



HORTICULTURE DEPARTMENT TIRAP DISTRICT : KHONSA

NAME OF PROJECT

**POLICY PAPER ON DESIGNING OF
SUSTAINABLE HORTICULTURE ON MULTI -
STORIED CROPPING SYSTEM AND ALLIED
SECTOR UNDER MISSION ORGANIC
FOR DREAM CHANGE : RE-SHAPING THE
DEVELOPMENT DISCOURSE OF ARUNACHAL
PRADESH**

CONCISE STATEMENT

- This sustainable horticulture project is designed as Multi storied cropping with the cultivation of Large Cardamom, King Chilly, Ginger, Walnut, Avocado, natural standard of trees and *Michelia champaka* (Teeta Chap) as agro-forestry for windbreaks, along with vegetable cultivation and Animal Husbandry . In Animal Husbandry Duckery, Poultry and Dairy will be included. Over all large cardamom would be the main crop among all the crops.

MAIN OBJECTIVES OF THE PROPOSAL

- *To Re-Shape the conventional method of cultivation and uplift the rural economy.*
- *To eradicate **Opium menace** to the youths and upcoming generation with a motive of bringing social changes thereby bringing socio economic change.*
- *To overcome the use of synthetic fertilizers by introducing Organic cultivation under Mission Organic Arunachal.*
- *To generate employment to unemployed youth of Tirap District*

The proposed multi-Storied cropping system will include cultivation of Large Cardamom, Ginger, King Chilly, Walnut, Avocado, Natural tree as standard, Chamelia champaka as agroforestry along with vegetable cultivation and Animal Husbandry . In Animal Husbandry Duckery, Poultry and Dairy will be included where Large Cardamom is the main crop. Cluster approach mode of cultivation shall be obeyed while implementing the scheme.

LARGE CARDAMOM

- Large cardamom (*Amomum subulatum*) is a major cash crop contributing directly to poverty alleviation through rural economic development. The large cardamom crop needs a special consideration due to the fact that there has been practice of jhum cultivation and opium cultivation with jungle clearing of valuable trees and many species of shrubs of economic importance. The jungles are cleared up at the top or slopes of the mountains for seasonal cultivation which in long term affecting the green coverage increasing soil erosion and losing of organic fertility of top soil, thereby preventing the progress and development of the society as whole.
- In short, cardamom has helped to alleviate many smallholder households from poverty. Cardamom being shade loving is planted under trees. Cardamom is also contributing in mitigating climate change in addition to conservation of biodiversity and meeting household fuel wood and timber needs.

- The best sustainable alternative way to support the rural economy of farmers of Tirap District is to wean away the ill practice of **Jhum and opium cultivation** of the area and proper utilization of most potential hills through cultivation of horticulture crops with a special emphasis for cash crops like large cardamom
- Another highly positive reason for large cardamom plantations is its ability to protect the environment. The plants maintain permanent green cover on forest floor that prevents soil erosion and does not disturb the fragile ecosystem. It is ecologically adapted to farming on mountain slopes and under forestry system.

CLIMATE AND SOIL

- The crop grows well under the shade tree in the Sub-Himalayan mountains at an altitudes ranging from 1000 m to 2000 m above the sea level with rainfall of 3000 m to 3500 mm distributed in about 200 days a year. Cultivars suited to higher altitudes can tolerate lower temperatures and those suited to lower altitudes to marginally higher temperature regimes. Deep and well drained soil with loamy texture and best suited. The PH ranges from 4.5 to 6.0. The terrains, land with moderate slope is preferred and Agro Climatic conditions of the district is quite conducive for growing the proposed crops.

CULTIVARS

There are mainly five cultivars

- **Ramsey:** Suited to high altitudes above 1515 m from sea Level
- **Sawney :** Most suited to medium and high altitude areas of 1350 m from sea level and above.
- **Golsey:** Suitable in the areas below 1500 m from the sea level
- **Seremna:** This cultivar is grown at low altitude and is known for its high yield potential.
- **Varlangey :** The variety is grown in mid and high altitude areas. Its yield performance is exceptionally high at high altitude

PROPAGATION

- The large cardamom is mostly propagated through seeds as well as suckers. Suckers are preferred mostly for commercial cultivation which are to be selected from diseases free and high yielding mother plant. However, saplings raised from seeds are encouraging for extensive cultivation. It grows well in marshy and catchment area of streams.

LAND PREPARATION

Planting is done during March – June, when there is enough moisture in soil. The land selected for planting is cleared of all under growth, weeds etc. Pits size of 30x30x30 cm are prepared at a spacing of 1.5 m x 1.5 m, after the onset of monsoon showers. Wider spacing of 1.8 m x 1.8 m is recommended for cultivars like Sawney, Varlangey, Ramsey etc. The pits are filled with topsoil mixed with cowdung manure compost @ 1 – 3 kg per pit. Seedlings/Suckers are planted in the centre of the pits. Care should be taken not to plant the seedling/rhizome very deep in the pit. After planting the seedlings/suckers may be staked and the base is mulched with dried leaves.

MANURING AND FERTILIZER

- For a sustained production the soil fertility should be maintained to its optimum. Well decomposed cattle manure/compost or organic products, non – edible oil cakes may be applied @ 2 kg/plant at least once in two years in April – May. In plantation with very high productivity, fertilizers @ 20:30:40 kg NPK per hectare may be applied in two split doses with full of P and half dose of N & K in April and half dose of N & K in September. Mulching the base of plants after application of the second dose helps the plants in the intake of nutrients

WEEDING

- Weed control in the plantations crop is important for the maximum utilization of the available soil moisture and nutrients by the plant. Three rounds of the weed growth in the initial two to three years. Weeding can be either hand weeding or sickle weeding depending upon the intensity of weed growth from the plant base. The weeds can be pulled out by hand and the weeds in the entire space need only be slashed with sickle. Clean weeding may be avoided. While weeding, dried shoots and other trashed materials can be used as mulch around the plant base to conserve soil moisture in the ensuing dry months and to prevent weed growth around the plant base.

IRRIGATION

- Irrigation can be exploited to irrigate the crop by gravity flow, either through pipes, sprinklers or flood irrigation through open channels. For sustainable and better yield the plants may be done @ 40 – 50 litres per plant at fortnight intervals.

PEST AND DISEASE

- There are many species of pests and insects, large cardamom is free from the attack of any major pests except for the sporadic incidence of leaf eating caterpillars. Aphids are found in most of the areas, which transmits virus diseases, viz chirke and foorkey. Problems due to fungal or bacterial diseases found in this crop. Diseases like leaf streak or rot diseases are found in large cardamom.

HARVESTING AND CURING

- The indication of time of harvest is when the capsules of topmost turns into brown in colour. The maturity bearing tillers are cut to a height of 30 – 45 cm and left another 10 – 15 days for full maturity. The harvested spikes are heaped and capsules separated and dried. The cured capsules are rubbed on wire mesh for clearing and removal of calyx (tail).
- The improved curing techniques are presently available by which cardamom is processed to give better quality and appearance. One such method of spices board improved Bhatti system of curing in which cardamom is dried by indirect heating at 45° c – 50° c.

Organic farming concept and development

- Organic farming is an alternative Horticulture/agricultural system which originated early in the 20th century in reaction to rapidly changing farming practices. Organic farming continues to be developed by various organic agriculture organizations today. It relies on fertilizers of organic origin such as compost manure, green manure, and bone meal and places emphasis on techniques such as crop rotation and companion planting. Biological pest control, mixed cropping and the fostering of insect predators are encouraged. In general, organic standards are designed to allow the use of naturally occurring substances while prohibiting or strictly limiting synthetic substances

For instance, naturally occurring pesticides such as [pyrethrin](#) and [rotenone](#) are permitted, while synthetic [fertilizers](#) and [pesticides](#) are generally prohibited. Synthetic substances that are allowed include, for example, [copper sulfate](#), elemental [sulfur](#) etc. [Genetically modified organisms](#), [nanomaterials](#), human sewage [sludge](#), [plant growth regulators](#), [hormones](#), and [antibiotic used in livestock](#) husbandry are prohibited. Reasons for advocacy of organic farming include real or perceived advantages in [sustainability](#), [openness](#), [self-sufficiency](#), [autonomy/independence](#), [health](#), [food security](#), and [food safety](#), although the match between perception and reality is continually challenged.

- Organic agricultural methods are internationally regulated and legally enforced by many nations, based in large part on the standards set by the [International Federation of Organic Agriculture Movements](#) (IFOAM), an international [umbrella organization](#) for organic farming organizations established in 1972. Organic agriculture can be defined as: an integrated farming system that strives for sustainability, the enhancement of soil fertility and biological diversity whilst, with rare exceptions, prohibiting synthetic pesticides, antibiotics, synthetic fertilizers, genetically modified organisms, and growth hormones.

Need of organic farming

- With the increase in population our compulsion would be not only to stabilize agricultural production but to increase it further in sustainable manner. The scientists have realized that the 'Green Revolution' with high input use has reached a plateau and is now sustained with diminishing return of falling dividends. Thus, a natural balance needs to be maintained at all cost for existence of life and property. The obvious choice for that would be more relevant in the present era, when these agrochemicals which are produced from fossil fuel and are not renewable and are diminishing in availability. It may also cost heavily on our foreign exchange in future.

The key characteristics of organic farming benefits include

- Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention
- Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms
- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures
- Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention
- The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing
- Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats.

Cluster Approach for Organic Farming

- India is now looking at a "cluster" approach to increase the area under chemical free farming in other states, after turning Sikkim into a fully organic state. Maharashtra already started earmarking exclusive organic farming zones, it leading the pack, with 932 exclusive clusters, followed by Madhya Pradesh (880), Rajasthan (755), Uttar Pradesh (575), Uttarakhand (550) and Karnataka (545).

For promoting organic farming to cater to growing domestic demand and the high export potential of such crops, the Centre's overall plan is to develop 10,000 clusters, in which 1 cluster is of 20 hectares each, across the country exclusively. The aim of this planning is to increase the cultivated area under organic farming from nearly eight lakh hectares at present to 10 lakh hectares by 2017-18.

A cluster is formed by 50 or more farmers. For seed, harvesting of crops and transporting produce to the market under the Paramparagat Krishi Vikas Yojana' (traditional agriculture development plan) of the agriculture ministry, every farmer will be provided Rs 20,000 per acre in three years

Knowing the importance of Organic cultivation, Govt. of Arunachal Pradesh is also giving much emphasis on organic cultivation. In some pockets of west siang district of our state have also undertaken cluster approach of organic cultivation in the trade name of “GREEN GOLD”.

Economic viability of Large Cardamom Plantation in Multistoried cropping with Ginger, King Chilly, Walnut and Avocado, Vegetables and Animal husbandry (Duckery/Poultry/Diary) for 400 Hectares

Sl.No.	Establishment year	Standing crop/ Dry capsules	Rate	Economic Return
1.	1 st year	a). 4,888 nos. L/Cardamom Suckers b)2,000 Kgs Ginger c)King Chilly plant, 500 nos d) <i>Michelia champaka</i> (Teeta Chap) d)Walnut grafted e)Avocado saplings f) Vegetable Cultivation g)Animal husbandry (Duckery/poultry/Dairy)	Rs.7.00 Rs.30.00 Rs.10.00 Rs.12.00 14 Nos 14 Nos LS LS	Rs.34,216.00 Rs.60,000.00 Rs.5,000.00 Rs.600.00 910.00 7,000.00 Due to Vegetable cultivation and animal husbandry Economic return will be enhanced by 10%
2.	2 nd year	a). 9,776 nos. L/Cardamom Suckers. b)6,000 Kgs, Ginger c)King Chilly plant, 500 nos d) <i>Michelia champaka</i> (Teeta Chap) d)Wallnut grafted e)Avocado saplings f) Vegetable Cultivation g)Animal husbandry (Duckery/poultry/Dairy)	Rs.7.00 Rs.30.00 Rs.150.00 Rs.12.00 14 Nos 14 Nos LS LS	Rs.68,432.00 Rs.1,80,000.00 Rs.3,00,000.00 Rs.600.00 910.00 7,000.00 Due to Vegetable cultivation and animal husbandry Economic return will be enhanced by 10%
3.	3 rd year	a).29,328 nos. L/Cardamom Suckers. b) 14,664 Kgs (dried capsules) c). <i>Michelia champaka</i> (Teeta Chap) d)Walnut grafted e)Avocado saplings f) Vegetable Cultivation	Rs.7.00 Rs.300.00 Rs.12.00 14 Nos 14 Nos LS	Rs.2,05,296.00 Rs.43,99,200.00 Rs.600.00 910.00 7,000.00 Due to Vegetable cultivation and animal husbandry Economic return will be enhanced by 10%

FROM D.C KHONSA TIRAP DISTT.

**THANK
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