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Research Article

Empowerment of medicinal and aromatic plants stakeholders through institutional capacity building

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ABSTRACT

The study attempts to determine the capacity building needs of the medicinal and aromatic plants (MAP) farmers emphasizing three major thematic areas. Data was collected from thirty-four progressive farmers from Karnataka who had attended capacity building program on cultivation and conservation of medicinal and aromatic crops. Analysis of study revealed that 45% farmers were in middle age category (30-39 years), 41% of them had land holding up to 5 acres, and 21% between 5.1 to 10 acres. Under cultivation needs of medicinal and aromatic plants, farmers' priority was to get training on "Integrated pest and disease management" with a weighed score (WS)of 2.68. Under processing needs "Training on value addition in medicinal crops" (WS 2.47). With respect to marketing needs of MAP farmers the most important training needs were "Marketing intelligence" (WS 2.44). The most important constraints felt by the respondents were "Inadequate incentives for cultivation of MAPs (74%). The most important suggestion felt by cent per cent respondents was "Need for organized markets" for MAPs. The investigation inferred that there is a critical need to plan and design regular capacity building programs in identified thematic areas to fulfill the knowledge gap among the medicinal and aromatic plant growers of Karnataka to enable them a sustainable income.

Keywords: Capacity building programme, farmers' awareness, training needs, medicinal and aromatic plants (MAPs)

INTRODUCTION

Training is a process of acquisition of new set of knowledge, skills, and attitudes (KAS) in the context of preparing for entry into a vocation or improving one's productivity in an organization or enterprise (Sajeev and Singha, 2010; Ajayi, 1995). Training of farmers basically contributes not exclusively to human resource advancement but also to educate them in recent trends, varieties, technologies, methodologies developed in the field of agriculture. The basic needs of farmers are crop-wise information *viz*., soil testing, availability of improved seeds and quality planting material, inter-cultural operations, nutrient management, irrigation, plant protection measures, and allied information etc. (Babu and Singh, 1986). India is one of the 12 mega diversity centers of the world harnessing 45,000 species of higher plants, of which more than 7,500 species are reported to have medicinal properties. With the world becoming more health conscious, the demand for plant-based medicines is escalating rapidly. Medicinal plants have always occupied an inevitable place in Indian system of medicine (*Ayurveda, Unani* or *Siddha*). The demand for medicinal and aromatic plant-based raw materials is growing at the rate of 15 to 25% per annum. According to an estimate of WHO, the demand

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for medicinal plants is likely to increase more than US $5 trillion in 2050. Karnataka houses one of the most conventional medicine cultures in the country. Numerous significant and helpful species are found here. These are known for their therapeutic properties and these references are accessible in ancient Indian texts. Several households especially in rural areas use medicinal plants for their essential primary medical care needs as self-drug, for preventive reason, restoring and therapeutic applications. Karnataka is one of the leading States that has a significant presence of Ayurvedic and Unani manufacturing companies. There is an upsurge in the use of *Ayurvedic* medicines in the state. Some of the large manufacturers and best nature cure centers are based in Karnataka. As of now there are more than 71 Ayurveda; Unani, Homeopathy and nature fix and yoga schools in Karnataka and these add to the quantity of professionals consistently. Today, numerous individuals are using these systems of medicines in the state and it has its prominence offering natural cure to several maladies.

During Covid-19 pandemic period, there is an increasing demand for medicinal plants and herbal formulations as immune boosters and to prevent or cure ailments and diseases. Considering its importance, Government of India has also announced an assistance of Rs. 4,000 crores for the promotion of herbal cultivation in the country during May 2020. Recognizing this importance, the Government of Karnataka established medicinal plant conservation areas to promote and regulate the sector for optimizing the benefits to people as well as to ensure sustainable growth. Medicinal plants have also been identified as one of the thrust areas by the department of forest and different programs have been initiated for their conservation in the forests and protected areas. In the recent past, cultivation of these plants is being undertaken on private lands also.

Even though, some of the MAPs are in cultivation, the demand exceeds the supply of these plants in Karnataka. At present, around 90 per cent of the supply of the raw material is directly from the forest and mostly from outside the State. Traditionally, the tribes and local communities 'in and around forest', used to supply medicinal plants from herbal products. The major drawback in global market of Indian medicinal plants products is inconsistent quality, dearth of scientific validity of claimed medicinal properties, and high price of the products. Thus, future of medicinal plants sector will depend on continuous supply of quality raw material, uncontaminated by either synthetic pesticides or heavy metals or by genetically modified organisms and certified by accredited agencies. Unscrupulous harvesting has threatened the existence of many important species in their natural habitat. The future requirement of medicinal plants must be met out from the available resources in a sustainable manner. This situation has urged to take up cultivation of high value medicinal crops in farmers' field. Moreover, lack of quality planting material and access to elite germplasm for breeding, lack of knowhow on agro-technology and economics, lack of knowledge regarding GAP of medicinal crops, absence of dependable market support and very low price offered for the cultivated produce has hindered many from taking up the cultivation of medicinal crops. As these are new crops to our farmers, proper training regarding identification of medicinal and aromatic plants, parts used, active principle content, uses, cultivation practices, post-harvest management and value addition has to be given at most priority.

Preparing needs appraisal is one of the crux towards prioritizing the area of farmers interest, design and advancement of educational program that can best suit the prevailing state of farmers conditions. Pholonngoe and Richard (1995) underscored the requirement of need evaluation while expressing that non-formal education hope to give a meaningful development, they should keep in mind that the needs of adults change constantly. Accordingly, preparing evaluation must be done to plan pertinent and need based programs that can oblige changes over time. Caffarela (2002) noticed that a precise cycle of farmers training should incorporate need appraisal, objective and, arranging instructional strategies and procedures, checking and assessment.

But very little research has been conducted regarding training need assessment of medicinal and aromatic crop farmers of Karnataka. In light of the above discussion, the study attempted to achieve the following specific objectives;

i. To determine the extent of training needs of farmers in relation to medicinal and aromatic crops.
ii. To suggest suitable interventions and policy changes for accelerated development of medicinal plants sector.
iii. To obtain and address the various issues faced by MAP farmers.

MATERIALS AND METHODS

Sampling procedure

Data was collected through well designed interview schedule from the 34 trainees who had attended three days the farmers' training program on "Conservation and cultivation of medicinal and aromatic plants" organized by ICRA-IIHR, which was sponsored by National Medicinal Plants Board (NMPB), Ministry of AYUSH, New Delhi during 26-28 February 2018 through a well-designed interview schedule.

Analytical procedure

Data collection from respondents was done by using pre-tested structured schedule through personal interview method. For investigating the information, descriptive statistics like rank order, percentage and scoring strategies were utilized to get important outcomes. Analysis was supported with appropriate statistical parameters to present the results of the study. Specific and relevant training need items under each theme was developed and collected through different review of literature, as well as own field experiences.

Farmer's responses in this study were collected in a 3-point continuum as 'Very Important (VI)', 'Important (I)' and 'Not Important (NI)' by assigning scores 3, 2 and 1 respectively. The results were calculated as weighted score for each of the thrust areas identified for the training.

$$\text{Weighted score (WS)} = \frac{(\text{No. of VI}\times 3) + (\text{No. of I}\times 2) + (\text{No. of NI}\times 1)}{\text{Total number of VI + I + NI}}$$

Where, VI = Very Important, I = Important and NI = Not Important, WS = Weighted Score

RESULTS AND DISCUSSION

As listed in Table 1, majority of respondents (85%) were male. The age distribution of respondents was fairly spread over the various age groups, with the highest (44%) representation found in "22 to 38" years categories and 18 % in "56-72 years". It revealed that most of the farmers belonged to active age group.

A perusal at the trainees' educational background revealed about 6% of the respondents had no formal education, 3% had completed primary school, 18% had completed "secondary school", 15% completed "pre-university education", 44% completed graduation and 15% completed post-graduation. These findings suggest that many farmers in the target groups were literate, which will impact on their ability to access information on different types of medicinal and aromatic crop production. This should be considered while developing training modules for farmers. Majority of the respondents (40%) had up to 5 acres of agricultural land while 21% of the respondents were having

Table 1: Socio-demographic characteristics of the respondents

Characteristics	Frequency	Percentage
Sex		
Male	29	85
Female	5	15
Age (years)		
22-38	15	44
39- 55	13	38
56-72	6	18
Education		
Illiterate	2	6
Primary	1	3
Secondary	6	18
Pre-University	5	15
Graduate	15	44
Postgraduate	5	15
Landholding		
No land	2	6
Up to 5 acres	14	41
5.1-10 acres	7	21
10.1 -15 acres	5	15
> 15 acres	6	18
Occupation		
Farming	13	38
Farming + business	15	44
Farming + others	6	18
Social participation		
No social participation	10	29
Member of one organization	17	50
Member of more than one organization	7	21
Cultivating medicinal and aromatic crops		
Yes	31	91
No	3	9

between 5.1 to 10 acres. About 38% of respondents' occupation was farming alone, 44% had farming and business and 18% had farming and others (Table 1).

Crop production/cultivation refer to acquiring knowledge and skill about principles and practice of crop production, protecting from pests, diseases, weeds, soil and water management. The perusal of the Table 2 infers that, 'Integrated pest and disease management (WS 2.68)' and 'Principles and practices of organic farming in MAPs' were the most sought after by the farmers (WS 2.56) followed by 'Knowledge on collection practices (2.35)' and 'Production of quality planting material of MAPs (WS2.32)'. Hence, development of capacity building programs on the above aspects is a pre requisite for profitable farming of MAPs.

Unlike other plants, medicinal plants should be harvested only during the ideal season or time span to guarantee the best quality production of medicinal plant materials and their finished products. The best harvest (top season/season of day) should be determined with respect to the quality and amount of biologically active constituents instead of total vegetative yield of the targeted medicinal plant parts. MAPs must be harvested at proper phenological stage wherein the accumulation of their phytochemical constituents is maximum. Moreover, these constituents are confined to different organs in different species. Hence, identification of the proper harvesting stage and parts to be harvested for each species is utmost important. Further, MAPs are consumed either in fresh/semi-

Table 2: Cultivation needs of MAPS (N=34)

S.No.	Capacity building needs	Very important	Important	Not important	Weighted score
1.	Integrated pest and disease management	24	9	1	2.68
2.	Principles and practices of organic farming in MAPs-	23	7	4	2.56
3.	Knowledge on collection practices (GCPs)	18	10	6	2.35
4.	Production of quality planting material in MAPs	17	11	6	2.32
5.	Quality management in medicinal crops	17	8	9	2.24
6.	Techniques of inter-cropping MAPs with traditional agricultural and horticultural crops	16	9	9	2.21
7.	Integration of medicinal crops in different farming systems	14	11	9	2.15
8.	Good Agricultural Practices (GAPs)	12	15	7	2.15
9.	Soilless cultivation	12	14	8	2.12
10.	Integrated water management	10	13	11	1.97
11.	Integrated nutrient management	9	12	13	1.88

Table 3: Processing needs of MAPs farmers (N=34)

S.No.	Capacity building needs	Very important	Important	Not important	Weighted score
1.	Value addition in medicinal crops	19	12	3	2.47
2.	Extraction of active principles from MAPs	20	9	5	2.44
3.	Pre-harvest management	20	8	6	2.41
4.	Handling and operating field distillation unit	18	12	4	2.41
5.	Knowledge on medicinal crops and their phyto-constitutes	16	13	5	2.32
6.	Good harvesting practices	14	16	4	2.29
7.	Post-harvest management	17	10	7	2.29
8.	Knowledge on adulteration and substitutes in MAPs	12	16	6	2.18
9.	Storage practices	13	10	11	2.06
10.	Quality management in medicinal crops	11	14	9	2.06

Table 4: Marketing needs of MAPs farmers (N=34)

S.No.	Capacity building needs	Very important	Important	Not important	Weighted score
1.	Market intelligence	20	9	5	2.44
2.	Market information	18	8	8	2.29
3.	Knowledge on marketing of medicinal crops	14	15	5	2.26
4.	Contract farming in medicinal crops	8	21	5	2.09
5.	Knowledge on export of MAPs	10	16	8	2.06
6.	Export of bio active compounds	10	14	10	2.00

processed/processed form and hence, primary processing and post-harvest management practices must be followed to retain the quality in medicinal plants. To reduce the degradation of active principles and the deterioration of the plant drug, proper drying, packaging and storage of the medicinal plants should be ensured. If not the moisture in the plants products encourages growth of molds and other microorganisms.

Figures in the Table 3 number indicates, the most important needs in the processing of MAPs were "Training on value addition in medicinal crops" (WS 2.47), followed by "Extraction of active principles from MAPs' (WS 2.44), "Pre harvest management of MAPs" (WS 2.41) etc. It can be inferred from the above table that farmers are in dire need of knowledge on various processing techniques and have their products value added to get better returns.

Forecasting the market trends for herbal sector is always difficult, due to lack of statistics and very large variability in reports and information concerning amount of material in natural populations and plantations. Market of MAPs is inconsistent, cryptic, traditional, unregulated and shows wide divergence in market values. It is monopolized by few whole sale dealers, supply chain is very large and fragmented, to a great extent relies upon mediators, lack of marketing infrastructure, lack of proper marketing information, product, price, and destination.

Several parameters like climatic factors, depression due to irrational collection, number of the collectors, profitability of farming etc. all these affects the annual fluctuations in the number of plants that arrives in the market. It often happens that a new medicinal plant species causes sudden spurt in demand and gains popularity in the herbal pharmacy industry, which in turn lead to rapid increase in demand of plants raw material leading to rise in prices in the market. This rise leads to greater collections of natural populations and destructions of the habitats. Hence, scientific cultivation needs immediate attention. Over-exploitation of plant population in nature inevitably leads to their depletion, and consequently reduce the supply of the raw material. The above facts signify the importance of marketing of the medicinal and aromatic crops. The perusal of the Table 4 inferred that, the most important marketing need of MAP farmers were "market intelligence" (WS 2.44), followed by "market Information" (WS 2.29) etc.

Table 5: Constraints experienced in medicinal and aromatic crops (N = 34)

S.No.	Items	Yes	%
1.	Inadequate incentives for cultivation of MAPs	25	74
2.	Inadequate linkages between cultivators/ collectors and the end users/ institutional purchasers	24	71
3.	Lack of government support on parity with other horticulture crops	24	71
4.	Domestic price fluctuations	24	71
5.	High planting material cost	23	68
6.	Non-strategic production	23	68
7.	Attempt to select varieties	21	62
8.	Excessive dependency on monsoon	20	59
9.	Lack of technical know-how	18	53
10.	Export price fluctuations	16	47
11.	Issues of certification	16	47
12.	Lack of awareness about export market	16	47
13.	Product management	16	47
14.	Agronomy or production practices of MAP crops	15	44
15.	Lack of transparency in trade	14	41
16.	lack of consumer awareness	13	38

Table 6: Suggestions recommended for cultivation of MAPs (N =34)

S.No.	Suggestions	Number	Percentage
1.	Need for organized markets	34	100.00
2.	Minimum support price (MSP) for MAPs	34	100.00
3.	Establishment of district wise distillation units	29	85.29
4.	Market information and market intelligence system	30	88.24
5.	Establishment of farmer cooperatives at village or regional level that can sell MAPs directly to exporters	34	100.00
6.	Providing linkage for marketing	32	94.12
7.	Creating of network groups and connecting with groups dealing with Marketing	29	85.29

Constraints are the limitations faced by the farmers. A perusal of Table 5 indicated the various constraints experienced by the respondent farmers for growing MAPs. The most important constraints felt by the respondents were "Inadequate incentives for cultivation of MAPs (74%) followed by "In adequate linkages between cultivators and the end-users" (71%), "Lack of government support on parity with other horticulture crops" as opined by (71%) respondents and "Domestic price fluctuations (71%)".

The most important suggestion felt by cent per cent respondents was "Organized markets" for MAPs, followed by "establishment of farmer cooperatives at village or regional level that can sell directly to exporters" and "MSP be introduced and fixed", wherein, 94.12% of the respondents suggested "Effective market linkage".

Policy recommendations

A review on the present theme revealed that there is a need to establish nurseries for supply of seeds and quality planting materials, processing or distillation units with adequate capacity in the production regions of MAPs, so that the quality and quantity of the product could be maintained, and the growers would be able to get a higher price for their produce. Access to technical know-how can help to promote these processing units. This activity should be backed with the availability of planting material and support on the package of good practices for cultivation of MAPs. Also, the study has observed that efforts towards strengthening of the market information system and management of price risks will go a long way in developing the positive economy of MAPs cultivation. The following recommendations were also suggested based on the interaction with the respondents:

1. Establishment of MAP nursery units at block and gram panchayat levels
2. Creating large scale awareness on the use of medicinal and aromatic plants
3. Encouraging nursery gardeners at district training centers or KVKs
4. A portal giving end to end information on cultivation, processing, marketing aspects
5. Buy-back assurance or contract farming of MAP should be strengthened
6. Minimum assured price or minimum procurement price for the produce
7. Larger cultivation may reduce harvesting pressure on natural resources, particularly rare and threatened species, which in turn help in their conservation.

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