CHAPTER-6

SUGGESTIVE RECOMMENDATIONS: A POLICY DOCUMENT

6. SUGGESTIVE RECOMMENDATIONS: A POLICY DOCUMENT

India has a strong traditional base in using herbal-based products for healthcare and therefore has a great opportunity to meet worldwide expectations through enhancing the exports of quality-based herbal raw material and strengthening the sector within the country. The sector requires fair trade practices, generating marketing, adopting *ex-situ* conservation methods of medicinal plants, resorting to GAP for generating quality herbal raw material, and mass awareness regarding potential medicinal plants among the general public, especially in the Punjab state which has less than 1% agricultural area under medicinal plants cultivation. Though, NMPB is playing a stellar role in promoting the medicinal plants sector across India through various promotional and awareness programs. The Regional-cum-facilitation Centres established by the NMPB is providing luminous light to aware, adopt, and train the farmers interested in medicinal plants. The farmers of the Indian state of Punjab have a unique cropping pattern *i.e.* monoculture of Wheat and Rice, which provides them an assured market, with zero risks in production. Hence, more efforts are required to shift farmers from traditional crops to medicinal plants. Based on the present study, we summarize some observations and recommendations in sections 6.1. and 6.2. that might help the concerned stakeholders in order to promote the adoption of medicinal plants.

6.1. OBSERVATIONS

6.1.1. Agriculture in Punjab: The Background

- The cultivable area of Punjab is 4.20 million hectares (83.4% of total geographical area).
- Punjab has become the epicenter of wheat-rice cropping pattern, after the successful implementation of the ‘Green Revolution' (farmech.dac.gov.in).

- The green revolution improved the economy of the farmers, but with time their economic condition started deteriorating, along with the depletion of natural resources and environmental degradation.
- On average, two farmers and one laborer have been committing suicide daily since 2000. Of the 10 lakh farming families in 1991, about 5 lakh were small ones in Punjab. In just one decade, these small farmer families came down to 3 lakhs. Under the capital intensive system of farming, 2 lakh families had given up farming in the state[*].

6.1.2. Ecological Status

- At present, 199.97 lakh metric tonnes of paddy has been procured in Punjab by the government of India during 2020-21, which is 19% more than the target of 168 lakh metric tonnes and 26% more than the procurement done during the corresponding period of 2019-20[†].
- The highly water-intensive paddy crop was not indigenous to Punjab and its widespread cultivation necessitated intense exploitation of groundwater sources. Flood irrigation and application of chemical fertilizers incentivized by government policies aimed at enhancing production damaged soil and its fertility over years.
- The water table level in the paddy growing areas has alarmingly gone down. According to a report, 15,000 litres of water is used to produce one Kg of paddy, while the requirement is just 600 litres as per the Indian Agricultural Research Institute[‡].

6.1.3. Need of Diversification in the State

- The *Johl* committee[§] (1986 and 2002) realized the unsustainability of the wheat-paddy cropping pattern and recommended a series of measures for restructuring and diversifying agriculture, the most significant of which was shifting 20 percent of the area under agriculture to non-paddy crops.

[*] Inputs: Article published by Prof. Sukhpal Singh, Principal economist, Punjab Agricultural University, Ludhiana, Punjab, in the Tribune, 01/Mar./2021.
[†]The Tribune (2020). Free farmer, empowered farmer. Ministry of Agriculture and Farmer Welfare. 21/November/2020.
[‡] Inputs: Article titled "Water use is excessive in rice cultivation", published in Down to Earth magazine, 10/November/2017,
§ Inputs: Article titled "Either there wasn't an economist in Swaminathan panel, or he didn't know economics", published in The Print, 16/March/2018.

- The committee also emphasized that commitment of central and state governments in terms of technological, institutional, and assured price support for alternative crops was critical for achieving the desired objective.
- Recently, the government of Punjab has set a diversification plan with the finance minister setting aside INR. 200 crores for this purpose[**].

6.1.4. Scope of Adoption of Medicinal Plants in the State

- Reports are revealing the growth of the herbal raw sector riding on the growth of herbal, wellness and nutraceutical industry in India. Apart from the collection of medicinal plants, the cultivation of medicinal plants was increased in the country. The major driving force behind this growth is the herbal units that are involved in making extracts, and specific formulations that required a high volume of limited species of good quality.
- Given the current level of farming technology and practices, promoting medicinal plants and horticulture crops based on their agro-ecological suitability, standard agro-techniques, and assured marketing can be a potential alternative to the traditional crops.
- Most of the medicinal plants are not only less water-intensive but also essential to meet the increasing demands of industry in the state.
- There is huge opportunity of marketing of the medicinal plants as there are 284 licensed herbal units in Punjab based on Ayurveda.
- There is a huge scope of integrating medicinal plants into the traditional cropping system. There is a tradition of practicing a mixed farming system comprising medicinal plants and traditional crops in the South Asian states indicating its scope in Punjab as well.
- Another advantage of incorporating medicinal plants in the traditional cropping system is their ease of incorporation due to a large number of species and choice of plants such as trees, shrubs, herbs.

[**] Inputs: Article titled "Diversification plan set to take off, finally**"** published in The Tribune, 01/March/2020.

6.2. RECOMMENDATIONS

6.2.1. Marketing of Medicinal Plants in Punjab: Challenges and Opportunities

- In order to promote medicinal plant cultivation in the state, the recommended crops must compete with traditional crops such as Paddy and Wheat, which have almost zero risks in cultivation and marketing. The agro-economics study mentioned in the section 5.10. of this thesis highlighted medicinal plants such as *Curcuma longa, Aloe vera, Ocimum sanctum*, have more returns than the traditional crops. Hence, other potential medicinal plants driven by their market demand and economic value (must give higher returns to the farmers as compared to the traditional crops that are supported by the minimum support price) shall be suggested to the farmers.
- During the field visits and general interaction, it was observed that some farmers stressed that providing subsidies has less value, if there are no potential buyers and marketing of medicinal plants. In contrast, many farmers showed their willingness to cultivate medicinal plants if informed regarding the potential buyers. Despite 284 licensed herbal industries in Punjab according to NMPB report, there is a huge gap between farmer and the industry, which needs to be bridged. Hence, more transparent trade practices ensuring an efficient link between the producer and the end-users, and monitoring the demand and supply of medicinal plants in the trade chain shall be helpful. The backward linkages (farm inputs) and forward linkages (processing and value additions) of agriculture should be set up in the public domain.
- A comprehensive network must be built in the state, which should make farmers aware regarding the nearest herbal industries, *mandis*, its demand, and the quality requirements. NMPB's *e.charak* mobile app., and other trading mobile apps. or a website for medicinal plant stakeholders involving online bidding of herbal produce based on the quality can be useful. The most important is the need for the policies that align all stakeholders' *viz.* farmer, buyer, industry, government, processing units, etc.
- Punjab has one of the strong marketing networks for wheat and paddy because of *mandis*. There are *mandis* every five to six kilometers in Punjab. These *mandis* employ up to 300,000 laborers in transportation, sorting, and packing.

These *mandis* procure from about 2 million farmers[††]. Therefore, the concept of the formation of herbal *mandi's* can be explored utilizing the existing infrastructure of *mandi* with the help of the state government and linking potential buyers for marketing of medicinal plants in the state.

- *Majith mandi*, Amritsar is the largest *mandi* after the *Khari Baoli*, New Delhi. The mandi has approximately 35 traders and 70 major medicinal entities (annual trade volume 20,000 MT) are traded from the mandi[‡‡]. Apparently, a mandi-level centralized record-keeping system for the trade shall be built for efficient trading of the medicinal plants.
- The collection center such as Herbal Health Research Consortium (HHRC)-Amritsar, supported by the Ministry of AYUSH can be explored for providing quality certifications of the farmer's produce for quality-based marketing.
- The present study highlighted the need for a written contract agreement between the farmers and the end-users (industries). There is a need to build confidence among the farmers and the industries to sign a contract agreement before initiating the cultivation of medicinal plants. The contract between the company and the farmers must be farmer-friendly and simple to understand by a farmer.
- A standard model draft for contract agreement must be made and its regulation must be carried out by the NMPB with the help of the state forest department or state agriculture department to assure guaranteed 100% buyback of the farmers produce. The regulatory body must assure that the agreement between the farmer and the industry was practical to implement. The demand for medicinal plants must not affect the agreement conditions and the duly amount must be paid to the farmers.
- To promote medicinal plants based products, National Bank for Agriculture and Rural Development (NABARD) shall significantly support interested farmers by providing them fair loans under farmer-producer organizations for starting agri-business.

[††] Inputs: Article by Arvind Shukla in the Gaon Connection, 15/Dec./2020.
[‡‡] Report on "Medicinal Plants in India: An Assessment of their Demand and Supply" by National Medicinal Plant Board and Indian Council of Forestry Research and Education, Dehradun, compiled by G.S. Goraya and D.K. Ved, 2017.

6.2.2. Mechanism for Promotion of Cultivation of Quality Medicinal Plants in Punjab

- ***Digitalization of medicinal plants cultivators and related stakeholder data:***

In India, information regarding medicinal plant cultivators, and herbal or related industries is not scattered but also scanty. This is a major hurdle for effective health care planning, linkage with industries, trade, and policy development. There is a need to identify model farmers involved in the cultivation of medicinal plants and subsequently, digitalize their information to avoid scattering their data in different departments. As represented in the section 5.4. of this present study, a digitalized network of model farmers would ensure linkages of farmers, promote interaction leading to the promotion of medicinal plant cultivation in the state. Apart from this, the mapping of farmers on the agro-ecological specific map using GIS would lead to determine the number of farmers cultivating the specific medicinal plant in the specific agro-ecological zone of Punjab highlighting the natural biophysical potential of the specific area. This model based on digital mapping can be brought to the public domain to link clients, farmers, industries, and concerned officials to plan strategies for improved access, trade, and outreach.

- ***Domestication of medicinal plants based on agro-ecological zoning model*:**

At present, there is no guidelines that give suggestions about right medicinal plants in the right location. Considering five different agro-ecological zones of Punjab, it is necessary to make the farmers aware regarding the agro-ecological suitability of the potential medicinal plants in the state. As detailed out in the section 5.2 of the present study, the medicinal plants based on the agro-ecological zoning studies shall be suggested to the farmers and made public through digital platforms, seminars, conferences, and medicinal plants stakeholders meetings conducted by the NMPB. Based on the climatic and land pattern data, we have highlighted 13 potential medicinal plants such as *A. vera, P. emblica, W. somnifera, G. glabra, A. racemosus, A. paniculata, O. sanctum, C. longa, C. asiatica, A. calamus, R. serpentina, O. basilicum,* and *C. borivilianum,* that can be adopted by the farmers in different agro-climatic zones of Punjab. Apart from these 13 medicinal plants, other medicinal plants based on the agro-ecological studies and market demand can be suggested to the farmers in future studies.

- ***Value additions, primary processing, and product development:***

In the presented in section 5.5 of the present study, except *C. longa* farmers that sold their produce in powder form, all the other farmers sold the produce without processing. Farmers have a long history of selling their produce as sourcing material at times even without drying leading them to fetch low price. Under such conditions value additions is the answer for good economic sustenance and sustainable supply of the sourcing material. Farmers must be made aware at least regarding the small scale agri-business opportunities that lead to manufacture herbal based products such as *Amla* pickles, *Triphala churna, Chyavanprash,* candies, medicinal plant based oils, etc. Farmer producer companies and self-help groups can augment value additions, primary processing, and product development.

- ***Farmer Producer Companies and Self Help Groups*:**

As detailed out in the section 5.5 of the study, it was observed that there was less participation of farmers in farmer-producer companies and self-help groups except a few in the present study. Farmer producer companies and self-help groups have a significant role in generating good income for the farmers especially the small farmers, who do not have large marketable surplus individually (both inputs and produce) to get the benefit of economies of scale. The farmers must be made aware and motivated to establish farmer-producer companies for value additions and product development. NMPB and RCFC-North-I can take a lead role in the mass awareness among the farmers. A concrete support policy should be laid down at state/national level to support such progressive farmers for effective outcomes.

- ***Clusters of medicinal plants cultivators:***

Farmers should be motivated at the mass level regarding the formation of large clusters of medicinal plant to attract the industries and similarly, processing equipment such as boiling, grinding, polishing, drying, distillation must be provided at village block level to facilitate the farmers for value additions.

- ***Promotional events:***

NMPB has played an important role in promoting the cultivation of medicinal plants by conducting medicinal plants stakeholders meetings. However, with the increase and projected growth of the medicinal plant sector, more promotional events related to local anchoring of cultivation and selection of species shall be conducted. Similarly, more extension services regarding the NMPB, Ministry of AYUSH's

'Central sector scheme on conservation, development, and sustainable management of medicinal plants' shall be disseminated to the farmers across the state through frequent medicinal plants stakeholders meetings.

- ***Identification of alternative potential crop cycles:***

Rice and wheat are considered commercially viable crops that are cultivated in *Kharif* and *Rabi* season respectively. After every end of the season, farmers get their assured income. In order to compete with the existing traditional crop cycle, alternative competitive medicinal plants based on *kharif* and *rabi* season shall be identified and suggested to the farmers with the help of various agricultural institutes. The cultivation of *C. longa* which is a nine-monthly crop can be rotated with the maize to replace water gulping paddy crop in Punjab. As presented in the section 5.2 of the present study, medicinal plants such as *O. sanctum, A. paniculata, C. borivilianum* can be potential *kharif* crops if their market is assured before their cultivation. Multilayer farming of medicinal plants with different types of vegetables, pulses, and fruits that may complement each other in many ways such as providing shade canopy, litter, increasing the moisture-holding capacity of the soil while nurturing microflora must be explored by the agricultural research institutions in order to generate maximum returns to the farmers. Cultivation of medicinal plants such as *P. emblica* and other medicinal tree species on the boundaries of the field can be fruitful for the farmers. Mixed farming of medicinal plants with the traditional crops can also be beneficial leading to soil improvement and enhancing livelihood if species are selected carefully.

- ***Organic certifications:***

The majority of the farmers in Punjab use both organic and chemical fertilizers to meet the N, P, K demands of the soil. The chemical fertilizers used are government-recommended *viz.* Urea, DAP, and Potash. Most of the *Kandi* region of Punjab has natural land and the belt has great potential for medicinal plant cultivation. So, farmers should be motivated to adopt medicinal plants in the region, and subsequently, organic certifications should be provided to the farmers accordingly with the help of government support. As highlighted in section 5.8 of the study, farmers must be made aware regarding the adoption of phytoremediation plants to circumvent heavy metal and pesticide residues, if any.

- ***Good Agricultural and Collection Practices:***

There is a prevailing belief that the adoption of GACP is restrictive and obstructs farmer's agriculture practices. On the contrary, the adoption of GACP provides a sustainable production system for both the producers and users. Hence, farmers must be made aware and motivated to adopt GACP with the help of the Quality Council of India (QCI). As highlighted in the section 5.5 of the study, less information is available regarding the propagation and agro-techniques of the majority of the medicinal plants in India. This trend suggests the need for the dissemination of good agricultural and collection practices methodologies, based on the state's agro-ecological conditions to the farmers.

- ***Quality Planting Material providers****:*

Farmers faced shortages of seeds or quality planting material as discussed in the section 5.5 of the present study. There are also increasing concerns regarding the authenticity of the planting material. Research organizations shall explore and identify more elite cultivars for the release at their institute level or through Central Varietal Release Committee. More species shall be explored to register under Protection of Plant Varieties and Farmers' Right Authority (PPVRFRA) registration domain. Furthermore, QPM/seeds should be produced at a high scale at various agricultural research centers and shall be made available to the farmers on subsidized rates at nearby places to avoid transportation costs.

- ***Testing labs:***

According to the present study, farmers lacked the crucial knowledge regarding the requirements of the industry in context to the quality of raw herbal produce as presented in the section 5.8 of the study. Therefore, more AYUSH and National Accreditation Board for Testing and Calibration Laboratories (NABL) testing labs shall be established in the state, and subsequently, the farmers must be made aware of these laboratories for evaluating the quality of produce in order to promote quality-based trade.

- ***Rural employment:***

The agro-economics study mentioned in section 5.10 of the present work highlighted the cultivation of medicinal plants as a labor extensive job; therefore its adoption has the potential to generate more rural employment, if implemented and fostered in systematic manner.

- ***Government funding:***

Funds are provided by the NMPB to establish collection centers, therefore farmers should be motivated and cooperative collection centers, storage, and processing centers shall be established. These centers shall be established in villages/blocks through the support of *panchayats*.

- ***Research:***

Research should be promoted to explore the feasibility of the cultivation of more medicinal plants. The agro-techniques should be drafted by active researchers with the help of the regional agricultural universities/ICAR institutions/NMPB. The Punjab Agricultural University Ludhiana and its research stations can provide great help in drafting agro-techniques of medicinal plants based on demonstration plots. An exclusive department of medicinal plants must be established in the PAU with the cooperation of NMPB and related ICAR institutes.

- ***Planning:***

The promotion of cooperatives/state farming, micro and macro-level planning of medicinal plant production, and consumption requirements should be prepared. Government should establish '*Kisan-Aushadh-Kendra*' providing a one-stop solution to the farmers for purchase, obtaining QPM, storage, processing, quality testing, product development and technology, entrepreneurship support, facilitation, industry linkage, and consultancy. The policies shall be planned in such a way enabling a stepwise 05-year plan to achieve the target of converting 20-25% of farmers towards medicinal plant cultivation.

The Government of Punjab is keen in exploring potential crops for diversification. As already discussed medicinal plants have huge market demand requires almost no chemical fertilizers or pesticides, therefore suggesting medicinal plants to the farmers of Punjab can help in economy and reducing soil distress. As the cultivation of medicinal plants is almost new in Punjab, it requires a comprehensive roadmap to promote cultivation of medicinal plants. The suggestions mentioned in this chapter would help the policymakers to suggest suitable medicinal plants to the farmers based on agro-climatic suitability and subsequently help in aligning the farmers using a holistic geo-spatial model. This policy document is drafted keeping in view the volatile market of medicinal plants, therefore, the suggestions based on trading with the Government participation will be helpful to the farmers. It further focusses on to

strengthen already existing *mandi* system that can be a viable platform for selling herbs. Apart from this, the suggestions presented in this chapter highlights the need of active participation of farmers in self-help groups, farmer-producer companies in order to promote clusters and value additions promoting rural based agri-business. In contrast, the highlighted suggestions and recommendations in this chapter can be a viable document in promoting the medicinal plants cultivation in the state in an effective and planned manner.