

ORGANIC SEED SPICES: NEED AND PROSPECTS FOR HIGH INCOME

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INTRODUCTION

India is the largest producer and consumer of spices with annual production of 10.67 million tons from an area of more than 4.52 million ha during 2020-21. Amongst spices, seed spices are important group and are an integral part of the food system. Among major spices cumin (14.8%), garlic (14.7%), ginger (7.5%), fennel (6.8%), coriander (6.2%), fenugreek (5.8%), Red chilli (4.2%) and turmeric (1.3%) show significant growth rate in production. The export of spices contributes 41% of the total export's earnings in terms of all horticultural crops in the country. Seed spices are the most remunerative crops per unit time, space and resource utilized and hence are considered golden wealth of arid and semi-arid region of the country

Spices contributed 1.24 per cent of India's total export earnings. The share of spices in the export earnings from agricultural and allied products is 8.5 per cent. Status of export and

import of spices during 2020-21 showed that the export quantity was 11 crore MT with value of Rs. 19505 crore, while we are also importing spices with value of Rs. 4995 crore. This shows the need of increasing both area and production under spice crops (Spices Board, 2020). India is exporting only 15 percent of its production annually and fulfill the 50-60 percent of world demand. India is consistent source of seed spices for importing countries worldwide. There has been ever increasing demand of seed spices and importing countries look at India for quality produce of seed spices but spices should be free of pesticides and chemicals.

Seed spices production organically in India is in infancy and major credit of organic spices export goes to main group of spices produced, particularly in Kerala and adjoining parts. The production of seed spices is concentrated mainly in the arid and the semi-arid regions covering Rajasthan, Gujarat and Madhya Pradesh. Organic farming is gaining global importance with increasing awareness of the consumers towards quality products free from inorganic chemical residues and the

environmental protection. There is a great scope of up scaling of organic farming in Rajasthan due to low use of fertilizers, pesticides and less chance of severe reduction in yield of crops during conversion period. However, lack of suitable package and practices for organic farming of crops and availability of organic inputs both in time and scale are the main constraints.

Among organic exports, spices are important crops in India and their share in total exports is 1.68 per cent. Spices response to the application of organic manures and nutrient management through organic sources can increase the productivity of spices as reported in organic cumin (Sharma et al., 2012). A small group of farmers in these states have started organic cultivation but official information regarding its production, area and exports is not available. The organic production of seed spices crop has not gained much momentum due to lack of scientific information on suitable production technology, appropriate plant protection measures and specific varieties for organic production. Besides nutrients, management of diseases and pest through organic methods are the of important constraints in enhancing productivity of spices.



NEED OF PRODUCTION OF ORGANIC SPICES

Organic spices production is now a commercial venture which is driven by environmental and food safety concern is getting momentum in India and across the world. Demand for green food and pesticide free food is on increase and harnessing the potential of organic farming which address soil health, human health and environmental health is considered of greater significance. Since, 2009, organic farming has attracted many farmers in India. Emphasis is now being should be given to develop eco-friendly production technology which could enhance the nutritive value, export and processing qualities of seed spices crops, research on these issues to be intensified under the coordinated programme. Large scale investment in the sector will overcome the marketing constraints of these produce and hence will be a highly remunerative venture in the days to come. As the demand for organically produced seed spices are increasing in the world market particularly in the developed countries, it has become necessary to develop such technologies to benefit farmers.

Continuous imbalanced use of fertilizers and pesticides have resulted in declining factor productivity and increasing resistance of pest and disease causal organisms. This has resulted in poor health of soil and health problems to people. The promotion of production of organic seed spices may be considered in terms of following facts.

- Organically produced spices are safe, nutritive and good for human health and the technology is ecofriendly.
- Organic spices are highly remunerative because of higher demand in international market as the quality of organic seed spices is relatively better.
- Biological life of soil becomes dynamic which helps in enhancing availability of nutrients to plant and fertility status of the soil maintained over a longer period of time.
- It is believed that organically produced seed spices may be more resistant to pest and diseases as compared to conventional pesticides.
- Organic farming practices are near to nature hence dependency on external inputs reduced.
- Export of pesticides residue free product is a demand.

STATUS OF ORGANIC FARMING IN WORLD AND INDIA

In world, 72.3 million ha area in 187 countries is under organic agriculture which includes both cultivated and wild harvest. India has brought 4.34 million ha area under certified organic farming. Out of this cultivated area accounts for 2.65 million ha while remaining 1.68 million ha is wild forest harvest collection area. Currently, India ranks 10th among the top ten countries having the cultivable land under organic certification. In terms of wild collection, India ranks 3rd next to Finland and Zambia. Around 15.9 lakh certified farmers are engaged in the country in organic farming. Madhya Pradesh has the largest area (22.75 lakh ha) under organic production system. The domestic market for organic products in the year 2020-21 was estimated at Rs.10000 crores. India being a country with different agro climatic zones, each state produces its own specialty products.

PRODUCTION AND EXPORT OF ORGANIC SEED SPICES

An overview of organic farming statistics in the country indicates that from certified organic area of 4.33 mha about 3.49 mt of total organic products were produced by 15.9 lakh farmers/producers. Out of 3.49 mt of organic production, about 8.88 lakh tons of organic products were exported which valued about Rs. 7078 crores (~1041 m US \$). The details of export of spices and condiments 2019-20 and 2020-21 is as follows.

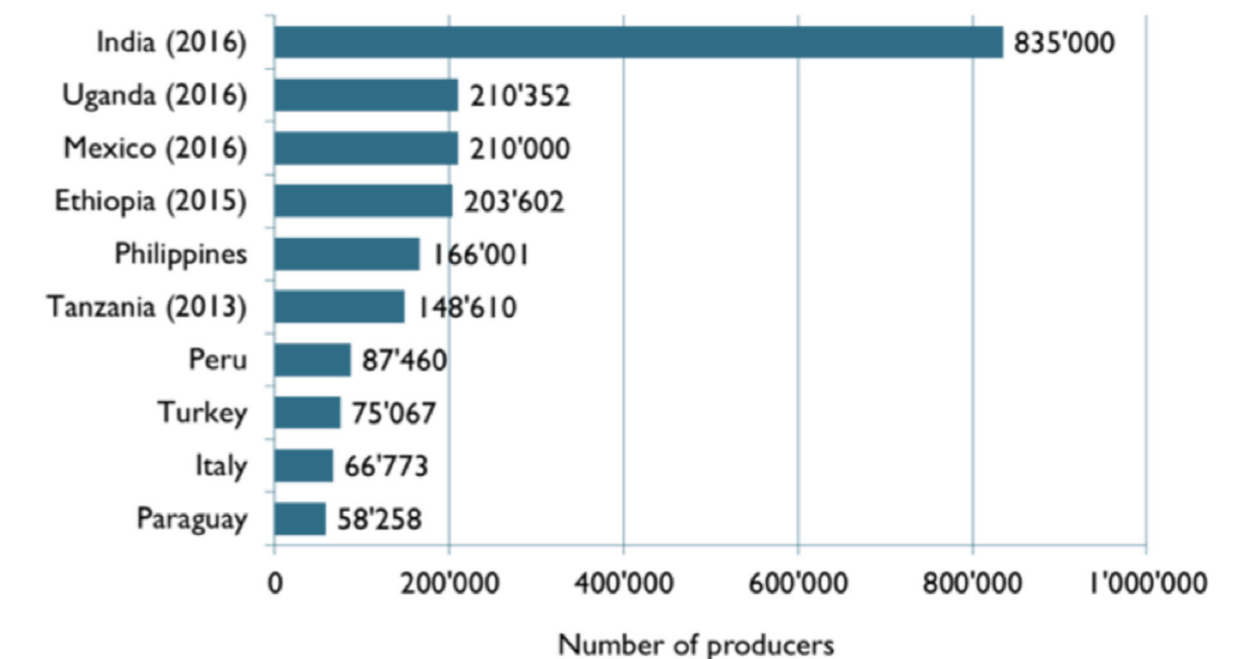
Category	Year 2019-20	2020-21	Growth (%)
Exported (t)	8053.30	10022.00	24.45
Total value (Rs. In lakh)	24369.00	380.61	56.19
Total value (US \$ million)	35.84	55.97	

Data indicate that out of 1.04 lakh ton of organic spices and condiments produced in the country about 10000 ton was exported which constitutes only 10% of total production.

The ten countries with the largest numbers of organic producers 2017



Source: FiBL survey 2019



SCIENTIFIC RESEARCH IN ORGANIC FARMING IN INDIA

Under ICAR-Network Project on Organic Farming (NPOF), location specific package of practices for organic production of crops in cropping systems (42 no's) suitable to 11 states have been developed which can be practiced for getting optimum productivity under organic management. The productivity gap between conventional and organic production system ranges between 10 to 40 per cent in different crops in different soil type and management system. Cost of production per unit area is comparable or less under organic agriculture than inorganic management when on-farm organic inputs are used. However, if organic inputs from outside the farm are purchased and utilized, the cost of production increases by about 13 %. Therefore, organic agriculture should naturally depend on on-farm generation of inputs including mixed cropping, crop rotation, residue recycling, composting etc.

CRITICAL GAP ANALYSIS

Importance of seed spices in India is well known. There is a vast scope of earning foreign exchange in the export of seed spices in the international markets. Similarly, there is a lot of scope for earning income of farmers by production of quality seed spices. There are certain constraints and weakness in spice production in the country. In this context it is pertinent to analyze the critical gaps which can be addressed in systematic manner. In seed spice quality profiling and its enhancement is a major issue which needs to be addressed for enhancing export of seed spices from India. Pesticide residue is yet another issue which need to be addressed as it affects the quality of the product. Critical gap needing attention are low productivity and poor quality of the product, inadequacy of infra-structural facilities for postharvest management and marketing, inadequate efforts for product diversification and consumption, inadequacy of quality seed and planting material, inadequacy of human resource, lack of appropriate database for effective planning, inadequacy of trained manpower and infrastructure in the states, poor delivery system, credit support/and price support and slow pace in adoption of improved technology are the important gaps to be overcome.

SCOPE OF ORGANIC SEED SPICES IN FUTURE

There is a good market for coriander, cumin, fennel and fenugreek in Germany, Netherland, USA and Japan. Export of spices and condiments is increasing but there is a need of assurance of good quality and safe seed spices in the international market. Export of organic seed spices from Rajasthan has a very high opportunity as Rajasthan is one of the largest producer of seed spices with good conditions of organic farming. Good production facilities are being provided to farmers by state Govt. also. There is a need of dealing the following issues for enhancing export of organic seed spices as well as fetching higher price in domestic market also.

PESTICIDE RESIDUE FREE SEED SPICE PRODUCTION

In cumin, wilt in the initial growth phase and blight incidence during post flowering stage causes heavy yield loss. Root rot is also a problem in few seed spices and insect pests are also the major concern in all seed spice crops. To save the crop, farmers make excessive use of pesticides which increases the residual toxicity leading to rejection of export lots in international market. Beside pesticide residue problem, forecasting models for integrated disease management and integrated pest management are not available. Diseases like wilt, blight and powdery mildew in cumin; wilt, powdery mildew and stem gall in coriander; blight and gummosis in fennel, and powdery mildew, downy mildew and mycoplasma like organism (MLO) in fenugreek frequently attack these crops causing heavy loss of yield and deteriorate the quality of the produce. Though the package of practices for the control/ management of each of these diseases have been formulated but still diseases like wilt (cumin and coriander), root rot (fenugreek) and gummosis (fennel) are difficult to be controlled completely. Concerted efforts are needed to evolve appropriate technology for their effective control or varieties which can tolerate or resist these diseases. Maintenance of critical level of pesticide residues, aflatoxin and salmonella in seed spices along with minimum standards of grain quality is the need of hour.



SCIENTIFIC RESEARCH IN ORGANIC FARMING IN INDIA

The general guidelines for production of organic seed spices are as follows:

1. Minimum area of 0.40 ha is the eligibility requirements for organic spices growers and applicant should possess a valid organic certificate issued by a certification agency.
2. The farmers are free to convert a portion of the farm but it is available that entire farm is converted to organic, truthfully and systematically.
3. It is essential that all the crops in the field, where organic spices are produced are also maintained using organic method of production.
4. Crop rotation involving a legume the cycle should be followed and crops belonging to the same family should be avoided.
5. Mixed farming system integrating crop husbandry and livestock is most ideal.
6. The organic farm is to be maintained as a closed ecosystem limiting the net loss of nutrients through soil wash and run off from the system.
7. In order to avoid contamination of organically cultivated plots from neighboring plots and isolation distance of at least 25 meter width is to be left from all round the conventional farm.
8. Minimum of two years is required as conversion period for organic cultivation. In case of cultivation on virgin lands, the conversion period can be relaxed.
9. Varieties cultivated should be adapted to the soil and climatic condition and possibly be naturally resistant to pests and diseases of the region. The organic basic seed material should be used. In case of non-availability initially convention planting material shall be used.
10. Well rotten FYM or compost @ 10-12 t/ha for fennel and 4-5 t may be use for coriander, cumin and fenugreek as basal application.
11. Regular surveillance is necessary for effective management of this pest. Application of of non-chemical pest management practices may be done for control of pests and diseases.



TECHNOLOGIES FOR ORGANIC SEED SPICE PRODUCTION:

The information available on nutrient management, insect pest and disease management in seed spices are summarized in following heads.

Crop	Nutrient Management	Pest and Disease management
Coriander	<ul style="list-style-type: none"> • FYM 4 tons ha⁻¹ or • Vermicompost 2 tons ha⁻¹ • Green manuring of Dhanicha (Summer) 	<ul style="list-style-type: none"> • Use 5-7 Pheromone trap ha⁻¹ • Spray <i>Azadirachtin</i> (1500 ppm) 5.0 ml L⁻¹ water on appearance of pest and second spray at 15 days interval
Cumin	<ul style="list-style-type: none"> • FYM 4 tons ha⁻¹ or vermicompost 2 tons ha⁻¹ 	<ul style="list-style-type: none"> • Spray <i>Azadirachtin</i> 2.0 ml L⁻¹ water on appearance of pest or NSKE (5%) at 45 DAS and 2nd spray at 15 days interval • Spray BD 501 @ 2.5 g in 40 litre of water at 2-3 leaf stage in morning & during 1st & 3rd week of February or spray of milk whey 10 % during 2nd & 4th week February to control wilt & powdery mildew
Fenugreek	<ul style="list-style-type: none"> • Compost 4q ha⁻¹ at the time sowing • Vermicompost 3 q ha⁻¹ at the time sowing • Neem cake 100 kg ha⁻¹ at the time sowing • Spray panchgavya 3 % at 6 WAS • Spray vermiwash @ 10 % at 30 DAS and 15 days interval • Spray of compost tea 20 % at 30 DAS and second spray at 15 days interval 	<ul style="list-style-type: none"> • Neem oil (1.0%) on appearance of pest and second spray at 15 days interval • Spray BD 501 @ 2.5 g in 40 litre of water at 2-3 leaf stage on appearance of powdery mildew and second spray at 15 days interval • Use 16 yellow sticky pot ha⁻¹ for monitoring of pest • Spray dashparni 10 % at 30 DAS & after 15 days interval • Remove the infected plant debris from the field and burn
Fennel	<ul style="list-style-type: none"> • Compost 6 tons ha⁻¹ • Vermicompost 2 t ha⁻¹ at the time sowing • Neem cake 2 q ha⁻¹ at the time sowing • Spray panchgavya 3 % at 6 WAS • Spray vermiwash @ 10 % at 30 DAS and 15 days interval • Spray compost tea 20 % at 30 DAS and 15 days interval 	<ul style="list-style-type: none"> • Neem oil (1.0%) on appearance of pest and 15 days interval • Spray BD 501 @ 2.5 g in 40 litre of water at 2-3 leaf stage • Use 16 yellow sticky pot ha⁻¹ for monitoring of pest • Remove the infected plant debris from the field and burn • Spray dashparni 10 % at 30 DAS & after 15 days interval

POSTHARVEST MANAGEMENT AT FARM LEVEL

Long term results of organic management clearly establishes that the scientific Package of practices (POP's) for organic production of crops in cropping systems perspective should be adopted for keeping the crop productivity at comparable or higher level than chemical farming.

The data on effect of organic, inorganic and integrated management practices on yield & economics of fenugreek are given in table. The maximum seed yield (1830 kg/ha) was recorded under state recommendation followed by 100% inorganic nutrient sources (1790 kg/ha). The maximum net return (Rs. 80503/ha) was recorded under 100% inorganic nutrient sources followed by state recommendation (Rs 77725/ha). The yield of organic fenugreek was less than 3.38% in comparison to state recommendations.

Table: 2 Yield and net return of fenugreek under organic and conventional farming

Treatments	Seed yield (kg/ha)	Stover yield (kg/ha)	Gross return (Rs/ha)	Cost of cultivation (Rs. ha.)	Net return (Rs./ha)	Net return @ 25% premium	Net return per rupee invested
100% Organic management	1770	3752	30995	100286	69291	2.24	86614
75% Organic + Innovative Practices	1650	3498	30985	93489	62504	2.02	78130
75% Organic + 25% Inorganic	1510	3201	28481	85556	57075	2.00	57075
50% Organic + 50% Inorganic	1440	3053	25980	81592	55612	2.14	55612
100% Inorganic Nutrient Source	1790	3795	20920	101423	80503	3.85	80503
State Recommendation	1830	3880	25965	103690	77725	2.99	77725

POSTHARVEST MANAGEMENT AT FARM LEVEL

The postharvest handling activities start after the harvesting of crop, first with drying of freshly harvested crop, threshing, seed drying, cleaning, grading, packing and transportation of whole seed to market, processing plant or storage place. The postharvest management at farm level assumes greater importance because of more deterioration and postharvest losses which happens at this stage. The major

objective of value addition at farm level is to enhance the processable character of farm produce and to achieve the quality and safe raw material for processing. This will also provide better income to the farmer, less losses in transport to market for processing as well as creation of gainful employment at rural level. Similarly, optimum drying on clean polythene sheets/drying yards, ensuring permitted moisture level in the final product is one of the most critical steps to be followed to avoid fungal contamination. In the present international trade scenario, on-farm processing and management of spices have great scope. Improved and more scientific on-farm methods need to be promoted and popularized to get good quality product.



Organic Herbs and Spices

GOOD PROCESSING, STORAGE AND HYGIENE PRACTICES

There is obviously a high risk of contamination by dust and dirt occurring if the raw materials are laid out in the sun. The area used for drying crops in the sun should be raised platform or concrete floor inaccessible to domestic animals and where dust contamination by wind is minimized. Precautions should be taken to prevent contamination by rodents, birds, insects and other animals during drying and handling in the open. Solar and powered dryers protect against contamination and are thus strongly recommended. Fan driven dryers may suck in fine dust particles in dusty areas, therefore powered dryers may need a muslin filter over the air inlet. During storage it is necessary to

take care of temperature and relative humidity. The studies are required to ascertain critical seed moisture level, packaging material and storage conditions viz. storage temperature, relative humidity for retaining the quality for a longer period. Value addition throws open ample opportunity in spices export. The consistent effort by various agencies during the last one decade has improved the share of the value-added products in the export basket to more than 30% in terms of value. India can now boast as the monopoly supplier of spice oils and oleoresins to the world.

INITIATIVES TO BE UNDERTAKEN FOR INCREASING INCOME FROM ORGANIC SEED SPICES IN INDIA

- Organization of buyer-seller meets to promote Indian organic seed spices.
- Capacity building of scientists, Govt. officials and farmers regarding quality requirement of organic seed spices in different countries.
- Capacity building programme on organic production technology and organic certification.
- Stakeholders meet on issues of exporters on quality aspects.
- Technology demonstration for organic seed spice production, post-harvest management, storage and processing.
- Promotion of FPOs in organic seed spices production for enhancing value chain network.
- Incentives to farmers for promotion of ecosystem services and reduction of environmental negative externalities.

