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Varietal Preferences and Adoption Pattern of Economically Viable Medicinal and Aromatic Crops by the Indian Farmers

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Abstract

Central Institute of Medicinal and Aromatic Plants (CIMAP) is the knowledge gateway of medicinal and aromatic plants related services and technologies. It organizes kisan mela (Farmers Fair) every year and display new varieties/technologies and innovative cultivation practices on commercially viable MAPs for its end users. Analyzed data reveals that 75.85% farmer preferring aromatic crops and only 24.15% farmers in favor of medicinal crops. In the year 2010-2012, aromatic crops are quite popular among the farmers and increment pattern of aromatic crops were 40% & 71.90 in Mint; 48% & 78.37% in Rose, Menthol mint still dominates the choice, while in case of medicinal plants, the adoption pattern increments were 75% & 38.09% in Stevia; 35.71% & 21.05% in Withania; 37.5% & 77.27% in Tulsi respectively. It leads to improved socio-economic condition of farmers in the area using cultivable land but also in rural sector under stress and unsustainable land.

Key words

Cropping pattern, agro-technology, socio-economic growth, MAPs cultivation.

Introduction

Agricultural practices are the major mean for the survival and living for over 58.4% of Indian population, near about 1/5th of the total gross domestic product contribution is from these agricultural sectors, in our export earning agriculture shares about 10% growth and side by side it plays major role in providing the major raw material to industries on large scale [1]. In majority people depends on medicinal plant products for curing human and livestock ailments, while aromatic plants reported with their importance either in domestic or commercial uses, on an average 12.5% of the reported plant species have medicinal values. The medicinal and aromatic plants (MAPs) cultivation need to be conserve in any type of agro-ecosystems approaches along with good marketing strategy would also results in promoting the cultivation of medicinal plants [17]. Cultivation of economically viable MAPs can improve the socio-economy of farmers, fast growing MAPs with high economic potential were given priority, traditional cereal crops production is uneconomic and diversification in cropping system is necessary [4]. Farmers have to make their income and growth mainly through these agricultural practices but the real fact is that

their economic growth is not substantial to leave the agriculture. Farmer are migrating to urban area in search of job, it is necessary to overcome these situations and diversify their agricultural practices and along with the cultivation of medicinal and aromatic plant. It is an alternative way to bring good economic and production rate, and also protects the MAPs by the implementation of sustainable wild harvesting methodology [2] and also along with this intensive and continuous harvesting of wild medicinal plants could results with over exploitation and tragic development in biodiversity [22].

Medicinal and aromatic plants (MAPs) are the diversified crops they could be easily cultivated in some of the rare areas of wastelands, saline and alkaline soils. On an average 2700 and 2500 MAPs species were collected from India and Africa with wide application in medicinal and another usage [10, 18]. Practices with MAPs like collection, simple processing and trading contributes towards the cash income of poor small holder farmers and especially well socio-economic status of women in developing countries [9] MAPs constitute a large segment of the flora which produce raw material for the pharmaceuticals, cosmetics, perfumery, fragrance and flavor industries. On an average 95%

of MAPs were much more diversified from wild region and this also has been reported with health promising and other economic aspects [8]. More than 20% of over the counter prescription drugs (OTC) are presently derived from plants. Most of the essential oil bearing crops is mainly unaffected from pest and disease. Therefore no further use of pesticide were admitted, in these crops, because of their perennial in nature they have good root system and helps in preventing soil erosion, hence these crops are environment friendly. Global market value of these essential oils, aroma, chemical, natural flavors and fragrances is about US\$15 billion and India ranks second with 21% sharing of US\$922 million estimated oils(excluding turpentine oil) in 1999. World production of essential oil is estimated about 1,10,000 tones and India with sharing of 16% ranks third in this order. Out of these oils produced, 55-60% use for food flavours and 15-20% of fragrances and the remaining were used for the isolation of aroma chemicals [20], While globally Kenya were being reported in fulfilling the 70% demand of Pyrethrum [21] and Morocco stands with second largest exporter of medicinal and aromatic plants material from Africa [12]. The medicinal and aromatic plants (MAPs) as an alternative way in securing livelihoods and upliftment of farmers of developing world with their settled traditional and conventional agriculture system [7].

CIMAP plays a pioneer role in the widespread production and cultivation of MAPs crop in the different agro-climatic zones of the country. Number of commercially viable medicinal and aromatic plants varieties has been produced by CIMAP made available quality planting material for industries. These varieties are CIM-Ayu, CIM-Somya (Tulsi), Poshita and NIMITLI-118 (Ashwagandha), CIM-Biridhi, KS-1 (Khus), Krishna (Lemongrass) CIM-Pawan (Geranium) etc. In order to make these crops and varieties popular among the growers number of programme like awareness meet, survey based technology intervention and training activities have been routinely conducted by CIMAP. With these efforts, MAPs crops could be increased in area and quality production of MAPs different part of the country. The present study was aimed to assess the preferences of varieties and adoption pattern of crop among the farmer/stockholder in present agriculture scenario.

Methodology

To disseminate the knowledge base of MAPs varieties, agro-technologies, process technologies,

marketing linkage and encouraging farmers for wider adoption, the CIMAP organizes kisan mela every year on 31st January. Farmers from different part of Uttar Pradesh (U.P) and other states like Bihar, Jharkhand, Madhya Pradesh (M.P), Chhattisgarh, Maharashtra participated in the kisan mela to know about latest varieties, agro-technologies and process technologies in MAPs cultivation. Farmers purchased planting material of MAPs to their choice of adoptability and suitability in the area. A list of farmers visiting the kisan mela in 2010, 2011 and 2012 was prepared. The data on the various MAPs planting material that have been purchased by the farmers were collected from the CIMAP Research Farm and analyzed to work out the choice of different planting material either crops/varieties. The total one thousands four hundred twenty nine farmers were shown interest to collect the planting materials and propagules to their choice, suitability and economics of the crops during the years.

Results and Discussion

It is evident from figure 1a, 1b and table 1 in respective years (2010-2012), majority of farmers preferred to cultivate Menthol mint (50.45%) followed by Rose (8.96%), Geranium (7.35%), Tulsi (5.39%) and lemongrass (5.25%). Among the varieties most preferred indicating number of farmers in descending order were Saryu (349), Kosi (280), Saksham(32) in Mint; Noorjahan (85) and Ranisaheb (45) in Rose; CIM-Pawan (61) and Borbon (44) in Geranium; CIM-Somya (49), CIM-Ayu (23), CIM-Shyama (4) and Vikarsudha (1) in Tulsi and Krishna (57), Nima (10), Pragati (5), and Parman (3) in Lemongrass respectively. Number of Farmers have also got interested in few other crops like Stevia (4.34%) with var. CIM- Meethi and CIM-Madhu; Withania (3.92%) with var. Poshita; Brahmi (3.50 %) with var. CIM-Jagriti; Khus (2.80%) with var. CIM-Biridhi, KS-1, Gulabi. and Dharni; Satavar (2.66%) with var. CIM-Shakti; Aloe (1.82%) with var. Sheetal; Citronella (1.05%) with var. Bio-13, Krishak, Manjari and Manjusa; Sarpagandha (0.98%) with var. CIM-Sheel; Isabgoal (0.49%) with var. Niharika; Kalmegh (0.49%) with var. CIM-Megha; Chamomile (0.28%) with var. Smohak; Kewanch (0.21%) with var. CIM-Ajar; Souf (0.07%) with var. Sujal. The farmers of Uttar Pradesh, Bihar and Jharkhand are mainly preferred Mint, Stevia and Khus, while Rose, Withania, Geranium are preferred by Uttar Pradesh, Maharashtra, Bihar and Jharkhand

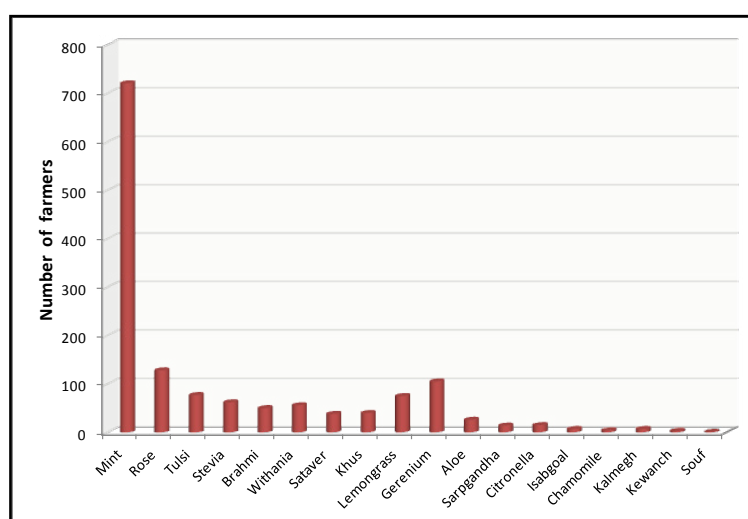
Crops	Varieties and total no. of farmers (in parenthesis)	Total No. of farmers	% share
Mint	Saryu (349)	721	50.47
	Kosi (280)		
	Kushal (41)		
	Himalaya (20)		
	Saksam (32)		
Rose	Noorjahan (85)	128	8.95
	Ranisaheb (43)		
Tulsi	CIM-Ayu (23)	77	5.39
	CIM-Somya (49)		
	CIM-Shyama (4)		
	Vikar Sudha (1)		
Stevia	CIM-Madhu (62)	62	4.34
Brahmi	CIM-Jagriti (50)	50	3.5
Withania	Poshita (56)	56	3.92
Sataver	CIM-Shakti (38)	38	2.66
Khus	CIM-Bridhi (19)	40	2.8
	KS-1(18)		
	Gulabi (2)		
	Dharni (1)		
Lemongrass	Krishna (57)	75	5.25
	Nima (10)		
	Pragati (5)		
	Praman (3)		
Gerenium	Borbon (44)	105	7.35
	CIM-Pawan (61)		
Aloe	Sheetal (26)	26	1.82
Sarpgandha	CIM-Sheel (14)	14	0.98
Citronella	Bio-13 (10)	15	1.05
	Krishak (3)		
	Manjari (1)		
	Manjusa (1)		
Isabgoal	Niharika (7)	7	0.49
Chamomile	Smohak (4)	4	0.28
Kalmegh	CIM-Megha (7)	7	0.49
Kewanch	CIM-Ajar (3)	3	0.21
Souf	Sujal (1)	1	0.07
Total		1429	100

Source: CSIR-CIMAP Research Farm, Lucknow, India

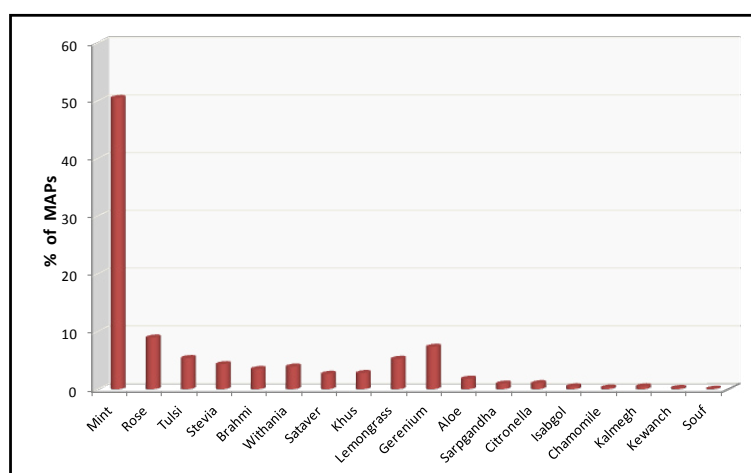
Table 1: Different Varieties of MAPs preferred by the farmers and their no. during Kisan mela 2010,2011 and 2012.

farmers respectively. Herbs like Tulsi, Brahmi are preferred by the farmers of Uttar Pradesh, Bihar and Madhya Pradesh, while Aloe, Sarpgandha, Citronella, Kewanch are preferred by the farmers of Uttar Pradesh and Bihar (Table 2). Chamomile preferred by the farmers of Chhattisgarh and Maharashtra. Chhattisgarh is the only state where

Saunf has been preferred by the farmers. It is also interesting to note that crop like Khus, Ocimum and Withania were not popular crop in north India taken up by the farmers as annual and short term crop but due to profitability and easy marketability (Table 2). It is due to CIMAP efforts to popularize these crops through survey awareness gosthi,



Graph 1a: Pattern of adoption of MAPs crops by growers over the period of three years (2010, 2011 and 2013) during CIMAP Kisan mela (Farmers fair)



Graph 1b: % pattern of MAPs adopted by the farmers in 2010, 2011 and 2012

demonstration and field visit where farmers have acquired knowledge to raise these crops under non-traditional belt. Although some farmers have also preferred plant material of Kewanch, Withania and Brahmi as medicinal crops due to assured returns in local market. It is observed that farmers are still prefers aromatic crop due to assured and defined market then medicinal crops in the country. Menthol mint is now dominating and widely accepted crop over most of district of Bihar and Uttar Pradesh also in the states like Jharkhand, Maharastra, Madhya .Pradesh, Tamilnadu, and Andhra Pradesh (A.P.) [3].

Cultivation of menthol mint more profitable in Deccan plateau [16]. Some of the MAPs crops like Ocimum, Satavar and Khus are popularizing in Uttar Pradesh extensively in various training

and intervention programmes organized by CSIR-CIMAP [14]. It has been found that Ocimum crops can be grown region of low rainfall and region having inadequate irrigation. Some of MAPS are also grown through agro forestry system [16]. Earlier studies have also demonstrated that menthol mint grows well under poplar based agroforestry system in foot hills of Uttarakhand [11]. Improved agro-technology in cultivation of Geranium in comparatively short period definitely leads to large scale cultivation in North Indian Plaines [15]. Citronella, Lemongrass, Palmarosa and scented geranium are mostly preferred by north and West Indian farmers. These crops could also be grown in few areas like red soil region of south India and also in arid region of Bundelkhand [13]. It is also observed that farmers of U.P and Bihar are adopting Vetiver and Ocimum as well fitted crop due to

Crop	2010		2011		2012		Total
	States	No(s)	States	No(s)	States	No(s)	
Mint	UP,Bihar	150	UP,Bihar,MS	210	UP,Bihar,Jharkhand	361	721
Rose	UP,Bihar	25	UP,Bihar,Jharkhand	37	UP,Bihar,Jharkhand,MS	66	128
Tulsi	UP,Bihar,MS,Jharkhand	16	UP,Bihar,MP,MS	22	UP,Bihar,MP	39	77
Stevia	UP	12	UP,Bihar	21	UP,Bihar,Jharkhand	29	62
Brahmi	UP,Bihar	13	UP,Bihar,Jharkhand	11	UP,Bihar,MP	26	50
Withania	UP,Bihar,Jharkhand	14	UP,Bihar,Jharkhand	19	UP,Bihar,Jharkhand,MS	23	56
Satawar	UP,Bihar	5	UP,Bihar	13	UP,Bihar,MS	20	38
Khus	UP,Bihar	6	UP,Bihar,Jharkhand	16	UP,Bihar,Jharkhand	18	40
Lemongrass	UP,UT,Bihar,Jharkhand	40	UP,Bihar,Jharkhand	18	UP,Bihar,Jharkhand	17	75
Gerenium	UP,Bihar,Haryana	54	UP,Bihar,Jharkhand,MP	36	UP,Bihar,Jharkhand,MS	15	105
Aloe	UP	5	UP	8	UP,Bihar	13	36
Sarpgandha	UP	3	UP,Bihar	2	UP,Bihar	9	14
Citronella	UP,Bihar	6	UP	5	UP,Bihar	4	15
Isabgoal	UP	1	UP,Jharkhand	3	UP,Jharkhand,MS	3	7
Chamomile	....	0	MP	1	Chhattisgarh,MS	3	4
Kalmegh	UP	1	UP	4	UP,MS	2	7
Kewanch	....	0	UP	1	UP,Bihar	2	3
Souf	....	0	....	0	Chhattisgarh	1	1
Total		351		427		651	1429

Source: CSIR-CIMAP Research Farm, Lucknow, India

Table.2: Trends of preferences of MAPs crops by the Indian farmers.

annual and short term crop with good profitability. MAPs are being adopted by the farmers of Bundelkhand region of Uttar Pradesh as rain fed crop especially Lemongrass in Aonla based agro-forestry system and also sole crop of Palmarosa. There were immense possibilities to grow aromatic grasses like Lemongrass, Palmarosa and Tulsi as rainfed crops. Kalmegh/Tulsi and Bajra/Maize can be suitable for co-cultivation to raise the income of small and marginal farmers of this region [6]. Recent science and technology interventions done by CIMAP in Bundelkhand region indicates that Palmarosa crop is emerging alternate crop in place of Mint in Bundelkhand region especially Jalaun and Jhansi district due to low water requirement and low inputs [6].

Conclusion

Agricultural practices are the medium for the farmers to maintain good socio-economic growth, along with the traditional practices of crops, introduction and inventorisation of MAPs could provide a good return value to the farmers. Globalization of MAPs quite familiar with the concept of standardization of plant material that were grown organically and meet the demand of market with higher efficacy [5].

ex-situ and in-situ conservation are the objectives in maintenance of MAPs status with their occurrence, general distribution and abundance[19], which also include Continuous S&T inputs in terms of awareness gosthi, training programmes and demonstration leads to wider adoption of these rainfed crops in the dry part of U.P especially in Bundelkhand region. An agro-technology based practice makes many areas either rainfed or irrigated for commercial cultivation of MAPs. Introduction of new varieties of MAPs by CSIR-CIMAP leads to quality production of raw materials and essential oils for commercial exploitation by the essential oil processing industries.

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References

- [1] Agriculture: National portal of India (Internet) 29.4.2011, National portal content management team; available from: <http://www.india.gov.in/sectors/agriculture/index>.
- [2] Canter, P. H. Bringing medicinal plants into cultivation. *Focus Altern Complement Ther*, 2005, 10: 167-168.
- [3] Chouhan, H. S., Kalra, A., Mengi, N., Rajput, D. K., Patra, N. K., Singh, K. Performance of Menthol mint (*Mentha arvensis*) genotypes to varying level of nitrogen application under poplar based agro-forestry system in Uttar Pradesh, Foot Hills. *J. of Med. & Arom. Pl. Sci.* 2000, 22:447-449.
- [4] Chauhan, RS. Socioeconomic improvement through medicinal and aromatic plants (MAPs) cultivation in Uttarakhand, India. *Jour. of sustainable agriculture*, 2010, 34(6):647-658.
- [5] Craker, L. E., Gardner, Z. Sustaining the harvest: challenges in MAP production and markets. *Acta Horticulturae*, 2005, 676: 25-30.
- [6] Hasan, S. A., Singh, K., Krishna, A., S. P. S. Khanuja, S. P. S. Preferences and adoption pattern of medicinal and aromatic plants (MAPs) in relation to their cultivars by Indian farmers: A case study. *J. of Rural Tech.*, 2006, 2:6.
- [7] Huber, F. K., Ineichen, R., Yang, Y. P., Weckerle, C. S. Livelihood and conservation aspects of non-wood forest product collection in the Shaxi valley, Southwest China. *Economic Botany*, 2010. 64(3):189-204.
- [8] Karki, M. B. Organic Conversion and Certification: A Strategy for Improved Value addition and marketing of medicinal plants products in the Himalayas; paper presented at the Regional workshop at wise practices and experimental learning in the conservation and management of Himalayan Medicinal Plant; Kathmandu, Nepal, December 15-20, 2002.
- [9] Karki, M., Tiwari, B., Badoni, A., Bhattarai, N. Creating Livelihoods enhancing Medicinal and Aromatic Plants based Biodiversity-Rich production systems: Preliminary lessons from South Asia Oral paper presented at The 3rd World Congress on Medicinal and Aromatic Plants for Human Welfare (WOCMAP III) 3-7 February 2003, Chiang Mai, Thailand.
- [10] Kempanna, C. Prospects for Medicinal plants in Indian Agriculture. *World Crops*, 1974, 26: 166-168.
- [11] Krishna, A., Singh, K., Yaseen, Moh. Bansal, R. P., Yadav., R. P. Role of MAPs in augmenting socio-economic status of farmer's in Bundelkhand: A survey. *J. of Rural Tech.*, 2006, (2):312-316.
- [12] Lange, D., Mladenova, M. Bulgarian model for regulating the trade in plant material for medicinal and other purposes, In: *Medicinal plants for forest conservation and health care*, Non-wood forest products series No. 11, FAO, Rome, Italy, 1997.
- [13] Prakasa Rao, E. V. S., Puttanna, K., Ganesha Rao, R., S. Prospect of commercial mediculture and recent advances in agro-technologies of aromatic plants in South India. *J. of Med. & Arom. Pl. Sci.*, 2000, 2: 207-213.
- [14] Ram, M., Gupta, M. M., Naqvi, A. A., S. Kumar. Commercially viable annual crop of geranium in North Indian plains. *Curr. Res. on Med. & Arom. Pl.*, 1995, 17:17-20.
- [15] Ram, M., S.A. Kumar, S. A. Method for production of planting material of Geranium (*Pelargonium graveolens*) in North Indian Plains. *J. Med. Arom. Pl. Sci.*, 1996, 18:297-299.

- [16] Singh, K., Rajeshwara Rao, B. R., Kothari, S. K., Kaul, P. N., Mallavarapu. G., R., Cultivation of aromatic crops in South India: problems and prospects. *J. Med. Arom. Pl. Sci.*, 2000, 22:218-230.
- [17] Rao, M. R., Palada, M. C., Becker, B. N. Medicinal and aromatic plants in agroforestry systems. *Agroforestry systems*, 2004, 61-2(1): 107-122.
- [18] Schmelzer, G. H. Gurib-Fakim, A. (Editors). Medicinal plants of Tropical Africa conclusions and recommendations based on PROTA 11(1): 'Medicinal plants' CTA, 2008, 791 pp.
- [19] Shinwari, Z. K., Gilani, S. S. Sustainable harvest of medicinal plants at Bulashbar Nullah, Astore (Northern Pakistan), *Jour. of ethnopharmacology*, 2003, 84(2-3): 289-298.
- [20] Singh, K., Sushil K., Kothari. Cultivation of mint, citronella, java and basil for diversification and globalization of Indian agriculture. In: *Intl. Conf. Med. & arom. Pl.* 15.-17. March, Hyderabad, 2003.
- [21] Uwechue, R., *Africa Today*, Third Edition, Africa books, 1996.
- [22] Wiersum, K. F., Dold, A. P., Husselman, M., Cocks, M. Cultivation of medicinal plants as a tool for biodiversity conservation and poverty alleviation in the Amatola region, South Africa in R. J. Bogers, L. E. Craker and D. Lange (eds), *Medicinal and Aromatic Plants*, 2006, pp. 43-57.