

Chapter-3

DEPARTMENT OF AGRICULTURE

Topographically, the District can be divided into three broad regions mainly on basis of soil-crop-climate complex.

(i) Flood-plains ; Paddy-Maize-Wheat

This is most fertile area of this district formed by Beas in North-West. More than 580 Sq.Kms are under cultivation in these plains. It covers about 17.00 percent of the geographical area of the District. It has wide-spread irrigation facilities. Paddy-Wheat followed by maize-wheat are the main rotations of this region.

(ii) Kandi Belt ; Maize-Wheat

The Kandi area is located at the foot of Shivaliks and covers the submountaneous undulating plain with a slope of more than 16 meters per kilometer which progressively decreases towards west side of the district. There is acute shortage of water and this area faces high incidence of soil erosion which is caused by the rivulets (choes) passing through this region and are flooded during the rainy season. Soil of this region is poor and it constitutes 53% of total geographical area of this Distt. In Kandi area about 50% area is sown under rainfed conditions. Rainfall at the sowing time is a major factor influencing rise of fall in the sown area of this belt and and this is the major cause of wide fluctuations in area and production of crops in the district. This region broadly covers Talwara ,Bhunga and Hoshiarpur-II. Maize in kharif and wheat in rabi are the major crops of this region.

(iii) Bet Area :Maize-Wheat,Paddy-Wheat,Sugarcane

Located on the beds of lower Shivalik , these are undulating plains with relatively low slope decreasing upto 4 metres per kilometers covers 30% area of the district . This is suitable for maize , sugarcane and paddy crops.

CONSTRAINTS ON AGRICULTURAL GROWTH IN THE DISTRICT

The main problems which hinder development of farming in this Distt. are :-

- 1) Insufficient ground water & erratic rainfall distribution
- 2).Excessive run off and sediment
- 3) loss.Low fertility of soils. 4)Small land holding
- 5) Insect pest & wild animal
- 6) Lack of improved crop production and protection technology
- 7) Lack of infrastructure

To over come these constraints, measure to generate additional employment , to improve soil health and to trace nutrient deficiency in different type of soil should be taken . Beekeeping , Vermiculture, Mobile Soil Testing Laboratory & Mobile Plant Clinic & Training Van are few measure that are proposed by Department of Agriculture to solve the problems of farmers.

A. Proposal for Gypsum in Selenium affected villages

In district Hoshiarpur three village namely Simbli, Panam and Nazarpur are affected with Selenium. Selenium contents in fodder and food effect severely animal and human being. Out of total 500 acre effected, 200 acre is severely affected. Because of high Selenium contents in shallow under ground water, this water is not fit for irrigation. Application of Gypsum can reclaim soil. During 1994-95 department of agriculture distributed gypsum free of cost to the farmers to treat the effected fields. The results were excellent. So to reclaim the soil the department of Agriculture need following fund :-

Estimated costs :-

Area affected from Selenium = 500 acre
 Need of Gypsum per acre = 4 quintal in alternate year.
 Total Gypsum (for three year) = 8 quintal.
 Need of Gypsum for Selenium affected area = 500 X 8 = 4000 quintal or 400 ton.
 Estimated cost of Gypsum per acre = Rs. 1375
 Total expenditure for Selenium affected area = 1375 X 500 = Rs. 687500
 Training to farmers = Rs. 12500
 Total estimated cost = Rs. 700000

Summary of main objectives / benefits

The summary of main objectives and benefits expected to be achieved are given below -

Objective	Scheme	Direct	Indirect Output	Indirect Output
To reclaim the selenium effected soil.	Gypsum for selenium effected soil.	Reduce selenium effect in the soil and prevent spread disease in human being and animal by selenium toxicity.	Reduce selenium toxicity effected fodder and food to spread in other area of the state.	Reduce disease in human being and animals created by selenium toxicity.

The above project will benefit a population of 9500 persons , will generate 500 man days employment and will create sustained employment for 100 persons

B. Proposal for Vermicompost

Punjab is an agricultural state About 65% farmers are marginal and small farmers. During 1950 S And early 60 s only nitrogen nutrient deficiency was fulfilled through chemical fertilizers. After the green revolution due to the sowing of high yielding varieties of crops continuously , there is deficiencies of nutrients in soil like N,P,K,Zn,Fe,S,Mn &Cu. One has to add all these nutrients in the shape of chemical fertilizers in the soil.

Micro organism in the soil are declining and the soil health is deteriorating day by day . At present organic matter in Punjab soils is 0.02% to 0.25% which is low as compared to minimum requirement of 0.45% to efficiently use of Bio fertilizers . Fertility of soil is

declining due to use of chemical fertilizers. The physico-chemical and biological properties of soil are deteriorating further.

In Punjab small farmers burn rice straw and husk. On burning 246 lac tons of rice straw the losses are as under:

Nutrient	Quantity in the lac tons
N	0.97
P	0.48
K	2.60

The total nutrients loss is 4.05 lac tons. To maintain the soil health we have to depend on FYM, compost and green manuring. The vermicompost is a cheaper & balance organic fertilizer.

At present in distt. Hoshiarpur the farm waste are as under.

S.No.	Source	Approximate quantity(lac tons)
1.	Rice straw & husk	5.7
2.	Sugarcane trash	0.5
3.	City garbage	0.5
4.	Cow dung	12.0
	Total	18.7

About 12 lac tons of vermicompost can be prepare from, this waste. So there is enough scope for vermiculture.

Process for formation of vermiculture

Vermicomposting is an easy and effective way to recycle agricultural waste, city garbage and kitchen waste. In this process worms helps in transforming waste in to high quality fertilizer. The vermicompost is valuable soil amendment and may replace the chemical fertilizer . Many countries have adopted vermicomposting for sound waste management and recycling strategies. The concept has many benefits without negative attributes. Eisenia foetida and Eudrilus eugene species are identified as best vermicomposters.

Preparation of Vermicompost

Conversion of selected garbage components by earth worm are simple process and can be easily handled by any layman in the village . The main things required for preparation of vermicompost are farm wastes, leaves of plants and cow dung, and peeling of vegetables etc. Pits of one meter width and length as required to be constructed in a shady location under trees or a shed. The bottom of the pit is made up of 2 inch layer pieces of bricks and sand or floored with bricks. This will facilitate the drainage of water. Above this about 6 inch layer of loam soil are spread. This will act as a bed for earth worms. Put thick layer of wheat bhusa, or leaves or any farm waste of 3 inch to 4 inch on the vermibed. It is kept moist without flooding. After this made a layer of 2 inch to 3 inch of well rotted FYM and then put worms at the rate of 3 kgs per 100 sq feet of bed. After putting the worms . fill the pit with straw, leaves of plants, kitchen waste, or a week old dung up to 4 inch. After every 4 days put the raw material up to 4 inch till the pits are completely filled. Finally it is covered with gunny bags. Keep on watering to maintain the moisture upto 40%.

At maturity watering is stopped to ensure drying of compost and for inducing the worms to migrate to other vermibeds. This worm culture can again be used for preparation of vermicompost. The mature compost is grey to brown coloured granular mass. After collecting from the pits, it is sieved and dried in shade and packed.

This process completes in 45-60 days. The process depends on the number of earth worms in the pits. In the starting it will take about 60 days, After wards this process will complete in 40-45 days.

Advantages of vermicompost

1. Vermicompost is stable fine granular organic matter, when added to clay soil, loosens the soil and provides the passage for entry of air and water. It absorbs the water and prevent water logging and improves water holding capacities. In sandy soils where there is problem of water retention, the strong mucus coated aggregates of vermicompost hold water for longer time.
2. Vermicompost is not only a mixture of NPK but also contains many micro nutrients like Mn,Fe,Mo,B,Cu and Zn etc.

AVERAGE NUTRIENT CONTENTS OF VERMICOMPOST & FYM.

S.No.	Nutrient	Vermicompost	FYM
1.	N %	1.4 – 1.6	0.50 – 0.75
2.	P ₂ O ₅ %	1.6 - 2.5	0.17 – 0.20
3.	K ₂ O %	0.6 – 0.8	0.50 – 0.55
4.	Ca %	0.44	0.91
5.	Mg %	0.15	0.19
6.	Fe (ppm)	175.2	146.5
7.	Mn (ppm)	96.51	69.0
8.	Zn (ppm)	24.43	14.5
9.	Cu (ppm)	4.89	2.8
10.	C : N ratio	15 : 1	31 : 1

3. By buffering action it neutralize the soil pH.
4. Vericompost improves the physio chemical as well as the biological properties of soil hence improves the soil fertility.
5. Enhance quality, self life and nutritive value of horticultural crops.
6. Vermicompost keeps the temperature of soil cool in summer and warm in winter season.

Estimated cost of unit of vermicompost capacity 2.5 tons

S.No.	Item	Estimated cost(Rs.)
1	Shed 27' x 12'	20000-00
2	Earth worms	7500-00
3	Water arrangement & Equipment	2500-00
	Total	30000-00

The production of compost in a year is 20 tons & net income from this 20 tons vermicompost is Rs. 16000.

Financial gain to group from vermicompost :-

Capacity of 1 unit of vermicompost = 20 ton per year.

Profit per ton of compost = Rs. 800

Profit per unit of vermicompost = 20 X 800 = Rs.16000 per year.

Labour cost (direct employment) per ton = Rs. 250

Labour cost (direct employment) per unit per year = 20 X 250 = Rs. 5000

Indirect employment i.e. transportation = Rs. 250 per ton

Transportation cost per unit per year = 20 X 250 = Rs. 5000

Net profit per help or group of farmers = 16000 X 10 = Rs. 160000 per year

Direct employment of labour = 5000 X 10 = Rs. 50000 per year.

Indirect employment i.e. Transportation = 5000 X 10 = Rs. 50000 per year.

Total financial gain from a group = Rs. 160000 + Rs. 50000 + Rs. 50000 = Rs. 260000 per year.

Earth worm can be used for hunting fishes and it can be used as feed to the fishes. About 200 Kg. earth worm can be surplus from the unit every year.

Total cost of 3000 vermicompost shed @ Rs 30000per unit is Rs. 9.00 Crore. If Rs. 15000/- will be provided under RSVY scheme and remaining amount will be arranged through bank as loan then the total project cost is 4.50 Crore. It is essential to impart training to self help group/small farmers. Expert of department will impart training to farmers for three days. At least 1000 farmers/members of SHGs will be trained under this scheme every year. So there is need of fund for imparting training to farmers / self help groups. So 2 % of total project cost will be allotted for training. Estimated cost of training will be 0.09 crore. So total share from RSVY to vermicompost as follow :-

For vermicompost shed = 4.50 crore

For training = 0.09 crore

Total = 4.59 crore.

For facilitating involvement of general self help groups in economic activity it has been envisaged that 100 self help groups per year will be trained by the agriculture department in vermiculture. The other details are as below-

Total SHGs to be trained	300 in three years
Members to be trained	3000 in three years
Average unit cost	30000 per unit
Revolving fund from project	15000 per unit
Bank loan	15000 per unit
Assistance from project	Rs-4.50 Crore
Training Component	Rs-0.09 Crore
Total project Cost	Rs-4.59 crores

Summary of main objectives / benefits

The summary of main objectives and benefits expected to be achieved are given below -

Objective	Scheme	Direct	Indirect Output	Indirect Output
Generate employment and produce vermicompost.	Vermicompost.	To generate self employment for 3000 farmers and vermicompost for 5000 acre.	Improve soil health, replace chemical fertilizer and generate employment	Reduce environment pollution and improve soil health.

The above Project will benefit 21500 persons ,will generate 204000 man days employment and will create sustained employment for 3000 persons

Promotion of Turmeric Plantatio

The production of green turmeric has shown significant improvement in Punjab but for use, it has to be dried, processed and grinded. No such facility exist in Punjab in the organised sector. As turmeric is an essential part of Indian cuisine and no immediate substitute is available, sustained growth in demand is expected for the product.

As a part to diversify agriculture huge potential under turmeric cultivation has been envisaged. Presently about 450 acre area is under turmeric cultivation in the district. Small and Marginal farmers interested in cultivation of Turmeric have formed an association to increase the area under the crop and for processing of the product. If processing facility of the product is made available the area under turmeric can increase to 1500 acres in one year as per the estimates of the department.

As per a simple economic estimate, one acre farm yields 40-45 quintals under shade and 80-90 quintals in open conditions. The raw turmeric is sold @ Rs 5/-per kg ie 45000/ Rs per acre as against 15000-20000 for other crops. The same will be procured by the society for processing . As such it will be a good viable alternative for the farmers by the department.

For promoting turmeric cultivation and to motivate farmers, agriculture department will educate, impart training and technical know how to the farmers. For this purpose 2% of the project proposals have been earmarked for training component to the farmers.

Turmeric Processing and Packaging

The production of Green Turmeric has shown significant improvement in district Hoshiarpur with current year levels in the range of 3000-4000 MT However, for the green turmeric to be used for various applications, it has to be dried, processed and grinding. No such facility exist in the district in the organized sector, resulting in very low realization of the value.

The main objective is to encourage local farmers to take up cultivation of cash crop and wean them away from already over produced crops like rice and wheat etc. under crop diversification and provide them a fair remuneration for their produce. The production of green turmeric has experienced a sustained growth in the past 4-5 years. However farmers face difficulty in selling their produce due to non-availability of any processing facility in the region. Major portion of the produce is processed locally through traditional method. If a processing and packaging plant is set up at district level it will encourage the farmers to produce turmeric.

Process

Cleaned turmeric finger/mother rhizomes are taken in perforated troughs made of GI or MS sheet with extended parallel handles. A perforated trough containing the raw turmeric is immersed in a pan with water, which can hold 3-4 trough at a time. The fingers/mother rhizomes are boiled till they become soft. The cooked turmeric is then taken out of the pan by lifting the trough and drawing the water into pan itself. The same hot water in the pan can be used for boiling next set of raw turmeric, which is already filled in the second set of troughs. Generally cooking of turmeric should be done within 2-3 days of harvest. The rhizomes may also be placed in basket with perforated bottom and sides and then dipped in covered tanks. Artificial drying is done by using cross flow hot air at maximum temperature 60°C. The yield of the dry product varies from 20-30% depending upon the variety and location where the crop is grown. Dried rhizomes are then polished and pulverized to convert it into fine powder.

Project Cost :

<u>Particulars</u>	<u>Rs. in Lacs</u>
Site development	2.00
Building	10.00
Plant & Machinery	19.00
Misc. fixed assets	4.00
Preliminary & Pre operative exp.	2.20
Margin money for working capital	2.00
Training (2%)	0.80

	40.00

(Project prepared by North India Technical Consultancy Organisation (NITCON))

Strengths of Project :

1Local available raw material and future potential.

Cent percent of the present supply of processed turmeric in the state of Punjab is being sourced from other regions.

Considerable freight advantage to local producer therefore, the unit can offer its product at market competitive rate.

Sustained / increasing demand for processed turmeric for various uses / purposes .

Provide a better alternative to rice and wheat cultivation to local farmer under crops diversification.

Provide alternate crop to enhance a per unit income of farmer in agro-forestry.

Light Texture soil of the district and congenial climate are suitable for Turmeric cultivation

The project will benefit a population of 2250 person, will generate 13500 man days employment and will create a sustained employment for 30 persons.

Maintenance of the Plant :

To manage this plant the control can be entrusted to a society of small and marginal farmers viz Farmer Produce Promotion Society (FAPRO), Village Kang Mai, P.O. Haryana, Distt. Hoshiarpur which was registered on 19.11.2001 under certificate of Registration of Society Act XXI of 1860. This society has a membership of 300 farmers and and bee-keepers who elect the managing committee . The Board of Directors constitute technical experts like Chief Agriculture Officer, Dy. Director (Horticulture) and the nominee of Punjab Agro Export Corporation. This society is already handling operations from the last four years. In order to meet the recurring expenditure on running and maintenance of machinery user nominal charges will be charged from beneficiaries/ members.

The society will form Farmer Clubs of a cluster of 2-3 villages to discuss and sort out local problems and will decide about the operations and the marketing strategy. The society with the active support of the department will impart necessary training input to the farmers and devise ways to make the product competitive and consumer friendly and to promote marketing. After the commissioning of the plant, the society will be responsible to run the project at its own without any further government assistance.

Promotion of Bee – Keeping

Honey is the natural syrup collected by Honey bees and sweetest way to get one's daily dose of essential nutrients like carbohydrates, minerals, amino acids, protein and vitamin in a combined form. Honey is among the storable foods which can be kept for long periods. In food processing, bakers and candy makers use honey as a source of reducing sugar contents. Honey is used in breakfast foods, shakes, sauces, and syrups as well as in jams, jellies and spreads.

Hoshiarpur district is known as 'Honey Bowl' of the Punjab State as there is sufficient availability of flora here round the year, particularly due to Sunflower crop. Department of Agriculture is providing training in Beekeeping and helping the trainees to acquire beehive colonies with the help of bank loan. Beehives are available from nearby district. Octroi on honey and sales tax on boxes have been exempted since March, 1995, which gave a great fillip to this activity. Private agencies in the district have also huge export orders of honey. During the year 2003-04, about 460 tons of honey had been exported to other states through private agencies.

The vast potential for bee keeping in Punjab in general and Hoshiarpur in particular is yet untapped as there is no comprehensive project having backward and forward integration at reasonable price. Bee keeping is a good source of income and employment to the farmers.

Bee keeping is the best source of self employment. There are about 800 beekeeper in District Hoshiarpur. The average yield range between 35 and 50 Kg per hive for stationary and migratory beekeeper respectively. However there is no honey processing plant in area which force them to sell their produce to unroganized sector at low price. Processing of honey is necessary before commercial sale to remove foreign particle, destroy yeast,

reduce moisture content, prevent fermentation and maintain original flavour, colour and nutritional value. Pasteurization/processing is also essential to avoid granulation of honey, not preferred in the domestic market. Honey marketing cum processing plant is required urgently and the quality of the honey is to be improved to get more export orders.

Bees collect pollen and nectar of flowers from rapeseed, safeda, citrus, pears, litchi, barseem, sunflower and khair which are available in Hoshiarpur in plenty. Besides pollen collection, they also help in cross pollination of some of these crops which improve yield and quality of the crop.

For promotion of Bee-keeping, the agriculture department will impart training to the small and marginal farmers and SHG members during the currency of the project to take up this self employment activity with bank loan. An estimated cost of 10 bee hives unit is Rs 30.000/ only which will be met by bank loan.

Proposal for setting up Honey bee processing plant-The project is proposed to be equipped with complete range of equipment from filtration to pasteurisation, moisture condensing unit and packing facilities. The unit would also have fully equipped laboratory to cater to the BIS/ AGMARK specifications. The setting up of honey processing facility would allow local honey to be competitive and available at reasonable prices and thus giving a boost to Punjab honey. A significant improvement in income of the bee keepers would provide a fillip to the agrarian economy.

Process: Raw honey is pre heated and strained/filtered through cartridge type micro filters to separate excessive pollen, wax and other micro impurities. It is then subjected to pasteurization by heating at different ranges of temperature to destroy osmophilic yeasts, to delay crystalization and to lower the viscosity for subsequent processing. The pasteurized honey passes through a vapour evaporation unit equipped with vacuum pump, condenser and condensate tank for removal of excess moisture/vapours. The processed honey after cooling is packed.

A significant improvement in remuneration to local bee farmers would provide a fillip to agrarian economy and help the bee farmers to introduce their product in the market at par with established supplier.

Cost of Project

Particulars	Rs. in Lacs
Site development	1.00
Building	6.00
Plant & Machinery	20.00
Misc. fixed assets	3.78
Preliminary & Pre operative exp.	3.50
Margin money for working capital	1.00
Training	0.72

	36.00

(Project prepared by North India Technical Consultancy Organisation (NITCON))

The above project will benefit a population of 27000 person, will generate 1080000 man days employment and will create a sustained self employment for 27020 persons.

Maintenance of the Plant :

To manage this plant the control can be entrusted to a society of small and marginal farmers viz Farmer Produce Promotion Society (FAPRO), Village Kang Mai, P.O. Haryana, Distt.

Hoshiarpur which was registered on 19.11.2001 under certificate of Registration of Society Act XXI of 1860. This society has a membership of 300 farmers and and bee-keepers who elect the managing committee . The Board of Directors constitute technical experts like Chief Agriculture Officer, Dy. Director (Horticulture) and the nominee of Punjab Agro Export Corporation. This society is already handling operations from the last four years. In order to meet the recurring expenditure on running and maintenance of machinery user nominal charges will be charged from beneficiaries/ members.

The society will form Farmer Clubs of a cluster of 2-3 villages to discuss and sort out local problems and will decide about the operations and the marketing strategy. The society with the active support of the department will impart necessary training input to the farmers and devise ways to make the product competitive and consumer friendly and to promote marketing. After the commissioning of the plant, the society will be responsible to run the project at its own without any further government assistance.

Summary -Agriculture department proposals

S.No.	Name of scheme	Total funds for schemes (in three years) in crore	Proposed share from RSVY in crore
1	Gypsum for selenium affected soils	0.07	0.07
2	Vermiculture	9.09	4.59
3	Promotion of Turmeric plantation	0.40	0.40
4	Promotion of Bee keeping	0.36	0.36
	Total	9.92	5.42