

CONCLAVE ON RE-SHAPING THE DEVELOPMENT DISCOURSE OF ARUNACHAL PRADESH

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SUB-THEME : SUSTAINABLE AGRICULTURE DEVELOPMENT

TOPIC:

From Bio-resource to Bio-enterprise – Sustainable and eco-friendly agriculture by harnessing indigenous plant bio-resources of Arunachal Pradesh.

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Abstract:

Arunachal Pradesh with huge forest and bio-resource wealth cannot follow similar kind of agricultural development strategies adopted by other states having no or lesser such resources. Being the lung of the country, the State has an important responsibility to strike balance in between agriculture expansion requirements and maintenance of forest cover and bio-diversity conservation. With fragile eco-system, natural calamities like flood and landslides, the State cannot afford to adopt such development strategies involving denudation of green covers to aggravate the calamities. The need of the hour is to adopt sustainable agriculture development strategies which are eco-friendly, more income generating to farmers, suiting to State's difficult geographical situations and infrastructural constraints , enhancing green covers to maintain the image of a green state of the country. Developing and judicious use of the State's rich plant bio-diversity as alternate high end commercial crops offers opportunity to fulfill such multi-pronged sustainable development aspirations of the State.

Key word: Bio-resource- Eco-friendly- sustainable agriculture.

Background:

Sustainable development of agriculture has assumed a very important placed in the recent years especially in view of ever increasing population and changing agriculture scenario. There is need for shifting from chemical dependent agriculture to organic agriculture for food safety while ensuring greater production for food and nutritional security. Also there is Climate Change factors that are going to change the direction of agricultural developmental plans as the world now needs not only food and nutritional security but environmental security as well without which the human survival on earth itself will be at stake.

Any form of development in the world cannot sustain itself if there is no element of plan for environmental security. This also hold indispensable for sustainable agriculture development as we cannot deliberate on sustainable agriculture agenda without discussing the sustainable irrigation plans which will again entail sustainable environment and forest management plans. We cannot simply advocate for area expansion for more crop production undermining the absorption capacity of the environment vis-à-vis water availability of the area for irrigation. Hence, sustainable agriculture development will be only possible if there is convergence of all

these development plans into one umbrella which calls for policy decision of the government to pool all resources scattered in different developmental ministries in the country such as Ministry of Agriculture and Farmers Welfare, Ministry of Water Resources, Ministry of Environment, Forest and Climate Change etc and do away with working in isolation of one another. There is need for complete paradigm shift in looking at the development agendas for agriculture for environmentally sensitive mountain states including Arunachal Pradesh.

Challenges and opportunities for sustainable agriculture development in Arunachal Pradesh:

In order to secure sustainable agriculture growth in the State, perhaps we will have to deal with multiple challenges although there are silver linings. The State can exploit its virgin soil and convert traditional organic shifting cultivation practices to commercial organic cultivation. The State has also multiple climatic conditions suitable for horticultural crops including highly valued indigenous medicinal plants for crop diversification. But the State is also inherent with fragile environment. The State faces devastations from flood and landslides during monsoon period of the year incurring huge losses of lives and properties including crop damages. So our agriculture expansion should not be to such an extent as to imbalance the forest and aggravate such natural calamities.

The agriculture in the State is mostly Shifting Cultivation with 1949.36 Sq.km under it (Wasteland Atlas of India- 2011). Due to cultivation in catchment areas, there is threat to rain fed perennial streams and rivers which forms major source of drinking water and irrigational water supply. For example, there is already concerns on drying of perennial streams which have been the sources of potable water supply and irrigation due to cultivations in the catchment areas. As per a report, water supply for total numbers of 733 habitations has been affected by drying of sources due to cultivations in the catchment areas in the *State (Public Health Engineering Department, Arunachal Pradesh, 2012)*. This is a serious threat as sustainable agriculture cannot be realized without sustaining irrigation water sources. Therefore, there is need to restrict the agricultural expansion to such an extent that it does not affect the forest-water augmentation continuum.

Another inherent bottleneck for agriculture development is poor road connectivity and severe lack of marketing and post harvest infrastructures. Majority of the farmers are in less accessible areas and are discouraged of commercial cultivations due to poor marketing of perishable produces. Hence, there is need for crop diversification towards non perishable high value low volume crops including high value medicinal plants by the way of converting huge plant bio-resources into bio-enterprise to enhance the farmers income.

Forest wealth is very vital to Arunachal Pradesh as the State is considered 12th mega bio-diversity hotspot in the world. The State is major carbon sink of the country and originator of

important rivers as about 3000 small streams and rivers flows out from forests of Arunachal Pradesh which provides huge ecological services to the nation. Existence of huge floral and faunal biodiversity is considered to be crucial for livelihood security of poor and vulnerable population and therefore, conservation of natural resources, maintenance of biological wealth while accelerating the agricultural growth are considered paramount importance in the present context and as well as of the future (*ICAR Vision-2030*). Thus we cannot jeopardize such natural wealth of the State for another set of development. As such there is a need to look at increasing the crop-productivity by technology innovations towards vertical expansion instead of horizontal expansion wherever possible.

In the context of above, the agenda for sustainable development of agriculture sector in the State needs multifaceted strategies, ranging from exploiting organic agriculture with sustainable irrigation, post harvest and marketing plans, technological infusion for more productivity through vertical expansion and converting the huge plant bio-resources to bio-enterprise. The State need to explores the possibility of developing indigenous plant bio-resources of the State as income-generating alternate economic or cash crops being easy to handle, high value low volume in nature and eco-friendly and more importantly to sustain the green coverage of the State while simultaneously giving good economic returns to the people.

Green wealth of Arunachal Pradesh:

As per the State of Forest Report 2015, an area of 67,248 sq.km of forest area has been recorded in Arunachal Pradesh which is second highest in India. The State, also known as Paradise for Botanist have more than 4500 species of flowering plants including 568 species of Orchids comprising 52% of total species found in the country. This includes more than 112 species of rare and medicinal orchids. The State is home to more than 500 species of medicinal plants which includes about 26 species of Globally Significant Medicinal Plants (GSMP). The State is also home to 78 species of bamboo which is more than 50% of total bamboo species found in the country. In the State is centre of origin of various cultivated crops like Mango, Citrus, Walnut, Kiwi, Cherry, Plum, Apple, Banana, Mangosteen, Rambutan etc as their wild relatives are found in the wilderness. These plant bio-resources comprise huge genetic pool for future food security of the people. Improvement of these resources could provide for niche produce of the State and which could prove high paying and more adaptive and eco-friendly over traditional crops.

Scope for developing bio-resources into bio-enterprise – A game changer:

a) Medicinal plants and wild spices;

Recent year's heavy extraction and bio-piracy of costly herbs from the State to black markets in Myanmar and China has exposed the huge commercial opportunities lying in plant bio-resource

of the State which yet unexplored. It also exposed the lack of awareness among people on their rich forest wealth and importance of bio-diversity. Or perhaps it could be due to lack of proper government policy to make best utilization of the bio-resource for benefit of the people and hence now needs correction before these valuable resources are lost forever.

Indigenous plants which are now in trade are highly priced in the markets and hence fetch heavy return in comparison to traditional crops. For example, a medicinal herb *Aconitum heterophyllum* found in the State and illegally traded is priced at Rs. 10,000- 15,000 per kg or *Paris Polyphylla* at Rs. 5000-7000 in the market which is not at all comparable to traditional crops like Pineapple , Apple or Oranges which are generally sold for Rs. 50 to 100 per kg in the season. Many valued medicinal plants of the State have been already exploited clandestinely in past such as *Taxus baccata* or Himalayan Yew for its anti-cancer properties. A pilot commercial cultivation is initiated in Mechuka, West Siang district.

There is also scope for commercial exploitation of some exotic spices found in wilderness. Star Anis (*Illicium griffithii*) is one such costly temperate spices found in cold region of the State. The current market price of the spice ranges from Rs. 2000 to 3000 per kg. Similarly the spice Large Cardamom which in recent years has emerged as profitable cash crop endemic to North East region of the country grows in large scale in wilderness in the State. The wild species of large cardamom found in the State has better aroma than the cultivated one. Now it fetches about Rs. 500 to 1500 per kg in the market. Such wild species could be developed into niche variety from the State with R&D efforts.

These medicinal plants and indigenous plants have huge scope of commercialization with the Central Government giving emphasis on development of Indian Traditional Medicine system or AYUSH and expansion of herbal companies like Patanjali, Dabur, Hindustan Liver etc in the North Eastern region.

b) Orchids and Floriculture:

Despite having huge diversity in the orchids, Arunachal Pradesh could not reap the benefit in floriculture business due to a simple reason that the efforts has not been put to develop this important bio-resource of the state. India has floriculture market of about Rs. 3500 Cr and it is growing at the rate of 25 to 30% per annum (ASSOCHAM, 2013). Indian domestic orchid market earlier had been filled with import of cheap orchids (Rs.10-30 per spike) from Thailand other South East Asian Nations. Now costly orchids (Rs. 50-100 per spike with vas life of 20-30 days) have also been introduced in the market by importing elite varieties or hybrids from Singapore, Thailand , Malaysia and Brazil and multiplying in the country. Not only internal demands for orchids has increased due to increased supply but also export has also gone up with Rs. 548.74 Cr in 2016-17 (APEDA). The world floriculture market is estimated to be of Rs. 90,000 Cr and India's share is meager which implies tremendous scope in this sector. There are

now about 300 units dealing in orchid business in India exporting to countries like US, UK, Italy, Germany, Japan, Netherland, Dubai, Kuwait etc from the imported hybrid varieties.

The significant point to compare here is that Arunachal has 568 species where as countries like Singapore and Thailand has about 250 to 300 native species. Had we utilized our orchid diversities in hybridization programme like Singapore and Thailand, perhaps internal markets for hybrid orchids in India could have been captured by the State. Therefore, there is need to exploit the opportunities existing in our own country by developing elite varieties through hybridization programme using our superior orchids diversity.

Conclusion:

Arunachal Pradesh, with high stake in vast forest cover and rich bio-diversity, will have natural dilemma in prioritizing commercial agriculture development and environmental or forest conservation as both the sector usually traverse in opposite directions. There are examples in the world on controversies involving large scale Palm Oil and Rubber cultivation vis-à-vis environmental degradation. Another important factor to consider is that 47,534.6 sq. km or 70.68% of total forest land of the State belongs to the indigenous tribal communities which provide livelihood and other requirements of the people. In these forest lands, people do jhuming or shifting cultivations. Hence, any forest conservation effort has to address the economic and livelihood interest of the people. Therefore, it is but natural for the policy planners to strike a balance whereby both environmental concerns and economic development has to be addressed simultaneously and appropriately. Further, considering difficult geographical situation and lack of marketing and post harvest facilities, agriculture planner has to promote high value low volume crops requiring less post harvest infrastructures avoiding losses by farmers.

Considering all vital factors as above, judicious utilization of bio-resources as alternative or complementary crops of commerce seem to be the right solution to the complex problems currently faced by the State in developing agriculture sector justified as under:

- a) If properly developed through R&D intervention, cultivation of indigenous plants will give much higher economic returns to farmers in comparison to normal crop varieties and could completely change economic status of farmers. After all, what matters to the farmers at the end of the day is what they earn, not what commodity they sell.
- b) The indigenous plants grows in wilderness and more adaptive to forest canopy environment. As such cultivation will be most eco-friendly with little requirement of clearance of forest for cultivation which otherwise is a major problem in normal agricultural developmental programmes.
- c) Indigenous plants are generally traded after drying , hence can be kept for long time and requires no elaborate post harvest facilities or processing unlike perishable items which get rot if not disposed at right time. Such crops suits with our majority poor farmers who does not have proper post harvest, transportation or marketing facilities.

- d) Promotion of eco-friendly indigenous plant cultivation will ensure green coverage which in turn will help preserve perennial flow of streams. That will further ensure assured irrigation for already cropped areas and make the cultivation sustainable.
- e) Commercial orchid is grown under protected cultivation and hence does not entail forest clearance. Hence, it will fetch good return to farmers with no much environmental hazards.
- f) The State could achieve twin objectives of economic development of farmers as well as maintenance of green coverage and bio-diversity.

Policy recommendations:

1. Policy and Road-map for development of indigenous economic plants into major niche crop of commerce originating from the State through vigorous R&D works. The policy should address need for development of eco-friendly cultivation technologies and production of elite varieties, besides protection and conservation of indigenous bio-resources.
2. Policy and Road-Map on Sustainable Agriculture vis-à-vis Sustainable Irrigation and Forest Management. The policy should address scope and limit of agricultural area expansion to be made keeping in view fragile eco-system and need of protecting Forest wealth as well. It should also address need for Catchment Area Protection for water security to sustain irrigation and potable water supply in the future. It should also essentially address need for more of vertical expansion and improvement in current cropped area for more production per unit area and doubling of farmer's income instead of expanding into newer areas, besides focus on more introductions of high value low volume crops considering inherent difficult geographical situation of the State.
3. Policy on incentives for people or communities maintaining forests and bio-diversity. The policy should address compensation for Ecological Service to the people of State and mechanism for access of the people to national and international green funds, which could be source of eco-driven livelihood.
4. Policy on Ecological Tourism involving the Community maintaining forests as alternate livelihood source.

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