EXPORT ORINTETED VALUE CHAIN STUDY

VALUE CHAIN STUDY

Coriander - Rajasthan

Prepared by:
Sunil Kumar
Pratyush Ranjan Singh

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A. ABBREVIATIONS

AMD	Agricultural Market Development
APAU	Andhra Pradesh Agricultural University
APEDA	Agricultural and Processed Food Products Export Development Authority
APMC	Agriculture Produce Market Committee
ASTA	American Spice Trade Association
BRCGS	British Retail Consortium Global Standards
BSCI	Business Social Compliance Initiative code of conduct
CSR	Corporate Social Responsibility
DA&FW	Department of Agriculture and Farmer welfare
DPR	Detailed Project Report
ESA	European Spice Association
ETI	Ethical Trading Initiative
EU	European Union
FAO	Food and Agriculture Organization
FPC	Farmer Producer Company
FPO	Farmer Producer Organization
FSSC	Food Safety System Certification
GAP	Good Agricultural Practices
GAU	Gujarat Agricultural University
GFSI	Global Food Safety Initiative
GI	Geographical Indication
GST	Goods and Services Tax
Ha	Hectare
ICAR	Indian Council of Agricultural Research
IFS	International Featured Standards
ISO	International Organization for Standardization
KVK	Krishi Vigyan Kendra
MRL	Maximum Residue Limit
MT	Metric Tonne
NAFTA	North American Free Trade Agreement
NGO	Non-Government Organization
NHB	National Horticulture Board
NIAM	National Institute of Agricultural Marketing
NRCSS	National Research Centre on Seed Spices
PoP	Package of Practices
PQI	Portfolio Quality Index
RARI	Rajasthan Agricultural Research Institute
RASFF	Rapid Alert System for Food and Feeds
RAU	Dr. Rajendra Prasad Central Agricultural University
RSAMB	Rajasthan State Agricultural Marketing Board
SAFTA	South Asian Free Trade Area

SAU	State Agriculture University
SEDEX	Supplier Ethical Data Exchange
SKNAU	Sri Karan Narendra Agriculture University
TNAU	Tamil Nadu Agricultural University
TRACES	Trade Control and Expert System
UAE	United Arab Emirates
UK	United Kingdom
US	United States
USA	United States of America
Yr	Year
%	Percent
€	Euro

B. EXECUTIVE SUMMARY

India is the homeland of spices since ancient times. It is the largest producer, consumer and exporter of spices, with 48 per cent share by volume and 43 per cent share by value, in the world. In India, Rajasthan is from top leading states of coriander production, accounting for 89,341 MT production in the year 2019-20 due to favourable agro climatic conditions in the state. The coriander produced in the state have a high potential of export but lack of proper supply chain development has restricted the global market. To promote the export of coriander from Rajasthan, the Indo-German Cooperation on Agricultural Market Development (AMD) project is envisioned to support sustained economic growth in the agricultural sector and improved livelihoods in rural regions of India.

The study on "Export Oriented Value Chain of Coriander" deals with the assessment of existing value chain of coriander in Rajasthan and recommends the development of sustainable export-oriented value chains for the coriander in the state. The study was conducted at Kota cluster where four FPC's were shortlisted for promoting the export of Coriander from the state. Existing value chain studies revealed that the coriander are sold at domestic as well as foreign market. Various gaps like lack of knowledge about mechanized farming practices, insect-pest and disease infestation, lack of knowledge about postharvest management and storage practices of produce, lack of coordination with supporting institutes and lack of storage facilities were observed during the study which hampers the production of quality produce for export.

There are vast opportunities for coriander growers in both domestic as well as export market, but to gain profit from market access, they need to substantially increase the quality of their produce. Various interventions are suggested to mitigate the gaps by providing support at various stages of the supply chain i.e. production, postharvest and enterprise, market development and Institutional support. The suggested interventions are depicted hereunder:

Production support	Reducing Cost of production of Coriander
	Development and Introduction of export-oriented agronomical practices
	Developing a mechanism for product traceability
	Facilitation in creating field level post-harvest management infrastructure
Postharvest and Enterprise support	Multiproduct facility for sorting, grading and packaging as per export requirement
Market Development	Introduction of entrepreneurs, FPO and other stakeholders to export markets and buyers
Institutional Support	Training and capacity building of value chain stakeholders
	Efficient convergence with public sector schemes
	Strengthening of FPOs

There is a need to improve the efficiency along with whole value chain and reduction in cost of doing business through investments in production, postharvest infrastructure, storage and aggregation facilities for promoting the export of coriander from the state.

1. INTRODUCTION

India has emerged as one of the leading producers of various agricultural products globally. This increase in production has created a marketable surplus and therefore, various Indian products need to explore global markets. However, access of Indian products in global markets has remained limited due to issues relating to competitiveness, quality, market access, and other factors (policies, phytosanitary restrictions, trade agreements, and non-tariff trade barriers) affecting exports. The supply chains of various agri-commodities have not evolved to meet the requirements of the global markets because of general inefficiencies that exist at different levels and negligence towards the understanding of the global market requirement.

The Indo-German Cooperation on Agricultural Market Development (AMD) project, therefore, is intended to support India's strategy in modernizing its agricultural markets leading to the sustainable economic growth of India's agricultural sector and improving livelihoods in the rural regions. To achieve its project activities, the project strategically endeavors promoting exchange of technical dialogues between the German and Indian stakeholders, imparting export-oriented trainings & capacity building measures, and strengthening sustainable and market-oriented value chains enabling ecosystem for Farmers Producer Organization's (FPOs). As part overarching project objectives, one of the key result areas of the project is to demonstrate with pilot activities how the integration of FPOs into sustainable and market-oriented value chains can work. During the project's inception phase (August 21 to April 22), under this result area, various analytical studies were undertaken by the project, both based on empirical evidences and providing strategic guidance. Specifically, the studies were commissioned to identify the export potential of 23 different Agri-commodities, under the frame of "One District One Product list" (listed in the project's pilot states as proposed by DA&FW[1]) and assessed its export potential to the European Union markets. Secondly, State's agri-food profile assessment was carried out for Rajasthan, Odisha, and Uttar Pradesh to outline the broad contours of agri-food systems existing in the states. Furthermore, a diagnostic study was undertaken to identify the learning and challenges faced by the FPOs engaged in export-oriented activities. The findings of the different studies, later coupled with the state level consultations, the Project's Steering Committee agreed to strengthen the value chain of up to six most potential commodities in its pilot states and recommended to undertake three inclusive strategic pathways during its implementation phase (May 2022 onwards), namely-

1. Implementation of the export-oriented sustainable value chain for Coriander and Cumin from Rajasthan;
2. Piloting a model that would Institutionalize Agricultural Produce Marketing Committees (APMCs) as an export-oriented service provider; and
3. Supporting FPOs in development and implementation of viable export-oriented business plans in the three project pilot states.

[1] Project pilot states are Rajasthan, Uttar Pradesh, and Odisha states.

This particular study deals with the assessment of the existing value chain of Coriander and Cumin value chain in Rajasthan state and recommends the development of sustainable export-oriented value chains for these two commodities. Scope of the study covers following aspects -

- Exploring commodity-wise value chain structures, activities, seasonality and the relationships among agents (Input suppliers, Government department & institutions, farmers, cold storage/warehouse, processors, commission agents, traders, wholesalers, exports, transports and logistic);
- Examining the infrastructure capacity and utilization capacities/efficiencies, testing and quality facilities, traceability, certification, packaging, labelling, logistics and transport systems;
- Examining the flow of commodities and their distribution patterns through different agents and through different channels;
- Understanding the value-added for different agents and analysing their costs, margins, profits, and losses;
- Identifying the bottlenecks, opportunities, and areas of potential improvement for export-oriented value chain development; and
- Proposing areas of interventions and strategic recommendations that strengthen and promote export-oriented value chains from pilot regions to the EU markets

The approach adopted to conduct this particular study has been discussed in the following chapter.

2. METHODOLOGY

For conducting the value chain study of coriander, initially, intensive interactions were held with the ADT team to understand the overall objectives of the project. After rounds of discussion, the approach for the project was concluded, which included secondary research, a literature review and detail methodology for primary survey in the project area.

For the promotion of exports of Coriander, the project has targeted Kota cluster for coriander and Jaisalmer cluster for Cumin, and four farmers' producer companies (FPCs) have been shortlisted for this purpose. Therefore, for primary research, value chain stakeholders were selected from these clusters. Respondents for the primary survey included representatives of these FPCs, traders / aggregators and exporters already working in the project area.

For interactions, an interview guide was prepared in consultation with the ADT team and other consultants. These interview guides included roles and responsibilities of various value chain players, costs, margins and mark-ups at different levels, key challenges, and inefficiencies in the value chain.

Based on the analysis of secondary literature and information compiled from the field, the value chain analysis report has been prepared. The report has been divided into different chapters, such as a Review of Existing Value chain studies, Product profile, Value Chain analysis, and Proposed Interventions for Export.

3. REVIEW OF EXISTING VALUE CHAIN STUDIES

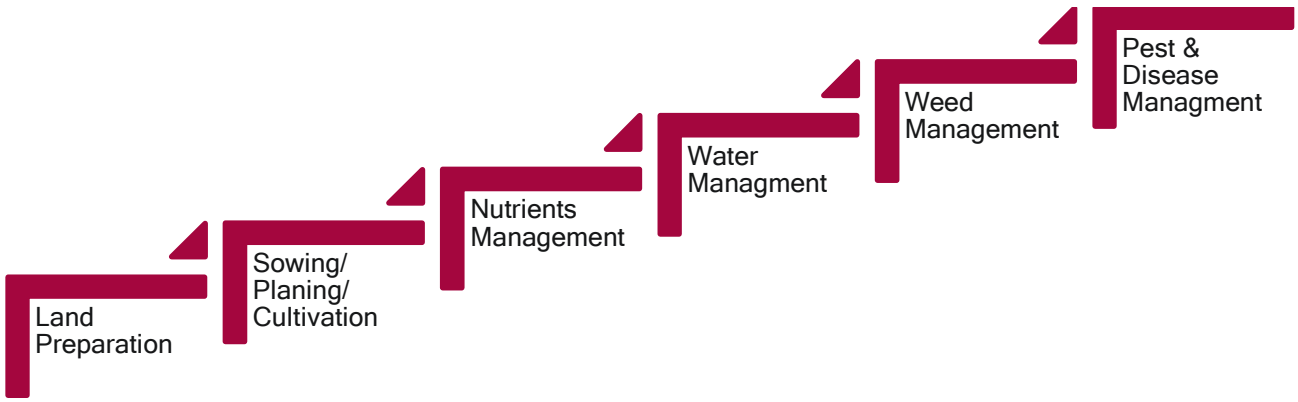
Coriander is a major seed spices crop grown in different part of India. India, accounts for approximately 80 percent of the total world Coriander production. Still there are limited value chain studies have been undertaken by different agencies and departments. India being the largest producer, is the largest consumer and exporter of coriander in the world. Based on the analysis of different study key findings are described in this section:

One of the studies of coriander has been conducted by GT Agency for the state of Rajasthan. Based on the study the value chain actors of coriander are as follows:

The study talks about the major constraints across value chain actors and the brief part covered here:

<u>Production stage</u>

Coriander is mainly a Rabi crop in India. The sowing season of coriander varies between early October to mid-November without much land preparation. Crop duration of coriander is about 110-140 days and harvested in February – March. At production stages, the key activities are presented in diagram below:



The key constraints during production stage are highlighted below:

Lack of Mechanization- It has been observation under these studies, that most of the farmers are using conventional equipment's and mechanization is very limited in most of the districts. Some of the farmers used press drills appear which produce better results on a firm.

Weather constraints - Due to composite climatic zone, weather condition of Rajasthan are extreme cold and extreme hot. The extreme cold condition across Rajasthan specially Kota division has impacted coriander crop due to frost. The study highlighted the high impact of weather condition on coriander crop.

Insecticide Resistance- At the seedling stage coriander is often attacked by the leaf eating caterpillars and semi-loopers.

In addition to the above, the study indicated about the major disease in Rajasthan namely Powdery Mildew Disease, Wilt disease, Stem Gall, Blight Disease and Stem Rot disease.

Harvesting stage

Harvesting of coriander has done when the fruits are fully ripe and start changing from green to brown colour. After harvesting farmer kept coriander to the field for open drying. The farmers in the Kota region store around 60% of their produce harvested for the period of 3 months to 2 years. Farmers generally wait for the higher mandi/market prices. Around 5% of losses are s due to insect parts, rodent droppings, weed seeds, other foreign mate, rial and overly dark color. Farmer has also not well known about the moisture level of market requirement.

Coriander is largely marketed by farmers through the APMC, local vendors, and private food processors. One of the important marketing channels viewed is to processed products of coriander like powder, paste, oil, and puree. These end users are urban households and hotel etc. In addition to the above, the other marketing channel is mandi itself where the raw coriander seeds are bought by the food processors which not only cater the local national market but also target the export to the countries like US, UAE, etc.

Rajasthan's population in rural and semi urban areas prefer freshly grinded coriander powder. In urban areas branded coriander powder is more preferred. Local level branding and marketing is one of the key challenges. Major brands in the market are namely MDH, Catch, and Everest etc
The existence of a long chain of middle men including the APMC and related commission agents, producers share in consumers' rupee is adversely affected.

Institutional Level

There are large range of support institution available in the region. The key support institutions in Rajasthan are Department of Agriculture, Rajasthan State Seed and Organic Production Certification Agency, Rajasthan State Agriculture Marketing Board, Krishi Vigyan Kendras, State Agriculture Universities/ ICAR, RARI, Durgapura and National Agriculture Research System and NRC spices, Ajmer, etc. Despite of large institution available in Rajasthan the extensive support has not reached at ground level. Some of the people are unaware about the kind of schemes, programmes run by the Institution. The farmers have limited digital platform availability, which they are limited knowledge about the market price, new varieties, and modern technology for coriander farming.

Storage facilities

The farmers have lack of storage facilities and they cannot store large quantities and sell them during harvesting season. During harvesting season, the price has low as compared to non-arrivals season. Due to relatively lower prices prevailing in mandis in close proximity, farmers are forced to transport produce to distant mandis. Although large producers are successful in storing coriander throughout the year, they follow the traditional methods of storage and grading rather than modern and scientifically proven methods. Farmers do have not any centralized place/facility to store coriander at the village level. The risk associated with storage is high, pest/moisture may lead to damage.

Distress sale is obligatory on some farmers as they have to repay the loan availed from traders during the time of sowing for seed, fertilizers etc.

As per the study, processing and market infrastructure are one of the main concerns because traditionally farmers have limited options of marketing only through APMC mandi. Farmers have not received information on market price. Some farmers sell crops through village level traders because due to which they are not realizing prices.

Additionally, the primary processing infrastructure is very week, as there are no facilities for primary processing such as cleaning, grading and sorting at the farm level. Farmers are also not well aware of the moisture meter for quality check of coriander.

Value Chain actors and profit margin

To evaluate the value chain of Coriander, consultations were held with major stakeholders in the chain including farmers, Consumers, Processors, traders, supporting public and private service providers and institutions, etc. in various parts of the state. The study also indicated the share of stakeholders in consumers:

Some of the major challenges faced by coriander value chain actors:

- Farmers have faced the problem of the non-availability of improved & good quality seed.
- Farmers have not having facilities of grading and storage.
- There is inadequate infrastructure/ facilities with producers, traders, millers and at market level resulting in marketing inefficiencies.
- The large number of intermediaries in the chain leads to low income to producer which eats into the margins of farmers.
- Obsolete techniques are being used in processing, which reduces output.
- Under-ripe coriander seeds have an unpleasant flavour and over-ripe seeds tend to shatter which reduces the yield. Fluctuations in supply (based on production), coupled with export-import dynamics, make prices of coriander unstable which obviously affects producers and consumers both.

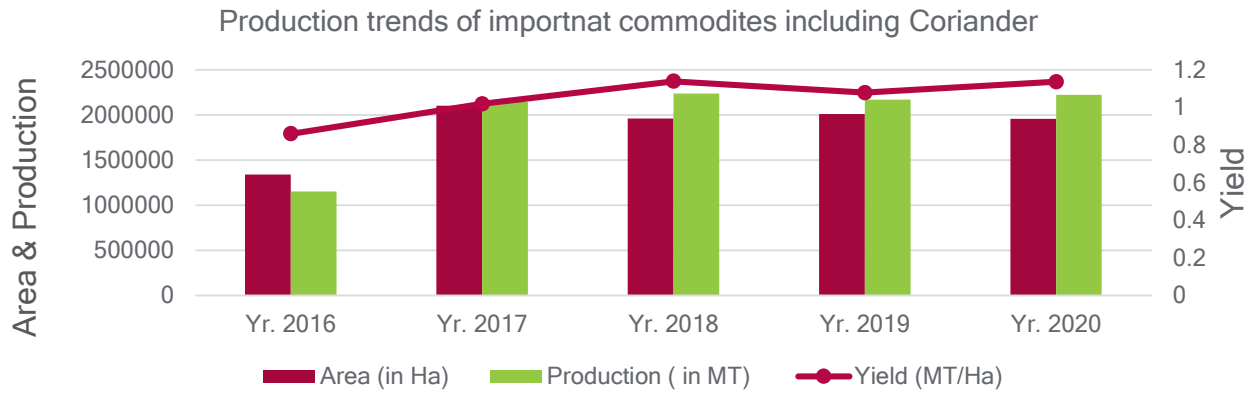
4. COMMODITY PROFILE – CORIANDER

4.1 Market Overview

4.1.1 Global Production of Coriander

The Coriander are now growing in more than 100 countries, wherein the production is concentrated mainly in Asia and more precisely in India. The major global production of coriander is India, Morocco, Canada, Romania, Russia, and Ukraine. The other producers are Iran, Turkey, Israel, Egypt, China, US, Argentina, and Mexico. Coriander is known to have been cultivated for seed purpose in India, Morocco, Canada, Romania, Russia, Ukraine, Turkey, Egypt, China, US, Argentina, and Mexico. The major exporters of coriander are mainly India, Turkey, Egypt, Romania, Morocco, Iran, and China etc. and Middle East, South-east Asia, USA, UK, and Germany are the major importers of coriander[2].

The coriander production data including other commodity such as Anise, badian, cumin, caraway, fennel, and juniper berries are available at global level. The below figure shows the year wise trends of Area, Production and Yield are provided[3].



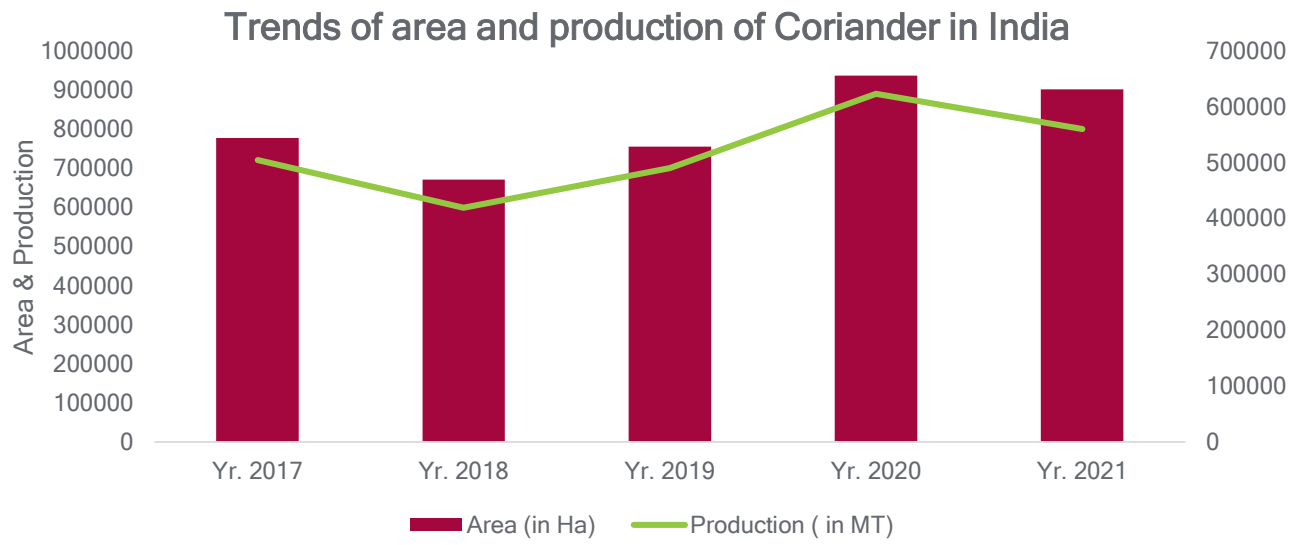
Countries wise combined data (Anise, badian, coriander, cumin, caraway, fennel, and juniper berries) (Area-Ha Production -MT)							
S. N	Country	2018		2019		2020	
		Area	Production	Area	Production	Area	Production
1	Afghanistan	25333	18093	25444	18123	25759	18387
2	Argentina	7424	6540	6722	5962	7739	6912
3	Canada	14069	12224	13947	12087	13980	12128
4	China	39454	50879	39171	50339	39291	50565
5	Egypt	32339	28706	32502	28879	32534	28923
6	India	1564000	1503000	1587000	1448000	1546000	1431000
7	Morocco	25253	27494	25364	27625	25418	27687
8	Russian Federation	21082	10146	49233	37578	61981	36926
9	Syrian Arab Republic	101005	76107	90627	45356	79085	70988
10	Tunisia	14115	11133	14213	11225	14312	11318
11	Türkiye	81304	284878	91615	306679	73735	314999
12	Others	35870	206740	35333	179686	37577	214268

[2] https://www.fao.org/faostat/en/#data/QCL
[3] https://www.fao.org/faostat/en/#data/QCL

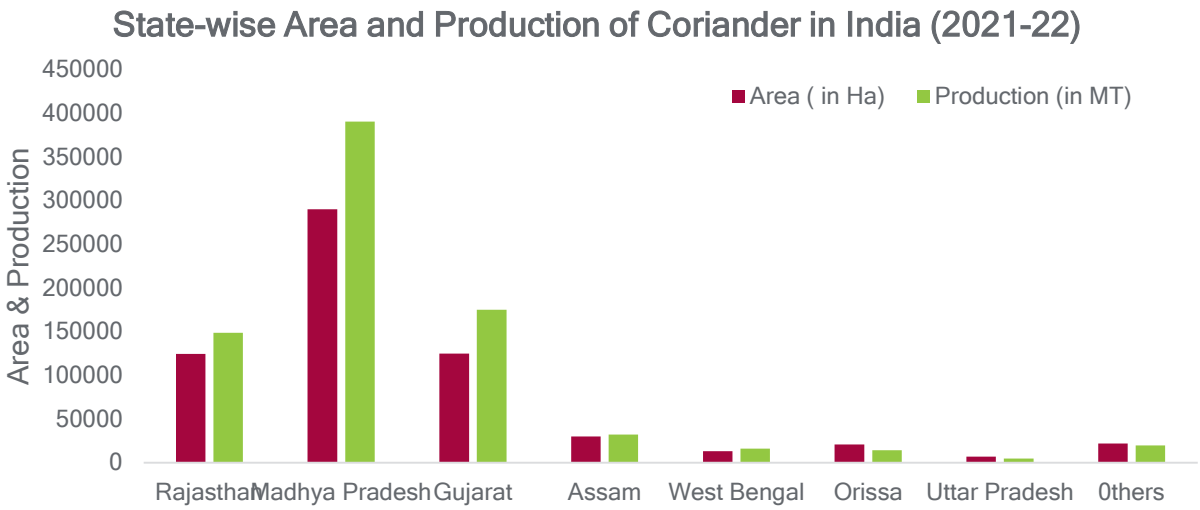
Countries wise combined data (Anise, badian, coriander, cumin, caraway, fennel, and juniper berries) (Area-Ha Production -MT)							
S. N	Country	2018		2019		2020	
		Area	Production	Area	Production	Area	Production
Total		1961248	2235940	2011171	2171539	1957411	2224101

4.1.2 Indian Production of Coriander

India is the largest producer and consumer of coriander seed. Coriander production has increased significantly in the past decade. The rise in output was primarily on account of rise in yields. However, coriander production has moderated in 2017-18 due to adverse weather conditions. Total Coriander production in India during 2021–2022 was estimated to be 800,742 MT from an area of 631,698 Ha with average productivity of 1.2 MT/ha according to the Spices Board India. Numerous varieties of coriander are grown in almost all states in India. Madhya Pradesh is ranked first in Coriander production with a share of 48.77 percent (390,531 MT) followed by Gujrat at 21.85 percent (175,000 MT) and Rajasthan placed the hird position which contributes 18.57 percent (148,703 MT). West Bengal, Andra Pradesh, Odisha, Assam, Uttar Pradesh are also among the major producers[4].



[4] www.indianspices.com; Spices Board India



Varieties and Grades

Improved varieties like Guj.Coriander-1, Guj.Coriander-2, RCr-41, UD-20, Rajendra Swati (RD-44), CS-287, CO-1, CO-2, CO-3, Sadhana, Swati, and Sindhu may be cultivated to get a high yield. Coriander is classified into grades like Badami, Eagle, Scooter, single parrot, double parrot, green medium, green extra and green special. After the harvesting of coriander, it is dried in sunlight; the excess drying leads to brown colour and fetch a low price. These brown colour seeds are called the Badami grade. The finer quality is called green and it is traded at a premium to all other grades. However, the Badami grade has the highest market share, constituting 50% of the total produce. Many improved varieties of coriander are now available for cultivation in Tamil Nadu, Andhra Pradesh, Gujarat, and Rajasthan states[5].

Many improved varieties of coriander are now available for cultivation in Tamil Nadu, Andhra Pradesh, Gujarat, and Rajasthan states.

Variety	percentage	Characteristics
CO-1	A pure line selection	Released by TNAU, Coimbatore. Tall plant, many umbels per plant, suitable for green and grains. Duration 110 days. Yield 500kg per ha.
CO2	A reselection from culture P, of Gujarat	Released by TNAU, Coimbatore. High yield, dual purpose variety, tolerant to drought, oil 0.3%. Duration 90-10 days. Yield 600-700kg per ha.
CO-3	Reselection from Acc. No. 695	Released by TNAU, Coimbatore. High yield, dual purpose, medium size grain, seed oil 0.38-0.41%. Duration 103 days. Yield 640kg per ha.
Gujarat Corander-1	A selection from local	Released by GAU, Jagudan, High yield, a greater number of branches, seeds
Gujarat Corander-2	A selection from CO2	bolder and greenish in colour. Duration 112 days. Yield 1100kg per ha. Released by GAU, Jagudan. High yield, more branches, dense, foliage, umbels large size, grain purpose variety, bold seeds, no lodging. Duration 110-115 days. Yield 1900kg per ha.

[5] https://www.nbhcindia.com/docs/research-reports/Seasonal%20Commodity%20Insight%20-%20Dhaniya.pdf

Rajendra Swati	A mass selection from germplasm type	Released by RAU, Dholi. High yield potential, suitable for intercropping, fine seeded rich in essential oil, resistant to stem gall disease. Duration 110 days. Yield 1200-1400kg per ha
Rcr-41	Recurrent selection from UD	Released by RAU, Jobner. High yield, tall erect, suitable for irrigated areas, resistant to stem gall. Duration 130-140 days. Yield 1200kg per ha.
Swati	Mass selection	Released by APAU, Guntur. High yield, semi erect, suitable for delayed sowing, Duration 80-90 days. Yield 885kg per ha.
Sadhana	Mass selection	Released by APAU, Guntur. High yield, suitable for rain areas, semi erect, resistant to aphid and mites. Duration 95-105 days. Yield 1000kg per ha.

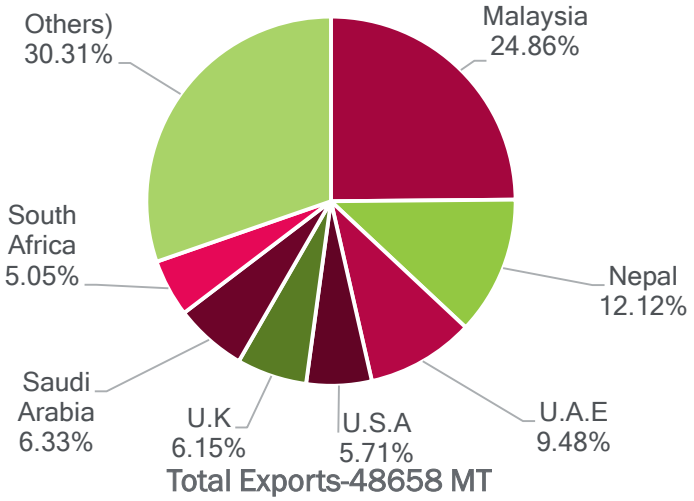
(Source: National Horticulture Board (NHB))

4.1.3 Exports Scenario of Coriander from India

India is the largest-producer and exporter of coriander in the global market. The exports have increased significantly in the past few years due to strong demand from the overseas markets. The changing pattern of food consumption or consumption of more spicy foods, especially in developed countries and the large population of Indian origin in these countries has resulted in good export orders for Indian spice exporters. The major importers of coriander from India are Europe, the US, Singapore, and the Gulf countries. [6].

India is the largest producer, consumer, and exporter of coriander with greater share in world export market. Other major producers are Malaysia, Nepal, UAE, South Africa, Saudi Arabia, USA, and U.K. But India is not a major importer of coriander in the world market. India imports 4000-5000 MT which is not even 1 per cent of our production. Imports in last 4-5 years have been constant with no major changes.

Exports of Coriander Seed from India to different countries (2021-22)



The production fluctuates widely between years in India and has varied from below 2 lakhs tons to above 3 lakh ton in this decade. India annually exports approx. 50,000 - 55,000 tons of coriander a year. The export of coriander seed during 2021-22 has been an all-time high both in terms of volume and value and the export has been 48658 MT valued at Rs. 48251 lakhs in in Rs crore in in 2021-22. The major buyers were Malaysia 24.86 per cent (12097 MT), Nepal 12.12 per cent (5895 MT), UAE 9.48 per cent (4612 MT), Saudi Arabia 6.33 per cent (3079 MT) and USA 5.71 per

[6] Spice Board of India

cent (2782 MT)[7]. The quantity and value wise exports of Coriander from India to different countries are provided in the below table.

S. N	Country wise Exports Scenario of Coriander from India (Quantity in tons and Value in lakhs)									
		2017-18		2018-19		2019-20		2020-21		2021-22	
	Major Country	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
1	Malaysia	10565	7606	11208	7986	11611	9983	12515	10032	12097	11486
2	Nepal	2695	1562	3480	2179	3914	2640	6966	4893	5895	4474
3	U.A. E	4328	3015	4253	2800	5409	3888	6274	4642	4612	4124
4	U.S. A	1678	2193	1828	2493	1655	2408	3061	4077	2781	4049
5	U. K	2604	2424	2617	2629	2882	3027	3554	3899	2990	3351
6	Saudi Arabia	2958	1889	3713	2327	3723	2727	3255	2524	3079	2814
7	South Africa	1983	1684	2592	2296	2607	2680	3168	3185	2458	2676
8	Others	8375	6902	19209	12499	15332	12479	18566	16375	14747	15278
	Total	**35185**	**27275**	**48900**	**35208**	**47135**	**39831**	**57359**	**49628**	**48658**	**48251**

4.2 Coriander Production in Rajasthan

4.2.1 Area and Production

According to the Spice Board of India, Rajasthan is the third largest coriander-producing state in the country as already discussed in the above section, it has 60,039 Ha of area under production and is producing 89,341 MT (2019-20) of Coriander in the state of Rajasthan. The following table shows that district wise area and production of Coriander in Rajasthan where Jhalawar district is the leading producer of coriander contributes the production of 46788 MT followed by Kota (19,604 MT) and Baran contributes 16,217 MT and so on during 2019-20[8].

District wise area and production of Coriander in Rajasthan							
S. N	District	2017-18		2018-19		2019-20	
		Area (Ha)	Production (Tonnes)	Area (Ha)	Production (Tonnes)	Area (Ha)	Production (Tonnes)
1	Ajmer	79	105	207	58	183	39
2	Baran	18552	32571	10488	18545	9400	16217
3	Bikaner	325	433	184	239	164	244
4	Bundi	1730	2702	784	1070	230	325
5	Chittorgarh	2535	2648	1598	1987	2120	3627
6	Churu	125	166	86	112	27	40
7	Jaisalmer	9	12	5	7	1	2
8	Jhalawar	53809	66250	43828	46289	35757	46788
9	Odhpur	746	993	410	532	849	1263
10	Kota	18202	22131	10169	18869	10667	19604
11	Pratapgarh	817	1088	882	1145	424	631
12	Sawai Madhopur	251	277	161	267	157	234
13	Tonk	203	270	13	17	51	76

[7] http://www.indianspices.com/sites/default/files/Major_Item_Country_export_2021-22.pdf
[8] Department of agriculture & Farmers Welfare

District wise area and production of Coriander in Rajasthan							
S. N	District	2017-18		2018-19		2019-20	
		Area (Ha)	Production (Tonnes)	Area (Ha)	Production (Tonnes)	Area (Ha)	Production (Tonnes)
14	Others	417	554	156	403	9	251
Total		**97800**	**130200**	**68971**	**89540**	**60039**	**89341**
Source: Department Of agriculture & Farmers Welfare							

4.2.2 Coriander Crop Seasonality

Time of sowing

For vegetable purpose, optimum time for sowing is first week of October and when grown for seed purpose, complete sowing in last week of October to first week of November. The crop requires 4-6 irrigations. The sowing of coriander starts post the harvesting of these two crops without much land preparation[9].

Harvesting

Crop duration of coriander is about 110-140 days and harvested When crop attained 20-25 cm height harvesting for green leaves can be started. Three to four cutting can be taken. When crop is grown for seed purpose, it is ready for harvesting in February – March month. Harvest when the capsule gets matures but has green colour. Overripe capsules fetch a lower price.

Post-Harvest

After harvesting allowed the crop to dry in sunlight for 6-7 days. After proper drying, carry out threshing after the cleaning operation.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

	Sowing Season
	Harvesting Season

[9]https://www.tourism.rajasthan.gov.in/content/dam/agriculture/Rajasthan%20Agricultural%20Competitiveness%20Project/valuechainreport/RACP_VC_Coriander.pdf#page=28&zoom=100,170,450

5. VALUE CHAIN ANALYSIS

5.1 Major Actors in Value Chain

Rajasthan is one of the major coriander producing state in India. The value chain of coriander in the state is very structured and traditionally being managed by players who have been in the business of agricultural commodity trading since generations. In market, coriander is sold as seed and powder. From perspective of supply structure, the actors are same for both the products, however costing for two products get changed as powder making has additional cost of powder making and small retail packaging.

Broad actors in the supply chain of coriander in Rajasthan are given below -

Actor	Profile and Role & Responsibilities
Agri-input dealer	Coriander is a highly disease and pest susceptible crop, therefore, the input need for the crop is high. Starting from Seed, insecticides, fungicides and weedicide, all types of chemicals are used in the coriander cultivation. Agri-input dealers not only sell the required inputs to the farmers, to certain extent they are also advisors to the farmers on agri-input purchase. In case of coriander, most of the seed varieties are developed by the government research institutions. Major seed suppliers are Rajasthan State Seed Corporation and a large number of local seed companies. In absence of a lack of coriander crop-specific documented protocols for use of important brands, agri-input dealers and retailers are the main influencers to farmers on the use of these pesticides. Agri-input dealers also finance the agri-inputs, as large volumes of these inputs are given on the credit to the farmers. In all, agri-input dealers and retailers are highly influencing actor of the coriander supply chain.
Farmers	As has been discussed, coriander is a disease-prone and weather-sensitive crop; coriander production at times is a high-risk crop for farmers. Although in the cluster, most of the farmers cultivate coriander, however, there is wide variation in crop cultivation practices adopted and yield achieved by progressive ones compare to the others. In addition to high inputs, coriander is also a relatively labour-intensive crop as well. Starting from land preparation, sowing, fertilizer application, disease and pest management, weed management, harvesting, threshing, drying and winnowing and cleaning etc., all the activities need good number of labour, which are managed by the farmers and the family.
Local Aggregators	In project cluster, local aggregators are not very significant actor, however, a small quantity of coriander is marketed through them. These aggregators basically purchase products from small and marginal

Actor	Profile and Role & Responsibilities
	farmers, who have small quantities. For these farmers, taking it to market generally cost higher. These aggregators collect coriander from farmers' field / home, transport it to markets for further selling. Sometime, these aggregators work on behalf of large traders for procurement. Local aggregators generally earn their margin through price difference at village level and in major market.
Commission Agents	Regulated markets are the major place for the marketing of coriander. In regulated markets, commission agents play role of transaction facilitators for the farmers through auctioning. The commission agent assures payment to the farmer on behalf of the buyer. Additionally, commission agents also fulfill the credit need of the farmers, either by giving a guarantee for the purchase of agri-input or providing funds as and when required for household needs (such as family functions and festivals etc.)
Wholesalers	Wholesalers purchase the coriander in the regulated markets (mandi) through auction and supply it to processors. Some wholesalers also have direct relations with the farmers and procure directly from the field. Wholesalers generally earn their margins in two ways, namely i) through differences in the purchase price and selling price (in case of the supply of product to processors distant) and ii) through time arbitrage (wholesaler purchase the coriander during harvesting season, store it appropriately and sell it during off-season). Wholesalers are the main financer of the coriander value chain after it reached the market and they take the maximum risk of market price change. In some cases, though very limited, wholesalers are also the processors and they participate in the market auction to procure coriander for their captive use.
Warehouse / cold storage owners	Storage of coriander is an important activity in the value chain. Wholesalers, after procurement from the market, store the product in properly maintained warehouses. In some cases, coriander is also stored in cold storage. In case of a warehouse is WDRA accredited, wholesalers also avail finance from banks against warehousing receipt pledge finance.

Actor	Profile and Role & Responsibilities
  Coriander stored and pledged for finance in warehouses at Gondal (Gujarat)	
Market committees	Agricultural market committees facilitate and regulate the trade of coriander (along with other agricultural commodities) in major production clusters. Market yards, having shops and sheds are provided by the market committees for conducting the transactions. Officials from committees ensure fair and transparent auctioning and record each transaction. In addition, market committees contribute in providing market price information to different stakeholders and online platforms such as www.agmarknet.nic.in.
  Coriander shed in Ramganj Mandi (Kota)	
Processors	In the case of Coriander, there are two different types of processors. At the primary level, the processor sort, grade, and pack coriander seed. For this sorting and grading, mechanical as well as sensor-based color sortex machines are used. Primary processors also pack the coriander seed as per the requirement of end buyers/distributors/exporters. Sometimes the packaging material is provided by the buyers only. At the secondary level, processors convert seed into coriander powder and pack it as per requirement (of wholesale or retail).
Marketing companies & distributers	At the retail level, coriander is sold in two forms as coriander seed and as powder. There are small and large spices marketing companies who have developed their brand and distribution network. Some of them charge high premium for their brand.

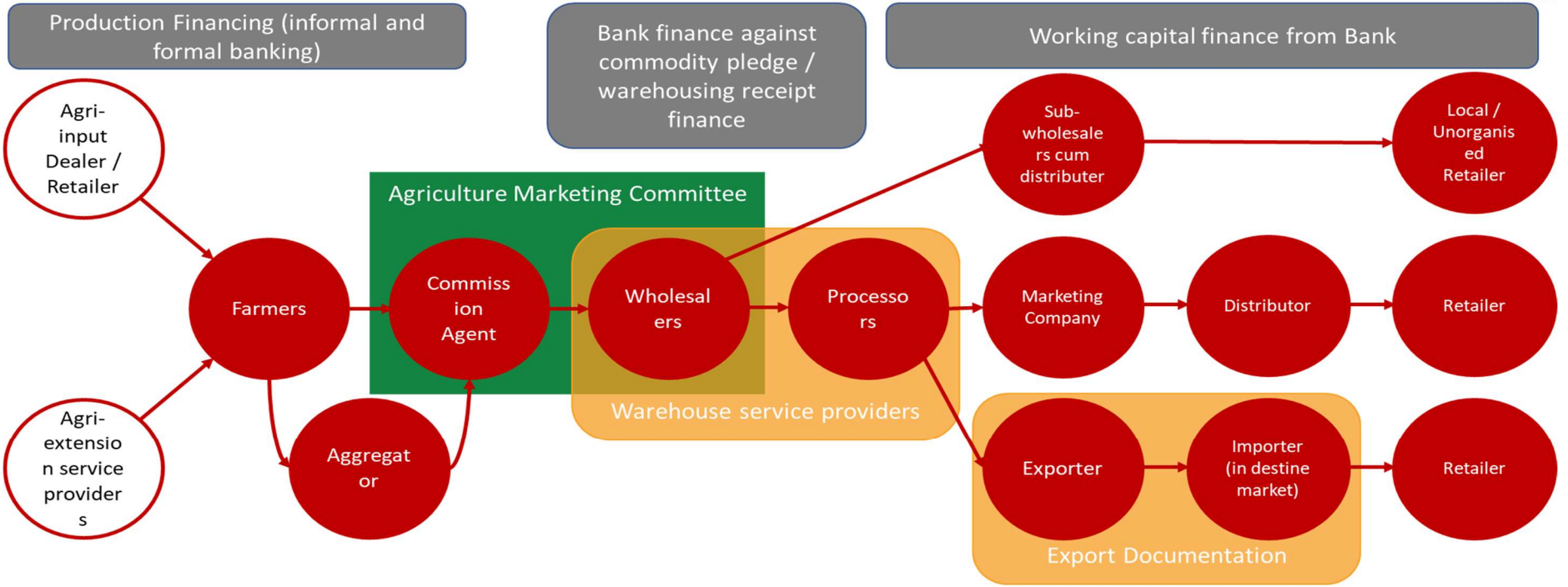
Actor	Profile and Role & Responsibilities
	Marketing companies mostly invest in creating brand image in the market and ensuring availability of their brand on retail shelves.
Exporters	Same to the marketing in the domestic markets, coriander is exported in both forms, as seed, and as powder. In the case of exports of coriander seed, exporters either procure it from primary processors or get job work done (if procured directly from the markets). In the case of the export of Coriander powder, mostly the companies marketing coriander in domestic markets are either exporting directly or supplying to the exporters.
Extension services providers	For promoting improved production practices and training farmers on various other aspects, different government agencies are working in the field. National Research Centre for Seed Spices (ICAR), Ajmer, Krishi Vigyan Kendra (KVKs), at the district level and State Agricultural Universities are the key agencies providing extension services. In addition to the government agencies, some NGOs and private agencies (under CSR initiatives) also provide extension support to the farmers.
Farmers Producer Organisations	Farmers producer organisations (FPOs) are relatively very new institutions in coriander value chain. At this stage, most of the FPOs (in selected production cluster of Rajasthan), working in coriander value chain are of nascent stage. Current role is mostly limited to providing agri-inputs and marketing of small quantities of coriander in the market. It is expected that with government thrust on promotion and strengthening of FPOs from government side and also support extended by various private sector players, over period of the time, these institutes will have significant role in the complete value chain.

Above mentioned list covers most of the actors in the supply chain of coriander. In addition to these direct actors, there are other supporting actors, who contributes to functioning of the value chain and in ensuring that the coriander reaches to targeted consumers.

5.2 Commodity Flow Analysis

In market, trade of coriander happens based on the quality of the produce. There are two important physical quality parameters of the coriander, namely the colour and percentage of broken / split seed in the lot. General market grades are like badami, eagle, scooter, single parrot, double parrot, green medium, green extra and green special. Green colour is considered as premium grade and Badami and brown are graded lower. In market, Badami grade has maximum arrival.

In production cluster of Kota, majority of coriander is marketed through regulated markets (APMC Mandi) only. Broadly, the trade channel is straight, however, in many cases, actors in the coriander trade are playing multiple roles. Most common supply chains of coriander have been discussed in the following paras -



Quality of Coriander is also determined as per the Grading as per Spices Grading and Marking Rules, 2005. These quality parameters make base for warehousing and availing finance against warehousing receipt.

Grade designations and quality of Coriander (Whole)								
Grade Designation	Quality – Special Characteristics							
	Organic Extraneous matter ,% (m/m) (Max.)	Inorganic extraneous matter, %(m/m) (Max.)	Split fruits, % (m/m) (Max.)	Damaged, discoloured, shriveled, insect bored fruits %(m/m) (Max.)	Moisture, % (m/m) (Max.)	Total ash % (m/m) (Max.)	Acid insoluble ash ,%(m/m) (Max.)	Volatile Oil % (ml/100 gm) (Min.)
Special	0.8	0.2	5.0	2.0	9.0	7.0	1.0	0.2
Standard	3.5	0.5	30.0	5.0	10.0	7.0	1.5	0.1
General Characteristics								
(1) Coriander (Whole) shall be dried mature fruit of *Coriandrum sativum* L. (2) It shall not contain any added colouring matter, or preservatives; (3) It shall be free from mould growth and living insects and practically free from dead insects, insect fragments and rodent								

contamination; (4) It shall comply with restrictions in regard to Aflatoxins, Metallic Contaminants, Insecticide or Pesticide residue, poisonous metals, naturally occurring Contaminants, Microbial load and the like as specified by the Codex Alimentarius Commission or as per buyers requirements for Export purposes and the Prevention of Food Adulteration Rules, 1955 for domestic trade.

Similarly, quality grade has also been specified for the coriander powder under the Grading as per Spices Grading and Marking Rules, 2005, which is as under –

Grade designations and quality of Coriander Powder						
Grade Designation	Quality/Special Characteristics					
	Moisture, % (m/m) (Max.)	Total ash, %(m/m) (Max.)	Acid insoluble ash, %(m/m) (Max.)	Crude fiber, % (m/m) (Max.)	Nonvolatile ether extract %(m/m) (Min.)	Volatile oil % (ml/100gm) (Min.)
Special	9.0	6.5	1.0	25.0	15.0	0.10
Standard	10.0	7.0	1.5	28.0	12.0	0.05
General Characteristics						
(1) Coriander Powder shall be obtained by grinding clean, sound, dried and mature fruits of Coriandrum sativum L; (2) It shall be ground to such a fineness that it shall pass completely through a 500 micron sieve. However, for standard grade, 95% of it should pass through 1000 micron sieve; (3) It shall have a typical aroma and flavor characteristic of the spice and shall be free from musty odour; (4) It shall not contain any added coloring matter, preservatives or any foreign matter; (5) It shall be free from living insects and practically free from moulds, dead insects, insect fragments and rodent contamination; (6) It shall comply with restrictions in regard to Aflatoxins, Metallic Contaminants, Insecticide or Pesticide residue, poisonous metals, naturally occurring Contaminants, Microbial load and the like as specified by the Codex Alimentarius Commission or as per buyers requirements for Export purposes and the Prevention of Food Adulteration Rules, 1955 for domestic trade.						

5.2.1 Domestic Supply chain

Mostly the coriander is marketed through the regulated markets (*APMC Mandi*) only. The supply chain gets bifurcated only when the coriander is transported out of the market. This bifurcation is mainly based on two criteria, i) based on the type of processing to be used and ii) type of end markets to be targeted.

Channel 1: Marketing by organised payers –

Farmers bring their produce in the regulated markets, mostly in plastic and jute bags or sometimes as loose in the trolly. Each farmer, in general, has relationship with the commission agent at the market. These commission agents facilitate in auctioning of the coriander at the market yard. Technically, the auctioning takes place under the supervision of APMC appointed auctioneer, however, in practice, traders have mutual trust and the auction is organized by a commission agent who can send transaction records to the APMC officials.

Wholesalers and processors having a license as buyers in the APMC market participate in the auction for the procurement of the coriander. After auctioning, material is moved either to a warehouse or to processing facility (for sorting grading or sortex). After sorting and grading, and packaging coriander is supplied to different market players. In some cases, the marketing companies have their own packaging facility, wherein they pack coriander seed in retail packs for further supply. These marketing companies, dealing in multiple products, have their distribution channels in different markets. Distributors appointed in each city further supply to retailers for sale. The same supply chain is followed in the case of coriander powder.

Channel 2: Marketing through unorganised / non-branded market – In retail market, in addition to packed coriander, large quantity is also sold as loose coriander seed at retail store. In this case, sub-wholesaler cum distributers purchase material from wholesalers based in production clusters. Thereafter these sub-wholesalers market coriander in the local market by placing it at retail shops. Sometimes these supplies are also packed in unbranded retail packets.

5.3 Export supply chain

Export supply chain gets separated at Processors' level. Exporters, generally provide quality specifications and packaging requirements to the processors. Accordingly, processors supply the material to exporters at their supply centre. Exporters, further supply them in different markets as per the demand and orders. For exporting coriander to EU requires testing of the sample on different parameters.

The most common requirements regarding contaminants in coriander are related to the presence of pesticides residues, mycotoxins, heavy metals, microbiological organisms, odour and flavour. In addition to the mandatory requirements, there are many other specific buyers requests. European Spice Association published Quality Minima Document specifications. These include compliance with additional food safety, quality and sustainability standards.

Export supply chain has additional expenses of documentations, which includes certifications under SAFTA, NAFTA, PQI, Species Board of India license, Custom approval requirements and others.

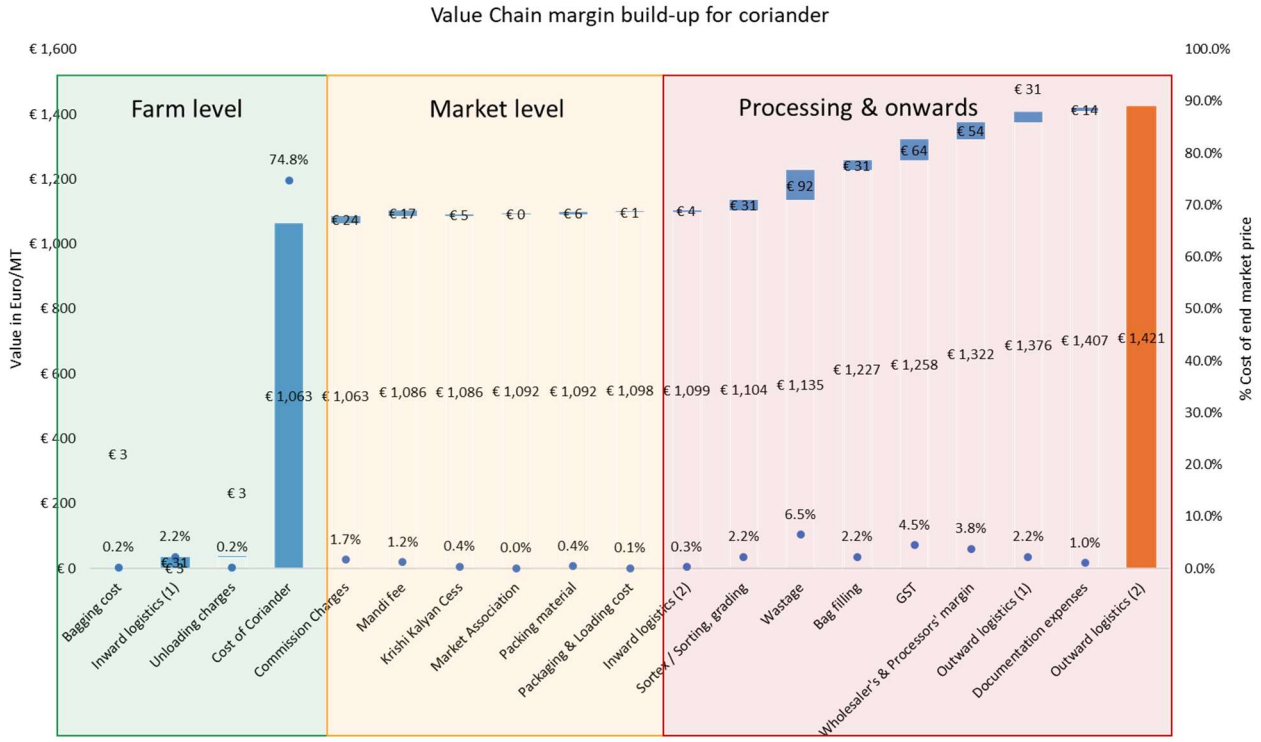
5.4 Price mark-up for Coriander exports

Price mark-up for the coriander has been prepared based on inputs from different stakeholders in the market. Detail break-up has been prepared for coriander seed till it reaches port. From thereafter, cost build-up and margins depends on transportation costs to different destined markets and quality.

In the cost calculation, the largest composition is market price of coriander (at Mandi) and thereafter, there are some fixed cost components (per unit) and others are linked to base price on percentage basis. Description of price build-up has been provided as under -

- For farmers, cost of production coriander is approximately Rs. 28.00 – 35.00 per Kgs (€ 0.35 – 0.44 per Kg), depending upon yield levels and expenses incurred on disease and pest management by farmers. In case of higher disease-pest incidences, farmer incure higher cost on pesticide and also have lower yield levels, which increases unit cost of production significantly.
- Prices of coriander fluctuate in the market on daily basis, based on quality of product, market arrival and demand. For purpose of calculation of markup, prices at market level (Auction price) have been taken at Rs. 85.00 per kg (€ 1.06 per Kg). There have been wide variations in the auction prices during the seasons of 2021 and 2022.
- Farmers earn approximately Rs. 45 – 50 per Kg (€ 0.55 – 0.62 per Kg) from Coriander. However, this is gross margin, and does not include the cost of labour and land rent. If these costs are included, the margin of Rs. 45-50 per kg will reduce drastically.
- At regulated market (APMC Mandi), cost components include Market Fee, Commission agents charges, farmers' welfare cess, market association's charges and labour expenses for unloading. These expenses combined constitute Rs. 4.00 per Kgs (€ 0.05 per Kg). Material is packed in reusable bags (generally last for 4-6 times).
- After buying the coriander from market, buyers incur cost of packaging, loading and transportation upto their respective facility (warehouse / sortex unit). This costs around Rs. 0.90 – 1.00 per kg, depending on the distance of warehouse / processing facility from the market.
- Coriander is sorted and graded in different manner, such as mechanical cleaning or sortex. Facility operators charges Rs. 2.50 per kg for sortex, however in case of mechanical cleaning and sorting, this cost varies from Rs. 1.25 – Rs. 2.00 per Kg.
- In process of sortex and / or cleaning and sorting, around 7-10% of material is get separated as waste (constituting impurities such as stones, stem, other seeds etc.). This waste constitutes 7-10% of total volume and costs around Rs. 7.40 per Kg (€ 0.09 per Kg) of finished product.
- Coriander also attracts GST at the rate of 5% and which costs approximately Rs. 5.10 per Kg (€ 0.06 per Kg). In case of GST, there is a need for restructuring it, because the government does not include sorting & grading activity as processing activity (as shape and form of product is not changed), therefore, trader, in need to show same quantity of material purchased and sold their books. However, in actual there is a loss of 7-10% in the process and quantity purchased differs from the quantity sold.

- Above this, margin for wholesalers cum processers, outward logistics and packaging costs varies on various factors, such as negotiation power of seller, payment terms, packaging types, distance of delivery etc.



With above cost estimates, sorted coriander of average quality is made available at Rs. 110 – 115 per kg (€ 1.38 – 1.45 per Kg) for further sale in local market as well as for exports. This price further varies depending upon the colour of coriander. There is also difference in price depending on ratio of split seed in the lot. Split seed fetches around 10% lower prices in the market.

5.5 Gaps in the Value Chain

In the complete value chain of coriander, specifically from the export perspective to Europe, there are gaps and challenges across the chain. However, the challenges are more prominent at the back end compare to front end. Detail of these challenges, at each level of the value chain have been discussed hereunder -

Production Gaps:

For farmers, coriander is important commercial crops in major production clusters. Therefore, most farmers engaged in coriander production take this crop very seriously. To ensure maximum yield, farmers try to take best available measure for protecting the crop. However, for farmers, exports to Europe have never been into their mind. Mostly, the coriander value chain gaps at production and farm level are due to lack of knowledge and awareness about the desired practices.

i) **Absence of export-oriented package of practices at field** – Given that there are no linkages of exporters and farmers, farmers are just not aware of any export oriented package of practices at field for coriander cultivation. Although general package of practices (PoPs) have been

developed by NRCSS (Ajmer) and the State Agricultural Universities (SAUs at Jobner and Jodhpur), however these PoPs are also not adequately promoted at the field level.

ii) **Use of uncertified seed material** – Large number of farmers use coriander saved from the previous season as seed, and this leads to mixing of different varieties. This affects yield and quality of produce. Export of coriander seed to Europe has a requirement of declaration of Variety or the cultivar on the shipment and if the same variety / cultivar is not found in the lot, there is high risk of rejection of the export.

iii) **Injudicious and access use of chemical pesticides** – Coriander is highly disease and pest susceptible crop. With a slight change in weather, the crops attract fungal diseases and other insect pests. To control these diseases and pest attacks, farmers apply multiple rounds of pesticides as per the advice of agri-input retailers. Given the high economic stack farmers, sometimes keep spraying insecticide till near harvesting. These practices lead to a high level of pesticide residues in the produce. For accessing European markets, high level of pesticide residues is one major cause for rejections.

iv) **Lack of Training and capacity building of the farmers for export –** Although, there are multiple government agencies working on extension and capacity building of farmers for adoption of improved packages of practices (e.g. KVK, NRCSS, Department of Agriculture & Farmers Welfare, Spices Board of India, developmental agencies and NGOs), however, on the ground the outreach of these agencies is very limited. Current extension activities are irregular in nature, not having continuity and follow-up with the farmers and without any mechanism to monitor the adoption of packages in the field.

v) **Absence of farm-level certification for food safety** - Food safety, hygiene, sustainable production system, ethical production, fair trade are some of the most stringent Sanitary and Phyto sanitary measure these days, being adopted by the importing countries as well as demanded by the importers. However, in coriander production cluster, hardly any farmer is aware of these certification or is adopting to these certifications. Above this, there has been no such consistent programme at the ground level which promote and support farmers in availing these certifications to qualify for export to European markets.

vi) **Changing climatic conditions and high weather risks** – Coriander is very sensitive to crop to climate change. the yield levels and quality of seed can vary widely due to various climatic factors, such as rain at wrong time, temperature variations and humidity etc. Climate change and risks associated with the climate change have become a big challenge for the farmers.

Harvest and Postharvest Management Gaps:

Harvesting and post-harvest practices of coriander farmers has wide gaps in fulfilling the required quality criteria and process needs. Harvesting and threshing practices are mostly manual. Threshing is done by tractor or animals in an open space. Similarly, drying of coriander seed is also done on open floor in unhygienic condition, where risk of contamination with micro-organisms due to due to birds, animals, rodents and dust and dirt at various stages is very high.

Farmers do not have any specific infrastructure at village level or community level, where processes such as thrashing and drying can be done in a hygienic manner, following required processes.

Marketing Gaps:

For coriander, the marketing processes are very structured through the regulated markets, however, from the perspective of developing export value chains, there are wide gaps. Some of the important gaps are highlighted here –

i) **Large number of intermediaries** – for export, longer supply chains not only add to the cost and adversely impact the competitiveness in the market, but also is concern from the point of hygiene, food safety and traceability perspective. Additionally, large number of intermediaries also creates communication gap and hamper farmers' access to market information.
In current supply system, actors such as commission agents (who interact with the farmers), wholesalers, processors and exporters are engaged making the supply system three to five layers. Farmers seldom get a chance to hear directly to the exporters and understand the actual market requirement. This information asymmetry makes supply chain inefficient in more than one way.

ii) **Poor hygiene conditions throughout the supply system** – there are possibilities of contamination at auction sheds due to open access and poor maintenance at most places. Animals (cattle, dogs, camel etc.) can move at the auction places, similarly rodents and insects also can infest the material on the auction platform. Packaging material is reused which can lead to cross-contamination. Bags are often marked with non-food grade ink which can cause the dyes to leach inside the bags. In a similar fashion, there are many other avenues in supply of coriander from field to market and market to processing facilities, where contamination can take place.

iii) **Lack of awareness amongst channel partners about export requirements** – Exporters generally would like to keep export markets and terms of trade secrete from their supplier. Traders and small processors, though are otherwise capable of supplying coriander directly to export markets, but due to limited access of information, awareness and understanding, they do not enter into exports. While discussing with commission agents and wholesalers in the Ramganj mandi, many traders expressed that they want the next generations to explore the export opportunities, but they are not aware and do not have any clue to start the export business.

Programmes and Policy Gaps:

For promotion of seed spices, including coriander and cumin from Rajasthan and from Kota cluster itself, in past, government has taken up various policy initiatives. Some of the key initiatives are setting-up of Agri-export zone for Coriander in 2004-05, setting-up of Spices Processing Park at Ramganj mandi and many other interventions under these initiatives. However, these initiatives have not yielded the desired results. Conceptually, these programmes / schemes have all the necessary components required for promotion of exports, but due to various challenges, the potential has not been exploited.

Another major initiative from government side is to form farmers' collectives in the form of Farmers Producer Organisations (FPOs). Large number of FPOs have been registered in the area under various schemes, however, sustainability of these institutions is still a challenge. Until and unless these institutions stand up on their own feet, it cannot be expected from them to create a visible impact on farming system, including participation in export.

6 INTERVENTIONS TO ACCESS EU MARKETS

6.1 EU market requirements

A detail description of requirement for exporting coriander to European market has been provided in the annexure 1.

6.2 Potential Interventions

India is the largest exporter of Coriander in the world and is also the largest importers. Import of coriander seed in India is mainly for two purposes, one mainly as vegetable seed and second for industrial use. However, export of Indian coriander purely as spice and condiment for food. Although India is the second most important exporter of Coriander to Europe after Russia. Ukraine is also one of the key exporter of Coriander to Europe. However, given the current situation of war between these two countries, the supply must have been impacted.

Within Europe, Germany is the second most important market for imported coriander seed after United Kingdom. Given the huge demand, India still have wide scope for exporting to Europe if Indian coriander can be made competitive in aspects of pricing and quality. Some of the interventions required for this purpose are as under.

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
Production	Reducing Cost of production of Coriander	In European markets, there is wide difference in prices of coriander imported from Russia, Ukraine and from India. Indian coriander costs almost € 0.02 per Kg more compare to other sources. Although there are other interventions required to make the supply chain more efficient, however one important intervention to this can be by increasing yield levels. Improved varieties along with improved packages of practices and assuring irrigation can help farmers in improving yield levels by 15- 20%. Additionally, improved weather information and advisory on climate change adaptation can also be a critical intervention for reducing climate risks. Under the project, there is need for innovative collaborative approach, wherein one of the existing research and extension institutions, new age weather and climate advisory service provider (if possible through *physital* (physical + digital) mode) come together and take-up piloting of advisory services for 2-3 years in a cluster approach.	NRCSS (Ajmer) + Private sector start-ups (WRMS / CropIn or any new age advisory services provider)
	Development and Introduction of export-	One of the key interventions under the project shall be to develop export oriented package of practices for production of Coriander, which can also fulfill the	NRCSS, Private sector player for mobilisation of farmers, and

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
	oriented agronomical practices	requirement of GAP certification. The PoP shall also include practices for harvesting and post-harvest handling of product at the field in hygienic conditions. For introduction of these PoPs in field, project shall plan organising extensive demonstrations in the cluster by onboarding progressive farmers. These demonstrations can be used for training of other fellow farmers in catchment area of each mini-cluster. Demo farms can also be integrated with localised weather stations and digital advisory services on climate-resilient production practices. At the field, a collaborative approach will be needed between project officials, scientific institutions, weather, and climate-based advisory services provider and FPO. For proper coordination of these actors, Project can hire services of a project implementing agency in the field for the project period.	follow-up on adoption in the field. GAP certification agency. FPO can also be made a partner here for field activities and for the continuity of interventions.
	Developing a mechanism for product traceability	Traceability is becoming one of the important requirements for any commodity targeted for export to the European Union, USA, Japan and other developed markets. Currently, there has not been any system in place, where farmers' field is tagged and supply can be traced back to the source of origin. The project shall collaborate with the Spices Board and a couple of exporters to implement the traceability system. For this, the project can also take help of APEDA, wherein HORTINET and/or Tracenet platform. The project can target the piloting of a traceability system for coriander, which can be integrated with APEDA's existing system for continuity.	Spices Board, FPO, and Coriander Exporter collaborated through a field implementation partner.
	Facilitation in creating field level post-harvest management infrastructure	One of the major concerns for the export of coriander has been the unhygienic conditions at the field for the thrashing and drying of the coriander seeds. This leads to many contaminations and causes rejection. To avoid this situation, there is need for the promotion of appropriate practices, use of machinery and post-harvest infrastructure	Department of Horticulture, Rajasthan State Agriculture Marketing Board (RSAMB)

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
		such as mechanical thrasher and dryers for the coriander or covered shed having provisions for checking external contaminations due to animals and rodents and mixing of foreign material etc. For this particular intervention, Project shall explore collaboration with the department of Horticulture/agriculture and explore available subsidy components for farm level infrastructure. Even if required, this may require technical advisory to the government for incorporating some of new components in existing schemes of the Government. Project shall target some demonstration of such facilities in the project area for convincing other farmers to adopt to these practices.	
Post-harvest and enterprise support	Multiproduct facility for sorting, grading and packaging as per export requirement	In the existing supply chain of coriander, maximum quantity of product is moved out of production cluster of Kota / Ramganj Mandi for sorting / grading and packaging, mainly to Gujarat (Unjha) and from there it is moved to different markets including for exports. At the local level, although there are some units of sortex (for colour sorting) have been installed (two new units have recently come up in the Spices Park at Ramganj Mandi), but still, the infrastructure is insufficient. While discussing with the stakeholders in the market, it was highlighted that the traders need handholding in understanding the export business as well as confidence building by convincing on capacity utilisation, market linkages and trade facilitation. Project, therefore, shall make provision for a focused enterprise incubation facility to convince and help entrepreneurs to invest in infrastructure project. The incubation centre shall have the technical know-how to guide the entrepreneurs, as well as support for the preparation of DPR, facilitating bank loan, applying to government subsidy schemes, and introducing these entrepreneurs to potential business partners.	NIAM, Private consulting firm having experience of facilitating entrepreneurs.

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
Market development	Introduction of entrepreneurs, FPO and other stakeholders to export markets and buyers	Lack of awareness of markets, quality requirement, documentation need, terms of trade and other aspects of business, amongst the traders, is one big challenge for promoting direct export from the Kota cluster. This needs step-wise introduction of these stakeholders to European markets, which may include following activities – - Orientation on export business and requirements - Exposure to existing export facilities in domestic markets - Buyer-seller meets with potential business partners - Exposure to European markets - Initial handholding, facilitation in negotiating the trade for confidence building.	By collaborating with the APEDA, Spices Board and taking help of an agency for facilitiating the intervention.
Institutional Support	Training and capacity building of value chain stakeholders	Stakeholders in the value chain, starting from farmers, traders (aggregators), potential entrepreneurs, processors will need training on different aspects of value chain activities of exports. Some of these training activities can be as under – - For farmers – Production practices, GAP certification, safe use of pesticides, Traceability, coriander grades and quality parameters as export markets, hygiene and safety at post-harvest level. - Traders / Entrepreneurs / FPO – Quality parameters for exports, certification requirement, Export documentation requirements, food safety and hygiene requirement. - Government officials – Need of documentation, convergence, project goals, project implementation structure and schedule, support and deliverables expected from the government officials in successfully implementing the project.	Project partners (APEDA, RSAMB, NRCSS, Spices Board and others)
	Efficient convergence with public sector schemes	Different government departments at Central and state level have large number of schemes and programmes in which provision for various proposed components must already be existing. However, the implementation of these interventions	

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
		remains a challenge due to various field-level issues. The project shall identify these programs/scheme components and shall try to ascertain bottlenecks or pain area for the concerned department. Based on this assessment, a convergence plan shall be designed and implemented. This will need collaboration with different departments at a different level of hierarchy (at Central, State and District level).	
	Strengthening of FPOs	FPOs, as an emerging collective institution, can play important role in the promotion of the export of coriander from the cluster. The FPO identified in the cluster has poor patronage amongst member farmers, has a very weak understanding of business, limited access to capital for setting-up infrastructure, and no understanding of export businesses. Therefore, a strong handholding mechanism will be required to support FPOs to participate in export activities. The project shall utilise the presence of FPO for onboarding farmers for the project and also for channelizing all other field-based interventions in the project area.	FPO support agency.
Production	Reducing Cost of production of Cumin	There is wide difference in yield levels of Cumin in Rajasthan and in Gujarat and due to this difference, cost of production of cumin (per Kg) is very high compare to Gujarat. Although there are other interventions required to make the supply chain more efficient, however one important intervention to this can be by increasing yield levels. Improved varieties along with improved packages of practices and assuring irrigation can help farmers in improving yield levels by 15- 20%. Additionally, improved weather information and advisory on climate change adaptation can also be a critical intervention for reducing climate risks. Under the project, there is need for innovative collaborative approach, wherein one of the existing research and extension institutions, new age weather and climate advisory service provider (if possible,	NRCSS (Ajmer) + Private sector start-ups (WRMS / CropIn or any new age advisory services provider)

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
		through *physital* (physical + digital) mode) come together and take-up piloting of advisory services for 2-3 years in a cluster approach.	
	Development and Introduction of export-oriented Agronomical practices	One of the key interventions under the project shall be to develop export-oriented package of practices for production and post-harvest practices of Cumin, which can also fulfil the requirement of GAP certification. The PoP shall also include practices for harvesting and post-harvest handling of product at the field in hygienic conditions. For introduction of these PoP's in field, project shall plan organising extensive demonstrations in the cluster by onboarding progressive farmers. These demonstrations can be used for training of other fellow farmers in catchment area of each mini-cluster. Demo farms can also be integrated with localised weather stations and digital advisory services on climate-resilient production practices. At the field, a collaborative approach will be needed between project officials, scientific institutions, weather, and climate-based advisory services provider and FPO. For proper coordination of these actors, Project can hire services of a project implementing agency in the field for the project period.	NRCSS, Private sector player for mobilisation of farmers, and follow-up on adoption in the field. GAP certification agency. FPO can also be made a partner here for field activities and for the continuity of interventions.
	Developing a mechanism for product traceability	Traceability is becoming one of the important requirements for any commodity targeted for export to the European Union, USA, Japan and other developed markets. Currently, there has not been any system in place, where farmers' field is tagged and supply can be traced back to the source of origin. The project shall collaborate with the Spices Board and a couple of exporters to implement the traceability system. For this, the project can also take help of APEDA, wherein HORTINET and/or Tracenet platform. The project can target the piloting of a traceability system for cumin, which can be	Spices Board, FPO, and Cumin Exporter collaborated through a field implementation partner.

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
		integrated with APEDA's existing system for continuity.	
	Facilitation in creating field level post-harvest management infrastructure	One of the major concerns for the export of cumin has been the unhygienic conditions at the field for the thrashing and drying of the cumin seeds. This leads to many contaminations and causes rejection. To avoid this situation, there is need for the promotion of appropriate practices, use of machinery and post-harvest infrastructure such as mechanical thrasher and dryers for the cumin or covered shed having provisions for checking external contaminations due to animals and rodents and mixing of foreign material etc. For this particular intervention, Project shall explore collaboration with the department of Horticulture/agriculture and explore available subsidy components for farm level infrastructure. Even if required, this may require technical advisory to the government for incorporating some of new components in existing schemes of the Government. Project shall target some demonstration of such facilities in the project area for convincing other farmers to adopt to these practices. FPOs can be capacitated (by training and mobilising funds) for creating required post-harvest infrastructure for storage.	Department of Horticulture, Rajasthan State Agriculture Marketing Board (RSAMB)
Post-harvest and enterprise support	Infrastructure for sorting, grading and packaging as per export requirement	While interacting with the stakeholders, such as large farmers and KVK officials in targeted production cluster, it was highlighted that there is no facility of sorting/grading and packaging (for export and of sufficiently large industrial size) in the cluster. This is mainly, because the traders participating in the Cumin trade in this area are mostly from other markets and they are not interested in any long-term, high capital infrastructure in the area. To fill this particular gap, project shall facilitate the local FPOs by guiding them	NIAM, Private consulting firm having experience of facilitating entrepreneurs.

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
		properly on business model of cumin trade, its supply chain, technical advisory on setting-up modern sorting/ grading infrastructure. This may need handholding of FPOs in preparing Detailed project report for creating required infrastructure.	
Market development	Introduction of entrepreneurs, FPO and other stakeholders to export markets and buyers	Lack of awareness of markets, quality requirement, documentation need, terms of trade and other aspects of business, amongst the traders, is one big challenge for promoting direct export from the Jaisalmer cluster. This needs step-wise introduction of these stakeholders to European markets, which may include following activities – - Orientation on export business and requirements - Exposure to existing export facilities in domestic markets - Buyer-seller meets with potential business partners - Exposure to European markets - Initial handholding, facilitation in negotiating the trade for confidence building.	By collaborating with the APEDA, Spices Board and taking help of an agency for facilitating the intervention.
Institutional Support	Training and capacity building of value chain stakeholders	Stakeholders in the value chain, starting from farmers, traders (aggregators), potential entrepreneurs, processors will need training on different aspects of value chain activities of exports. Some of these training activities can be as under – - For farmers – Production practices, GAP certification, safe use of pesticides, Traceability, cumin grades and quality parameters as export markets, hygiene and safety at post-harvest level. - Traders / Entrepreneurs / FPO – Quality parameters for exports, certification requirement, Export documentation requirements, food safety and hygiene requirement. - Government officials – Need of documentation, convergence, project goals, project implementation	Project partners (APEDA, RSAMB, NRCSS, Spices Board and others)

Stage of Value Chain	Proposed intervention	Implementation mechanism	Partner Institution
		structure and schedule, support and deliverables expected from the government officials in successfully implementing the project.	
	Efficient convergence with public sector schemes	Different government departments at Central and state level have large number of schemes and programmes in which provision for various proposed components must already be existing. However, the implementation of these interventions remains a challenge due to various field-level issues. The project shall identify these programs/scheme components and shall try to ascertain bottlenecks or pain area for the concerned department. Based on this assessment, a convergence plan shall be designed and implemented. This will need collaboration with different departments at a different level of hierarchy (at Central, State and District level).	
	Strengthening of FPOs	FPOs, as an emerging collective institution, can play important role in the promotion of the export of cumin from the cluster. The FPO identified in the cluster has poor patronage amongst member farmers, has a very weak understanding of business, limited access to capital for setting-up infrastructure, and no understanding of export businesses. Therefore, a strong handholding mechanism will be required to support FPOs to participate in export activities. The project shall utilise the presence of FPO for onboarding farmers for the project and also for channelizing all other field-based interventions in the project area.	FPO support agency.

After deliberation on the recommendation, project team need to prioritise the activities and establish a project implementation cell in the project cluster area. Learning from past initiatives of promoting export of coriander from the cluster, Indo German Cooperation on Agriculture Market Development (AMD) project shall plan its activities in such a way that impact of activities can be made visible on ground from initiation phase itself. Positive outcome at initial level will help in confidence development amongst the stakeholders.

Project shall also identify very good resources for implementation of project interventions, who have proven track record and commercial orientation so that project can be taken up to a logical conclusion and mechanism can be established for sustainability and continuity of activities initiated under the project.

6.3 Specific Action Points –

Production –

- Working on reducing the cost of production of Coriander. This can be done in two ways, by increasing yield levels and by reducing input costs. (NRCSS, Ajmer and State Agricultural Universities can be partnered for this)
- Introduction and training on export-oriented production practices. One of the important aspects of this can be the promotion of and training of farmers on Good Agricultural Practices (GAP).
- Establish a traceability system from farms to market (Online system such as HortiNet or GrapeNet has been developed by the APEDA).

Post-harvest management and marketing –

- Setting-up export aligned processes and infrastructure for post-harvest management of coriander at field. (This may need hygienic space for drying, which can help in avoiding contamination in the field and can reduce risk of rejections)
- Training of individual entrepreneurs, FPOs and other stakeholders in supply chain on various aspects of exports (e.g. Documentation requirement, Quality parameters, Product handling and quality control)
- Creating market linkages by organising focused buyer-seller meets and market exposure visits for FPOs' management and entrepreneurs in the Coriander supply chain.
- Strengthening infrastructure at the Market Yard (Ramganj Mandi) by setting-up export compatible Coriander Shade (raised shade with controlled access). This can help a lot to private sector enterprises in purchasing quality products and can also motivate farmers by providing differential prices.

FPO strengthening -

- Training and capacity building of FPO staff and management on various activities required to comply with the export requirement. This will need training on production practices, certification requirements, operation management, documentation requirement and export marketing.
- Infrastructure support to FPOs for sorting, grading and packaging of Coriander as per export requirements. A special financial package can be designed for FPO to set-up state of the art facility for export processing.

Annexure – 1: Entering the European market for coriander seeds (Last updated:20 October 2020)
Source: https://www.cbi.eu/market-information/spices-herbs/coriander-seeds/market-entry

Food safety certification combined with sterilisation and reliable and frequent laboratory tests, creates a positive image for coriander seed exporters to Europe. Sustainable production and implementation of corporate social responsibility standards will provide additional advantages for emerging suppliers. The strongest competitors to new coriander seeds suppliers to Europe are in Russia and India. Other strong competitors are in Ukraine, Bulgaria, and Morocco. Other emerging suppliers include those in Spain, Romania, and Argentina.

What requirements should coriander seeds comply with to be allowed on the European market?

What are mandatory requirements?

All foods, including coriander seeds, sold in the European Union must be safe. This applies to imported products as well. Harmful contaminants, such as pesticide residues, and excessive levels of mycotoxins or preservatives are banned. The content of the packaging should be readily obvious from the labelling.

Official border control for coriander seeds imported to the European Union

Official food controls include regular inspections that can be carried out at importation, or at all further stages of trade. In case of non-compliance with the European food legislation, individual cases are reported through the Rapid Alert System for Food and Feeds (RASFF), which is freely accessible for the general public.

Be aware that repeated non-compliance with the European food legislation by products from a particular country may lead to special importation conditions or even suspension of imports from that country. Those stricter conditions include laboratory test results for a certain percentage of shipments from specified countries. Coriander seeds are currently not subject to increased border control for any supplying countries. As an illustration, 50% of the coriander leaves (not covered in this study) imported from Vietnam must be checked at customs, meaning that every other container or shipment from Vietnam is taken for analysis.

Contaminants control in coriander seeds

The European Commission Regulation sets maximum levels for certain contaminants in food products. Frequently updated, this regulation sets limits for general foodstuffs, in addition to some specific contaminant limits for specific products. The most common requirements regarding contaminants in coriander seeds relate to microbiological contamination and the presence of pesticide residues, foreign bodies, and product composition.

Contamination with foreign bodies

Contamination with foreign bodies is one of the food safety issues concerning coriander seeds in the European market. Therefore, it is particularly important to control cleanliness of the seeds before exporting. Major foreign body contaminants in coriander seeds include dead insects, insect body parts, excreta of animals (such as mice, rats, cattle, birds, and insects), other parts of the coriander plant (for example, dried stems and leaves), and extraneous foreign matter, such as sand, mud, glass, or metal parts of agricultural machinery.

There is no official limit for foreign bodies in coriander seed shipments to the European market. Most European buyers define their own specification requirements or follow the cleanliness specification of the American Spice Trade Association (ASTA), which defines the maximum levels for the presence of dead insects, excreta, moulds and other foreign matter.

Microbiological contaminants

Microbiological contamination is one of the most frequent reasons for removing imported coriander seeds from the European market. Microbiological contaminants, such as bacteria and viruses, can be transferred from animals and people to coriander seeds. Bacteria are usually transmitted to coriander seeds by irrigation with unsafe water, use of untreated manure as fertiliser, or harvesting by dirty hands. In some areas, the drying process is performed in the open air, which increases the risk of infestation with bacteria from animals and birds.

European regulation on microbiological criteria for foodstuffs more specifically defines control, sampling and maximum level of microbiological contaminants in food. In line with this regulation, exporters of coriander seeds will be asked by European importers to make laboratory analysis tests for the presence of microorganisms, such as salmonella, listeria, E. coli and staphylococcus. The maximum limits for most important microbiological contaminants are the following:

- Salmonella spp.: absence in 25 g
- coli: < 10 cfu/g
- Enterobacteriaceae: < 1000 cfu/g
- Moulds: < 1000 cfu/g

One of the most important parameters in exporting is to ensure control over microbiological contaminants. It is therefore strongly recommended to heat treat (sterilise) the coriander seeds, in order to minimise your recall risk. Please note recall costs in Europe can be extremely high and they can ruin your reputation as a supplier. If sterilisation costs are too high for your company, please note that sterilisation services can be done in Europe, for example, by service providers, such as Food Ingredients Service Centre Europe or others.

Pesticides Residues

The European Commission has set maximum residue levels (MRLs) for pesticides in and on food products. Products containing more pesticide residues than allowed will be withdrawn from the European market. However, excessive residues of pesticides are not very frequent in coriander seeds trade. The European Commission regularly publishes and updates a list of approved pesticides that are authorised for use in the European Union. One of the current issues is the announced decrease of chlorpyrifos residues.

Irradiation

Irradiation of coriander seeds is not often used but it is authorised by the European Union as a way of sterilisation. Irradiation must take place in approved facilities, and irradiated foods must be labelled. As such, European consumers dislike irradiated food. Buyers in Europe are increasingly asking for radioactivity contamination tests for imported coriander seeds. Food irradiation legislation, maximum permitted levels of radioactive contamination and the European Commission radiation protection legislation are base regulations for laboratory tests for the detection of increased levels of radioactivity in coriander seeds.

Mycotoxins

The presence of mycotoxins (aflatoxins and ochratoxin A) is frequent in dried spices and herbs. Coriander seeds, especially in powdered form, very easily absorb water from the environment making them susceptible to developing moulds and mycotoxins. Therefore, producers need to take utmost care in post-harvest and storage practices.

Product composition

Buyers and European authorities can reject products if they have undeclared, unauthorised or too high levels of extraneous materials. There is specific legislation for additives (like colours, thickeners) and flavourings that list what E-numbers and substances are allowed. Authorised additives are listed in Annex II to the Food Additives Regulation. Food additives are not allowed in the production of dried whole coriander seeds. However, in the production of powdered coriander seeds, anti-caking agents may be used. Keep in mind that European traders and consumers prefer additive-free coriander seeds.

Unfortunately, fraudsters also target coriander seeds, as well as several other spices. Replacing coriander seeds with other materials is not common but still happens. In the whole coriander seed trade, food criminals sometimes try to cheat buyers by mixing whole seeds with exhausted or spent seeds, from which essential oils or oleoresins have been extracted. Another form of cheating is false declaring seeds of inferior grade as high-quality seeds. When coriander seeds are traded in ground form, food fraud can involve mixing coriander powder with plant waste or wood dust.

What additional requirements do buyers often have?

Quality requirements

Several factors determine the quality of coriander seeds, some as imprecise as taste or flavour. Other quality criteria relate to the coriander cultivar, such as size of the seeds, shape or colour. However, the same cultivars can have different qualities, even when produced in the same country, as quality is influenced by implemented agricultural practices, climatic conditions during production season and post-harvest operations.

The most common parameters for quality specification of coriander seeds include:

- **Cleanliness or purity:** Coriander seeds should be intact when traded as a whole, and they must be free from diseases, foreign matters, foreign odours, and any other disorders. The European Spice Association (ESA) proposes that the maximum presence of external matter should be below 1% of the weight for all spices. However, this requirement can vary depending on buyers' requests and may involve more specific indicators, such as maximum allowance of split or defective fruits, number of dead insects, or measuring of specific foreign matters (like in ASTA Cleanliness Specification).

Impurities in coriander seeds are also measured by burning the seeds at 550°C to constant weight and measuring the residue of ash. Maximum content of total ash for coriander seeds is set at 7% and acid insoluble ash at 1.5%.

When shipped, the variety or cultivar should be declared in the product specification. If varieties or cultivars other than declared are present in the packaging, some buyers perceive it as fraud, but

some buyers allow tolerances. For example, the old Indian standard for coriander seeds suggests a maximum tolerance of 4% for presence of different varieties.

- **Moisture content:** Minimum moisture content set by Quality Minima Document of the European Spice Association is 12%. Still, buyers may request a different moisture content, usually between 9% and 14%.
- **Mesh or particle size**: When coriander seeds are exported in powdered form, they are ground to pass through a sieve of a specific diameter. Sieves are often specified in micron sizes and typical requirements demand 95% to 99.5% of ground coriander seeds to pass through the specific size of the sieve, usually 500 microns, but sometimes more. As coriander seeds are fibrous, the size of the sieve is usually larger compared to most other ground spices, such as pepper or chillies.
- **Odour and flavour:** Coriander seeds must have a characteristic odour and flavour. The flavour profile of coriander seeds mostly depends on the chemical components of the essential oil, such as d-linalool or coriandrol, alpha pinene, terpinene, geranyl acetate, camphor, and geraniol. The flavour profile varies depending on the variety, cultivar, geographic, climatic, and growth conditions. For example, Indian coriander seeds have less citric taste profiles than Eastern European coriander seeds.
- **Volatile and essential oils**: As described above, the content of essential oils is important for the sensorial characteristic of coriander seeds. Coriander seed quality is higher when the percentage of ash is low, and the content of essential oils is high. However, the content of essential oil of the macrocarpon variety is relatively low (commonly below 0.5 ml/100 g) and a limit is not set for this variety. For the microcarpum variety, the limit is set at 0.6 ml/100 g.

Many coriander seeds exporters define specific percentages of volatile oils in their product specification, including for the macrocarpon variety, which is mostly in the range of 0.1 ml/100 g to 0.4 ml/100 g. However, the determination of such low levels of essential oils is not accurate nor reliable. Because of that, ESA suggests that for the macrocarpon variety, you should agree on flavour properties with your buyer through sensory tests (smelling and tasting) rather than through laboratory analysis of volatile oil content.

Food safety certification

Although food safety certification is not obligatory under European legislation, it has become a must for almost all European food importers. Most established European importers will not work with you if you cannot provide some type of food safety certification.
Most European buyers will ask for Global Food Safety Initiative (GFSI) recognised certification. For coriander seeds, the most popular certification programmes are:

- International Featured Standards (IFS)
- British Retail Consortium Global Standards (BRCGS)
- Food Safety System Certification (FSSC 22000)

Please note that this list is not exhaustive and food certification systems are constantly developing. Most food safety certification programmes are similar to the ISO 22000 standard.

Although different food safety certification systems are based on similar principles, some buyers may prefer one specific management system. For example, British buyers often require BRC, while IFS is more common for German retailers. Also note that food safety certification is only a basic requirement to start exporting to Europe, but reliable buyers will usually visit your production facilities, checking for example your traceability and hazard control points.

Corporate Social Responsibility

Companies have different requirements for corporate social responsibility. Some companies require adherence to their own code of conduct, other companies require adherence to one or more common standards. Examples include the Supplier Ethical Data Exchange (SEDEX), Ethical Trading Initiative (ETI), and Business Social Compliance Initiative code of conduct (BSCI). If your coriander seeds are meant for the retail segment, suppliers will have to follow a specific code of conduct developed by retailers. Many retailers, such as Lidl, Rewe, Carrefour, Tesco, and Ahold Delhaize have their own codes of conduct.

Packaging requirements

Coriander seeds are mostly exported in bulk and packaged in jute, polypropylene, or paper bags. The size of the bulk packaging varies depending on the buyer's requirements, but it is often 25 kg. The dimensions of the selected packaging size should conform to the conventional pallet sizes (800 mm x 1,200 mm and 1,000 mm x 1,200 mm). Please note that in some European countries, labour health and safety legislation allows workers to lift a maximum of 20 kg, so smaller weights of packaging are increasingly used, such as 10 kg–20 kg.

Coriander seeds must be stored in dry and cool places, protected from sun, heat, moisture, insects, and other animals.

Net weight of retail packaging is usually between 20 g and 40g. Retail packaging includes glass containers, plastic bags, plastic containers, and paper bags. Glass containers are particularly popular, as they enable consumers to see and visually inspect coriander seeds before buying.

The content of the packaging must correspond to the indicated quantity (in weight or volume) on the label. Importers will check size and weight to ensure that pre-packed products are within the limits of tolerable errors.

Labelling requirements

Every export package must declare:

- Name of product, for example 'coriander seeds'
- Net weight in metric system
- Shelf life of the product
- Lot identification number
- Country of origin and name and address of the manufacturer, packer, distributor, or importer

Lot identification and the name and address of the manufacturer, packer, distributor, or importer may be replaced by an identification mark. An export package label can also include details, such as coriander seeds variety, brand, harvesting year, and drying method.

In retail packaging, product labelling must comply with the European Commission Regulation on the provision of food information to consumers, which defines nutrition labelling, origin labelling, allergen labelling, and minimum font size as mandatory information. Retail packs must be labelled in a language easily understood by the consumer in the European target country, so generally in the country's main language, which explains why European products often carry multiple languages on the label.

In addition to this regulation, from 1 April 2020, all food in retail packs in Europe must be labelled with an indication of origin. For example, if coriander seeds are packed in Germany, packaging still needs to indicate the origin. This can be done by indicating a country (like the Russian Federation), or by indicating 'non-EU' or by declaring 'coriander seeds do not originate from Germany'.

It often happens that coriander seeds contain other seeds or grains grown in the same field, which is called cross-contamination. In particular, wheat and mustard seeds are considered allergens and have to be declared as such. It is important to give attention to proper cleaning coriander seeds before packaging, to minimise contamination from other seeds.

What are the requirements for niche markets?

Organic coriander seeds

To market coriander seeds as organic in Europe, they must be grown using organic production methods according to European legislation. Growing and processing facilities must be audited by an accredited certifier before you may put the European Union's organic logo on your products, as well as the logo of the standard's holder, for example, Soil Association in the United Kingdom, and Naturland in Germany.

Importing organic products to Europe is only possible with an electronic certificate of inspection (e-COI). Each batch of organic products imported into the European Union has to be accompanied by an electronic certificate of inspection as defined in Annex V of Regulation defining imports of organic products from third countries. This electronic certificate of inspection has to be generated via Trade Control and Expert System (TRACES).

Sustainability certification

Sustainability is a broad term covering many aspects of production, distribution and trade, and there is still no worldwide recognised certification for all of it. One increasingly used aspect is to publish CO_2 emission rates for specific products, but it is difficult to obtain reliable measurements for those claims. An example of a recently established certification based on CO_2 emissions is Myclimate.

Currently, the most famous certification schemes are Fairtrade, which focuses on ethical practices, and Rainforest Alliance, which focuses on environmental impacts. Fairtrade International developed a specific standard for herbs, herbal teas and spices for small-scale producing organisations. This standard defines issues related to traceability, management and production practices and labour conditions. According to this standard, a premium price of 15% over and above the negotiated price between producer and seller must be established.

There are currently two Fairtrade certified coriander seed producers in India, one in Sri Lanka and one in Egypt.

In order to improve sustainable production and sourcing of spices and herbs, a group of mainly European companies and organisations formed the Sustainable Spice Initiative in 2012. The major objective of this initiative is to strive for fully sustainable spice production and trade in the sector.

Ethnic certification

Islamic dietary laws (Halal) and Jewish dietary laws (Kosher) propose specific dietary restrictions. If one wants to focus on these niche markets, consider implementing Halal or Kosher certification schemes.