder is a source of income for many landowners, as the fodder from this area is considered to be of superior quality and is preferred by many cattle owners. As a result, the fodder business in this area is well developed due to demand from other parts of the country. Horticulture fruit plantation has long been introduced in this area through chikoo (sapota) plantation and vegetable cultivation but both depend upon water availability beyond monsoon season. Both these are extensively cultivated primarily by medium to large farmers and by some small farmers as homestead cultivation if they have adequate water through the dry period of the year. Agriculture is able to provide only a partial employment while in the lean months (October onwards upto May) it is unable to provide substantial employment opportunities especially due to lack of adequate water availability and irrigation facilities. Water quality is also often found to limit the fruit and vegetable cultivation. As a result of this, rural migration is very common. Rural folk here are often seen working in alternate jobs such as labour in brick kilns and other local small to medium industries (rice mills, poha mills) or at the farms of large farmers who require unskilled or semi-skilled labour. At the same time, there are a few rural entrepreneurs in the same area, who have been able to generate year-round employment and income generating opportunity not only for themselves but also able to provide employment to others, while facing the same constraints. Our attempt is to find out, what makes this possible?

RESULTS AND DISCUSSION

The entrepreneurial ventures observed were poultry farm, brick making from fly-ash, rice processing, chikoo processing and warli art. These ventures chosen for detailed case study broadly encompass the agriculture & horticulture based and non-agriculture based activities such that a complete arena of possibilities for rural entrepreneurship is represented.

A. Agriculture and Horticulture based activities

1. Case study of Poultry farmer

Name: Moreshwar Lahanage; Village: Dabhon

Broiler poultry is predominant in the area compared to layers. The demand for poultry meat is stable with reasonably steady market prices than eggs and hence fetches better returns than eggs. Poultry farmer was entirely depending on government subsidies. He availed the financial support of Rs 1.50 Lakh through 'Adivasi Vikas project' provided by the State government for starting the poultry. The amount was just sufficient for infrastructure itself. Hence he had to search for a partner to run the venture. Secondly, poultry being a technical job, skilled manpower is prerequisite. Usually, one cycle of birds gets completed

in 27 days, starting from one-day old chicks bought from the hatchery. The expenditure for feeding materials and medicines is upto Rs. 1.27 lakh for 1500 birds in 27 days. Cost of feed is about Rs. 4500/day for 1500 birds (@Rs 85/ bird). Two or three labourers are required continuously to take care of one lot of about 1500 birds, including feeding, medication, cleaning etc. Usually birds weighing about one kg are preferred for sale. The weight can go upto 2 kg if birds are fed upto about 40-45 days but it increases risk and costs, as consumers prefer young chicks for their soft flesh and as the birds grow older, they are also likely to catch diseases. The marketing is done through a trader who in turn sells at hotels in the Mumbai. Cost of bird at the time of selling depends upon market rate on that day and weight of the bird. As this is the first attempt, the entrepreneur depends on an expert for technical aspects and also for marketing. This reduces the profit margin to almost half. He plans to scale-up the project to 10 times the present size through additional financial support from government.

Challenges faced: Poultry birds are susceptible to sudden disease incidences. The market prices are quite fluctuating. The entire life–cycle of the birds is very time bound and a strong marketing support is a must in order to make profits. Slight delay in selling the birds increases cost and reduces profitability. In this case, the entrepreneur received only half the profit as he depended upon middleman for marketing of the birds to hotels in Mumbai. Direct link to market would increase profitability to a great extent.

Critical success factors: Technical know-how and a dedicated team of skilled workers who stay at the site all the time and take care of the unit throughout day and night as per seasonal requirements. Timely supply of feedstock of required specification as per the stage of growth of the birds is a must. Adequate availability of basic resources like clean water, electricity etc is pre-requisite. Assured orders which are confirmed in advance are useful for planning the production cycle. There was availability of working capital for fulfilling the regular needs of the production cycle – at a reasonable rate of interest. The 'Adivasi vikas prakalp' supported the project in terms of financing the capital cost.

2. Case study of Rice processing unit: Mahalakshmi Rice mill at Aine village

There are three rice processing units in the vicinity. Farmers bring their paddy to rice mill and consume the rice for home consumption not for commercial purpose. Processing in the rice mill produces two by-products – husk and bran. The processing capacity of the mill was 5 quintal per hour, meaning 3 tonnes per day if it works for 6 hours, depending upon quantity and electricity availability. Charges were between Rs.20-25 per kg of paddy. The husk is sold to poultry owners at Rs. 7 per kg. The mill was working 8 months in a year & remaining 4 months the mill workers do rice farming.

Challenges faced: The processing is done only for 6-7 months in a year. Labour availability is not there during monsoon season. Power-cuts and machinery maintenance hamper continuous production during the on season. In the past couple of years, the profitability is reduced drastically because the low sales of the important by-product rice husk. This is due to slowdown in the brick kiln industry in the nearby areas, as a result of the low demand of bricks due to slowdown in the construction industry in the nearby cities.

Critical success factors: Assured supply of paddy is available for processing from the nearby community, as they cannot use it for consumption without processing. By-products like husk, broken rice, rice bran etc fetch good price which enables the rice miller to offer the milling service at a low price to small scale rice farmers. This ensures assured supply of paddy to rice mill.

3. Case study of Woman Entrepreneur in Chikoo processing

Name: Sharada Patil; Village: Gholvad

She runs a successful enterprise 'Amrut Madhuri' – a Chikoo processing unit incepted in the year 1990. She began her experiments in a modest way with small quantities of ripe chikoo fruits which were collected from own orchard. Her flare for cooking led her to try and develop different recipes in order to make this fruit appealing to the consumer. Number of recipes developed by her exceeds 140 which were published in a book. Over the period of past 25 years the processing activity has been scaled up. Now she does processing on about 1500-2000 Kg chikoo fruits in a season to cater to the growing demand. She has received recognition through several awards from government and other bodies. Quality of the fruits plays vital role in processing as it requires best quality ripe fruits only, which are available only during 4 months in a year, specifically during winter. The processing is done during those four months in a year to form the basic dried chips (also called as Chikoo mewa) which is either sold or used for making other products throughout the year. This limits the turnover to a great extent. Other limiting factors are dependence upon simple sun-drying method and a few skilled workers. Use of solar and electrical dryers has been tried but with mixed results. Drying of chikoo pieces is a laborious job, generally requiring 5 days for drying during which the material needs to be handled with utmost care, to avoid any discolouration, physical damage or over-drying. The only mechanisation which is done is the use of grinder for powdering and simple heat-sealing machine for packaging. This also implies that investment cost is low and labour cost is the major cost in this project. Another aspect which has a bearing on cost is that the yield of dried chips is approximately 10 % from the fresh weight of chikoo fruits. From 10 kg ripe fruits about 1 kg dried chips can be made which can be then utilised for processing different product such as chikoo powder, pickle, sweets, appetiser, etc. For 10 kg sapota she has to invest Rs. 100 for raw material and Rs. 100 for processing. After value addition she gets Rs. 300 per Kg in wholesale and Rs. 350 per Kg in retail selling. The marketing of the products is done through personal selling to visitors, tourists and through trade shows organized by government and local bodies to promote the small scale entrepreneurs. A special 'Chikoo festival' is being organized by government every year since past few years in which these products are being sold out quickly. To serve the growing demand, now she has started outsourcing the chikoo chips to other chikoo growers in the nearby area. She has trained local women into this skilled job for this purpose. She plans to scale up the existing venture in near future. Major constraints / limitations faced during expansion are – capital requirement for machinery if the operations are to be scaled up, lack of skilled labour for large scale operations and limited time and quantity of the right type of raw material even though the Dahanu and Gholvad area is well known for chikoo production.

Challenges faced: Though chikoo fruits are borne by the trees throughout the year, the quality of fruits is quite fluctuating. The best quality fruits which are suitable for processing are available only during about three months period in a year. This limits the scalability of the operations to a great extent. Chikoo processing is a highly skilled job as the attempts for mechanization have not resulted into any major breakthrough hence dependence on manual labour skill is unavoidable. Small entrepreneur lacks the skill and strength to carry out attractive packaging and marketing of products in cities. Maintaining uniform quality and ability to supply regularly in bulk are difficult for small entrepreneurs. This limits their outreach to the commercial large scale processing companies. Though government has taken note of the efforts of the entrepreneurial efforts by giving away several awards to the woman entrepreneur, further help by way of financial support is required. Like many other first generation entrepreneurs, this venture is also constrained by lack of adequate interest by the next generation to continue in the same business.

Critical success factors: Regular availability of chikoo fruits in own farm as well as in the vicinity from other farmers as Dahanu–Gholvad is a chikoo plantation belt. The woman entrepreneur stabilized the production system by making a small organization of women and training them, motivating them and offering them work on a regular basis. She also utilized the platform of government initiatives such as the 'chikoo festival' for promoting her products. Continuous efforts were taken to develop new recipes to cover the needs and tastes of different users. Total of about 140 recipes were developed by meticulous trials. On the basis of this, she was able to create her own identity and the presence of the brand name "Amrut Madhuri" to some extent over a period of 20 years.

CONCLUSION

Rural youth have to be encouraged to venture into such entrepreneurial activities so that their seasonal and permanent migration to other parts can be reduced. These few examples of successful rural entrepreneurs can lead the way in spreading the awareness drive for entrepreneurship development. Technology & Skill based training, capacity building, financial support through convenient schemes, training and support on marketing will form part of a full-fledged strategy for developing rural entrepreneurship. Identifying, documenting and publicising case studies and success stories of rural entrepreneurs have to be integral part of this strategy.

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POST HARVEST LOSSES IN TOMATO MARKETING

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ABSTRACT

The present paper entitled, "Post-harvest losses in marketing of tomato in Eastern dry zone of Karnataka" was undertaken with the specific objective to estimate the post-harvest losses in marketing of tomato. The data were collected by survey method pertained to the agricultural year 2013-14 for assessing post-harvest losses in tomato the technique of " overall assessment of commodity movement system" has been used. The prevailing Marketing channels in Kolar districts were Channel-I: (Producer→ Commission agent→ Wholesaler → Retailer → Consumer), Channel-II: (Producer→ Commission-agent→ Retailer→ Consumer), Channel-III: (Producer→ Retailer→ Consumer) and Channel-IV: (Producer→ Consumer.

The estimated total PHLs in physical terms were highest in channel-I (23.19kg), followed by 19.96 kg in channel-II and 17.32 kg in channel-III and lowest in channel-IV (13.78kg). Considering different channels in marketing of tomato the per quintal economic loss was maximum Rs. 440.19 in channel I and minimum Rs. 258.10 in channel IV. Among the channels, entire loss was borne by producer in channel IV as it was a direct channel. However, in channel I, II and III the share of intermediaries was to the tune of 68.25 per cent, 59.03 per cent and 49.05 per cent, respectively and the remaining burden of loss was borne by producer 31.75 per cent, 40.97 per cent and 50.95 per cent, respectively.

The major constraints faced by the tomato growers in marketing were high commission charges, high transport charges, wide price fluctuation, non-availability of cold

storage facility, lack of market information and non-availability of labour in time. Farmers suggested for reduction in rate of commission, timely availability of market information, cold storage facility and subsidized transport facility, refrigerated vans for quick and safe transport to reduce post harvest losses.

INTRODUCTION

Marketing of vegetable crops is quite complex and risky due to the perishable nature of the produce, seasonal production and bulkiness. The post-harvest losses and distribution channels play a vital role in price fixation of vegetables, especially in tomato which is sensitive to much environment-genetic interaction disorders which may be manifested during post-harvest ripening and post-harvest inspection. In tomato PHLs are mainly related to handling from harvest to retail. A substantial quantity of production is subjected to post-harvest losses at various stages of marketing due to factors like perishable nature, method of harvesting and packaging, transportation, external damages incurred during harvest and handling, harvest at an improper maturity etc. The most important factor impacting the growth of horticulture is low and declining productivity. The development of cold chain network and improved post-harvest management practices will help in reducing the post –harvest losses of vegetables.

The present paper entitled, "Post-harvest losses in marketing of tomato in Eastern dry zone of Karnataka" was undertaken with the specific objective to estimate the post-harvest losses in marketing of tomato.

METHODOLOGY

Kolar and Srinivasapur tahsils were selected from Kolar District. From each tehsil two villages were selected and from each village ten farmers were selected randomly for the study. Thus data were collected from forty tomato growers.

In marketing of tomato different channels were identified. Amongst identified channels a representative sample of each intermediary was selected. The data were collected by survey method pertained to the agricultural year 2013-14.

It could be seen that there were four marketing channels patronized by the tomato growers in the study area.

1. Channel-I: (Producer→ Commission agent→ Wholesaler →Retailer → Consumer)
2. Channel-II:(Producer→ Commission agent→ Retailer→ Consumer)
3. Channel-III: (Producer→ Retailer→ Consumer)
4. Channel-IV: (Producer→ Consumer)

Simple statistical tools such as arithmetic averages, percentages and ratios were used for analysis. For assessing post-harvest losses in tomato the technique of "overall assessment of commodity movement system" has been used.

RESULTS AND DISCUSSION

Extent of post-harvest losses in tomato

Especially in tomato which is sensitive to environment-genetic interaction disorders which may be manifested during post-harvest ripening or post-harvest inspection. The losses in tomato production and marketing occur at various levels. The loss just starts from

the field level due to the attack of various insects, pests and diseases, which damage the produce and ultimately affect the yield and quality. A substantial quantity of production is subjected to post-harvest losses at various stages of marketing.

The quantum of losses governed by factors like perishable nature, method of harvesting and packaging, transportation, etc. Tomato being a third most cultivated crop, the post-harvest losses is significant in terms of quantity and economic value. The producer has to bear the losses at the time of grading and enroute transportation. In the absence of modern techniques like pre-cooling and refrigerated transportation, tomatoes were handled at high ambient temperatures. Consequently, tomato shows considerable physical and physiological deterioration by the time they reach the market. A thing, which was common in marketing of tomato, was the complete absence or lack of storage at producer's level. Major share of tomato produced in Kolar was sent to APMC's at Kolar and Srinivasapur for remunerative prices. Due to delicate nature of tomato and long distance transportation without safe packing cannot withstand as compared to other vegetables. Therefore, an attempt has been made to estimate extent of post harvest losses at different stages in each channel of marketing.

Estimation of Post-harvest losses in tomato (PHLs)

Economic loss:

The aggregate post harvest losses in production and marketing of tomato at different stages in each channel are estimated and given in Table 1.

Table 1. Aggregate postharvest physical economic losses in production and marketing of tomato.

(Rs./q.)

Sr. No.	Particulars	Marketing channel I	Marketing channel II	Marketing channel III	Marketing channel IV
1.	Post harvest losses at farm level	79.71 (18.11)	79.47 (22.99)	85.67 (29.33)	125.12 (48.48)
2.	Losses in marketing				
a.	Producer	60.03 (13.64)	62.42 (18.06)	63.16 (21.62)	132.98 (51.52)
b.	Commission agent	48.00 (10.90)	49.56 (14.34)	-	-
c.	Wholesaler	107.87 (24.50)	-	-	-
d.	Retailer	144.58 (32.85)	154.17 (44.61)	143.31 (49.05)	-
	Total	**440.19**	**345.62**	**292.14**	**258.10**

(Figures in parentheses indicates percentages to total)

Considering different channels in marketing of tomato per quintal economic loss was maximum Rs. 440.19 in channel I and minimum Rs. 258.10 in channel IV. Among the channels, entire loss was borne by producer in channel IV as it was a direct channel.

However, in channel I, II and III the share of intermediaries was to the tune of 68.25 per cent, 59.03 per cent and 49.05 per cent, respectively and the remaining burden of loss was borne by producer 31.75 per cent, 40.97 per cent and 50.95 per cent, respectively.
This huge losses occurring to producer and or intermediaries need urgent attention of policy makers to safeguard the interest of farming community on priority.

CONCLUSION

Among the channels, entire loss was borne by producer in channel IV as it was a direct channel. However, in channel I, II and III the share of intermediaries was to the tune of 68.25 per cent, 59.03 per cent and 49.05 per cent, respectively and the remaining burden of loss was borne by producer 31.75 per cent, 40.97 per cent and 50.95 per cent, respectively.

Farmers suggested for reduction in rate of commission, timely availability of market information, cold storage facility and subsidized transport facility, refrigerated vans for quick and safe transport to reduce post harvest losses.

POLICY IMPLICATION

Government should provide infrastructure for cold storages in producing areas for benefits of the farmers and market functionaries during unfavorable price situations and linkage to processing industries.

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PERFORMANCE OF DCCBS IN MAHARASHTRA- A MODEL FOR QUANTITATIVE ANALYSIS

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ABSTRACT

The present study was undertaken to examine the performance of District Central Co-operative Banks in Maharashtra in respect of various performance indicators. The study is based on secondary data of District Central Co-operative Banks (DCCBs) in Maharashtra covering the period of 29 years i.e. from 1985-86 to 2013-14. The period wise average loan disbursement per DCCB and its composition were estimated for the base year (1985-86), middle year 2000-01 and the terminal year (2013-14) with the help of ratios, averages and percentages. The period wise performance in respect of important indicators was estimated with the help of linear and compound growth rates (CGRs). The ranking of districts was based on performance index (PI) of DCCBs. The DCCBs having better average performance index such as, Pune (13.96), Satara (13.18), Mumbai (12.73), Ahmednagar (12.04), Nashik (11.76), Kolhapur (10.81), Thane (10.65), Raigad (10.55) Solapur (10.32), Jalgaon (9.88) and Sangli (9.69) DCCBs were the strong units among the 30 DCCBs. The DCCBs having very low average performance index were Nanded (2.57), Beed (1.81), Jalna (1.97), Gadchiroli (1.12), and Wardha (0.98), which call for suitable economic measures, so that these DCCBs will improve their performance in future

INTRODUCTION

As stated by the Task Force on the Cooperative credit system (RBI, 2000), Cooperative credit movement in India has been able to keep pace with contemporary Rural Financial Institutions despite sound principles and long existence. The same Task Force pointed out many weaknesses of cooperative credit system. Some of these are : i) institutions have neither remained member–driven enterprises not their leadership as quite a large number of cases had proved to be professionally transparent accountable and functionally effective, ii) grass root level cooperatives (PACSs) are generally weak, many of them are dormant, suffered from infrastructural weakness, iii) they have low volume of business/ low resource base, low borrowing members, lack of democratization and professionalism, etc. iv) poor recovery performance and incidence of high overdues had drastically reduced the eligibility of the new members to borrow and had resulted in low paid-up share capita, which in turn has directly determined their borrowing capacity. The present study was undertaken to examine the performance of DCCBs in respect of various performance indicators and problems of District Central Co-operative Banks (DCCBs) in Maharashtra..

METHODOLOGY

The study is based on secondary data obtained from the annual reports of 30 DCCBs in Maharashtra for the period of past 29 years i.e. from 1985-86 to 2013-14. The

period wise average loans advanced per DCCB and its composition were estimated for the base year (1985-86), middle year 2000-01 and the terminal year (2013-14) with the help of ratios, averages and percentages. The period wise performance in respect of growth in performance indicator was assessed by using linear and compound growth rates for the two periods i.e Period I (1985-86 to 2000-01) and Period II (2000-01 to 2013-14).The rates of compound growth were estimated by using the following type of exponential model

$$Y = ab^t$$

The average performance index was estimated and ranking was done in the descending order of performance index. The ranking of districts and regions was based on performance index (PI) of DCCBs, which was obtained as under,

$$PI = \frac{Lo - Ld}{Lod} X \frac{MB}{MBs}$$

Where,

Lo - Loan outstanding (Rs.)
Ld - Loan demand (Rs.)
Lod – Overdues (Rs.)
MB - Number of borrowing members.
MBs - Membership at the state level .

RESULTS AND DISCUSSION

1. Average total loan distributed and its composition

It was revealed that (Table 1) the total amount of loan distributed per DCCB to its members in Maharashtra state had increased from Rs. 74.84 crores in 1985-86 to Rs. 515.25 corers in 2000-01 and Rs. 1140.70 corers in 2013-14.

Over 80 per cent of total loans and advances issued were in the form of short term loans till 2000-01 and remaining being medium term and other loans and advances during the base year, but in the terminal year it was declined up to 73.82 per cent which indicates special attention on short term loans by the DCCBs in Maharashtra. The percentage shares of medium term loan and other loan were 5.49 and 10.42 per cent in 1985-86, which had increased to 7.06 and 11.87 per cent in 2000-01 and 9.76 and 16.47 respectively in the year 2013-14.

Table 1 Average loans and advances distributed by DCCBs in Maharashtra

(Rs. in crores)

Period	Short Term loans			Medium Term loans			Other loans and advances	Total loans And advances
	Agricul-tural	Non Agricul-tural	Total Short Term	Agricul-tural	Non Agricul-tural	Total Medium Term		
1985-86	11.79 (15.75)	51.14 (68.34)	62.93 (84.09)	3.11 (4.16)	1.00 (1.33)	4.11 (5.49)	7.80 (10.42)	74.84 (100.00)
2000-01	107.85 (20.93)	309.78 (60.12)	417.63 (81.05)	20.68 (4.01)	15.82 (3.07)	36.50 (7.08)	61.12 (11.87)	515.25 (100.00)
2013-14	454.1 (39.81	388.00 (34.01)	842.10 (73.82)	26.27 (2.24)	85.13 (7.47)	110.13 (9.76)	187.87 (16.47)	1140.70 (100.00)

(Figures in the parentheses are the percentages to the respective total)

The proportion of total agricultural loans (both ST and MT) in the total loans was below 20 per cent in the base year, which increased to about 25 per cent in the year 2000-01 and 42.05 per cent during the terminal year. The proportion of non-agricultural loans (both ST & MT) in the total loans was 69.67 per cent in the base year which declined to 63.19 per cent in the year 2000-01 and 41.48 per cent in the terminal year. It indicates focused emphasis on agricultural loans by the DCCBs in Maharashtra during the recent years.

2. Performance of DCCBs in Maharashtra

The growth and progress of DCCBs is presented in Table 2. It was revealed that there was significant increase in total number of branches (2.79 per cent) and membership (2.98 per cent) of DCCBs in the state depicting the satisfactory performance of DCCBs in respect of expansion and coverage during Period- I. The total owned funds of DCCBs in the state had significantly increased. This was possible mainly due to the increased growth in share capital and reserve fund of the DCCBs in Maharashtra. The deposits of DCCBs in the Maharashtra state had recorded an impressive growth (18.52 and 14.11 per cent) indicating the movement of DCCBs towards self reliance. The PACs and individuals were the major sources of deposits in DCCBs.

Table 2 Growth and progress of DCCBs in Maharashtra (Rs in Crorers)

Indicator	1985-1986	2000-2001	2013-2014	Linear Growth Per cent		Compound Growth Rate (%)	
				Period-I	Period-II	Period-I	Period-II
No. of branches	2438	3722	3724	52.67	0.05	2.79***	0.62 NS
Membership	70599	107050	126401	51.63	18.07	2.98***	1.62**
Share capital	82	655	2323	699	255	13.99***	7.44***
Reserve fund	92	1677	7721	1723	360	27.58***	12.78***
Own fund	174	2332	10044	1243	331	18.86***	13.64***
Deposits	1437	19519	55570	1240	200	18.52***	14.11***
Borrowings	225	2242	5229	896	133	13.23***	8.92**
Working capital	1981	23736	74542	1098	214	17.57***	13.46***
Investment	452	7615	26088	1584	243	22.13***	15.46***
Loan issued	2245	15458	34221	589	121	12.76***	11.08***
Loan outstanding	1112	13719	37400	1134	173	16.86***	9.86***
Loan collection	415	5701	12962	1273	127	18.28***	9.88**
Recovery percentage	63.85	69.12	60.72	8.25	-10.86	0.25 NS	0.74*
Overdues	235	2547	10325	983	305	17.84***	13.34***
Overdue as % to demand	36.15	30.88	39.28	-14.58	27.20	-0.39 NS	0.78 NS
Overdues as % of outstanding	21.15	18.56	27.61	-12.25	48.76		
Cost of management	61	625	1513	925	142	16.57***	11.66***
Av. Cost of Managemebt	2.03	20.83	50.43	925	142		
Proportion of CM to working capital	3.08	2.63	2.03	-14.61	-22.81		
Profit	10 (30)	242	618	2320	155	21.34***	23.71***
Loss	--	70	122		74		

(Figures in parentheses are the number of DCCBs in profit or loss)

***** , **, * - Significant at 1,5 and 10 % level and NS= Non significant**

The annual growth rate of borrowings of DCCBs indicated a declining trend in second period (8.92 per cent) as compare to first period (13.23 per cent) indicating movement of DCCBs towards self reliance.. The total working capital of DCCBs in the state had recorded an impressive growth (17.57 and 13.46 per cent) and this was mainly due to increased growth in reserve funds and deposits. The growth in total loan issued by the DCCBs witnessed a significantly positive trend (11 to 12 per cent) of the State. It was mainly due to the increasing area under commercial crops and horticultural crops, which necessarily call for more investments in input use and plant protection and therefore, increase in demand for loans.

The poor performance in recovery by DCCBs was quite comprehendible from an increase in total overdues of DCCBs in the state. As the improvement in recovery percentage, the quantum of overdue remains on same position. The total and average cost of management in DCCBs of Maharashtra had significantly increased over periods under study The proportion of cost of management to working capital had declined from 3.08 per cent to 2.52 and 2.03 per cent during period under study.. The profits of DCCBs in the state showed a significant growth by 23.71 per cent per annum during the period II as compared to 21.34 during Period I. From the year 1990-91 onwards, the losses in DCCBs in the state have become a serious problem. The total losses of DCCBs increased from 70 crores to 122 crores during period II.

3. Performance Index

It can be revealed that based on DCCB wise average performance index, Pune (13.96), Satara (13.18), Mumbai (12.73), Ahmednagar (12.04), Nashik (11.76), Kolhapur (10.81), Thane (10.65), Raigad (10.55) Solapur (10.32), Jalgaon (9.88) and Sangli (9.69) DCCBs were the strong units among the 30 DCCBs. The DCCBs having very low average performance index were Nanded (2.57), Beed (1.81), Jalna (1.97), Gadchiroli (1.12),and Wardha (0.98), which call for suitable economic measures, so that these DCCBs will improve their performance in future.

Financial institutions, national and international have been emphasizing the need for operationally efficient farm credit delivery system given the scarcity and the resulting rationing of funds. Efficiency in fact is the outcome of good performance and institutional development. Being financial institutions, the process of financial intermediation, institution building has special relevance for DCCBs and the need for continuous performance evaluation cannot be belittled. The performance evaluation being quantitative analysis provides a better format for comparison of DCCBs than the recovery related eligibility criteria, from an objective point of view.

Table 3 Ranking of DCCBs and regions according to average performance index during 1985-86 to 2013 - 14 in Maharashtra

Sr. No	Region	DCCBs	Bankwise	Region average	Rank
1	Western Maharashtra	Pune	13.96	10.89	I
		Satara	13.18		
		Ahmednagar	12.04		
		Nashik	11.76		
		Kolhapur	10.81		
		Solapur	10.32		
		Jalgaon	9.88		
		Sangli	9.69		
		Dhule	6.45		
2	Konkan	Mumbai	12.73	9.57	II
		Thane	10.65		
		Raigad	10.55		
		Ratnagiri	7.56		
		Sindhudurg	6.38		
3	Marathwada	Aurangabad	8.96	4.92	III
		Latur	8.53		
		Parbhani	5.97		
		Osmanabad	4.66		
		Nanded	2.57		
		Jalna	1.97		
		Beed	1.81		
4	**Vidarbha**	Buldhana	8.39	3.97	IV
		Akola	7.63		
		Nagpur	4.88		
		Amaravati	4.61		
		Bhandara	4.40		
		Chandrapur	3.14		
		Yavatmal	3.12		
		Gadchiroli	1.12		
		Wardha	0.98		

The significantly higher average index of performance achieved by the DCCBs in Western Maharashtra (10.89) and Konkan region (9.57) indicated a developed system of DCCBs in these regions. The DCCBs in the Marathwada and Vidarbha regions had a poor record of performance as indicated by average index of 4.92 and 3.97, respectively throughout the period. The DCCBs in Western Maharashtra region had performed better where rural economic activities were more agricultural based. Comparing the DCCBs of Western Maharashtra region of the state to those in Marathwada and Vidarbha region, it was found that, broadly the lending operations of the former continued for the purposes like crop production, marketing of crops, minor irrigation, land

development, farm mechanization etc. The influence of the rate of recovery on overall performance, however continued to be significant and it may be said tat higher the rate of recovery, better the overall performance.

CONCLUSIONS

The satisfactory performance of DCCBs in Maharashtra Period- I was noticed in the number of branches, membership, loans and advances, reserve funds, own funds, deposits, investment, while better performance during Period-II (2000-01 to 2013-14) was observed in respect of recovery, profit and importantly, reduction in overdue asnd cost of management. The DCCBs having better average performance index such as, Pune, Satara, Mumbai, Ahmednagar, Nashik, Kolhapur, Thane, Raigad Solapur0, Jalgaon and Sangli. DCCBs were the strong units among the 30 DCCBs. The DCCBs having very low average performance index were Nanded, Beed, Jalna, Gadchiroli,and Wardha, which call for suitable economic measures, so that these DCCBs will improve their performance in future

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CREDIT UTILIZATION FOR AGRICULTURE BY FARMERS IN AKOLA DISTRICT

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INTRODUCTION

Agriculture credit is very important instrument in facilitating the process of agricultural development and there by initiating the growth of rural economy. In the present study economic environment characterized by deregulation of global competition, the crucial role of banks in meeting the socio-economic necessities of the farming community has been recognized. As such strengthening and promoting the credit through institutional source, i.e. banks assume greater significance through the farmer's point of view. Bank credits are made available to the farmers in the form of short term credit for financing crop production purpose and in the form of medium or long term credit for financing capital investment in agriculture and allied activities like land development including minor irrigation, farm machinery, dairy development, animal husbandry, fisheries,

plantation and horticulture, on the post harvest fronts, extending credits to storage, processing and marketing of agricultural produce at reasonable rate of interest. Efficiency in the management of agricultural loans distribution to different farm categories determines profitability and viability of both farmers and lenders. An analysis of the amount lended to different purpose over the years, sources of farm credit, credit utilization pattern, factors influencing repaying capacity, credit gap estimation was essential for making meaning conclusion. The study is restricted to three tahsil of Akola district in view of limited time and resources. Also the study in restricted to certain performance indicators only.

METHODOLOGY

Simple tabular analysis was used for analysis of primary data such as size of the holding, size and composition of the farm family, educational status and asset holding status (Rs.) by working out simple averages and percentages for selected farmers. In addition, utilization of credit has been analyzed purpose wise with simple mathematical and statistical tools. Secondary data pertaining to total agricultural credit advanced by major financial institutions in the district, number of farmers availing the loan facility in the district was collected.

Repaying capacity

R = Y- (C+L+K)

Where

R = Repaying capacity in rupees

Y = Total farm and off farm income in rupees

C = Total farm and off farm expenses in rupees

L = Other loan installments to be paid in rupees

K = Risk allowance in rupees taken as 10 per cent of the total Income

Credit gap Analysis:

Credit Gap = (credit required- credit sanctioned/amount of credit borrowed)

The percentage credit gap was calculated by following formula

= (Credit gap/credit required) x 100

The required amount of credit was estimated through personal discussion held with the farmer.

RESULTS AND DISCUSSION

1. Family expenditure pattern of selected farmers

It is revealed from Table 1 that the expenditure of marginal farmers on food consumption was Rs. 14200 while for small and other group of farmers, it was Rs. 15250 and Rs. 23720 respectively. The food expenditure contributed 55.53, 55.08 and 59.78 per cent share respectively of marginal, small and other group of farmer. The overall expenditure on food was Rs. 17723.33 which was 57.21 per cent to the total. The expenditure on purchasing clothes was RS. 5750 for marginal farmer while for small and other group of farmer it was Rs. 6070 and Rs. 7200 respectively. The per cent share of the size groups was 22.48,

21.92, 18.14 respectively. The overall expenditure on clothing was Rs. 6340 which was 20.46 per cent to the total expenditure. The expenditure on electricity by marginal, small and other farmers was Rs. 1581.43, Rs. 1760.49 and Rs. 2253.33 with per cent share 6.18, 6.35 and 5.67 respectively. The overall expenditure on electricity consumption was Rs. 1865.08 with 6.02 per cent to the total expenditure. The expenditure on education by marginal, small and other farmer increased as Rs. 533.33, Rs. 806.66 and Rs.1266.67 with per cent share of 2.08, 2.91 and 3.19 respectively. The overall expenditure on education was Rs. 868.88 with 2.80 per cent to the total expenditure. The marginal farmers expended Rs. 2060 whereas small and other farmers expended Rs. 2250 and Rs. 3100 with per cent share 8.05, 8.12 and 7.81 respectively. The overall expenditure on health was Rs. 2470 with 7.97 per cent to the total expenditure. Though the average expenditure on health by marginal, small and other farmers was increased, the per cent share of expenditure on health to the total expenditure was decreased. The expenditure on other activities was Rs. 780, Rs. 902.85 and Rs. 1350 by marginal, small and other farmers respectively with 3.05, 3.26 and 3.40 per cent to the total expenditure. The overall other expenditure was Rs. 1010.95 and 3.26 per cent to the total. In general, the total expenditure by marginal farmer was Rs. 25571.43, by small farmers it was Rs. 27686.67 and by other farmers it was Rs. 39673.33. The overall farm family expenditure was Rs. 30977.15. The per cent expenditure on food and clothing was higher in case of other and marginal farmer respectively which indicate the priority of expenditure on basic needs. The per cent expenditure on education was higher in case of other farmers which indicate their will to learn while the per cent expenditure on health was high in case of small farmers indicating their health consciousness.

2. Utilization of credit among selected farmers

Table .2 revealed that the credit utilized for productive purpose like crop production was Rs.3340, Rs. 7833.33 and Rs. 13050 in case of marginal, small and other group of farmers with a per cent share of 48.68, 58.97 and 60.60 respectively. The overall credit utilized for crop production was Rs. 8091.10 with per cent share 58.12 of the total credit utilized. For marginal farmer, out of the total credit utilized, the credit utilized for dairy purpose was Rs.910 while Rs. 1866.67 and Rs. 3150 for small and other group of farmers with a per cent share of 13.26,13.96 and 14.62 respectively. The overall credit utilized for dairy purpose was Rs. 1975.55 with per cent share 14.19 of the total credit utilized. The both together contributed Rs. 4250, 9750 and 16200 for the above size groups with per cent share of 61.95, 72.94 and 75.23 respectively to the total. For household expenditure, the credit utilized by marginal, small and other group of farmers was Rs. 1186.67,1850 and 2900 with a percent share of 17.29, 13.84 and 13.46 respectively to the total. The overall credit utilized for household expenditure purpose was Rs. 1978.89 with per cent share 14.21 of the total credit utilized. The credit utilized for house repairing was Rs.223.33, 313.33 and 338.33 by marginal, small and other farmers with a per cent share of 3.25, 2.34 and 1.78 respectively to the total. The overall credit utilized for house repairing purpose was Rs.306.67 with per cent share 2.20 of the total credit utilized. The marginal, small and other farmers respectively utilized Rs.533.33, 806.66 and 1266.67 for educational purpose having per cent share of 7.77, 6.03 and 5.88 to the total credit utilized. The overall

credit utilized for educational purpose was Rs. 868.89 with per cent share 6.24 of the total credit utilized. The marginal, small and other farmers respectively utilized Rs.666.67, 646.67 and 783.33 for social functions having per cent share of 9.71, 4.83 and 3.63 to the total credit utilized. The overall credit utilized for social functions was Rs. 698.89 with per cent share 5.02 of the total credit utilized. The unproductive purpose expenditure by marginal, small and other farmers was Rs. 2610, 3616.67 and 5333.33 with per cent share 38.04, 27.05 and 24.76 respectively of the total credit utilized. Dealing with unproductive purposes like household expenditure the credit utilized by small and other group was Rs.1850 and Rs.2900 with a per cent share of 13.84 and 13.46 respectively which is lower than per cent share of marginal farmer. Similar findings were put forth by Singh (2005). Overall, the contribution of the different activities in total credit utilized varied for crop production, dairy, household expenditure, house repairing and maintenance, education and social function from Rs.24273.30, 5926.67, 5936.67,920,2606.67 and 2096.67 with a per cent share of 58.12, 14.19, 14.21, 2.20, 6.24 and 5.02 to the total. The per cent credit utilized for productive purpose was higher in case of other farmers whereas the per cent credit utilized for unproductive purpose was higher in case of marginal farmers which indicate that the per cent diversion of credit was higher in case of marginal farmer than small and other farmers.

3. Repayment capacity of selected farmers

It was observed from the Table 3 that the farm income of the marginal, small and other farmers was Rs. 31732, 43203 and 106633 respectively with per cent share of 64.57, 65.06 and 80.23 to the total income respectively. The overall farm income of selected farmer was Rs. 60523 which was 73.08 per cent of the total income. The family income of the marginal, small and other farmers was Rs. 17407, 23200 and 26267 respectively with per cent share of 35.42, 34.93 and 19.76 to the total income respectively. The overall family income of selected farmer was Rs. 22291.33 which was 26.91 per cent of the total income. The total income of marginal, small and other farmers was Rs. 49139, 66403 and 1, 32,900 respectively. The overall income of selected farmer was Rs. 82814. The farm expenditure of the marginal, small and other farmers was Rs. 9007.14,14072 and 39646.67 respectively with per cent share of 26.04, 33.69 and 49.98 to the total expenditure respectively. The overall farm expenditure was Rs.20909 which was 40.29 per cent of the total expenditure. The family expenditure of the marginal, small and other farmers was Rs.25571.43, 27686.67 and 39673.33 with per cent share of 73.95, 66.30 and 50.01 to the total expenditure respectively. The overall family expenditure was Rs.30977 which was 59.70 per cent of the total expenditure. The total expenditure of marginal, small and other farmers was Rs.34579, 41759 and 79320 respectively. The other loans to be repaid by marginal, small and other group of farmer were Rs.2166.66, 2500 and 10000 respectively. The overall amount of loan borrowed by selected farmers from sources other than RRB was Rs.4888.88. The risk factor assumed to be 10% of total income to minimize error which is Rs.4913.30, 6640.30 and 13290 of marginal, small and other group of farmer respectively. The overall amount of risk was Rs.8281.20. The amount of loan borrowed from RRB was Rs.13720, 25267 and 43067 respectively by marginal, small and other farmers. The overall amount of loan borrowed from RRB was Rs.27351. The total income,

total expenditure, other loans to repay and loan from RRB was Rs. 82814,51886,4888.88 and 27351 respectively. The repaying capacity of marginal, small and other farmers found to be Rs. 7480.04, 15503.70 and 30290 which was 54.51, 61.35 and 70.33 in percentage which indicate that the repaying capacity was directly related with the total income and inversely related with the total expenditure. As the amount of other loans to be repaid increases, the amount of repaying capacity decreases. The repaying capacity of selected farmers was found to be Rs.17757.91 which was 62.06 per cent of the borrowed amount.

4. Credit gap status of selected farmers

It was observed from Table 4 that the borrowed amount by marginal, small and other group of farmers was found to be Rs. 13878.57, RS. 26733.33 and Rs.43066.67 respectively. The required amount by marginal, small and other group of farmers was found to be Rs. 16964.29, Rs. 33766.70 and Rs. 58000 respectively. The credit gap for marginal, small and other farmers was Rs. 3085.72, 7033.37 and 14933.33 respectively which is in per cent as 18.18, 20.82 and 25.74 respectively of the required amount. In overall, the borrowed amount was Rs. 27892.85, the required amount was Rs. 36243.66 and the credit gap was Rs. 8350.80 with per cent 23.04 to the total required amount. There is a direct relationship between credit requirement and size of holding. The required amount increased with a higher rate while the borrowed amount was also increased but with a slower rate than required amount which indicate that the credit gap has direct relationship with size of holding.

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Table 1 Family expenditure pattern of selected farmers (Fig. in Rs/annum)

Sr.No.	Particulars	Marginal (N=30)	Small (N=30)	Medium and above (N=30)	Overall (N=90)
1.	Food	14200 (55.53)	15250 (55.08)	23720 (59.78)	17723.33 (57.21)
2.	Clothing	5750 (22.48)	6070 (21.92)	7200 (18.14)	6340 (20.46)
3.	Electricity	1581.43 (6.18)	1760.49 (6.35)	2253.33 (5.67)	1865.08 (6.02)
4.	Education	533.33 (2.08)	806.66 (2.91)	1266.67 (3.19)	868.88 (2.80)
5.	Health	2060 (8.05)	2250 (8.12)	3100 (7.81)	2470 (7.97)
6.	Social Function	666.67 (2.60)	646.66 (2.33)	783.33 (1.97)	698.89 (2.25)
7.	Other	780 (3.05)	902.85 (3.26)	1350 (3.40)	1010.95 (3.26)
	Total expenditure	25571.43 (100.00)	27686.67 (100.00)	39673.33 (100.00)	30977.15 (100.00)

(Figures in parentheses indicate percentage to the total)

Table 2 Utilization of credit among selected farmers (Fig. in Rs/annum)

Sr.No.	Particulars	Marginal (N=30)	Small (N=30)	Medium and above (N=30)	Overall (N=90)
	Productive purpose	Credit utilized	Credit utilized	Credit utilized	Credit utilized
1.	Crop production	3340 (48.68)	7833.33 (58.97)	13050 (60.60)	8091.10 (58.12)
2.	Dairy	910 (13.26)	1866.67 (13.96)	3150 (14.62)	1975.55 (14.19)
	Sub total	4250 (61.95)	9750 (72.94)	16200 (75.23)	10066.67 (72.31)
	Unproductive purpose				
3.	Household expenditure	1186.67 (17.29)	1850 (13.84)	2900 (13.46)	1978.89 (14.21)
4.	House repairing	223.33 (3.25)	313.33 (2.34)	338.33 (1.78)	306.67 (2.20)
5.	Education	533.33 (7.77)	806.66 (6.03)	1266.67 (5.88)	868.89 (6.24)
6.	Social function	666.67 (9.71)	646.66 (4.83)	783.33 (3.63)	698.89 (5.02)
	Sub total	2610 (38.04)	3616.67 (27.05)	5333.33 (24.76)	3853.34 (27.68)
	Grand Total	6860 (100.00)	13366.70 (100.00)	21533.30 (100.00)	13920.01 (100.00)

(Figures in parentheses indicate percentage to the total)

Table .3 Repayment capacity of selected farmers (Fig. in Rs/annum)

Sr.No.	Particulars	Marginal (N=30)	Small (N=30)	Medium and above (N=30)	Overall (N=90)
1.	Farm Income	31732 (64.57)	43203 (65.06)	106633 (80.23)	60523 (73.08)
2.	Family Income	17407 (35.42)	23200 (34.93)	26267 (19.76)	22291.33 (26.91)
3.	Total Income	49139 (100.00)	66403 (100.00)	132900 (100.00)	82814 (100.00)
4.	Farm Expenditure	9007.14 (26.04)	14072 (33.69)	39646.67 (49.98)	20909 (40.29)
5.	Family Expenditure	25571.43 (73.95)	27686.67 (66.30)	39673.33 (50.01)	30977 (59.70)
6.	Total Expenditure	34579 (100.00)	41759 (100.00)	79320 (100.00)	51886 (100.00)
7.	Other Loans To Be Repaid	2166.66	2500	10000	4888.88
8.	Risk Factor (10%)	4913.30	6640.30	13290	8281.20
9.	Loan From RRB	13720	25267	43067	27351
10.	Repaying Capacity	7480.04	15503.70	30290	17757.91
11.	Per Cent Repaying Capacity (%)	54.51	61.35	70.33	62.06

(Figures in parentheses indicate percentage to the total)

Table 4 Credit gap status of selected farmers (Fig. in Rs/annum)

Sr.No.	Particulars	Marginal (N=30)	Small (N=30)	Medium and above (N=30)	Overall (N=90)
1.	Borrowed amount	13878.57	26733.33	43066.67	27892.85
2.	Required amount	16964.29	33766.70	58000	36243.66
3.	Credit gap	3085.72	7033.37	14933.33	8350.80
4.	Per cent credit gap	18.18	20.82	25.74	23.04

DISPARITIES IN THE SHORT TERM AGRICULTURAL CREDIT FLOW BY THE DCCBS IN MAHARASHTRA

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ABSTRACT

The trend analysis of Theil's entropy coefficient and coefficient of variation showed that there was a significant decline in inequality in short-term agricultural credit flow in the Konkan region during the entire period. In Marathwada region, the coefficient of trend equation indicated a slight increase in inequality. The results of the Gini ratio and Lorenz curve showed increase in inequality in the average year (0.23) and subsequent reduction in inequality in the terminal year (0.21) in Vidarbha region. The reverse trend was noticed for the Marathwada region, where inequality showed a declining trend in the average year (0.11) and then increase in the terminal year (0.25). The declining rate of inter-regional inequality in respective years was observed in Western Maharashtra (0.30 to 0.22) and Konkan regions (0.38 to 0.20). It can be observed that the Gini ratio were 0.43, 0.45 and 0.40 for the base year, average year and terminal year, respectively, indicating moderate intra-regional inequality in short term credit flow by DCCBs in Maharashtra. The Lorenz curve for short term credit flow showed an increase in intra-regional inequality in the average year and subsequently reduction in inequality in the terminal year. The results of Gini ratio and Lorenz curve for short-term credit flow showed that there existed inter and intra regional inequality in the short-term agricultural credit flow by the DCCBs in Maharashtra, which needs to be minimized through appropriate corrective measures.

INTRODUCTION

The DCCBs in the Maharashtra had played a pivotal role in the development of agriculture by providing a regular flow of short term and medium term credit to the agriculturists through the PACS in rural areas. The sickness of DCCBs is mainly due to the low recovery and mounting overdues. A large number of DCCBs at present are far from being strong and self sustain business enterprises. Low resource base and consequent heavy dependence on higher tier and refinancing agencies, in adequate volume of business, poor recovery management with attendant afflictions such as increasing NPAs and recurrent loss of assets have been some of the factors contributing to their financial and operational weakness.

METHODOLOGY

The study is based on secondary data obtained from the annual reports of 30 DCCBs in Maharashtra for the period of past 29 years i.e. from 1985-86 to 2013-14.

METHOD OF ANALYSIS

i) Theils entropy

$$H(Yi) = \sum_{i=1}^{N} Yi \left[\frac{1}{(\log (Yi))} \right]$$

Where, H (Yi) = Theils entropy

Yi = Proportion of i^{th} district in the total credit flow from DCCBs in the State

H (Yi) has been modified and is given by

I (Yi) = log N - H (Yi)

Where, I (Yi) Theils entropy coefficient which ranges from 0 to log N

N = Number of districts

Taking I (Yi) as dependent variable, linear trend equation was fitted to examine the regionwise inequality I (Yi) = a + bt + u

ii) Gini concentration ratio

Gini concentration ratio was assessed to measure the inter region and intra-region inequality of short-term credit flow by the DCCBs as follows.

$$L = 1 - \frac{\sum_{i=1}^{N} (Pi - Pi\text{-}1)\ (Qi + Qi\text{-}1)}{10{,}000}$$

Where,

Pi = Cumulative percentage of number of DCCBs up to and including i^{th} class.

Qi = Cumulative percentage of credit flow per hectare of gross cropped area by DCCBs upto and including i^{th} class

N = Number of DCCBs.

Higher the value of Gini ratio (L), more is the inequality in distribution of credit and vice versa (0 < L < 1).

iii) Lorenz curve analysis

It is the graphical representation of cumulative proportion of number of DCCBs in Maharashtra on horizontal X-axis and cumulative proportion of agricultural credit flow on Y axis.

iV). Factors influencing inequality:

In order to study the factors influencing per hectare short-term credit flow by DCCBs, a multiple linear regression analysis was attempted s is given below

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + u$$

Where,

Y = Per hectare short term agricultural credit (Rs.)

X1 = Gross cropped area (lakh hectares)

X2 = Proportion of area under commercial crops to GCA (per cent)

X3 = Proportion of area under horticultural (fruit) crops to GCA (per cent)

X4 = Average rainfall (mm)
X5 =Total deposits (Rs. in crores)
X6 = Short term agricultural loan recovery (per cent)

RESULTS AND DISCUSSION

i) Trend equations of Theil's Entropy Coefficient

Western Maharashtra $I(Yi) = 0.80 - 0.0014^{NS}$
(0.0027)

Konkan $I(Yi) = 0.10 - 0.0041^{**}$
(0.0017)

Marathwada $I(Yi) = 0.35 + 0.0012^{NS}$
(0.0010)

Vidarbha $I(Yi) = 0.04 - 0.0006^{NS}$
(0.0013)

Maharashtra $I(Yi) = 0.16 - 0.0012^{NS}$
(0.0034)

** Significant at - 5 per cent level and NS = Non significant
(Figures in the parentheses are the standard errors of respective coefficients)

The analysis of Theil's entropy coefficient showed that the regression coefficients of trend equations were negative and non-significant in the case of Western Maharashtra, Vidarbha and at the State level, which indicated a non-significant decline in inequality. There was a significant decline in inequality of short-term credit flow in the DCCBs of Konkan region during the period under study. In Marathwada region, the coefficient of trend equation indicated a non-significant increase in inequality of short-term credit flow.

ii) Gini concentration ratio and Lorenz curve analysis

The results of the Gini ratio (Table 1) and Lorenz curve (Fig, 1) showed increase in inequality in the average year and subsequent reduction in inequality in the terminal year in Vidarbha region. The reverse trend was noticed for the Marathwada region, where inequality showed a declining trend in the average year and then increase in the terminal year. The declining rate of inter-regional inequality in respective years was observed in Western Maharashtra and Konkan regions. The inequality at the State level showed an increase in the average year and subsequently got reduced in the terminal year. It can be observed that the Gini ratio were 0.43, 0.45 and 0.40 for the base year, average year and terminal year, respectively, indicating moderate intra-regional inequality in short term credit flow by DCCBs in Maharashtra. The Lorenz curve (Fig. 2) for short term credit flow showed an increase in intra-regional inequality in the average year and subsequently reduction in inequality in the terminal year.

Table 1 Gini coefficient ratio in short term credit flow by DCCBs in Maharashtra

Year	Western Maharashtra	Konkan	Marathwada	Vidarbha	Maharashtra
Base Year (1985-86)	0.30	0.38	0.24	0.19	0.43
Av. Year (2000-01)	0.25	0.28	0.11	0.23	0.45
Terminal Year (2013-14)	0.22	0.20	0.25	0.21	0.40

iii) Factors influencing inequality:

It can be observed that at the state level, the per hectare short term credit flow was significantly influenced by the factors like gross cropped area (X_1), area under commercial crops (X_2), average rainfall (X_4) and deposits (X_5). The results of multiple regression analysis showed a positive influence on short-term credit flow by all these variables except area under horticultural crops (X_3), which was positive but non-significant. The R^2 indicates that the six independent variables have jointly explained 85 per cent of the variation in the disbursement of ST credit in Maharashtra

CONCLUSIONS

The trend analysis of Theil's entropy and coefficient of variation showed that there was a significant decline in inequality in short-term credit flow in the Konkan region during the entire period. In Marathwada region, results of Gini ratio and Lorenz curve for short-term credit flow showed that there existed inter and intra regional inequality in the short-term credit flow by the DCCBs in Maharashtra, which needs to be minimized through appropriate corrective measures. It looks that the GCA, average rainfall and deposits with the DCCBs are the most important factors influencing the regional inequality in the disbursement of per hectare ST credit in Maharashtra State as a whole. Study suggests that the official machinery of DCCBs should make efforts to minimize the inequality in disbursement of short-term loans.

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DECOMPOSITION ANALYSIS AND ACREAGE RESPONSE OF TUR

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ABSTRACT

In this study an attempt had been made to study the growth and instability of tur in Amravati division. The study was based on secondary data on area, production and productivity of tur, FHP and Rainfall, collected from the various Government publications. The study revealed that compound growth rates for area and production of tur was recorded positive for all district and Amravati division. The coefficient of variation and coppock's instability index with regards to area (2.92 and 1.58) productivity (2.84 and 2.88) were lowest in Amravati and Buldhana district respectively, whereas production was recorded highest coefficient of variation and coppock's instability index in Akola district (37.72 and 33.44). In the coefficient of price risk, it shows impact to increase the area of tur under studied district i.e., farmers were price conscious in their area allocation decision. The study also reveals that, the long run price elasticity were comparatively higher than the short run price elasticity in tur, which indicated that the farmers were relatively market oriented in their decision in long run than in the short run.

(Key words: Acreage, Decomposition, Growth rate, Instability, Tur)

INTRODUCTION

Agriculture in India continue to hold the important place in Indian economy, where about 50 per cent of population leaving in rural area out of which 60 per cent of total population depends on agriculture. Agriculture sector employees around 50 per cent of labour force on total of 163 million hectare out of 328.7 m/ha of land. It contributes about 40 per cent to the national income and its developments. Therefore, is indispensable to feed the increasing demand of vast population. In a developing economy like ours, growth leads to the building up of pressures on agriculture on account of the rising demand for agricultural products. This process is accelerated by the rapid growth of population accompanied by rising levels of income. Does supply of agricultural products respond to rising demand for them. This question becomes critical and assumes central importance and hence calls for the efficient utilization of resources.

The question regarding growth of supply has two aspects, both are equally important. The more widely known and understood aspect refers to the growth of agricultural products. This is a major problem covering finding resources for agriculture to produce larger output and improving the institutional frame leading to a shift of the supply function. The second and equally important aspect deals with the shape of the supply curve or response of the supply of agricultural products to changing level of prices.

The supply response of crop or acreage response of agricultural crop is one of the important procedure tools predicting crop production. Agriculture is the most important sector in the economy of nation. In India during the last two decades increase in population has been more pronounced then increase in agricultural production, creating a lag in the availability and requirement of food crop. Thus to feed and cloth the teaming

millions of India, the pace of agricultural production has been increased for proper planning and policy formulating.It is a matter of paramount importance of study the behaviour of farmer's attitude towards area allocation to different crops. Thus, the function of functional changes in per acre production of its agricultural crop with respect to the change of its market price is known as the crop acreage response.

MATERIALS AND METHOD

Selection of crops:

For the present study, major crop of Amravati division i.e., tur, was selected purposively.

Selection of period:

For the growth rate and decomposition analysis, the period was divided into breakup of 10 years and overall as shown in below:

Period I - 1982-83 to 1991-92.

Period II - 1992-93 to 2001-2002.

Period III - 2002-2003 to 2011-12.

Over all period - 1982-83 to 2011-12.

Nature and source of data: Data used for present study were collected from various Governments and published source.The time series secondary data on area, production and productivity of cotton were obtained from various Governments published sources.

Analysis technique employed for analysing the data:

The present study was based on time series secondary data of tur in Amravati division.

Decomposition analysis

To measure the relative contribution of area and yield to the total output change for the cotton, Minhas (1964), the decomposition analysis model as given below was used. The method state that if A_0, P_0 and Y_0 respectively area, production and productivity in base year and A_n, P_n and Y_n are values of the respective variable in n^{th} year item.

$$Po = Ao \times Yo \text{ and}$$

$$Pn = A_n \times Y_n \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

Ao and A_n represent the area and Yo and Y_n represents the yield in the base year and n^{th} year respectively.

$$P_n - Po = \Delta P,$$

$$A_n - Ao = \Delta P$$

$$Y_n - Yo = \Delta Y \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

From equation (1) and (2) we can write

$$Po + \Delta P = (Ao = \Delta A)(Yo + \Delta Y)$$

Hence,

$$P = \frac{A_0 \Delta Y}{\Delta P} \times 100 + \frac{Y_0 \Delta A}{\Delta P} \times 100 + \frac{\Delta Y \Delta A}{\Delta P} \times 100$$

Production = Yield effect + area effect + interaction effect

Thus, the total change in production can be decomposed into three components viz. yield effect, area effect and the interaction effect due to change in yield and area.

Acreage response analysis:

The model which generally used in supply response analysis based on time series data will be adaptive expectations (or distributed lag) model. In the present study the Nerlovian lagged adjustment model (1958) was used. The acreage response means the change in acreage with the unit change in the variables affecting on during the period of study.

The model used in the present study is as follows.

$$At = a + b_1 A_{t-1} + b_2 FHP_{t-1} + b_3 Y_{t-1} + b_4 W_t + b_5 Y_R + b_6 P_R$$

Short run and long run elasticity:

The elasticity of variables show that the influence of unit change in variable on acreage decisions of crops. In the present study, variable elasticity were estimated for short run as well as for long run period.

Moreover, the short run and long run elasticity have been estimated as –

$$\text{Short run elasticity (SRE)} = \text{Regression coefficient of price} \times \frac{\text{Mean of price}}{\text{Mean of area}}$$

$$\text{Long run elasticity (LRE)} = \frac{\text{SRE}}{\text{Coefficient of area adjustment (r)}}$$

Where,

$r = 1 – (\text{coefficient of lagged area})$

RESULTS AND DISCUSSION

The results obtained from the present investigation have been presented in the following sub heads:

Decomposition analysis of Tur

The decomposition of tur production in area, yield and interaction effect presented in Table 1 and results demonstrate that per cent contribution of area, yield and their interaction for increasing production of tur in Western Vidarbha (i.e. Amravati division) and overall also.

During period I, the result yield effect not influence by area effect. Area effect of Akola, Buldhana and whole Amravati division is negative except Amravati and Yavatmal district which recorded area effect 117.91 and 168.8 per cent respectively.

Similarly yield effect was also recorded negative in Amravati, Buldhana and in whole Amravati division except Akola and Buldhana which recorded yield effect i.e., 476.48 and 487.53 per cent respectively. Interaction effect was negative for all the districts except Akola which shows interaction effect of 461.93 per cent. Akola district showed all the effect nearer to be proportional and in other area effect has played a driving force in the differential production of Tur in Amravati Division during I period.

Table 1: Per cent contribution of area, yield and their interaction for increasing production of Tur

Period	Particulars	Amravati	Akola	Buldhana	Yavatmal	Amravati Division
Period I	Area Effect	117.91	-838.40	-210.84	168.8	-190
	Yield Effect	-217.05	476.48	487.53	-882.4	-33.86
	Interaction Effect	-800.90	461.93	-176.69	-707.4	-305.54
Period II	Area Effect	24.19	-17.90	108.50	64.07	44.71
	Yield Effect	111.95	106.70	-15.53	125.64	82.19
	Interaction Effect	12.25	11.21	7.05	38.43	17.23
Period III	Area Effect	22.81	207.04	111.1	5.08	86.50
	Yield Effect	-144.91	-137.63	-9.22	95.38	-49.09
	Interaction Effect	14.98	30.46	-1.88	-0.638	10.73
Overall Period	Area Effect	268.57	426	15.26	135.81	211.41
	Yield Effect	-28.69	-186.74	68.75	-14.15	-40.20
	Interaction Effect	-133.46	-139.22	15.96	-21.67	-69.59

In the contrary during period II, it was noticed that yield effect has got domination over the area effect. In Amravati Division as a whole area effect was found only 44.71 per cent whereas yield effect was 82.19 per cent and interaction effect was 17.23 per cent. Lowest area effect was found in the Akola district i.e.-17.90 per cent and highest yield effect was also found in Amravati district with 111.95 per cent. In all the districts yield effect has got higher record i.e. more than 60 per cent except Buldhana district. It is also recorded in this period that interaction effect is positive in all the districts and in whole over Amravati division too.

Period III was also recorded as like the period II but area effect has been shown increased somehow. In whole Amravati Division area effect, yield effect and interaction effect was recorded 86.50 per cent, - 49.09 per cent and 10.73 per cent respectively. Highest area effect was shown in Akola district i.e. 207.04 and negative interaction effect was also in Buldhana and Yavatmal district i.e. -1.88 and - 0.63 per cent respectively. In all four district yield effect was recorded negative except Yavatmal district which shows the yield effect i.e. 95.38 per cent. Positive interaction effect was recorded in all district with whole Amravati division except Buldhana and Yavatmal district. So we can conclude that in this period yield effect was not increase with respect to area effect.

During overall period, area effect was found positive with highest area effect in Amravati district i.e. 268.57.Negative yield effect was recorded in all district with whole Amravati division except Buldhana district which shows yield effect i.e. 68.75. Similarly interaction effect was also recorded negative with whole Amravati division except Buldhana district which shows 15.96 per cent interaction effect.

Acerage response of Tur

The regression coefficient of these explanatory variables are presented in Table 2 revealed that the lagged area was found to be positively influential factors in the farmer's decision regarding area allocation to Tur and found significant at 10 per cent level of significance in Amravati, Akola and Yavatmal districts of Amravati division which indicated lesser rigidity in the adjustment of area under Tur.

The coefficient of farm harvest price were very less i.e. -1.06, - 0.38, - 0.05 and -1.93 in Amravati, Akola, Buldhana and Yavatmal districts respectively. It was insignificant and recorded negative in all district with whole Amravati division .It implied that prices had not shown any impact in the increase on area of Tur in the study period. One year lagged yield was also included in the function but the coefficient turned out to be negative and non significant which implies that one year lagged yield had no impact or vey less impact to area allocation of Tur in all the districts of western Vidarbha zone of Maharashtra.

The annual rainfall was employed as a proxy for combating the weather influence on the Tur hectare age allocation decisions. The coefficient of annual rainfall variable showed negative relationship for Amravati, Akola and Buldhana districts and positive relations to Yavatmal district and statistically insignificant in all the districts which showed annual rainfall favourably didn't influence the area allocation decision of the farmers except Akola district it produced the positive relationships.

The yield risk variable was incorporated in the model to gauge the impact of risk over the variation in the hectare age under Tur. The coefficient of variable had a negative and statistically insignificant response in all the districts of Amravati division which shows farmers are relatively less risk bearers.

It was also recorded that regression coefficient of price risk variable or factors were positive in all the districts. In all districts cases, it indicate that farmers were relatively better risk bearers and are statistically significant in Amravati, Akola and Yavatmal districts.

Table 2: Estimated coefficient for acreage response function of Tur

Particulars	Variables	Coefficients				
		Amravati	**Akola**	**Buldhana**	**Yavatmal**	**Amravati Division**
	Intercepts	594.89	110.51	481.98	814.52	264.52
One year lagged	A_{t-1}	1.75*	1.26*	0.54	2.61*	1.29
One year lagged farm harvest price	FHP_{t-1}	-1.06	-0.38	-0.05	-1.93	-0.42
One year lagged yield	Y_{t-1}	-0.12	0.22	0.73	0.12	0.14
Annual rainfall	w_t	-0.19	-0.53	-0.10	0.74	-0.11
Yield risk	Y_r	-4.81	-1.64	-2.19	-9.09	-20.06
Price risk	P_r	0.23*	0.05**	0.53	0.43*	0.79
Coefficient of determination	R^2	0.75	0.69	0.46	0.89	0.73

(Note: ***,** & * denotes significances at 1%,5% & 10% level of significances)

The value of $R^{2,}$ the coefficient of multiple determinations ranged from 0.75 to 0.73 for all the districts of Amravati Division. 0.75 was found in Amravati districts and it was 0.69, 0.46, and 0.89 found in Akola, Buldhana and Yavatmal district respectively which indicates that variables included in the model explained most of the variations in area under Tur in the study period.

Short run and long run elasticity

The price elasticity show the influence of unit change in price on acreage allocation of the crop. In the present study price elasticity were estimated for short run as well as for long run period.

District wise price elasticity of Tur

The short run price elasticity for different districts are 0.21, 0.58, -0.18 and 0.15 for Amravati, Akola, Buldhana and Yavatmal districts respectively. The highest short run price elasticity was found in the Akola district and negative price elasticity was found in the Buldhana district i.e. -0.18 which is fairly highest and is called for further investigation.

The long run elasticity for Amravati, Akola, Buldhana and Yavatmal districts are 0.45, 0.36,-0.64 and 0.39 respectively. Buldhana districts again reveal negative price responsiveness for long run as well. It is also recorded from the table that long run price elasticity are comparatively higher than the short run price elasticity indicated that the farmers were relatively market oriented in their decisions in the long run than in the short run in respect to the Tur in the western Vidarbha region of the Maharashtra.

Table 3: District wise Price Elasticity of Tur

Sr. No	Name of Districts	SRE	LRE
1	Amravati	0.21	0.45
2	Akola	0.58	0.36
3	Buldhana	-0.18	-0.64
4	Yavatmal	0.15	0.39

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SEASONALITY IN ARRIVALS AND PRICES OF MANGO IN LUCKNOW MARKET OF UTTAR PRADESH

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ABSTRACT

Mango is one of the most important high value commodities among the all fruit crops in India accounting highest production in the world and being a perishable commodity with specialty of alternate bearing, the marketing and pricing related problems are of major concern. Particularly, the high price fluctuations and lack of market infrastructure by observing the volatile nature of arrivals in the markets. Therefore, it is necessary to observe the trend of prices and arrivals to maintain the demand and supply of mango in future by reducing fluctuations in prices. The present study conducted to observe the pattern of prices and their correlation with the arrivals in the major market of Uttar Pradesh as the state ranks first in production of mango. Twenty one year data for Lucknow market was collected from APMC, Lucknow. Seasonal indices were calculated for price and arrivals of mango and trend analysis was done through the different equational forms. It was found from the study that the demand for high value commodity is always increasing and due to seasonality of the products, the prices are always fluctuating and trends of prices and arrivals estimated that prices are low during season periods with high quantities of arrival and vice versa in case of off season. The correlation coefficient between price and arrivals were found to be statistically non-significant in all the years of the study period.

(Key words: Mango prices, Seasonal indices, Trend, Growth)

INTRODUCTION

Present trend and the long term forecasting on the basis of previous data, helps in deciding the marketing practices and strategies to check the high fluctuation in prices. Indian agriculture is characterized by small land holding, less developed market infrastructure (Singh *et al*., 2004). Due to lack of cold storage facilities perishable commodities are prone to post harvest losses and growers miss the opportunity to sell them during high off season prices. The present study conducted to observe the pattern of prices and their correlation with the arrivals in the major market of Uttar Pradesh.

METHODOLOGY

Lucknow being one of the major mango markets on the basis of arrivals, was selected purposively. Data was collected from APMC Lucknow and AGMARKNET for 21 years (1993-2014). Being seasonal in nature only six months data were available, hence the six month data was taken as continuous basis for analysis. A seasonal index of price and arrivals of mango was worked out separately with ratio to moving average method as suggested by William *et al.* (1998).

Trend analysis was done through the different equational forms like, cubic, quadratic, exponential, linear, logarithmic and inverse depending upon the behavior of data were used.

Growth rate:

The annual trend in the arrivals and prices were worked out by measuring the growth in arrivals and prices of commodities. **(**Mane *et. al.*, 2011)

The trend equation tried was

Y = a + bt

Where, Y = Monthly arrivals / price, t = Time period

LGR was worked out using the equation,

Where, b = Regression coefficient, $\bar{x}$ = Arithmetic mean

In order to examine the nature of relationship between market arrivals and prices the following models were used in linear form. (Sharma Ravinder, 2011).

$P_t = f(P_{t-1})$

$A_t = f(A_{t-1})$

$P_t = f(P_{t-1}, A_t)$

Where, P_t = current price, P_{t-1} = lagged price, A_t = current arrivals and A_{t-1} = lagged arrivals of Mango in selected market

Correlation between price and arrival was examined with the help of Karl Pearson correlation coefficient.

Results and Discussion

The price of mango shows fluctuating trend not only year to year but also month to month within the same year. During off season, the prices are generally high and it falls suddenly after the post harvest period during which the arrival of mango is more in the market. These type of fluctuations in prices and arrivals are mainly depends on the production cycle of the fruit (Lahiri, 1990). The seasonal indices of price and arrival of mango in Lucknow market is presented below in table1.

Table.1: Seasonal indices of price and arrivals of mango in Lucknow market, 1993-94 to 2014-15

Sr. No.	Month	Price Seasonal Index	Arrivals Seasonal Index
1	**March**	129.52	0.31
2	**April**	113.28	3.50
3	**May**	91.77	47.04
4	**June**	90.89	443.69
5	**July**	85.40	95.66
6	**August**	89.12	9.78
	S.D.	17.49	172.24
	Mean	100	100
	C.V. (%)	17.49	172.24

Source: Calculated by authors from secondary data.

It is discernible from table 1 that seasonal indices of price vary from 85.40 to 129.52 and that of arrival from 0.31 to 443.69 from the month of March to August. It was observed that prices in the month of March (starting season) were comparatively higher than other months. A decreasing trend of price indices can be observed up to the month of July and it was slightly increasing in the month of August. The peak season of the mango has been characterized by low seasonal indices (Godara and Bhonde, 2006) which can be observed during the month of June and July. The coefficient of variation was estimated to be 17.49 which indicated variability among the seasonal indices of prices.

The arrival indices of mango showed increasing trend throughout the season. Arrival of mango in the market starts from the month of March to August. Low indices were observed during the start and end of the season i.e. month of March and August. Indices were highest during the month of June and July In the starting period of peak season (Balamurugan and Ramanathan, 2008) the arrivals start with very slow rate but increases continuously throughout the season. A very high variability among the seasonal indices of arrival has been explained by the co efficient of variation which was found to be 172.24

It appears that when the seasonal index of arrivals of mango was more during the period of May to July, the seasonal index of prices was somewhat low as compare to other months (Khunt *et al.*, 2006). On the other side when the seasonal index of arrivals of mango was low, the price index of mango was at the high level.

Trend in prices and arrivals of Mango

Trend refers to increasing or decreasing pattern either in linear or non linear form in long turn. It results due to the change in long run factors e. g. technological factors. The trend values obtained by fitting different trend equations for mango prices which are presented in Table 2. The R square values were found to be low in all form of trend equations though it was found significant. Only in quadratic equation trend was found non-significant.

Table 2: Trend values of Prices of mango in Lucknow market, 1993 to 2014

Sr. No.	Model	Intercept (a)	Trend value (b)	't' Value	'R' Square	Significance	Growth rate
1	Linear	387.04	8.08*	12.40	0.54	0.000	0.87
2	Quadratic	439.47	5.73*	2.18	0.54	0.031	0.61
			0.018^{NS}	0.92	0.54	0.358	
3	Compound	442.35	1.01*	1.41	0.58	0.000	0.11
4	Growth	6.09	0.01*	13.46	0.58	0.000	0.00108
5	Logarithmic	- 235.80	296.86*	10.14	0.44	0.000	32.11
6	Cubic	291.39	18.84*	2.883	0.56	0.005	2.04
			- 0.228*	- 1.999	0.56	0.048	
			0.001*	2.184	0.56	0.031	
7	Exponential	442.35	0.01*	13.46	0.58	0.000	0.00108
8	Power	176.66	0.397*	14.31	0.61	0.000	0.043
9	Inverse	986.87	- 1509.06*	- 4.58	0.14	0.000	- 163.25
10	Logistic	0.002	0.991*	1.41	0.58	0.000	0.11

NS- Non significant, * Significant at 5% level of significance

For identifying the changes observed due to change in actual prices on future prices, the slopes of various trend equations were fitted for Lucknow market prices of mango. From the above table it was observed that trend values for most of the fitted equations was found to be highly significant. It was non significant only in case of quadratic equation. Highest R square was found in power function which indicated that 61 variations in dependent variable were explained by independent variable (Naik *et al.*, 1990) i.e. time period. Logarithmic function resulted a highest growth rate of 32.11 per cent and followed by cubic function having 2.04 per cent growth rate over a time period. Trend value in cubic form of function was found 18.84, indicates that one unit change in time will have impact on market price by 18.84 unit. Highest trend value (296.86) obtained by using logarithmic form among all these equations which indicated the rupees change will occur in future prices due to unit change in the actual prices (Kumar *et al.*, 2009). Also growth rate found to be highest i.e. 18.89 per cent.

Table 3: Trend values of arrivals of mango in Varanasi market, 1993 to 2014

Sr. No.	Model	Intercept (a)	Trend value (b)	't' Value	'R' Square	Significance	Growth rate
1	Linear	63751.05	540.36^{NS}	1.29	0.013	0.200	0.54
2	Quadratic	58891.29	757.95^{NS}	0.446	0.013	0.656	0.76
			- 1.64^{NS}	- 0.132	0.013	0.895	
3	Compound	5424.93	1.007*	148.84	0.008	0.000	0.001
4	Growth	8.599	0.007^{NS}	1.024	0.008	0.308	0.00001
5	Logarithmic	6777.721	23771.94^{NS}	1.393	0.015	0.166	23.85
6	Cubic	12446.69	4871.04^{NS}	1.136	0.021	0.256	4.88
			- 78.66^{NS}	- 1.052	0.021	0.295	
			0.386^{NS}	1.045	0.021	0.298	
7	Exponential	5424.93	0.007^{NS}	1.024	0.008	0.308	0.00001
8	Power	1454.47	0.454**	1.671	0.021	0.097	0.00046
9	Inverse	106385.403	-161881.8^{NS}	- 1.044	0.008	0.298	-162.39
10	Logistic	0.000	0.993*	148.84	0.008	0.000	0.001

NS- Non significant, * and ** Significant at 5% and 10% level of significance respectively,

The trend values obtained for mango arrivals were presented in Table 3. The R square values were found very low (Singh *et al.,* 1995) than the price trend equations and most of them are non significant. It indicates that the variation in arrivals in the market were more dependent on the other factors rather than its production in a particular season. The slope was found to be significant only in case of compound and power functions. The

growth rate was found to be highest in logarithmic function followed by cubic function i.e. 23.85 per cent and 4.88 per cent respectively.

Relationship between price and arrivals of mango in Lucknow market:

Three models were used to analyze the data. The models were price with lagged price, current arrivals with lagged arrivals and current price with lagged price as well as current arrivals. From table 4 it can be observed that 75 per cent variation in the current price was explained by lagged price. In case of arrival R square was only 0.69 and coefficient was non significant which showed that current arrival was not influenced by lagged arrivals. It is revealed that when one unit change in lagged price and current arrivals were taken into account, the value of R square was found to be 0.76. It explained that 76 per cent variation in the current price was explained by lagged price and current arrival. However, only the coefficient of current arrivals with respect to current prices was found non significant (Babu and Sebastian, 1996) and all the other coefficient was found to be significant. Therefore, it may be concluded that lagged price has more significant impact on the current price of mango and current arrival has no any significant impact on current prices.

Table 4: Relationship between price and arrivals of mango in Lucknow market

Model	Constant	Coefficient			'R' Square
		Lagged price	Lagged arrivals	Current arrivals	
$P_t = f(P_{t-1})$	148.35	0.89*	--	--	0.75
$A_t = f(A_{t-1})$	18702.20	--	0.85*	--	0.69
$P_t = f(P_{t-1}, A_t)$	169.40	0.89*	--	0.000^{NS}	0.76

NS- Non significant, * Significant at 5% level of significance,
Source: Calculated by author from secondary data

Most of the agricultural commodities shows inverse relationship between arrivals and prices of the commodity. The factors like the availability of cold storage facilities, opportunities for export and import, value-addition through agro processing, etc. not only weaken this negative relationship (Kumar *et al.*, 2006), but also in many cases, it may turn positive. The relationship for different years from 1993 to 2014 was studied by computing correlation coefficients between market arrivals and prices of mango in Lucknow market. The results are given in Table 5.

Table 5: Coefficient of correlation between price and arrivals of mango in Lucknow market

Years	Correlation coefficient	Significance
1993	0.386^{NS}	0.450
1994	0.450^{NS}	0.371
1995	- 0.406^{NS}	0.424
1996	- 0.233^{NS}	0.657
1997	- 0.469^{NS}	0.348
1998	0.479^{NS}	0.337
1999	- 0.360^{NS}	0.483
2000	- 0.601^{NS}	0.207
2001	- 0.420^{NS}	0.407
2002	0.141^{NS}	0.790
2003	- 0.346^{NS}	0.501
2004	0.076^{NS}	0.886
2005	- 0.467^{NS}	0.351
2006	- 0.285^{NS}	0.584
2007	- 0.360^{NS}	0.483
2008	- 0.354^{NS}	0.491
2009	- 0.389^{NS}	0.446
2010	- 0.583^{NS}	0.224
2011	- 0.350^{NS}	0.496
2012	- 0.366^{NS}	0.476
2013	- 0.373^{NS}	0.466
2014	- 0.557^{NS}	0.251
1993-2014	**- 0.122**^{NS}	**0.162**

NS: Non Significant

Source: Calculated by author from secondary data

It is evident from the table 5 that in Lucknow market correlation coefficient was found to be negative (Prakash and Shrivastava, 1996) for seventeen years out of total twenty two years. It were statistically found to be non significant for all the years due to multiplicity of factors. Overall it was observed that it was non-significant and negatively correlated (Agarwal and Om, 1990) over a period from 1993 to 2014. The value of coefficient for overall period was – 0.122.

CONCLUSION

The demand for high value commodity is always increasing and due to seasonality of the products the prices are always fluctuating. Lack of sufficient cold storage facilities in India makes the supply of the products very low during off seasons and deprives farmers to get good prices. From the study of trends of prices and arrivals it was estimated that prices are low during season periods with high quantities of arrival and vice versa in case of off

season. Probability of change in future prices can also be observed from the trend equations. There are other factors which are also responsible for fluctuation of prices and arrivals. Proper storage facilities and regulated markets will help farmers to obtain good prices throughout the year meeting the demand and supply of the product and price volatility can be reduced.

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DETERMINANTS OF CROP LOAN DEFAULT

V.A.Thorat[1], J.S. Dhekale[2], S.B. Damare[3]

INTRODUCTION

Despite the crucial role of credit in agricultural production and development, farmers still have limited access to farm credit. Awoke (2004), noted that its acquisition and repayment are fraught with a number of problems especially in the small holder farming. Most of the defaults arose from poor management procedures, loan diversion and unwillingness to repay loans. Various researchers have put forward the benefits, problems, access and role of credit for increased productivity. But prompt repayment of credit is necessary for good credit worthiness. Inability of borrowers to repay amount of loans collected is crucial for the long-term sustenance of the credit institutions. As a result, many studies have tried to examine loan repayment performance of many socioeconomic groups. A number of empirical studies revealed income, sex, farm size, age of farmers, years of farming experience with credit, size of loan, household size, timeliness of loan disbursement, level of education of farmers, sales of crops, degree of diversification, income transfer and the quality of information as significant determinants of agricultural credit repayment and have also contributed positively to the credit worthiness of farmers. Although some had a negative influence on repayment.

Considering the socioeconomic and environmental peculiarities in Thane district it is therefore felt necessary to carryout thorough investigation of the determinants of loan repayment because of its importance to policy makers and the lending institutions. Hence, the major concern of this study in supplementing previous research and bridging the knowledge gap is to ascertain the major socio-economic and organizational factors that affect loan repayment capacity of cooperative farmers. This study is driven by these quests. The main objective of this study is to ascertain the determinant's of credit repayment among cooperative farmers in Palghar tahsil of Thane district.

METHODOLOGY

The present study is carried out in area of Palghar tahsil from Thane district, of Maharashtra state. The sampling technique followed for collection of data for the present study was multi stage random sampling technique with co-operatives as a primary unit and me as a secondary unit.

Selection of Village

Palghar tahsil of Thane district was selected purposively as a study area. The list of total number of villages having Agricultural Co-operatives Credit Societies in the tahsil was obtained from respective tahsil office. Six villages having Agriculture Co-operative Credit Society were selected randomly and 45 defaulters and 45 non defaulters from selected villages

ANALYSIS OF DATA

Logistic Regression Model

Logistic regression model was used to identify the factor responsible for loan default. The logit distribution function for non-defaulter is specified as:

$$P_1 = \frac{1}{1 + e^{-zi}}$$

Where,

P_1 is the probability of non-defaulter.

Z_1 is a function of n-explanatory variables (x) and expressed as:

$Z_1 = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots\ldots\ldots\ldots\ldots + \beta_n X_n$

Where,

β_0 is the intercept

$\beta_1, \beta_2, \ldots\ldots B_n$ are coefficients of the independent variables in the model.

P_i is not only non-linear in X but also in the β_i s, which can be written as:

$$P_i = \frac{1}{1 + e^{-(\beta 0+\beta 1 Xi1+\beta 2 Xi2+\ldots\ldots\ldots+ \beta n Xn)}}$$

Repaying Capacity

An appraisal of Table 1 revealed that the repayment capacity worked out to Rs. 14574.51 and total amount of loan payable to about Rs.26993.29. whereas, amount of overdue turned out Rs. 16777.73.

Table No. 1 Repaying capacity of defaluters.

Sr. no.	Particulars	Amount
1.	Income from farm	22742.33
2.	Off farm Income	23380.00
3.	Total income	46122.33
4.	Family expenditure	15040.67
5.	Operating expenses	16507.16
6.	Total expenditure	31547.82
7.	Repayment capacity	14574.51
8.	Total amount of loan taken	26993.29
9.	Amount paid	10215.56
10.	Overall overdue	10777.73

The actual amount of loan repaid rs.10215.56 which falls shorts of actual repayment capacity of the borrower. This implies that some of the borrowers where willful defaulters.

Table no 2 willful and non-willful defaulters.

Total no of defaulters	Willful defaulters	Non-willful defaulters
45	14	31
Percentage	31.11	68.89

The defaulters having enough income is not repaying the loan deliberately is treated as willful defaulters. Non willful defaulters on the other hand, are those, who have no surplus income to repay the loan. Table 2 owed that out of 45 defaulters 14 (31.11 per cent) are willful defaulters is and 31 (68.89 per cent) are non-willful defaulters. This warrants that the financing institutions should make all efforts to raise the repaying capacity of the borrowers to decrease the loan overdue. This could be achieved by adopting measures like supervised credit by the financing institution.

Parameters of estimates of the logistic regression model

Logit regression model was to ascertain determinants of borrower being non-defaulter. The dependent variable (non-defaulter or defaulter) taken the value of 1 or 0. Initially fourteen explanatory variables were included in the model. However, only six explanatory variables were turned out to be significant. The multicolinearty was tested by variable inflection factor (VIP) which revealed that there was no strong association among the explanatory variable. The result of logistic regression model is summarized in Table 6.
The goodness of fit of the model was 70.16 per cent and the log likelihood ratio was 55.54. The Nagelkerke R^2 was observed lo be 0.72, which indicates the number of sample observation correctly predicted by the model.

The coefficients would reflect the impact of the explanatory variables on the likelihood of the respondent being non-defaulter. A positive coefficient increases the

probability of being non-defaulter, whereas negative values decreases the predicted probability of being non-defaulter because original coefficients are expressed in terms of logit values where, value of 0.0 equates to an odds value of 1.0 and probability of 0.50. Thus, negative numbers relate to odds less than 1 0 and probabilities less than 0.50. (Joseph.F. Hair, *et al.* 2009).

Table No 3 parameter estimated by logistic regression model

Variable	**B**	**Wald statistic**	**Significance level**	**Exp. (β)**	**Odds ratio**	**Probability** (%)
Working members	1.4658	3,6281	0.0568[H!]	4.3309	4.331	81
Non working members	-1.7192	8.7516	0.0031***	0.1792	0.179	15
Consumption Expenditure	-0.0002	7.6392	0.0057***	0.9998	0.998	44
Use of loan for unproductive purpose	-0.0003	13.5789	0.0002***	0.9997	0.999	49
Proportion of overdues to total loan	-5.7593	7.7325	0.0054***	0.0032	0.00315	0.3
Proportion of overdues to total income	-6.7949	3.3178	0.0685*	0.0011	0.00112	0.1
Constant	11.5804	15.9474	0.0001***			

-2log likelihood: 55.538 Goodness of fit: 70.158
Cox and smell R^2: 0.537 Nagelkerke R^2 : 0.715

(*, ** and *** indicates at 1 per cent, 5 per cent and 10 per cent probability levels respectively)

CONCLUSION

The result of logit regression model revealed that the variables working members , non-working members, consumption expenditure, use of loan for unproductive purpose, proportion of overdue to total loan and proportion of overdue to total income has significant influence on probability of being non defaulter.

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VALUE CHAIN ANALYSIS OF SUGARCANE JAGGERY IN KOLHAPUR DISTRICT OF MAHARASHTRA

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ABSTRACT

In India,Maharashtra stands second highest in production of sugarcane followed by Uttar Pradesh. As regards Maharashtra, about 0.96 million hectares of area with production of 57.04 million tons with productivity of 74 tonnes per hectare(2010-2011). Out of total production sugar in Maharashtra, Kolhapur region stands second highest contributing 14.98 percent and the sugar recovery is a bout 12.51 percent (2011-12). In these study estimate the costs and returns of jaggery production. And to estimate the value addition to Jaggery.

The data was collected for the year 2011-12 . the highest jaggery producing area karveer district was purposively selected in which two tahsils panhala and karveer were selected randomly. Two villages were selected randomly from each tahsils on the basis of maximum number of units. From each village eight jagrrery producers were selected randomely. Total 16 jaggery units studied and made conculsion by using different statically tools. The per unit total investment was needed for the establishment at Rs.808509 jaggery processing units.

The per unit cost were estimated to Rs.3240745.98 for jaggery processing unit. The total cost of labour required for jaggery processing unit was Rs 580120.63 for 578.27 mandays respectively. The unskilled labour costs for operation like sugarcane cutting Rs180511.88. The labour cost on account of transportation of sugarcane from field

to jaggery processing unit was Rs 106023.13, for cane crushing Rs72601.88, heating of juice Rs42039.06, transportation of residue Rs 37497.19 respectively.

The second component of skilled labour i.e. Adkari. The cost on *Adkar* was found less (Rs 98935).The most valuable factor in resource use structure was raw material or sugarcane which accounted for Rs2529437.50; also the share of fuel and electricity supply was 0.67 percent in total cost of production of jaggery. It i s also seen from table that very less amount of cost on account of material used was found (Rs108031.41). The total variable cost incase of jaggery production worked out to be Rs 679483.24 processing units. In the cost of Sugarcane was the (Rs.2529437.50) 77.77 percent jaggery processing units respectively. Labour, fuel and electricity charges were the other important items of cost accounting for17.84 percent and 0.66 percent respectively. The contribution of total fixed cost, in the total cost Rs.11571. was very major when it is compared with the variable cost. The percentage of fixed cost to the total cost was 0.36 percent to the Jaggery producers.The main component of fixed cost was land depreciation and interest on fixed capital.Where as raw material,labour cost and electricity charges incase of variable cost of jaggery production is the major items .

It was clear from the table that gross returns from Rs200873.01.TheB:C ratio for in case of jaggery production,gross returns were obtained Rs3774770.29 and net returns to Rs 522452.44.The estimated B:Cratio was 1.16. It can be revealed that per quintal cost of jaggery production was Rs 2834.31. Sugarcane cost and labour cost were the major items of total cost, contributing 77.77 percent and 17.84 percent,in jaggery production. The land value, depreciation and Interest on fixed capital more incase of jaggery.It is also noted from the table that the per quintal net returns from jaggery was Rs 455.30.The break-even point gives the size of business. The break even point of Jaggery production it was337.97 qtls. in physical terms and Rs.1115300 in monitory terms. Chow's test At overall level ,the regression coefficent incase of jaggery production only raw material (X1)is significant but labour cost(X3)is non-significant.The pooled regression taken for employing chow test and the result revealed that it is 5 percent level of significant (6.4243**). It is observed that the return was increased to go value addition of the particular product . The farmer sale sugarcane and he received Rs 2204.34 and make sugar from sugar factory he received Rs 2414.34 (109.52%) and making jaggery he received Rs 2234.31 (128.57%).It is clearly observed that Jaggery making is profitable business.

INTRODUCTION

Sugarcane (*Saccharam officinarum*) is important cash as well as sugar crop in the world. In sugarcane cultivation Brazil ranks first, India ranks second and also is an important commercial crop of the country occupying around 4.94 million hectares of land with an annual cane production of around 339.16 million tones, with producers of white sugar, seed and feed and jaggery are 70.70 percent,11.90 percent and 17.40 percent .

In India, Maharashtra stands second highest in production of sugarcane followed by UttarPradesh. As regards Maharashtra, about 0.96 million hectares of area with production of 57.04 million tons with productivity of 74 tonnes per hectare(2010-2011). Out of total production sugar in Maharashtra, Kolhapur region stands second highest contributing 14.98 percent and the sugar recovery is about 12.51 percent (2011-12).India

occupies first position in production of jaggery in the world. In financial year 2009-2010, total production of jaggery in India was around 80 lakh tones. Jaggery and Khandsari are the major agro processing industries found in rural sector of our country. It is recorded that 70 per cent of world's jaggery production is in India (Dwivedi, 2010).The Maharashtra state is the largest producer and consumer of jaggery. Jaggery is specially used during 'Makar Sankrant' for making "*tilgul*". In Maharashtra, about 11 to 12 percent sugarcane was being used for jaggery preparation during the year 2005-2006 and jaggery from Maharashtra is also well known for its quality, which has wide demand in international market. India is largest exporter of jaggery in the world. In India only Uttar Pradesh and Maharashtra produce export quality jaggery because they have specialized centers for jaggery production. Jaggery is used as medicine for the patient suffering from jaundice, arthritis, kidney problems, joint pains etc. and also as lactogenic and cardiactonic. Jaggery is also used as part of animal feed mixtures and in tobacco curing. Jaggery has an ayurvedic and nutritious value. A nutritive value of jaggery is a rich source of Phosphorus, Calcium, Iron and Vitamin 'B' as compared to sugar. Sucrose 65-85 (%), Glucose fructose 10-15 (%), Water 3-10 (%) Protein 0.25 (%) Calcium (0.40%) Phosphate (0.045%) Iron (11mg/100gm) Vitamin 'B' (20mg/100gm), Copper (0.80mg/100gm). Jaggery is very rich in iron, which helps to maintain the hemoglobin level in blood for preventing anaemia.

OBJECTIVES

1. To study costs and returns of Jaggery production.
2. To estimate the value addition to Jaggery.

METHODOLOGY

The data was collected for the year 2011-12. The highest jaggery producing area Karveer district was purposively selected in which two tahsils Panhala and Karveer were selected randomly. Two villages were selected randomly from each tahsils on the basis of maximum number of units. From each village eight jaggery producers were selected randomly. Total 16 jaggery units studied and made conclusion by using different statically tools.

RESULT AND DISCUSSION

Returns from jaggery production

Per unit per season gross returns from jaggery production were calculated and presented in table 1. It was clear from the table 1 that gross returns from Rs. 200873.01.The B:C ratio for In case of jaggery production, gross returns were obtained Rs3774770.29 and net returns to Rs. 522452.44. The estimated B:C ratio was 1.16.

.**Per quintal cost and returns from jaggery production**

From theTable,1 it can be revealed that per quintal cost of jaggery production was Rs 2834.31.

Table 1 Per quintal cost and returns from jaggery production

Sr.No.	Particulars	Jaggery production cost	
		Cost	Percent to total (%)
1	**Sugarcane cost**	**2204.34**	**77.77**
2	Chemicals and Clarifying agents	94.15	3.32
3	Labour charges	505.56	17.84
4	Khadi cloths	1.39	0.05
5	Fuel and electricity charges	18.79	0.66
6	Land value	4.12	0.15
7	Depreciation	1.64	0.06
8	Interest on Fixed capital	4.33	0.15
I	**Total cost**	**2834.31**	**100**
1	Total returns @-	3289.61	-
2	Net returns	455.3	-
3	B:Cratio	1.16	-

(Figures in the parentheses are percentages to the total)

Sugarcane cost and labour cost were the major items of total cost, contributing 77.77 percent and 17.84 percent in jaggery production. The land value, depreciation and Interest on fixed capital more in case of jaggery. It is also noted from the table that the per quintal net returns from jaggery was Rs 455.30.

2. Break- even analysis

The break - even point was worked out for the estimating the minimum quantity of jaggery that should be produced in order to have no profit no loss in the business. The Break - even point for sample jaggery producers was calculated and presented in Table 2.

Table 2 Break-even analysis

Sr. No.	Particulars	Jiggery
1	In Physical terms (qtls)	337.97
2	In Monitory terms (Rs)	1115300

The break-even point gives the size of business. It is observed from the table for inorganic jaggery it was 337.97 qtls in physical terms and Rs.1115300 in monitory terms. It is indicated that minimum quantity of jaggery, each category has to produce to equal costs and returns. The time period required for achieving the break-even level of output was relatively longer for jaggery units (146 days).

Chow's test at overall level, it can be revealed from the table independent variable viz., raw material (X1), labour (X2) and chemical cost (X3) explained the variation in the net price per quintal of extent of 88 percent, which is 92 percent for jaggery, respectively. At overall level The regression coefficient incase of jaggery production only raw material (X1) is significant but labour cost (X3) is non-significant.The pooled regression taken for employing chow test and the result revealed that it is 5 percent level of significant (6.4243**).

Value chain analysis -

Sr.No	Sugarcane	Sugar	Jaggary
1 price (Q)	2204.34	2204.34	2204.34
2 Cost		210.00	629.97
3 Sale price	2204.34	2414.34	2834.31
4 percent increase	(100)	(109.52)	(128.57)

I t is observed that the return was increased to go value addition of the particular product. The farmer sale sugarcane and he received Rs 2204.34 and make sugar from sugar factory he received Rs 2414.34 (109.52%) and making jaggery he received Rs 2234.31 (128.57%).It is clearly observed that jiggery making is profitable business.

CONCLUSIONS

It can be revealed that per quintal cost of jaggery production was Rs 2834.31. Sugarcane cost and labour cost were the major items of total cost, contributing 77.77 percent and 17.84 percent, in jaggery production. The land value, depreciation and Interest on fixed capital more in case of jaggery. It is also noted from the table that the per quintal net returns from jaggery was Rs 455.30.The break-even point gives the size of business. It is observed from the table for inorganic jaggery it was 337.97 qtls. in physical terms and Rs.1115300 in monitory terms.

Chow's test at overall level, it can be revealed from the table independent variable viz., raw material (X1), labour (X2) and chemical cost (X3) explained the variation in the net price per quintal of extent of 88 percent, which is 92 percent for jaggery, respectively. At overall level The regression coefficient incase of jaggery production only raw material (X1) is significant but labour cost (X3) is non-significant.The pooled regression taken for employing chow test and the result revealed that it is 5 percent level of significant (6.4243**).

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ABSTRACTS

ECONOMICS OF PRODUCTION OF BANANA IN JALGAON DISTRICT

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ABSTRACT

Banana (Musa Paradisiaca) is an edible fruit, botanically a berry produced by several kinds of large herbaceous flowering plants. The data were collected for the year 2013-14. The Jalgaon district selected purposively. In Jalgaon district, three tehsils based on higher concentration viz., Yawal, Bhadgaon and Chalisgaon. In each tehsil three villages selected and ten cultivators from each village selected randomly i.e. the study covered 90 banana cultivators from nine villages. Economic analysis of data indicated that, the per hectare male labour requires 158 days and female labour requires 127 days. Bullock labour requires 8 pair days. Machine 35 hrs. Seed 2125 kg, Manures 122 qtl. and fertilizers N 325 kg, P 209 kg, K 315 kg. The per hectare cost of cultivation was Rs. 217953.29. The major items of cost were rental value of owned land (36.93 per cent) and human labour, bullock labour and machine labour (19.25 per cent), and seedlings (12.31 per cent). The percentage of Cost A and Cost B in the total cost of cultivation were 54.82 and 93.49 percent, respectively. The output of banana produced Rs. 484402.24 i.e. 468.33 qtl. The benefit cost ratio was 2.22 indicating profitability of crop.

(Key words: *Berry fruit, Banana, Cost of cultivation, Economics of production**)***

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CONSTRAINTS IN PRESERVATION AND PROCESSING OF MANGO FRUITS DUE TO DISEASES.

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Fruits contents moisture (70-95%), higher respiration rate, soft texture therefore the natural shelf life of fruits is few days. Because of its perishable nature it needs to be preserved and process the fruits to increase its shelf life. In India consumption of fruits have been increase by more than 30% during past few decades. It is also estimated that about 20% of all fruits are lost each year due to diseases. The data collection of the experiments "Estimation of post harvest losses in mango" was carried out at Regional Fruit Research Station, Vengurle centre during the year 2015. Farmers were selected from Ratnagiri and Sindhudurg districts, so also market studies at local and distant places were carried out during the study. It is observed that the anthracnose, stem end rot and *Aspergillus* rot are the major post harvest diseases which were found during studies. The

losses due to these post harvest diseases in Ratnagiri and Sindhudurg districts were 16-20% and 20-23% respectively; starting from harvesting to marketing of fruits. To overcome these diseases, the technologies adopted by the farmers and those recommended by University were studied for the project.

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ECONOMICS OF MARKETING OF MUSKMELON IN AKOLA DISTRICT

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The present study on economics of marketing of muskmelon in Akola district was carried out during the year 2013-2014. The study was based on primary data. The primary data of 60 growers were collected from tahsils of Akola districts and functionaries involved in muskmelon procurement producer, wholesalers, and retailer were selected for collecting information. The muskmelon producers have been found to be follow two channels for marketing of muskmelon; channel –I Producer → Consumer and channel-II Producer → Wholesaler → Retailer → Consumer .The marketing cost has been found higher in channel-II due to involvement of more middleman in channel. Producer share has been computed as highest in channel-I i.e. 95.00 per cent and channel-II 73.32 percent. The study has suggested that measures need to be adopted to increase access of farmers to market information and they should be motivated to market the produce collectively to reduce the cost on transportation.

Key words: marketing channel, producer share, price spread

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DECOMPOSITION ANALYSIS OF WHEAT IN AMRAVATI DIVISION

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An attempt has been made to study the growth and instability of wheat crop in Amravati division. The study was based on secondary data on area, production and productivity of wheat. The study revealed that the compound growth rates for area, production and productivity under wheat were recorded high during period III. The coefficient of variation and Coppock's instability index with regards to both area (39.18 and 39.18 per cent) and productivity (29.23 and 22.68 per cent) were highest in Buldhana district among the wheat growing districts of Amravati division. At overall level, area effect was most responsible factor for increasing wheat production in Amravati division as whole.

Keywords: Compound growth rates, coefficient of variation, Instability, production, productivity.

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STUDY ON GROWTH PERFORMANCE OF GIRIRAJA POULTRY BIRDS UNDER NORTH KONKAN COASTAL ZONE OF MAHARASTRA STATE

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2. *Associate Director of Research, RARS, Karjat (M. S.)*

The investigation on study of growth performance, body wight gain, feed consumption, feed conversion ratio, dressing percentage and mortality of Giriraja Poultry birds was carried out in North Konkan Coastal Zone under a project of All Indian Co-Ordinated Research Project on Integrated Farming System, Karjat, Dist. Raigad, Maharshtra state. In all 100 numbers of one day old Giriraja chicks were procured from Government hatchery. The corresponding average live body weight at the end of the seven weeks of age was 1120.63 gms. The average weekly body weight gain at the seven weeks of age was 249.77 gms. The average total weekly feed consumption gram/bird during the experimrntal period at the end of seven weeks was recorded as 671.55 gms. The cumulative feed consumption at seven weeks of age was 2650.93 gms. The cumulative feed efficiency at the end of seven weeks was 2.72. The overall mortality in Giriraja poultry birds during the experimental period was within the normal range (1 %). The average dressing percentage was 75.94 per cent.

Keywords: comparative study, Giriraja fowls, local fowls and Konkan region

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INFORMATION SEEKING BEHAVIOR OF THE TRIBAL FARMERS IN JAWHAR – PALGHAR, MAHARASHTRA: A VILLAGE LEVEL STUDY

A. S. Shigwan, V.V.Dalvi and P.R.Pawar

AICRP on Agroforestry

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Jawhar is one of the most remote areas in the Palghar District of the State of Maharashtra and is inhabited mostly by the tribal's. Agriculture is the main occupation of the people. A large population is engaged in the agriculture sector. Information research in social science depends heavily on availability of information. Access to the right information is a difficult task because information is abundant, but users do not know whether it is available and where to locate it. In this paper the researcher had tried to understand the

information seeking behavior of tribal farmers in Jawhar tehsil of Palghar district in Maharashtra. Here an attempt is made to understand information needs of farmers, sources used by them and what are the channels of information gathering. A survey is carried out on the 100 farmers of the tehsil, 50 farmers from two villages of Jawhar tehsil, were selected for the study. In case of agricultural information tribal farmers in locality, family members, relatives and neighbors found very popular sharing information among them. In Mass media/channels radio, television, and newspapers found popular to provide information to the tribal farmers of Jawhar.

Key words: Information sources, Tribal, Mass media.

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AN ECONOMIC ANALYSIS OF PROCESSED MILK PRODUCT (GHEE) OF GOVERNMENT MILK SCHEME, NAGPUR

S. A. Baraskar[1], N. T. Bagde[2], R. S. Patil[3] and A. S. Dake[4]

The present study entitled supply chain management of processed milk product (Ghee) of Government Milk Scheme, Nagpur were carried in Nagpur district. The fixed capital investment in Government Milk Scheme, Nagpur was Rs. 596.19 lakh. For preparation of ghee, total quantity of milk i.e. 634874.2 liters were used. Total variable cost and raw milk contributed 96.95 and 91.46 per cent respectively in total cost. Net returns from the preparation of ghee were Rs. 4511806.15. B:C ratio observed in production of ghee was 1.41. Price paid by consumer for 1 kg. of ghee was Rs. 410. The breakeven point for ghee production was 2657.83 liters whereas; percent margin of safety for ghee was 93.02. The supply chain efficiency was 2.67.

(Key words: Ghee, economics of processing, supply chain management)

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INSTITUTIONAL CREDIT ACCESS BY THE FARMERS IN DISTRESS PRONE DISTRICTS OF VIDARBHA

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The present study was carried out during the year 2014-2015 in Akola, Washim, Amravati, Yavatmal and Wardha districts of Vidarbha. An exploratory design of social research was used. From each district one Tahsil is selected randomely and from each selected tahsil 4 villages were selected randomly. From each selected village 10 farmers were interviewed with the help of structured interview schedules, thus this investigation

was confined to a sample of 200 farmers. The key finding revealed that in selected five district of Vidarbha namely Akola, Washim, Amravati, Yavatmal and Wardha out of 200 selected farmers 134 (67.00%) farmers had access the institutional credit for farming and 33.00 per cent have not access the institutional credit it might be due to the defaulter position of (27%) the farmers and remaining (6%) does not required the loan that means they doing their farming business without the loan. The data also revealed that 27.00 per cent farmers were observed in defaulter position during 2014-15. Hence they might be not eligible for getting fresh crop loan during *Kharif* 2014 season. The data regarding labourer availability to farming cleared that majority (94.00%) of the selected farmers express that labourer availability for farming is to some extent and 6.00 per cent farmers has not required any external labourer due to working of family members in own farm.

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ROLE PERFORMANACE OF PROPRIETORS OF AGRO-SRVICE CENTRES AND CONSTRAINTS FACED BY THEM IN AGRICULTURAL DEVELOMENT

Y.B. Shambharkar, D.M. Mankar, N.M. Kale, Ashru Fuke and P.P Bhople

The study entitled "Role of Agro-service Centres in Agricultural Development" was carried out in Mehakar and Lonar tahsils of Buldhana district in Vidarbha region of Maharashtra state. The exploratory Research design was used for the present investigation. Purposive selection of forty (40) agro service centers on one part and on other part 120 clientele farmers who served by the proprietors of Agro-service centers were selected randomly which constitute sample for the study.

The findings of the study revealed that, in case of role performance, relatively higher proportion of respondents (75.00%) were observed in medium level of supply of seed, followed by majority of respondents (80.00%) were in medium level of supply of fertilizer and large majority of respondent (82.50%) were observed in medium level of supply of pesticides.

As concerned to advisory services, most of the respondents (65.00%) were in medium level of supply of advisory services. The overall role performance rated by proprietors (67.50%) was found to be medium level. With regards to opinion of clientele farmers about role performed by the proprietors, majority of clientele farmers (77.50%) were in opinion in medium performance about role performed by the proprietors of ASCs.

With regards to constraints, majority of the respondents (70.00%) were faced inadequate finance as a constraints of input supply, where as, in case of advisory service maximum number of respondents (57.50%) were observed in facing constraints as a lack of proper knowledge about different machinery and implements.

EXPLOITATION OF WATER HARVESTING TECHNIQUES AND MULCHING IN SEMI ARID FRUIT CROPS

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Technologies must be developed to overcome the limiting environmental stresses that are specific to rainfed agriculture especially, moisture stress. In order to quantify the effect of *in situ* water harvesting techniques as well as harvest and utilization of whole rain water received during rainy season, an experiment was conducted at Horticulture section, College of Agriculture, Dhule 424 004 with different water harvesting techniques along with mulching. Due to which it is possible to collect maximum rain water in and around the fruit tree and conserve it in soil for further long duration. This conserved water will made available to fruit trees for vegetative and reproductive growth. 5% inverted circular basin, crescent bunding and inverted circular basins with 5 per cent slope and covered with locally available mulch material (*Glyricidia* leaves, *dhainch*a twigs, *Sorghum kadbi* and Aonla pruned twigs etc.) was given to each base crop. Crescent bunds were constructed for each plant and their size was increased every year with the growth of the plant.

Yield data of farm trial revealed that, significant differences were observed within the water harvesting techniques and are found superior over control. Maximum per hectare Aonla and ber yield (3888 and 4084 kg ha^{-1} respectively) was obtained in 5 % inverted circular basins with mulch material technique followed by crescent bunding (3737 and 3825 kg ha^{-1} respectively). On station trial same trend of result were observed during the age of fifth year of plantation.

On the basis of cost analysis, it was found that highest net returns (Rs. 49,250/- and 14,717) along with B:C ratio (6.43 and 2.90) was obtained in Aonla and ber respectively by 5 % inverted circular basin with mulch followed by crescent bunding (Rs. 49,231/-) in Aonla. Though, this technique of inverted circular basins, initial cost of basin, mulch and repairing are higher which in turn reduced the net returns in the initial years in both crops. However, in the long term this treatment will give highest net monetary returns as no recurring expenditure will be incurred in the succeeding years.

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THE OUTTURN ON TUBEROSE YIELD AND ECONOMICS IMPROVISED OWING TO THE SPLIT APPLICATION OF NPK

Manisha Deshmukh, P.K. Nagre, V.U. Raut, and Priya Gawande

An experiment entitled, "The outturn on tuberose yield and economics improvised owing to the split application of NPK " were carried out at Parks and Garden Unit, College of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *kharif* season of the academic year 2011-12. The experiment was laid out in Factorial Randomized Block Design with four replications and twelve treatment combinations. The recommended dose of fertilizers was applied in split. The results conducted during 2011-12, the maximum flower yield in respect of weight of floret per spike (38.60 g), per plant (204.54 g), per plot (3.273 kg) and per hectare (227.26 q) of tuberose was recorded under four split application of nitrogen (N_2), two split of phosphorus (P_2), two split of potassium (K_2) and their combinations (N_2P_2 and $N_2P_2K_2$). The maximum C:B ratio was obtained in N applied 4 split, P in 2 split and K also in 2 split (1:2.23).

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PERFORMANCE OF LIVESTOCK INSURANCE IN VIDARBHA

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The livestock insurance scheme, a centrally sponsored scheme, which was implemented on a pilot basis during 2005-06 & 2006-07 of the 10th five year plan. The main objective of scheme is to provide risk coverage to farmers and cattle rearers against loss of their animals and to demonstrate benefits of scheme to livestock owners and popularize it with ultimate goal of attaining qualitative improvement in livestock and their products. Present study entitled performance of livestock insurance in Vidarbha. The secondary data of animals insured in Vidarbha were collected from various government publications. Study revealed that, in Vidarbha during 2006-07, the no. of animals insured was highest i.e. 7546 and it was decreased upto 6430 animals in 2011-12. In Vidarbha region, it was observed that, the consumption of milk was lower than the recommended level by ICMR. The maximum numbers of animals were insured during 2006-07 i.e. 33754 and it was decreased upto 2294 animals in 2009-10. Awareness of livestock insurance among the livestock rearers play vital role in growth and development of livestock sector. (Key words: Performance, insurance, livestock)

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TRAINING NEED OF WOMAN MEMBERS OF SELF-HELP GROUP WITH RESPECT TO AGRO-TOURISM

Radha Redij[1], Neha Kale[2], P. A. Sawant[3], Bharatesh Kuppanatte[4]

The present study was conducted in Dapoli tahsil of Ratnagiri district of Konkan region. Fifty SHGs and from each SHG, three women members were selected randomly, thus making a sample of 150 women members. The data from the woman members were collected through personal interview schedule.

The study revealed that the awareness about agro-tourism among the members of SHG was very less (24.00 per cent). But the respondents were highly interested in agro-tourism (98.00 per cent).It was observed that majority (78.00 per cent) of the members of SHG had need of training on agro-tourism at 'medium' level. Majority (94.56 per cent) of the woman members of SHG required training in the major area of agro-tourism namely processing, packaging and marketing, followed by budgets and record keeping (89.80 per cent), safety (89.12 per cent), personality development (87.76 per cent), public relations (83.67 per cent), food products and recipes (82.99 per cent), improved agricultural technology (80.95 per cent), follow-up (78.91 per cent), guide for excursion/ site seeing (75.51 per cent) and communication (75.51 per cent). It was observed that about 78.00 per cent of woman members of SHG had need training on agro-tourism at 'medium' level, while 13.33 per cent of them had 'high' level of training need, 6.67 per cent woman members of SHG had need of training on agro-tourism at 'low' level; while 2.00 per cent felt 'no need' of training. The other areas in which the members expressed the training needs were: cultural activities (74.83 per cent), time management (73.47 per cent), hospitality (65.31 per cent), housekeeping activities (63.27 per cent) and selection of site, layout, construction and facilities (61.90 per cent).

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MARKETING BEHAVIOR OF SAPOTA GROWERS IN THANE DISTRICT OF MS.

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The study was conducted in Palghar and DahanuTahsils of Thane districts of Konkan region. The sample was constituted of 120 sapota growers from 12 villages. The respondents were interviewed with the help of specially designed schedule.

Majority of Sapota growers had 'medium' annual income, extension contact, mass media exposure, yield of sapota, market orientation and innovativeness. Majority of sapota growers belonged to 'old' age had 'college' education, small area under sapota and 'medium' marketing behavior. Seven characteristics namely land holding, area under sapota, annual income, extension contact, mass media exposure, yield of sapota and

innovativeness had significant association with marketing behavior. It could be observed that majority (70.84 per cent) of the sapota growers had 'medium' marketing behavior, followed by 18.33 per cent and 10.83 per cent of the sapota growers had 'Low' and 'High' marketing behavior, respectively. The average marketing behavior score of the respondents was 57.It is observed that maximum number of sapota growers 'always' collected information about available resources regarding new plantation (75 per cent), before plantation (61.66 per cent), marketing of sapota (49.17 per cent), method of distribution of sapota (35.83 per cent), selected the marketing channels that would give maximum profit (34.17 per cent) and selected institutions or persons giving maximum profit through sale of sapota (42.50 per cent). Majority of Respondents always cultivated varieties as decided (100.00 per cent) and followed marketing system as decided (40.00 per cent). The demand of sapota growers always regular and majority of sapota growers 'always' sold their sapota immediately after harvesting (95.00 per cent) through commission agent (47.17 per cent). It is observed that plant protection emerged out as an important training need. Processing of sapota seemed to be a major training need. Sapota growers wanted training in preparation of different types of processed product, chemicals to be used while processing and different types of processing method. 'Low quality of fruits due to occurrence of pest and diseases' followed by 'High wages of labour' and 'Shortage of labourer in peak period' were the major constraints.

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A STUDY ON WOMEN'S SELF-HELP GROUPS ENGAGED IN AGRICULTURAL ACTIVITIES IN RATNAGIRI DISTRICT.

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The study was conducted in Ratnagiri district. A sample of 107 women members of self-help groups drawn from 6 tahsils was interviewed.It was found that majority of respondents were having middle age, educated upto high schools, belonged to middle caste and farming was their major occupation, pre-scheme annual income of all of them was from below poverty line category and most of respondents annual income was above poverty line and after taking benefits of SHG. Most of them had 'medium' employment status. Respondent's family size was mostly large with marginal size of land holding. Most of the Respondents were having 'High' knowledge about SHGs with 'highly favourable' attitude towards SHGs. Majority of them had taken 'medium' nature and extent of benefits from SHGs. The characteristics of the beneficiaries namely education, annual income, knowledge about SHGs and attitude towards SHGs were significantly related with the extent of benefits.

It was observed that regarding agricultural activities about one-third (28.98 per cent) of them were found undertaking 'vegetable cultivation' through SHGs. It was followed by the other agricultural activities like 'post-harvest processing (21.50 per cent)', '

vegetable cultivation and floriculture' (10.28 per cent)' , ' KrishiUdyog (10.28 per cent)', ' cashewnut processing (10.28 per cent)' and ' Fisheries' (10.28 per cent).The major allied activities carried out by them was 'Papad making' (31.78 per cent) and it was followed by Bangle shop (9.35 per cent).Majority (52.35 per cent) of the respondents were taken 'medium' nature and extent of benefits from SHGs, while 28.97 per cent and 18.69 per cent of the respondents had 'Low' and 'High' nature and extent of benefits from SHGs, respectively.maximumnumber (36.45 per cent) of the respondents had taken the loan of equal amount 'upto' Rs.2500/- and Rs.2500/- to Rs.5000/- categories, respectively. Majority (54.21 per cent) of the respondents were frequently taking loan and about 37.38 per cent of the respondents' were regularly taking loan. Major constraints in carrying out agriculturalactivities were as like 'lack of irrigation facility (83.18per cent), 'small and fragmented land holding'(77.57 per cent)', ' lack of knowledge about agricultural technology' (74.77per cent)', 'lack of supply of input (73.83 per cent)','lack of marketing facilities (70.09per cent)', 'stray cattle menace'(65.42per cent), 'low market rate'(57.94per cent) were the major constraints faced by members of SHG.

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MARKETING BEHAVIOUR OF MANGO GROWERS

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The study was conducted in Ratnagiri and Rajapurtahasils of Ratnagiri districts and Devgad and Vengurletahasils of Sindhudurg district of Konkan region. The sample was constituted of 120 mango growers from 8 villages. The respondents were interviewed with the help of specially designed schedule.

Majority of mango growers had 'medium' annual income, area under mango cultivation, economic motivation, market orientation, extension contact, mass media exposure and yield of mango. Majority (71.67 per cent) of mango growers had 'secondary' education and 'medium' marketing behaviour. Eight characteristics namely education, annual income, size of mango orchard, market orientation, economic motivation, extension contact, mass media exposure and yield of mango had significant association with marketing behaviour. Maximum number of the mango growers 'always' collected information about available resources regarding new plantation (97.50 per cent), before plantation (93.34 per cent), majority of the respondents' always' decided the issues after planning namely, varieties to be grown (93.34 per cent), area allocation for variety (90.84 per cent). As regards the implementation of action plan, it was observed that majority of the respondents 'always' cultivated varieties as decided (97.50 per cent). Majority of the respondents 'always' cleaned all the mango produce (98.34 per cent) and undertook grading of mango fruits (98.34 per cent). Market demand of the mango was 'always' seasonal(95.00 per cent). Almost all the respondents 'always' sold their mango fruits on

dozon basis (99.17 per cent) through commission agent (94.17 per cent) within 2 days after harvesting (87.50 per cent).

Daily information of market rate by SMS through mobile phones (97.50 per cent), information about mango production indicating place, time and quantity (90.00 per cent) and information about export prices in different countries (72.50 per cent) were the major suggestions given by them.

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EFFECT OF DEFOLIATION ON SUCCESS OF GRAFTING OF SAPOTA IN POLYHOUSE

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Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

Present investigation entitled "Effect of defoliation on success of grafting of sapota in polyhouse". First and Second trial was carried out at the Department of Horticulture. Marathwada Agricultural University Campus, Parbhani. Plant propagation is an important aspect of agriculture in general and horticulture in particular. In order to accomplish large scale and commercial method of vegetative propagation of fruit plants, the method must be relatively simple, highly successful, low in cost and resultant plant should be vigorous in growth. Numerous results of investigation have been published on the vegetative propagation of fruit crops through grafting. Softwood grafting in sapota was done by wedge method as reported in Mango. The rootstock seedling was beheaded 15-20 cm in height above the ground level. A vertical slit of 2.5 to 3.0 cm length was given on the rootstock. On scion shoots similar matching cut was prepared in slanting manner on both the surfaces in lower portion. It is inserted on rootstock and wrapped by using polythene tape. After grafting, immediately protective irrigation was given to the grafted plants. The grafts in polythene bags were watered on alternate day. Timely weeds were removed from the polythene bags. The emerging shoots on the root stocks were nipped off whenever they appeared while watering the plants, care was taken that tied strips were not wetted.

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ECONOMIC IMPACT OF NUTRIENT MANAGEMENT PRACTICES UNDER FRENCH BEAN (*Phaseolus vulgaris L.*) IN PARBHANI DISTRICT

P.M. Metkari, S.S. Kharat & A.S. Nagargoje
Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

A field experiment was conducted in *rabi* 2006-07 at Research Farm, Department of Soil Science and Agricultural Chemistry, Marathwada Agricultural University, Parbhani to study the economic impact of nutrient management practices under French Bean in Parbhani District. The treatments comprised of various sources of organic (vermicompost) and inorganic (N, P_2O_5 & K_2O) sources of fertilizers. The experiment was laid in RBD with 10 treatments replicated three times. The recommended dose of fertilizer for French bean was 120:60:60 kg N, P_2O and K_2O ha^{-1}. The treatments in which micronutrients are included, they were applied as 25 kg $ZnSO_4$ and 25 kg $FeSO_4$ per hectare. The vermicompost was applied before sowing .The fertilizers were applied by drilling at the time of sowing. *Rhizobium* and PSB @ 250 g each were inoculated per 10 kg of French bean seeds. Seeds were coated with *Rhizobium phaseoli* and phosphate solubilizing bacteria *Pseudomonas striata* before sowing. NPK, T_7-vermicompost @ 5 t ha^{-1} + 50% of NPK + Fe + Zn + *Rhizobium* + PSB, T_8- vermicompost @ 5 t ha^{-1} + 50% of NPK of + 50% N through urea at flowering, T_9- As per soil test NPK application at sowing (150 kg N, 60 Kg P_2O_5 and 45 kg K_2O), T_{10}- Vermicompost @ 10 t ha^{-1} + *Rhizobium* + PSB.

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EFFECT OF DIFFERENT MULCHING MATERIALS ON GROWTH, YIELD AND QUALITY OF FIG (*Ficus carica*) Cv. DINKAR

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The field experiment conducted on Fig (*Ficus carica*) Cv. Dinkar at Central Research Station (CRS), Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during summer season of 2013 to study the effect of different mulching material on growth, yield and quality of Fig (*Ficus carica*) Cv. Dinkar laid out in Randomized Block Design and replicated three times. All the plant growth, yield and quality characters were superior with black polyethylene mulch followed by dry grass mulch over other mulching material while, plants without mulch (control) resulted poor growth and yield. With economic point of view, dry grass mulch resulted in the highest net return and found to be more economical with highest cost:benefit ratio.

Keywords- Mulching, Plastic Mulch, Fig, Dinkar

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EXPORT PERFORMANCE OF MARINE FISH AND FISH PRODUCTS FROM INDIA

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Fisheries play an important role in the economyof India in augmenting food supply, generating employment, raising nutritional level and in earning foreign exchange.India is also a major producer of fish through aquaculture and ranks second in the world after China. The objectives studied in the research work were export performance of marine fish and fish products and export competitiveness. The relevant data was collected from various data base, MPEDA Journals and articles for the year 1995-96 to 2014-15.The study concluded that Dried items earned highest foreign exchange i.e, (22.59) crore and quantity exported was (16.32 ton) followed by Chilled items (19.09 crore) and quantity exported (16.77 ton) respectively. The country wise growth rate of marine fish and fish products conclude that South East Asia give highest foreign exchange to India i.e, (18.89 crore) from (15.02 ton) quantity exported followed by Middle east (17.45 crore) and quantity exported (9.32 ton) respectively.

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IMPACT OF WATERSHED DEVELOPMENT PROGRAMME ON DEVELOPMENTAL PARAMETERS OF FARMERS

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Watershed Development Programme is one of the Government programme working in all India since 1965. Under this Integrated Watershed Management Programme was selected for study. The study was conducted in Wardha district of Vidarbha region of Maharashtra state. The sample consisted 120 farmers from 12 different village of wardha district were randomly selected. It was observed that there was a need to undertake the study to examine the impact of WDP on developmental parameters of farmers and extent of benefits derived by the beneficiaries from programme implemented by IWMP. Result revealed that higher proportion of the farmers i.e. 48.33 per cent in the middle age category of 36 to 50 year. A majority 40.83 per cent farmers educated up to secondary school i.e. 8^{th} to 10^{th} standard. Most of the farmers 48.34 per cent had small land holding. A majority of farmers i.e. 55.84 per cent had medium farming experience. Most of the farmers 39.16 per cent had low medium annual income. Over half of the farmers 62.5 per

cent belong to medium social participation. Most of the farmers i.e. 63.33 per cent had medium extension contact. Over half of the farmers 63.33 per cent belong to medium source of irrigation. Relatively higher per cent of beneficiaries 70.00 per cent had medium innovativeness. Most of the farmers i.e. 69.16 per cent belonged to medium level of risk orientation. It was observed in the study that the crop production, productivity, cropping intensity, employment generation and income status were found to be changed in positive direction in case of beneficiary respondent. Overall impact of watershed project with respect to per cent change in parameters was found to be medium after the implementation of soil and water conservation practices and income generating activities under IWMP.

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ECONOMICS OF KHARIF RICE AND SUMMER RICE IN COMMAND AREA OF KAL IRRIGATION PROJECT IN RAIGAD DISTRICT.

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Mahatma PhuleKrishi Vidyapeeth, Rahuri

Rice is one of the most important cereal crops, which plays a key role for food security. The Present study has been conducted in command area of Kal Irrigation Project in Raigad District. The data pertains to the agricultural year 2012-13. For this purpose, total 90 farmers were selected randomly from three reaches of Command area viz. head reach, middle reach and tail reach from study area. Economic analysis of data indicated that, the per hectare total human labour utilization was maximum in Kharif rice (222.75 labour days) followed by summer rice (216.71 labour days). The bullock labour and machine labour utilized in case of kharif rice were 7.26 pair days and 17.79 machine hrs, respectively. In case of summer rice, the bullock labour and machine labour utilized 11.29 pair days and 16.00 machine hrs, respectively. The quantity of seed and FYM used in summer rice 61.70 kg, 6.52 tonnes respectively, which was found to be higher than the quantity of seed and FYM used in kharif rice 51.95 kg, 5.64 tonnes, respectively. Fertilizers used for kharif rice N 110.37 kg/ha, mixed 115 kg/ha, while Fertilizers used for summer rice N 120.32 kg/ha, mixed 135.10 kg/ha. The per hectare gross returns obtained from kharif rice were Rs. 74400 and total cost was 80864 resulting in to net returns of Rs. -6464. Per hectare gross returns in summer rice were Rs. 80300, whereas total cost (cost 'C') was Rs. 82614 resulting in to net returns of Rs. -2314. The net returns from rice in both the season were negative resulting in to loss. The benefit cost ratio of kharif rice and summer rice were 0.92 and 0.97, respectively, indicating profitability at cost A and cost B. The per hectare yield of kharifrice and summer rice were 49 q and 53 q, respectively.

Key words: Kharif and summer rice, Cost of cultivation, Economics of production

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IMPACT OF DAIRY FARMING ON LIVELIHOOD OF FARMERS

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The study was conducted in Wardha district of Vidarbha region of Maharashtra State with sample size of 100 farmers from 10 different villages were randomly selected. Data were collected regarding knowledge and adoption of dairy management technology and impact of dairy farming. The study indicate that all the capital of livelihood were increases in knowledge and adoption of dairy farming. Study indicates that Knowledge and adoption of dairy management technology had positive and highly Regarding the impact of dairy farming, all the indicators of livelihood of respondents were significantly increases during the period of dairy farming. The per cent change were increased by 87.49 per cent, 76.26 per cent, 63.38 per cent, 17.56 per cent, 13.97 per cent and 6.60 per cent in case of physical capital, natural capital, financial capital, human capital, social capital and food security respectively. The overall impact of dairy farming on livelihood of farmers was highly significant and per cent change was increased by 30.08 per cent.

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ECONOMIC ANALYSIS OF UDOYGVARDHINI WOMEN'S SELF-HELP GROUPS (SHGS) IN SOLAPUR DISTRICT

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Self-help group (SHG) is a village-based financial intermediary committee usually composed of 10–20 local women or men, voluntarily coming together to save regular small sums of money, mutually agreeing to contribute to a common fund and to meet their emergency needs on the basis of mutual help. The Udoygvardhini Women's Self Group in Solapur district, established in the year 2003-04 was selected purposively for the study. The women's from the outskirt of Solapur district prepare the *rabi* sorghum roti and handover to the main center of the Udoygvardhini SHG,s at Solapur for further selling. The total production & marketing cost was Rs.3 / roti. The Gross price received by the Women's Self Help Group (SHG) at outskirts of Solapur district was Rs.3 / roti. While price paid by consumers in the Hotel was Rs.6 / roti. Daily sale of soft & hard (Bhakari) was 2500-3000. Marketing channel used was - Women's self help group at outskirts of Solapur district --- Udoygvardhini Women's Self Help Group (SHG) --- Hotels---Consumer. Annual turnover was Rs. 36 lack while annual expenditure was Rs. 27 lakh. Annual Net Profit was Rs. 9 lack. The Total requirement of rabi Sorghum for Udoygvardhini Women's self help Group was 150-

160 Q. /Annual. Indirectly, it increases the demand for sorghum in the area. The women's in this group get employment throughout the year and can earn good profit from the preparation of sorghum roti. A large scale awareness campaign about the nutritive value of the jowar roti should be taken to inform the general public about the nutritional value of sorghum over other fine cereals. The barrier of low social status attached to the consumption of nutritious cereals should be removed by terming them as "health foods". The sorghum rotis may be used extensively for mid-day meals programme of schools sponsored by various state governments. New recipes of sorghum are also in the offing but need to be popularized.

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ECONOMICS OF MARKETING OF BLACK GRAM IN NAGPUR DISTRICT

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The present study entitled "An economic analysis of marketing of black gram in Nagpur district" was undertaken in Nagpur district. Data pertained for the year 2012-13. For this study, total 90 growers were selected from Katol, Narkhed and Kalmeshwar tahsils of Nagpur district. Three marketing channels were studied. Total quantity of black gram (1027.80 Qtls.) sold through channel-I i.e. 17.03 per cent, in channel-II it was 21.40 per cent, whereas in channel-III it was 61.56 per cent. Highest marketing cost was observed in channel III i.e. Rs. 245.96. In Channel III i.e. Producer→Wholesale→Processor (Consumer), is the major channel of distribution and 40 farmers out of 90 farmers sold their produce by this channel. The producer's share in consumer's rupee was highest in channel-I. Net price received by producer is highest in channel-I. The selling of black gram through channel-I was found more remunerative than other channels. In regarding to marketing of black gram price variation and high cost of transportation were major problems experienced by farmers.

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DIETARY PATTERN AND PROBLEMS FACED BY SERVICE WOMEN DURING MENOPAUSE

Vijaya Bhond

ABSTRACT

Menopause is natural stage in the life of every woman as like menstrual course. Menopause is stage of ending motherhood and entering adult stage. Menopause is also known as climacteric menopause gives relief from pregnancy normally menopause stage is reached at the age of 47-48 years. The age of 15-50 years is the younger and motherhood

stage in the life of women present study is an attempt to know about the problems faced by women during menopause treatment thereon change in diet and importance of physical exercise.

Methodology study is based on the data collected from 100 service women residing in Rathi Nager, Radha Nager and V.M.V. to Panchvati area of Amravati city who has crossed menopausal stage recently simple tabular analysis was used to present the data Dryness of vaginal and end of glorious women life was main problem faced by service women. Majority service women feel unsecured at home and also at service place. Expert advice, treatment was preferred by 28 to 41% service women. Physical exercise and change in diet was made by 42% and 37% women respectively.

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CONSTRAINTS ENCOUNTERED IN ADOPTION OF SUGARCANE PRODUCTION TECHNOLOGY ON DIFFERENT SIZE OF FARMS IN MAHARASHTRA

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The study is based on the primary data collected during the year 2011-12 from 250 sugarcane cultivators were selected from three tehsils (Baramati tehsil of Pune,, Karveer tehsil of Kolhapur and Karad tehsill of Satara)and then categorized into three groups according to operational holding of sample farmers in small (Below 2.00 ha, N=66), Medium(2.01 to 4 ha,Na=56) and large(above 4.01 ha, No=128) size groups through random sampling method. The data were collected from sample sugarcane growers by the survey method. The sample sugarcane growers were contacted individually for collection of required information. The schedule was prepared by keeping in view the objectives of the study. The results clearly highlights the farmers usually do not adopt a technology as a package but take up individual practices suitably trimmed to fit into their budget and skills (management and operational) which lead to the variation in the adoption of cultural practices and consequently to the yield gaps. Therefore, cultural practices like preparatory tillage, season planting, recommended dose and balanced use of plant nutrients, weeding and intercultural operations, manure, diseases and pest management, water management have been very crucial for exploiting untapped farm potential incurring little cost. Sugarcane growers faced various constraints in the adoption of recommended sugarcane

production technology. Scarce and costly labhour for adopting tillage practices, high cost and non availability of F.Y.M., high cost of fertilizers, inadequate supply of electricity and load shading, costly drip irrigation system were the major constraints faced by more than 60.00 percent of sugarcane growers.

Key words: Constraints, sugarcane, production technology

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RESPONSE OF *Jasminum sambac* (L.) TO TIME AND SEVERITY OF PRUNING

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An experiment entitled "Effect of time and severity of pruning on growth, flower yield and quality of jasmine" was carried out at Satpuda Botanic Garden, College of Agriculture, Nagpur from December, 2013 to August, 2014 with sixteen treatment combinations in Factorial Randomised Block Design. The treatments comprised of four different time of pruning *viz*., 2nd week of December, 4th week of December, 2nd week of January and 4th week of January and four levels of severity of pruning *viz*., light pruning (45 cm above ground level), medium pruning (30 cm above ground level), heavy pruning (15 cm above ground level) and no pruning (control). The treatments were imposed on two year old plants of *Jasminum sambac* (L). The results revealed that, significantly maximum length of primary shoot, leaf area, flower buds plant^{-1} and flower yield ha^{-1} were recorded when the jasmine plants pruned during 4th week of December, whereas, minimum days for sprouting and maximum secondary laterals primary shoot^{-1} were found when the plants pruned during 2th week of January. Significantly minimum days for emergence of first flower were required during 4th week of January. Whereas, longevity of intact flower, diameter of flower bud, flower bud index and shelf life of flower were non-significantly influenced by time of pruning. In respect of severity of pruning, length of primary shoot, secondary laterals primary shoot^{-1},leaf area, longevity of intact flower, flower buds plant^{-1}, flower yield ha^{-1},diameter of flower bud and shelf life of flower were found significantly maximum, whereas, days for sprouting, days for emergence of first flower and flower bud index were found significantly minimum when the plants pruned at 30 cm above ground level. Interaction effect of time and severity of pruning on all the characters of jasmine under study was found non-significant.

(Key words: Jasmine, time, severity, flower yield, flower quality)

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PERFORMANCE OF NATIONAL AGRICULTURAL CROP INSURANCE SCHEME IN MAHARASHTRA

R. S. Patil[1], R. G. Deshmukh[2], S. W. Jahagirdar[3], K. R. Bhaskar[4]

Crop insurance aimed at mitigating the financial losses suffered by the farmers due to damage and destruction of their crops resulting from various production risks. Crop production is a mechanism to protect the farmers against uncertainties of crop production due to natural factors, beyond the control of farmers. Study revealed that, in Maharashtra state during kharif season, Marathwada region achieving highest percentage of amount given by government in the form of insurance fund i.e. 60.73 %, followed by Vidarbha 27.12 % and Western Maharashtra 11.74 %. In Maharashtra state during rabi season, Western Maharashtra region achieving highest percentage of amount given by Govt. in the form of insurance fund i.e. 67.63 %, followed by Marathwada 27.12 % and Vidarbha 2.58 %. In Vidarbha region during kharif season, Amravati division having highest fund of insurance i.e. 82.87 %, followed by Nagpur division i.e. 17.53 %. From Amravati division, Yavatmal district having highest fund i.e 23.28 % & Washim district having lowest fund i.e. 10.30 %. In Nagpur division, Chandrapur district received highest fund i.e. 8.74 % and lowest was Wardha district i.e. 1.19 %. In Vidarbha region during rabi season, Amravati division received highest fund of insurance i.e. 98.71 %, followed by Nagpur division i.e. 1.29 %. From Amravati division, Akola district received highest fund i.e. 73.59 % & Washim district received lowest fund i.e. 2.06 %. In Nagpur division, Nagpur district received highest fund i.e. 1.03 % & lowest was Gadchiroli district. In state wise distribution of fund released by government, highest % of amount received by Andhra Pradesh state i.e. 17.67 %, followed by Madhya Pradesh i.e. 16.73 %, followed by Gujrat state i.e. 12.92 %. Highest no. of farmers were benifited from Maharashtra state followed by Andhra Pradesh, followed by Madhya Pradesh.

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EXPORT PERFORMANCE OF INDIA'S GINGER

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India is rightly called as "spice bowl of the world" for its production of superior quality of spices. In the area of export ginger occupies fifth position in export earning among the spices. The area under cultivation in India is 107.54 thousand ha and the total production of the country is 385.33 thousand tons. In the present study, an attempt has been made to know the performance of gingerexport from India.The secondary time series data for the last 30 years regarding production and export were collected from

various issues of spice board of India. The entire 30 years was equally divided into two period i.e., period I (1980-81 to 1994-95) and period II (1995-
96 to 2009-10). The collected data were analyzed with the help of appropriate statistical tools like CGR, CV, Correlation, Index number in order to fulfill the objective of the study. The study indicates that, the compound growth rate of production of ginger was highest in period I (6.10 per cent per annum) and statistically significant. Similar result was found in export of ginger i.e., period I (7.98 per cent per annum). However the CGR was found highest in Period I (10.79 per cent per annum) for value in export of ginger. Correlation between the production and export of ginger in different years was positive (0.23) indicates that the movement of production and export are in same direction. The index number shows the annual trend for the values, which indicate that the index number for production and export of ginger were increasing trend in overall period on the initial tri-annum ending as a base value. Thus, the study concluded that the ginger have better export potential in future. To achieve the breakthrough in exports, it become necessary to initiate a systematic and long term export planning at the state as well as national levels.

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PERFORMANCE AND EXPORT OF INDIAN ONION

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Onion is one of the most significant and commonly used ingredients in Indian recipe. Thus the changes in prices have a huge impact on the food security, and farmer and consumer welfare. In terms of area, India ranks first in the world with over 760 thousand hectares spread over entire country. Globally, the country occupies the second position after China in onion production with a share of 11 per cent. In this study an attempt was made to ascertain the export performance of India's onion. The study utilizes the secondary data collected from different sources like Export Statistics for Agro and Food products, APEDA 2010, Department of Horticulture, Bangalore and the information was also accessed from the official websites of Agricultural Processed Products Export Development Authority (APEDA) and Food and Agricultural Organisation (FAO). The data collected pertained to the period 1992-1993 to 2009-2010. The entire 18 years was equally divided into two period i.e., Period I and Period II. The collected data were analysed with the help of appropriate statistical tools like CGR, CV, Correlation, and Index Number in order to fulfil the objective of study. Time series data of onion crop on area, production and productivity in India (1992-1993 to 2009-2010) has been utilized for the present study.

The growth in the area, production and productivity of onion in India was estimated using the compound growth function.The compound growth rate of area, production and productivity of India's onion for overall period respectively 5.03 per cent, 7.42 per cent and 9.11 per cent 5.03 and statistically significant at5% level.Correlation for area, production and productivity of onion in different years was positive (0.91, 0.86 and 0.81)

respectively. The index number shows the annual trend for the values, which indicate that the index number for area, production and productivity of onion were increasing trend in overall period on the initial tri- annum ending as a base value. Thus, the study concluded that the onion have better export potential in future. The values of Nominal Protection Coefficient and domestic resource cost worked out have revealed that Malaysia has shown the increasing trend while UAE has shown a declining trend. The NPC values of onion for 1992-1993 to 2009-2010 is 0.55 indicating its competitiveness. To achieve the breakthrough in exports, it become necessary to initiate a systematic and long term export planning at the state as well as national levels.

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