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A STUDY ON RAISING INCOME OF DRYLAND FARMERS IN KAVATHE MAHANKAL TEHSIL OF SANGLI DISTRICT

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ABSTRACT

Economic development is the process whereby low-income economies are transformed into modern industrial economies. As far as any region is concerned, the economic development is employed to describe a change in a region's economy involving qualitative as well as quantitative improvements. This area, being a drought-prone area, has no alternative means other than agriculture for economic development. The causes of underdevelopment and the policies accelerate the rate of growth of per capita income. The farmers depend upon their own farms and cattle for food-grains, milk, fuel, and vegetables. Others depend on markets and fair shops. Essential amount is spent on other non-food items such as entertainment, education, religion, rent, clothing, etc. As the rich have much more income, they spend more on their requirements; but the small income groups spend a little amount on food and non-food items. The rich have saving habits and large portion of their income is diverted to savings. But the poor's have no saving habits; they do their banking only for the purpose of getting subsidies/aids. The study concludes that Kavathe Mahankal tehsil is 100% drought-prone area. The geographical area of this tehsil is 93767 ha. i. e. 10.89% of total area 861000 ha of the district. The quality of land is inferior to have good yield of farm products. The average rainfall is below 60 mm in a year. The Farmers cultivate drought tolerant crops like jowar, bajra, maize, groundnut, etc. and plant fruits like guava, ber, pomegranate, dragon fruit, etc. These crops require low amount of water. This tehsil has low productivity i.e., below average. The study suggests that the whole population of this tehsil should be alert well in advance and informative of forecasts relating to climatic conditions. For this better assistance of meteorological department can be taken. The population of this tehsil should find the alternative ways of diversification towards high value crops required to improve income for their better living.

KEYWORDS: *Income, Dryland, Farmers, Livelihood, Drought prone Area*

INTRODUCTION:

Economic development is the process whereby low-income economies are transformed into modern industrial economies. As far as any region is concerned, the economic development is employed to describe a change in a region's economy involving qualitative as well as quantitative improvements. This area, being a drought-prone area, has no alternative means other than agriculture for economic development. The causes of underdevelopment and the policies accelerate the rate of growth of per capita income. The farmers depend upon their own farms and cattle for food-grains, milk, fuel, and vegetables. Others depend on markets and fair shops. Essential amount is spent on other non-food items such as entertainment, education, religion, rent, clothing, etc. As the rich have much more income, they spend more on their requirements; but the small income groups spend a little amount on food and non-food items. The rich have saving habits and large portion of their income is diverted to savings. But the poor have no saving habits; they do their banking only for the purpose of getting subsidies/aids.

II) REVIEW OF RESEARCH LITERATURE:

A review of some of the important research studies is as follows.

Anne O. Krueger, Professor of Economics, Stanford University, California has written in his bookⁱ, 'Economic development', that- "Developing countries are usually categorized by a per capita income criterion, and economic development is usually thought to occur as per capita incomes rise. A country's per capita income (which is almost synonymous with per capita output) is the best available measure of the value of the goods and services available, per person, to the society per year." D. Gale Johnsonⁱⁱ, Contributor, Service Professor Emeritus of Economics, University of Chicago said that- "Agriculture may also be a source of the capital needed for industrial development to the extent that it provides a surplus that may be converted into the funds needed to purchase industrial equipment or to build roads and provide public services. For those reasons, a country seeking to develop its economy may be well advised to give a significant priority to agriculture." Christopher B. Barrett, Michael R. Carter, and Jean-Paul Chavasa (2018)ⁱⁱⁱ, in their book, 'The Economics of Poverty Traps', narrated that- the people are not initially poor; but they become chronically poor only following an adverse event or shock. The initial environmental shock by which poverty induces undercuts the productive capacity of natural resources systems. Economic shocks induce depression, cognitive function, pro-social behaviour and aspirations. K J S Satyasai, Nirupam Mehrotra (2016)^{iv}, in Research Paper, 'Enhancing Farmers' Income' explained that- There are various possible options for enhancing incomes. Increase in output is only one of them. Farmers can combine other options of increasing incomes to double the income. One option is of enhancing production through increase in yields. Second option is leveraging water resources. Water resources are very scarce in relation to size of arable land. The leveraging can be done with micro-irrigation systems. Canal, tanks, and ground-water are also the

major sources. Third option is for dryland areas where small pockets of water management can serve better. Praveen, K.V., Suresh, A., Reddy, A.A., Singh, D.R. (2018)^v said in their article that -Farmers in India have developed the potential agriculture strategies to combat risk effectively. Some of such strategies are the time of sowing, crop sequence agro-forestry, and crop diversification. Farmers sow more varieties of the same crop to have stable output. The rainfed farmers of India have been facing the extreme farm distress. The analysis of the risk incidences and the risks adopted by the farmers is crucial to identify. Santosh Mehrotra, Ankita Gandhi, Partha Saha, Bimal Kishore Sahoo (2012)^{vi} narrated that – In the economic development process, there is an important phenomenon that gives the structural shift in different sectors. As the economy modernizes, the secondary and tertiary sectors are generally associated with higher productivity as compared to the primary sector. In India, the share of industry and services in output has increased sharply within the last 20 years, having their rising share in GDP. The share of agricultural sector is around 15 per cent of GDP (2010). There is a welcome change that highlights the growing relative importance of the more productive sectors. Shiv Kumar and V. P. Chahal (2018)^{vii}, 'Doubling farmers' income: Possible Way out' The economic think-tank at Niti Aayog has put forth a four-point action plan to double the incomes of India's farmers. The measures of four-point action plan includes: (i) remunerative prices for farmers by reforming the existing marketing structure; (ii) raising productivity; (iii) reforming agriculture policy; and (iv) relief measures. An intimate dissection of point action is required. Radheshyam Jadhav (2021)^{viii} in his article published in The Hindu, Businessline writes that – "We don't want alms, but the price of our sweat" used to be refrain of late *Sharad Joshi*, founder President of Shetkari Sanghatana. The sitting President *Anil Ghanwat* reiterated that Shetkari Sanghatana has been advocating for over 40 years for the freedom of farmers' access to markets and technology. Farmers' income would be doubled only when the government stops its intervention in the market. Bihari Bankey; Singh Madan; Bishnoi Rajesh; Mishra P K (2019)^{ix} Stated in their article that - The Government of India announced in its annual budget 2016-17 that farmers' income will be doubled by 2022. Doubling farmers' income in such a short period is not an easy task for policy makers. It is possible only when there is increase in total output and better price is given to farm product in market. On other side, the measures like reduction in production costs, diversification of product, efficient post-harvest management, value addition, etc. are to be taken. Chand Ramesh (2016)^x had written in his article published in The Indian Express that - Our Finance Minister's speech focused on doubling farmers' income in five years. Then, PM said while elaborating on this, that the Government will reorient its interventions in the farm and non-farm sectors to double the income of the farmers by 2022. The two speeches of FM and PM show difference. It is evident that the target of doubling farmers' income by 2022 is away by seven years from the current year.

III) RESEARCH METHODOLOGY:

OBJECTIVES:

The following are the specific objectives of this study:

1. To measure the income capabilities of the communities in the study area.
2. To identify the determinants and casual factors that affect income generation.
3. To evolve the strategies that will bring positive effect on raising income in study area.

HYPOTHESIS:

The present study tests the following hypotheses.

Income of the people and consequently standard of living in study area is not significantly lower.

SELECTON OF THE STUDY AREA:

Kavathe Mahankal block in Sangli district is the study area.

SAMPLE DESIGN:

Single-stage-stratified-random sampling technique was adopted for the study. The household member of a family was considered as a unit. I conducted the interviews of 100 family members in various villages in the Kavathe Mahankal block of Sangli district.

SELECTION OF VILLAGES:

A list of all villages in Kavathe Mahankal block was obtained from BDO office. Total 10 villages from this block were selected.

Table No.1

LIST OF SAMPLE VILLAGES IN KAVATHE MAHANKAL TEHSIL:

S. No.	Name of the Village	Population	Selected Sample Cases	Total Selected Samples
	Tehsil: Kavathe Mahankal	29835	100	100
1.	Alkud (s)	2329	10	10
2.	Ghorpadi	2109	10	10
3.	Moghamwadi	531	10	10
4.	Nangole	2545	10	10
5.	Ranjani	6162	10	10
6.	Dhalgaon	5370	10	10
7.	Tisangi	2313	10	10
8.	Kucchi	5019	10	10
9.	Irali	2423	10	10
10.	Kerewadi	1034	10	10

Source: Field Survey, 2023

SELECTION OF VILLAGERS:

We have randomly selected 10 persons from each village. Thus, the total number came out to 100 persons.

DATA COLLECTION:

Data collection was conducted in the Sangli District during Jan. to Mar., 2023. The primary data was collected through direct interviews of family members. Involvement of participants was first based on personal willingness to discuss the topics, leading to recommendations by participants (snowballing), and the establishment of working relationships with the researcher. Interviews were conducted informally and guided by prepared questions.

PRIMARY DATA SOURCES: A well-structured schedule was personally administered to obtain the relevant information regarding the family size and its composition, land inventory, investments, resource position, cropping pattern, income sources and living strategies.

SECONDARY DATA SOURCES: They includes publishes reports, projects, Draft Policy documents, reports of the Governments, reports of Sangli district, published research papers, study reports of various scholars, village land record, tehsil land record, Wikipedia, Internet sites, etc.

ANALYTICAL PROCESS:

TABULAR ANALYSIS: Tabular analysis is used to estimate the various costs and income measures, production cost, domestic expenditure pattern and economic surplus of the selected respondent households.

INCOME MEASURES: The income from various sources in respect of each household is measured. It consists of farm income and non-farm income from all activities.

SURPLUS/PROFIT: It can be said as Economic surplus i.e. the income left with the household after meeting the food and non-food expenditure of the family.

$$\text{Surplus/ Profit} = \text{Total Income} - \text{Total Expenditure}$$

FUNCTIONAL ANALYSIS:

Financial Analysis: The incomes from all sources are summed up. It gives a gross income of household. Then, all expenses incurred for livelihood are subtracted. The final figure shows surplus/profit.

It is assumed that a rise in income occurs at 20% per annum. Then there is a variation (addition) in total income.

V) PROFILE OF STUDY AREA:

Profile^{xi} of Kavathe Mahankal: The study area of *Kavathe Mahankal* tehsil in Sangli district is a drought-prone area. This tehsil has major portion of dryland as a natural resource. Agriculture is the main activity of Kavathe Mahankal tehsil. The geographical location is 17°00'22.6728"N 74°51'55.3392"E. The geographical area of this tehsil is 749.53 KM². Mush variation atmosphere is observed in different parts of the tehsil and it remains hot up to 41.50°C. The climate of the tehsil is dry except during south west monsoon period. Kavathe Mahankal has

experienced moderate to severe and acute drought conditions for more than 20 years. Kavathe Mahankal block has been categorized as Critical in water level. The entire block comes under the rain shadow area. Rainfall is uncertain and scanty. The average rainfall in this block is below 500 mm. during last many years.

The population of Kavathe Mahankal block is 152327 (Census 2011)^{xii}. Out of that male population is 77615 (50.95%), and female population is 74712 (49.04%). The total number of cultivators is 31864 and the land labours are 12904. Population density is 210.3 per KM². The literacy rate is 69.67%.

Tehsil head quarter is Kavathe Mahankal. This tehsil has total 60 villages. There are 154 primary schools, 33 secondary schools, 7 higher secondary schools and 1 degree college. There are 27 PACs, 27 hospitals and more than 40 medical service centers.

There is a net of co-operatives. Nearly each village has one co-op society forwarding credits to farmers and other activators. There are numbers of small village and cottage industries. There is only one sugar factory, Shri. Mahankali Sahakari Sakhar Karkhana Ltd. Kavathe Mahankal. There are 2 textile mills- one is Shri Mahankali Knitting & Garments P. Ltd., and other is Payod Industries P. Ltd. Hingangaon, Tal-K. Mahankal.

About 70 per cent of rural work-force in this area is engaged in agriculture. Kavathe- Mahankal is leading raisin making tahsil from sangli district^{xiii}. It indicates a relatively higher importance of agriculture in the livelihood pattern of population compared to other sectors (industry & service). Gross value added by work force dependent on agriculture is relatively low compared to other sectors. Self-sufficiency is one of the characteristics of the peasant agriculture. Farm families consume a substantial part of what they produce. While some of their output may be sold in the market. Their total production is generally not much larger than what is needed for their maintenance. The productivity per worker remains low under adverse conditions, the yields of crops per unit of land are also low. The available means of farming are not sufficient. So, the farmers in this area are socio-economically behind others.

Besides farming, the people of this area have multiple economic activities to contribute towards their incomes. They earn income from employment, business, shop-keeping, setting industry, trading, and by other means. The people raise capital from multiple sources and invest in productive assets. But across all stages of development, they take their own decisions and create both risks and profits.

The consumption pattern of the people of this area is marked by the medium range and minimum number of luxurious items like furniture, different varieties of clothes, well equipped residence, motor cars, motor cycles, etc. However, at present, this trend is changing. The rich people live luxuriously.

Trend in Agriculture: There are four agriculture strategies –

1. No agriculture production, 2. Monoculture production, 3. Mixed production, and 4. Polyculture production.

First strategy is farming without having own land. i.e. land- laboring. Such type of agriculture consists of poor

farmers and landless labors. They have marginal source of income. Second strategy consists of such farmers having their own land that they cultivate only one crop. The marginal and small farmers come in this category. Third strategy is mixed production system which consists of cultivating two or more crops in a single field. Such type of farming is done by medium and big farmers. The fourth strategy is polyculture production which consists of more than three crops grown by farmers along with livestock. They are, generally, medium and big farmers. There are hardly any data that can give farmers' income estimates. The income earned by farmers net of input cost has seen low and high growth paths in different periods. The growth in farm income requires favourable farm produce prices. Low growth of farm income seems to have been associated with distress. Many farm households adopt high-income earning avenues and tend to generate income from non-farm activities.

Table No. Landholdings of Farmers in Kavathe Mahankal Tehsil:

S. No.	Landholding:	No. of Farmers	Ha
1	Below 0.5 Ha	7340	790
2	0.5 to 1.00 Ha	8945	7750
3	1.00 to 2.00 Ha	7246	13495
4	2.00 to 3.00 Ha	4142	10385
5	3.00 to 4.00 Ha	1689	6415
6	4.00 to 5.00 Ha	1105	5355
7	5.00 to 7.50 Ha	838	6050
8	7.50 to 10.00 Ha	286	2504
9	10.00 to 20.00 Ha	194	3135
10	20.00 Ha & above	79	2133
	All Classes	31864	58012

Source: Profile of Sangli district (Tehsil-wise)

VI) INCOME AND CONSUMPTION:

The incomes vary with households. The incomes of medium and big farmers vary with land holding; and they may be assumed to Rs. 172/- for medium farmers and Rs. 437/- for big farmers per day per person. Differences in smallholder and other farmers' incomes reflect differences in capital assets, such as land or livestock, but also differences in the skills-mix which give rise to diverse sets of opportunities in the rural non-farm sector. Within the context of the rural economy, the livelihoods of smallholders depend on their choices on how to allocate their labour and few assets across farm and non-farm activities and generate the highest income. The wage labour or self-employment in the non-farm rural sector contributes more than farming towards smallholder household income. In this study area, about 23 percent of total income is generated by working in sectors other than

agriculture. Farming makes up for 65 percent of income and off-farm agricultural wage labour for about 12 percent. A large proportion of the household's income is made up by employment in the non-farm sector.

A large proportion of the budget is spent on food by poor. A large part of smallholders' income about 60% is allocated to food. A large part of the food produced by small farmers is consumed by own family and is not sold in the market. Spending more than half of the budget on food, means that there is not a lot to allocate on other goods and services. Some money is spent on housing and utilities – electricity, access to safe water, sanitation and maintenance. 10% of gross income is spent on housing and utilities, 5 % on goods like radio, TV set, smartphones, fridge, etc., the share of both education and health expenses in total expenditure is significantly higher – 15 % and 5 % respectively. There are other determinants of education and health expenditures, such as differences in the educational systems across countries, the proximity of school to the household, educational level, the size of the household, religion and others.

Graph No.1 Incomes of Farmers:

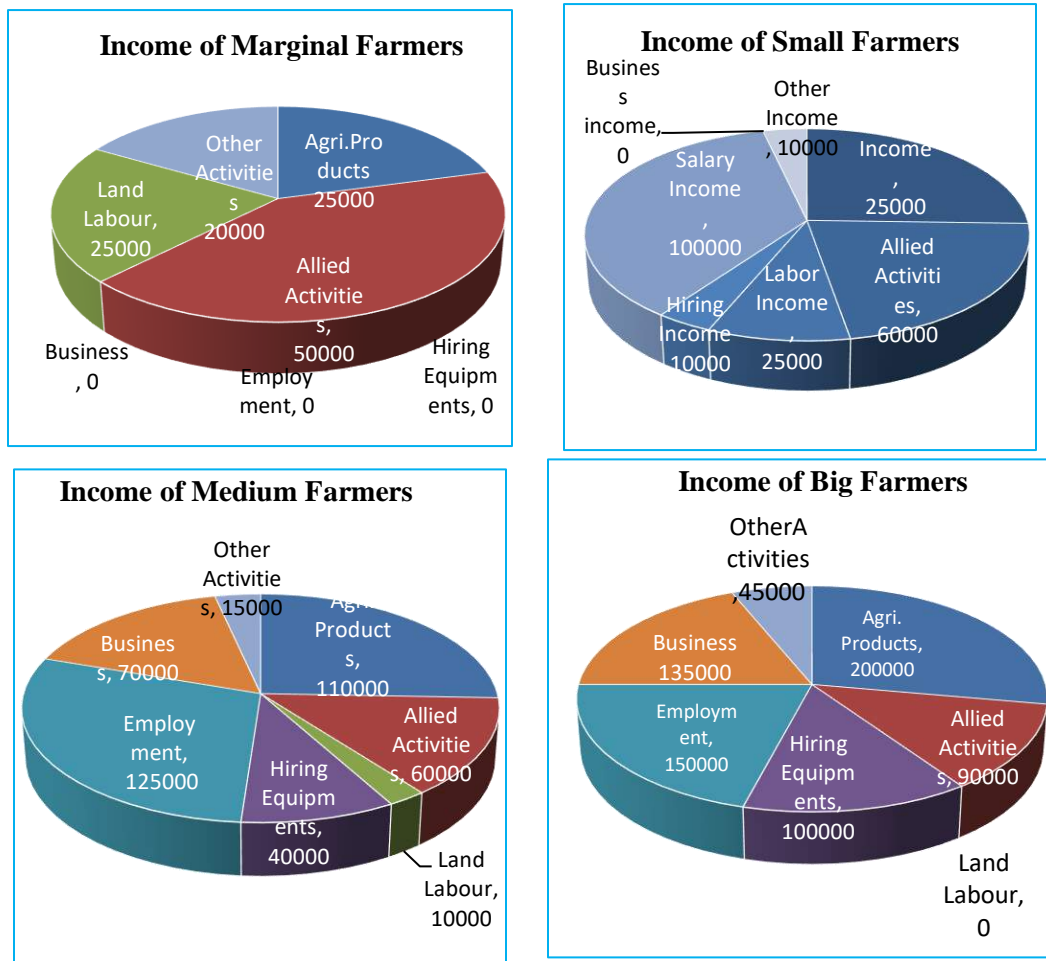


Table No.3
Average Income and Expenditure per Family in Study Area:

S. No.	Particulars	Marginal Farmers	Small Farmers	Medium Farmers	Big Farmers
A	Income sources:				
	Agriculture Produces	25000	100000	150000	250000
	Allied activities	60000	70000	60000	90000
	Agri. Labour	30000	20000	10000	0
	Hiring farm machineries	0	0	20000	50000
	Hiring irrigation water	0	10000	20000	50000
	Deposits/Interest on Deposits	0	0	5000	20000
	Employment salary	0	100000	125000	150000
	Business	0	0	100000	150000
	Other Income	25000	10000	10000	25000
	Total Income	140000	310000	500000	785000
B	Expenditure:				
	For Agriculture	15000	50000	70000	100000
	For Health	10000	30000	40000	50000
	For household	60000	75000	100000	130000
	For Education	30000	75000	100000	150000
	For Cultural ceremonies	10000	10000	25000	30000
	Purchase of Gold/Silver, metals	0	0	35000	50000
	Repayment of loans/Installment.	10000	40000	75000	150000
Investments	0	0	0	25000	
B Total Expenses	135000	280000	445000	685000	
Surplus (A - B)	5000	30000	55000	100000	

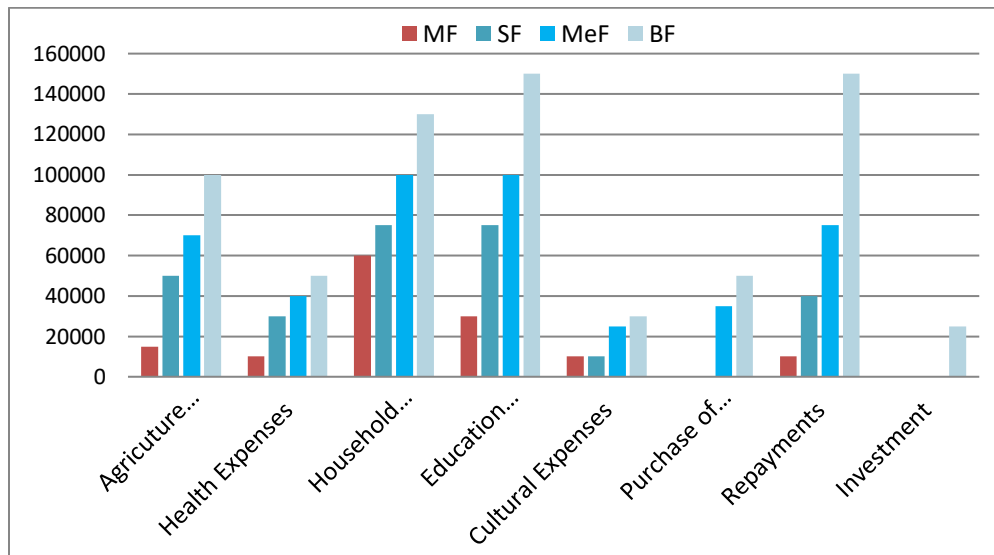
Source: Field Survey, 2023

There is variation in income as well as in expenditure. The income of marginal farmers comes to 96.43% to that of expenditure. In case of small farmers, income equals expenditure. In cases of medium and big farmers, the incomes come to more than that of expenditure. There is also a large variation in percentage of all categories of farmers ranging from Rs.1,4,000/- to Rs.7,85,000/-.The percentage of expenditures also varies according to category of farmers. As far as the deployed assets and human resources are concerned, the profit margin remains very low. This profitability must be, however, increased at individual level taking the help of government machineries implementing new programmes.

Expenditure pattern of all farmers remains different. The farmers gaining high income spent more amounts as compared to low-income groups. Particularly, marginal farmers spend very small amount on agriculture, where as they spend more than 50% amount on household expenses. Very small amount is spent on health and education.

Small farmers spend little more amounts on education of their children. The medium and big farmers spend much more amounts on education. Also they spend more amounts on household expenses and luxurious items.

Graph No. 2. EXPENDITURE:



PER CAPITA INCOME:

The average income of all farmers in the study area comes to Rs. 433750/- per annum. On an average each family consists of 5 members. So, The Per Capita Income comes to Rs. 86750/- . If the income is raised at 20% per year, the Per Capita Income comes to Rs. 104100/-. The Per Capita Income of the Sangli district was declared at Rs.178113/- at current price of year, 202-21. So, it can be concluded that the Per Capita Income of this study area is lower than that of Sangli district.

FUNCTIONAL ANALYSIS:

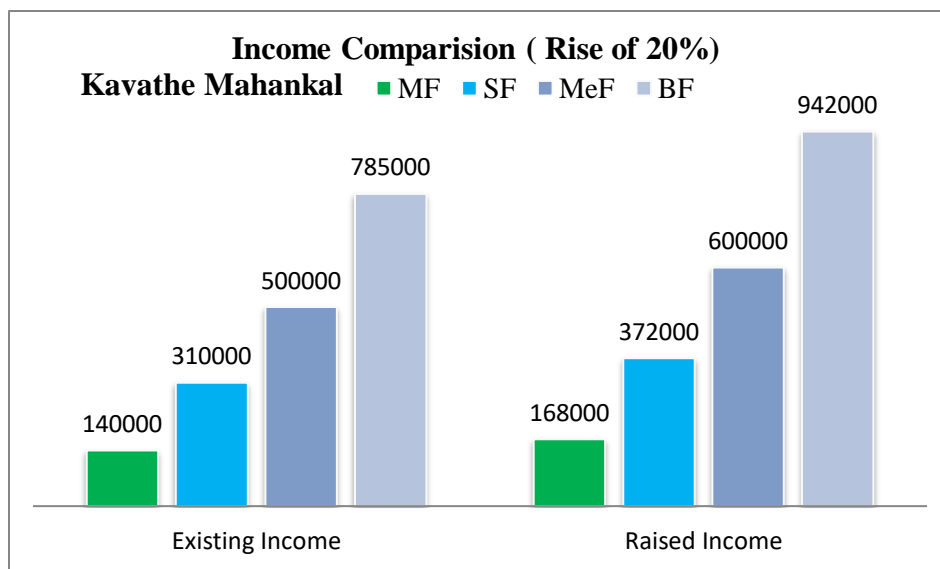
The rise in farmers’ income can be analyzed by taking into consideration the existing incomes and future incomes. These two income groups are compared by assuming the rise of 20% in incomes from all sources. It is shown in following table:

Table No. 4. Comparative Incomes:

Income Source	Existing Income of MF	Income with rise of 20%	Existing Income of SF	Income with rise of 20%	Existing Income of MeF	Income with rise of 20%	Existing Income of BF	Income with rise of 20%
Agriculture Produces	25000	30000	100000	120000	150000	180000	250000	300000
Allied activities	60000	72000	70000	84000	60000	72000	90000	108000
Agri. Labour	30000	36000	20000	24000	10000	12000	0	0
Hiring farm machineries	0	0	0	0	20000	24000	50000	60000
Hiring irrigation water	0	0	10000	12000	20000	24000	50000	60000
Deposits/Interest on Deposits	0	0	0	0	5000	6000	20000	24000
Employment salary	0	0	100000	120000	125000	150000	150000	180000
Business	0	0	0	0	100000	120000	150000	180000
Other Income	25000	30000	10000	12000	10000	12000	25000	30000
Total Income	140000	168000	310000	372000	500000	600000	785000	942000

Source: Field Survey, 2023

Graph No.3. Income Comparison:



Graph No. 3. Income Comparison:

If the agriculture activities are efficiently handled by farmers taking the aids of government’s agencies, farmers can achieve this target of rise in income. The first group of farmers, i.e. marginal farmers can earn more income of

Rs.28000/- (20% rise). The second group of small farmers earns more income of Rs.62000/- (20% rise). The third group of medium farmers earns more income by Rs.100000/- (20% rise). The fourth group of big farmers earns more income by Rs.157000/- (20% rise).

This can happen by farming with new concepts/methods in agriculture, diversifying agriculture, insertion of innovative technologies in farming and by other means.

VII) THE ALTERNATIVES FOR RAISING INCOME:

The people of this area have engaged in two types of main activities – Farm activities, and non-farm activities. Their incomes vary with their varied activities. The income of an individual can be raised through two ways – one is to raise farm income by applying standard processes and innovative technologies; and second is to raise non-farm income by applying diversified activities like jobs /employment, business, industry, trading, etc.

Raising Income from Farm Activities

Cropping System: Mixed cropping of cereals, pulses and cash crops is the best choice. The plans for the suitable crops to be grown, the times of ploughing, planting, and harvesting, the quantities of fertilizer and manures to be used is to be scheduled in time and correct.

Use of Seeds: There are varieties of seeds in the market. The improved qualities of seeds may be used. The high-yielding varieties are available.

Use of Fertilizers: Chemical fertilizers are immensely used by farmers. But organic fertilizers are important as they improve the soil structure, promote soil life and contain plant-feeding elements. Compost, Stable manure, Green manure are organic manures. They must be used in large quantities.) “Paramparagat Krishi Vikas Yojana (PKVY)^{xiv}” is launched by government for promoting organic farming.

Mechanized farming: In modern agriculture, a large proportion of the farm labour has shifted from agriculture into other pursuits. That fundamental shift is due to output and time taken by the labour force. Now-a-days the agriculture is associated with modern technology. There are machines/equipments like tractor, cultivator, rotavators, harvester, cutter, thresher, sprayer, etc. that give better and cost-effective output saving time.

Irrigation^{xv}: Kavathe Mahankal tehsil has about 23.32% of irrigation. Two major projects- Tembhu and Takari/Maisal supply 11942 mld and 14164 mld water to this tehsil, respectively. The better use of canal water is to be done effectively. Other minor projects at individual level or group-level can be undertaken.

Allied Activities: The browsing species of animals be reared that would produce more yields. However, the problem of fodder is the obstacle in rearing. But, this may be solved by creating green fields in uncultivable lands.

Bee-keeping has been promoted under Mission for Integrated Development of Horticulture (MIDH)^{xvi} to increase the productivity of crops through pollination and increase the honey production as an additional source of income of farmers.

Storage of Run-off water: The run-off water may be stored in ponds, tanks, and wells. It can be used in dry season. In future more investment is needed for water harvesting ponds and dams for recycling water for irrigation purpose.

The hardy fruit crops like ber, guava, pomegranate, mulberry, etc. can be grown in drylands. National Horticulture Board provides assistance for Date palm cultivation under the component of Development of Commercial Horticulture on demand driven basis.

Vegetable farming: The farmers can grow vegetables in their lands. In such farming they should use high-class varieties growing on low quantity of water.

Tissue Culture: Under the Mission for Integrated Development of Horticulture, assistance is provided for establishment of Tissue Culture Lab @ 40% of cost to private sector and 100% of total cost to public sector (cost norms Rs.250.00 lakh/unit) for multiplication of Tissue Culture Plant of Date palm.

VIII) RAISING INCOME FROM NON-FARM ACTIVITIES:

Use of Information Technology and Research: The contribution of research is in formulation of contingency plans for possible aberrant weather conditions. The technology is used for remote-sensing and forecasting of weather, information of disease, pest epidemics, and cyclones. The farmers must be techno-savvy to some extent and own the knowledge of the events happening. The government has launched 'e-NAM' initiative to provide farmers an electronic transparent and competitive online trading platform.

Agri-business: It consists of agricultural setting business of inputs which include seeds, fertilizers, pesticides, insecticides, livestock feed, organic manure and compost, planting material, etc. It also consists of trading of agricultural produces like fruits and vegetables, pulses, edible seeds, nuts and oils, grain milling products, dairy products, meat, fish and poultry, beverages, etc.

Agro-processing units: Agricultural processing includes dehydration, canning, packaging, processing of herbal and medicinal plants, dairy products, poultry products, livestock, food processing—for example, cereals for starch and feed, or millets for malt, drying, bleaching and processing for spices, condiments, dry fruits and savouries, mills for sugar and textiles. There is scope for setting the processing units in this area.

Ethanol Projects: Currently, most of this ethanol is made from molasses, a by-product of sugarcane. The production process uses a lot of water. Every litre of ethanol needs 2860 litres of water. Some studies indicate that converting sugarcane juice to ethanol is a more efficient process, as compared to converting molasses to ethanol

Sr. No	Z-test (Two tailed test) at 95 Percent Confidence Interval					
	Indicators	Sub-Hypothesis	Observation	P-Value	Mean Difference	Decision
1	Annual income	$H_0-433750=520500$	4	0.000	-86750	H_0 -Reject
		$H_1-433750\neq 520500$				H_a -Accept
2	Per Capita Per Day Income	$H_0-241=290$	4	0.000	-49	H_0 -Reject
		$H_1-241\neq 290$				H_a -Accept

because it consumes less water. Meanwhile, sugarcane farmers in Maharashtra are unhappy with the fair and remunerative price rate being offered for the crop, the staggered nature of payment, the lack of transparency in the weighing system, and rising costs of raw materials. The Sangli district is the bigger sugarcane producer. So, the ethanol projects can be started. This will generate additional income and employment.

Stable Markets: Many channels of government agencies and co-operatives are functioning through PCMC markets and mandies. The government has decided on fair prices of farm produces. Still, there is a gap in between fair price. The farmers have moved to revolutionary actions. But, the crisis of prices of farm products is not resolved. In such a position, the farmers can farm their own local mandies and decide on prices of their produces. This has started recently; but on sample basis.

HYPOTHESIS TESTING:

The above table adequately proves that the level of income of the people in the drought prone area is significantly lower and consequently standard of living is also lower, which demand to evolve strategies to improve.

XI) MAJOR FINDINGS AND POLICY SUGGESTIONS:

MAJOR FINDINGS:

Kavathe Mahankal tehsil is 100% drought-prone area. The geographical area of this tehsil is 93767 ha. i.e. 10.89% of total area 861000 ha of the district. The quality of land is inferior to have good yield of farm products. The average rainfall is below 60 mm in a year.

The Farmers cultivate drought tolerant crops like jowar, bajra, maize, groundnut, etc. and plant fruits like guava, ber, pomegranate, dragon fruit, etc. These crops require low amount of water. This tehsil has low productivity i.e. below average. The gross incomes of the households in categories of marginal farmers, small farmers, medium farmers and big farmers are Rs. 5000/-, Rs. 30000/-, Rs. 55000/- and Rs. 100000/- respectively. The main activity of the people of this tehsil is agriculture. Nearly 72% people are engaged in agriculture. The rest are in other jobs, taking education, unemployed, and labour works. The main allied activity of farmers' community is dairy farming. They earn nearly 25% of income from milk production. The farmers belonging to categories, marginal and small, have no farm machineries. Instead, they hire it when they are in need. The socio-economic status of medium and big farmers is better in villages; they are involved in political activities. The percentage of number of marginal and

small farmers in this tehsil comes to 49.0%, while percentage of landholding comes to 29.40%. There is no medium or big size industry in this tehsil, except one sugar mill and 2 textile mills. There is a large number of educated youths who are unemployed. The livelihood of the population of this tehsil is not sustainable due to climatic conditions, limited resources, financial un-stability and other effective factors.

POLICY SUGGESTIONS:

The whole population of this tehsil should be alert well in advance and informative of forecasts relating to climatic conditions. For this better assistance of meteorological department can be taken. The population of this tehsil should find the alternative ways of diversification towards high value crops required to improve income for their better living.

The Farmers households should undertake diversification towards livestock, poultry and towards non-farm sector activities is considered ideal, especially, for small holders who do not possess adequate land to generate enough income for the family. The farmers' community should enhance the farm productivity by adapting to new processes and modern technologies in farming. The youths of farmer households must take higher education to have eligibility for getting better jobs/employments. They can avail scholarships, education loans and free-ships. So, they cannot be sharers in income of family. The farmers must produce drought tolerant crops and while doing so, they can get financial and technical assistance from government agencies. There is scope for horticulture. So, the fruits like pomegranate, guava, ber, banana, grape, etc. can be grown on commercial basis. The farmers or their groups can erect minor irrigation projects so as to meet the need of water. The communities of this tehsil should be health conscious. There are many schemes of the governments and insurance companies that compensate for health problems. There are PM Swasthya Yojana, and PM Jan Arogya Yojana that bear all expenses of hospitalization. The farmers should open agro-based enterprises at local place which can hire farm machineries on nominal rent to farmers. This will imply new jobs and fulfill farm needs. The youths of farmer households after taking higher education and without accepting any jobs may set their businesses at local place; thus generating self-employment. Climate Change resilience can be built in through stabilisation and management of the natural resource base with an ecosystems-based approach to Participatory Watershed Management as a central point of activity. The governments should leverage the existing flagship programmes with unified focus for doubling farmers' income. There is huge gap between the yields of the crops and the attainable yields. This gap can be bridged by simple agronomic practices, crop rotations and weed control. The major issue is the rising production costs. Cost reduction strategy can improve the income. The government should keep control on input prices of seeds, fertilizers, pesticides, and other inputs.

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