



सत्यमेव जयते

GOVERNMENT OF GUJARAT

Setting up a Medicinal Herbs Extraction Unit

Agro and Food
Processing
Government of Gujarat



TM

10-13 Jan

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Connecting India to the World | 8th Global Summit

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The concept

The project envisages setting up of **Medicinal Herbs Extraction Unit** based on the raw material strength of Gujarat. The manufacturing unit can focus on production, processing, marketing, exports, etc.

Medicinal Herbs and Aromatic Plants (MAPs)

- ▶ Medicinal herbs have curative powers and are used in making medicines because of their healing properties as a result of containing active ingredients. They are also used as natural flavouring agents, cosmetic ingredients, etc.
- ▶ Herbal material such as gums, fixed oils, essential oils, resins extracts, etc. are also extracted from plants and used separately. These materials are processed by various local procedures, such as steaming, roasting, or stir baking with honey/ alcoholic beverages/ other materials.
- ▶ There is a renewed interest in MAPs, especially in developing countries, for application in pharmaceutical, nutrition, perfumery and cosmetic fields.
- ▶ Medicinal herbs are widely used as diet supplements and treating illness like valerian. The finished products can be in form of oil, powder, paste or aqueous solutions from extracted herbs.



The adoption of medicinal herbs increasing globally



- ▶ In Germany, ~700 plant based medicines are available, which are prescribed by ~70% of German physicians.
- ▶ In the US, increasing public dissatisfaction with the cost of prescription medications, along with an interest in returning to natural or organic remedies, has led to an increase in herbal medicine use.

~2,100 plant species globally have the potential for being used as medicinal plants

It has been estimated, that in developed countries such as the US, **plant drugs constitute as much as 25% of the total drugs**, while in fast developing countries such as India and China, the **contribution is as much as 80%**

Depending upon their properties, MAPs are used in different industrial sectors

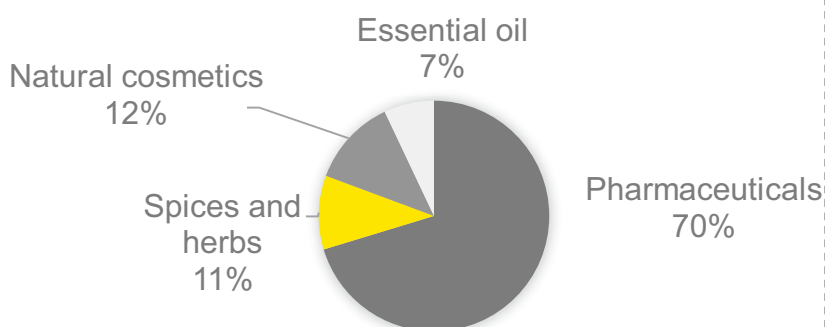
Purpose	Type of product	Uses
Pharmacological activity	Pulverised plants	Phytotherapy
	Simple extracts	Homeopathy Aromatherapy
	Essential oils	Preparation of medicines Models for synthesis
	Isolated active ingredients	Molecules for semi-synthesis
Raw materials for industrial use	Pulverised plants	Nutritional complements
	Essential oils	Foodstuffs
	Extracts	Perfumes
	Isolated products	Cosmetics

Source: University of Maryland Medical Center, National Health Portal India

Global MAP Market

- ▶ The global herbal trade stands at USD120 billion and is expected to reach USD7 trillion by 2050.
- ▶ About 80% of the world population is dependent on medicinal plants for health care and 20% of the pharma drugs are of plant origin, either extracted from the plants or synthetic derivatives of these plant species.
- ▶ Despite a steady performance of MAP sector over the years, India's share in the world herbal export is insignificant (1.6%) and 2/3rd of it is in the form of raw herbs.
- ▶ Global market for MAPs is largely dominated by China, Japan, France, Germany, Italy, Spain, UK and US.
- ▶ Herbal drugs are used in cardio vascular (27%), respiratory (15.3%), digestive (14.4%), hypnotics and sedatives (9.3%), miscellaneous (12%).

Medicinal herbs usage by industry in terms of sales, 2014 (USD billion)



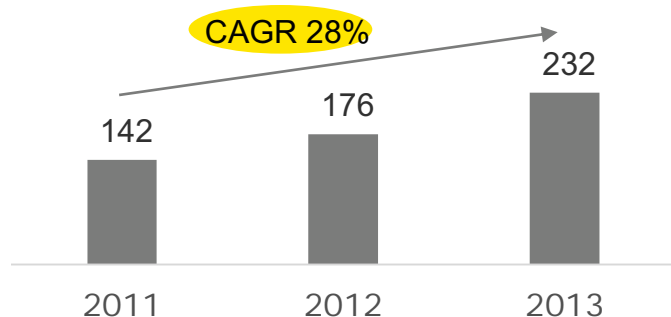
Source: Indian Council of Agricultural Research, July 2015

Medicinal plant export varieties

- ▶ As dried plants or plant parts. e.g. liquorice roots
- ▶ As extracts e.g. sag of opium poppy
- ▶ As isolated and purified active ingredients/ intermediates e.g. Gymnema powder
- ▶ As Ayurvedic, Unani, Siddh, and homeopathic formulations e.g. Over the counter (OTC) drugs, and range of proprietary formulations. This also includes range of herbal cosmetic products.

Indian Medicinal Herbs Market

Export of medicinal herbs and value added products, US\$ million



Source: Ken Research, Nov 2014

- ▶ India has large biodiversity and is endowed with 45,000 plant species out of which about 15,000-20,000 plants are known to have medicinal properties.
- ▶ With a share 46.4%, the US is the largest importer of medicinal herbs value added products from India in 2013. Other top importer countries include Pakistan and Germany.

Growth drivers

Safer alternative to synthetic drugs

- ▶ Increasing awareness about adverse effects of synthetic drugs, such as steroids, antibiotic, pain killers, etc. has boosted up the demand for medicinal herbs in domestic and export markets.
- ▶ Most herbal medicines are well tolerated by the patient with fewer side effects than pharmaceutical drugs

Cheaper than allopathic drugs

- ▶ Herbal extracts and powders are comparatively cheaper than synthetic drugs and formulations.
- ▶ Research, testing, and marketing add considerably to the cost of prescription medicines. Herbs tend to be inexpensive compared to drugs.

India's advantage

- ▶ India is seen as a reservoir of medicinal herbs and which are highly used by western countries

Demand and supply gap of indigenous (wild) medicinal plants in Gujarat

Plant groups	Demand for no. of species	Quantity (MT)	Supply of no. of species	Quantity (MT)	Difference	
					No of species	Quantity (MT)
Trees	48	788	24	782	-24	-06
Shrubs	22	278	08	55	-14	-223
Climbers	28	642	11	13	-17	-629
Herbs	50	791	22	330	-28	-661

- ▶ Although there is a demand supply gap of medicinal plants in the state, Gujarat government has introduced a number of initiatives to promote its cultivation and narrow this gap in the coming years.

Note: Key initiatives are mentioned on slide no. 14 and 15

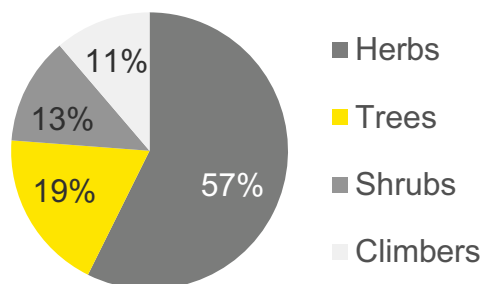
Gujarat – Competitive Advantage



Gujarat has a major contribution towards the country's biodiversity

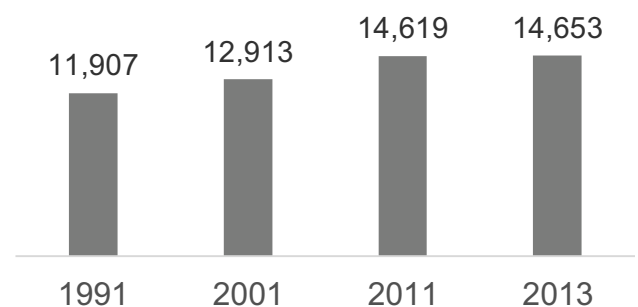
- ▶ Despite, its adverse geo-climatic conditions, the state has a remarkable diversity of plant species owing to its four bio-geographic zones and five biotic provinces
- ▶ Out of 16 forest types found in India, 4 are present in Gujarat
- ▶ Gujarat contains four out of the ten biogeographic zones in India and covers six major ecosystems
- ▶ In the state, there are ~4,320 plant species and medicinal flora forms a major component of this biodiversity. The state has 1,315 recorded species of medicinal value. Around 1016 plant species are wild where as 299 species are being under cultivation or plantation. Out of all these 102 species are of conservation-concern and 76 are naturally rare

Medicinal plants in Gujarat – by species, (1,315 total recorded medicinal plants)



Source: Gujarat Forest department

Increase in forest cover (in sq. km)



Source: Gujarat Forest department

- ▶ Major medicinal plants available in Gujarat include Ashwagandha, Bel, Ghrith kumara, Gugulu, Isabgol, Jeevanti, Kouch, Neem, Safed-musli, Sankhapushpi, Senna or Sonamukhi and Shatavari

Gujarat has necessary industrial infrastructure for usage of medicinal plants

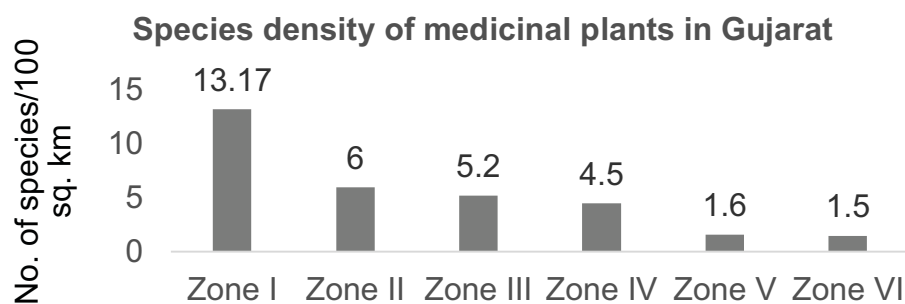
- ▶ In Gujarat, there is availability of required industrial and basic infrastructure to carry out herbal processing and developing products.
- ▶ Being an industrially developed state, there is a large number of pharma industries in Gujarat. There are more than 605 ayurvedic pharma industries, which use medicinal plants as raw material.

Project Information

Location - Zone wise Medicinal Plant Hotspots in Gujarat

Zones	Name	No. of Hotspots	No. of districts	No. of species
I	South Gujarat	3	2	923
II	Southeast Gujarat	6	2	1002
III	Central Gujarat	10	4	1048
IV	North Gujarat	8	2	918
V	Saurashtra	10	3	977
VI	Kachchh	8	1	691
	Total	45	14	1315

South Gujarat shows the highest density among all Zones: Preferred locations can be Narmada, Surat, Navsari and the Dangs



Source: Gujarat Forest department

- ▶ South Gujarat has 70% of the 1315 medicinal plant species found in the state

Medicinal plant hotspots in South Gujarat

Zone	Districts	No. of species	Part of any protected area
Zone 1	Dangs (area near Shamgahan, Malegaon, Saputara, Jakhana)	>200	No
	Dangs (area near Bardipada, Mahal, Gadhvi etc.)	>175	Yes (Purna Wildlife Sanctuary)
	Ta.Vansda Dist. Navsari	>180	Yes (Vansda National Park)
Zone 2	Ta.Dediapada Dist. Narmada	>200	Yes (Shoolpaneshwar sanctuary)
	Ta.Umarpada Dist. Surat	>325	No
	Ta.Rajpipla Dist. Narmada	-	No
	Ta.Songarh Dist. Surat	200	Yes (Purna Wildlife sanctuary)
	Ta.Vyara Dist. Surat	200	Yes (Purna Wildlife sanctuary)
	Ta.Mandavi Dist. Surat	-	No

Medicinal plants available in Gujarat



Ardusi/ Adusi
Adhatoda vasica



Bel
Aegle marmelous



Neem
Azadirachta indica



Saraswati
Centella asiatica



Guggal
Commiphora wightii



Shatavari
Asparagus racemosus



Ashwagandha
Withania somnifera

SN	Common Name	Botanical Name
1	Ghrit kumari	Aloe vera
2	Isabgol	Plantago ovata
3	Jeevanti	Leptidinea reticulata
4	Kouch	Mucuna pruriens
5	Safed-musli	hlorophytum borivillianum
6	Sankhapushpi	Evolvulus Asinoides
7	Senna or Sonamukhi	Cassia angustifolia

Infrastructure availability

Logistics & connectivity



Rail

- Gujarat has a total railway length of 5,257 km (8.25% of India)
- Mumbai-Ahmedabad bullet train project planned with investment of USD16.58b
- Ahmedabad metro rail project construction to begin in 2015-2016 with USD101.3m budget
- Govt of Gujarat further plans to invest USD1.65m in regional rail projects



Road

- Gujarat has a wide road network of around 77,030 km. Of these, 95% roads are surfaced, all-weather roads.
- In 2015-16 budget, the state government further plans to invest USD8.3m in a four-lane road joining Vadodara- Ankleshwar, USD2.7m in construction of expressways and USD81.4m in resurfacing roads



Air

- The state has 18 domestic airports (the highest in any state) and one international airport.
- During 2014-15, the Ahmedabad airport handled 59,313 thousand tonnes of freight. Freight traffic at Vadodara and Rajkot measured 966 tonnes and 79 tonnes respectively during April-September, 2015.



Port

- The state has one of the strongest port infrastructures in India, with 42 ports(21% of India's ports are in Gujarat), including one major port at Kandla and 41 minor ports, along a 1,600 km coastline.
- It is the first state in India to take up port privatisation. Gujarat Maritime Board, has developed port privatisation models such as private/joint sector ports, private/captive jetties

Utilities



Water

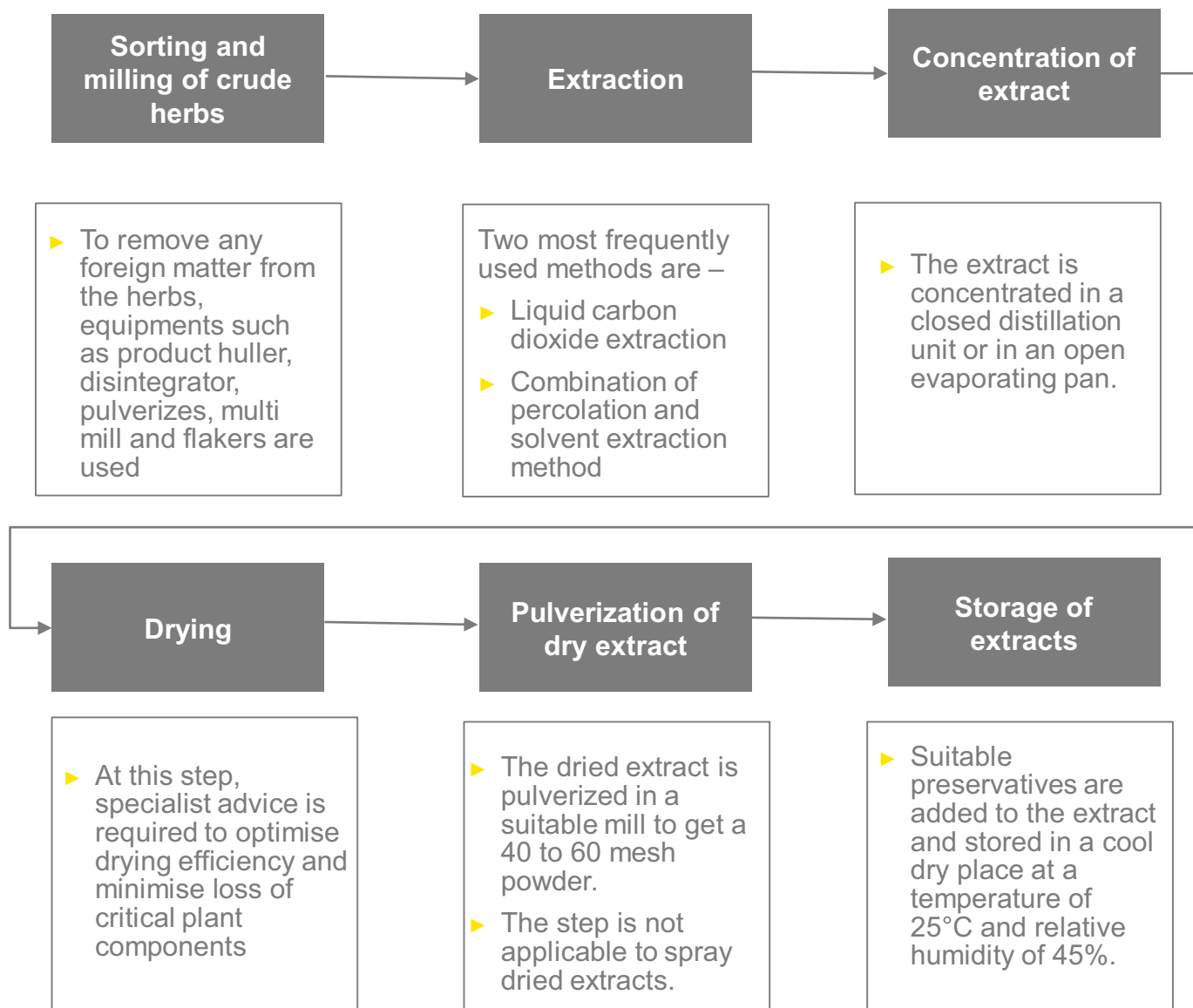
- Gujarat has a state-wide "water supply grid" spread across 1,20,769 km that aims to serve 75% of Gujarat's population.
- In the state budget for 2015-16, USD83m was allocated for bulk water supply schemes and USD574m was allocated for improving the infrastructure of existing water supply systems



Power

- Gujarat has 24-hour 3-phase uninterrupted power supply throughout the state, with installed power capacity of 29,293 MW(10.38% of India's overall power capacity)
- The state has surplus power to the tune of 2000 MW

Production process



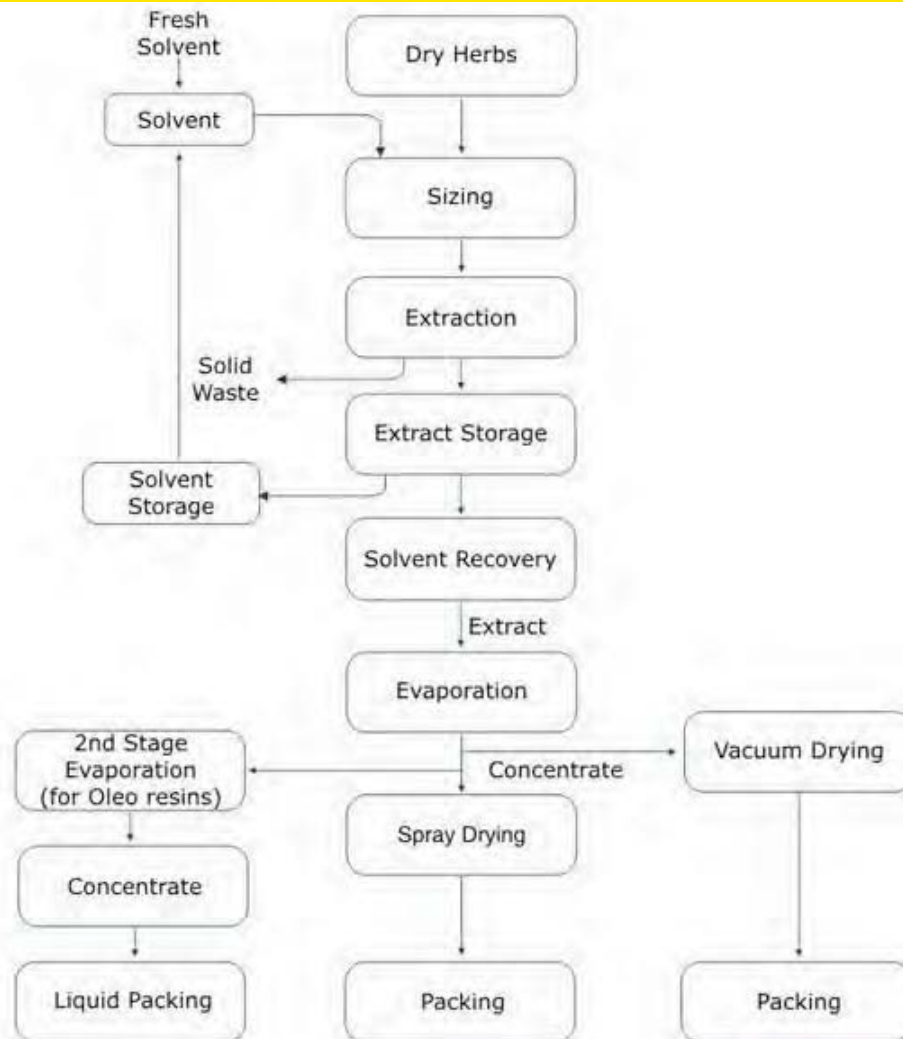
Raw material sourcing

- ▶ Medicinal herbs in Gujarat are both cultivated and naturally growing. Herbs are either collected from the forests of Gujarat by Gujarat Forest corporation, or traders collect herbs from tribals. Gujarat's herbal market is estimated at 50k – 70k MT, out of which ~50% is processed per annum.

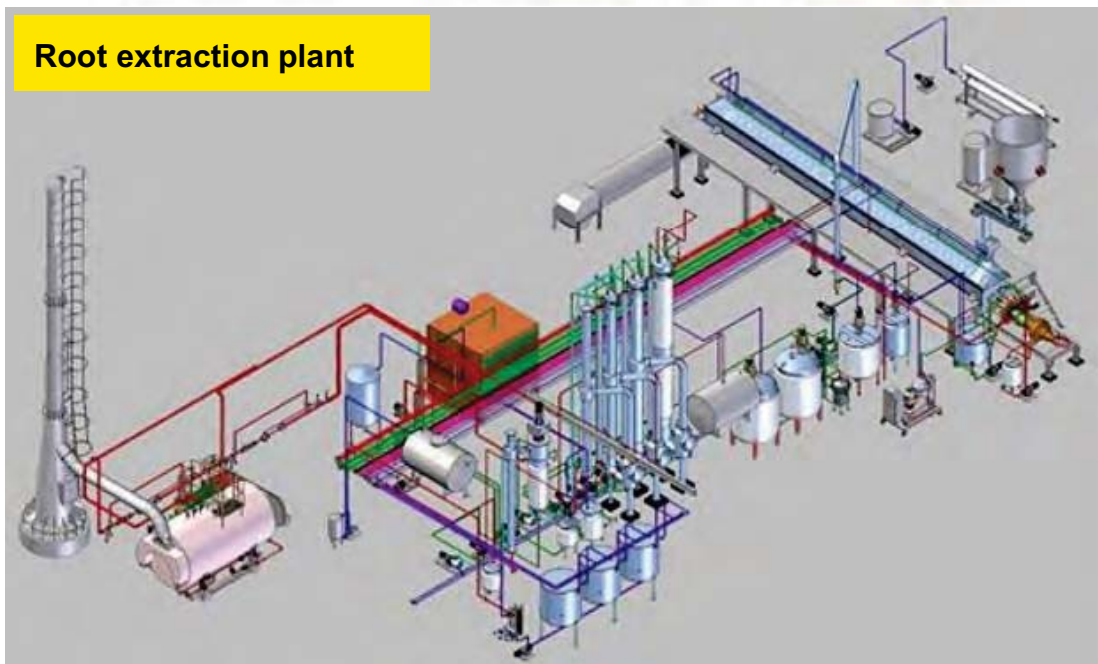
Quality control and standards

- ▶ The herbs are sorted individually to remove any foreign matter. They are milled to 80 mesh size depending upon the nature for the product huller, disintegrator, pulverizer, etc. are used.

Herbal extraction process - detail

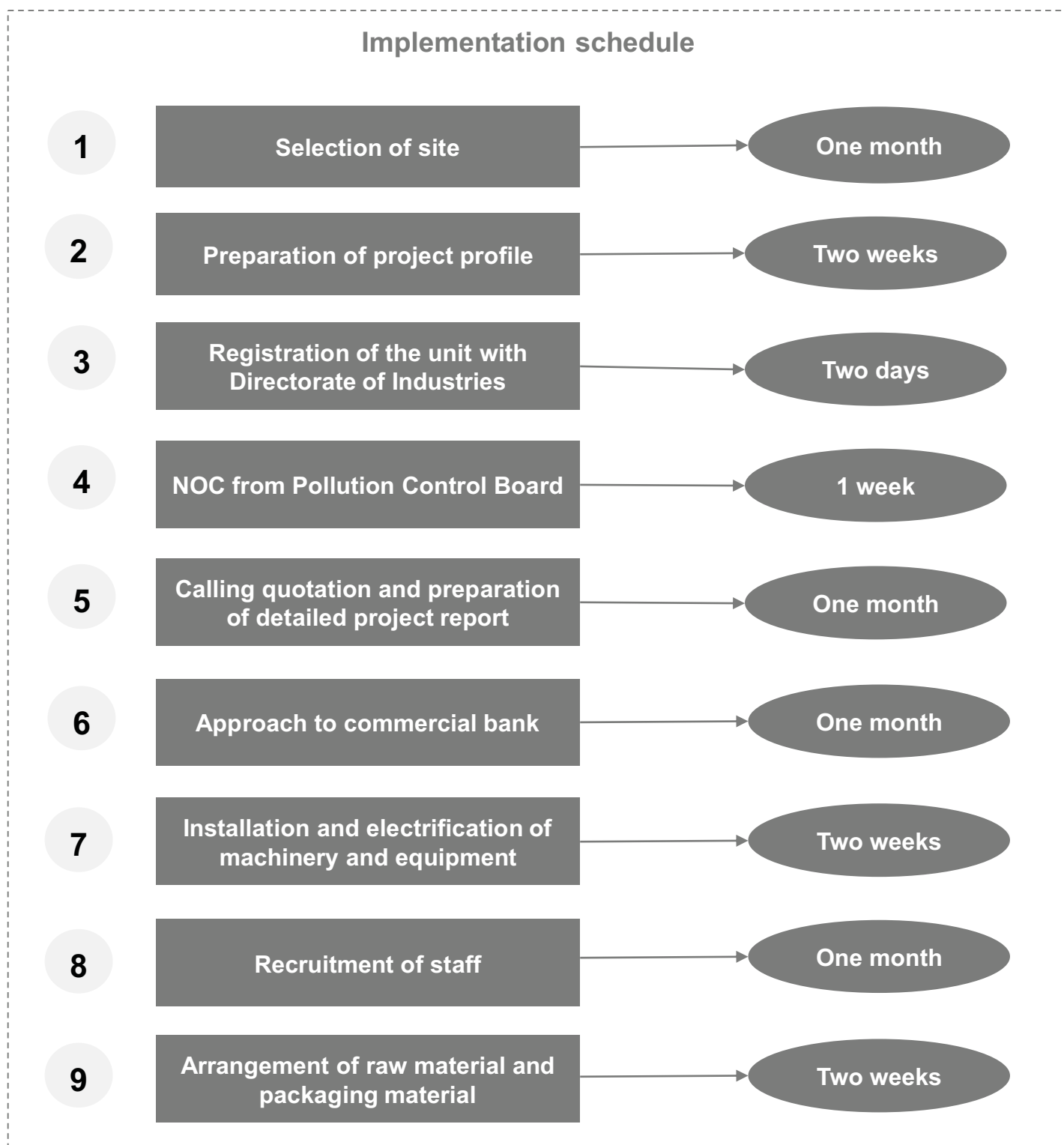


Root extraction plant



Implementation schedule

It is estimated that it takes 5-6 months for the implementation of the project. The implementation model includes below nine steps –



Major herbal extract producers

- ▶ Asean Aromatics Pvt. Ltd., Chennai
- ▶ Cigma Herbo Tech. P. Ltd., Coimbatore
- ▶ Dhawan International, New Delhi
- ▶ Lotus Herbals Ltd., Uttar Pradesh
- ▶ Dabur Ayurved Ltd., New Delhi
- ▶ Envin Foods & Industries Pvt. Ltd., Saharanpur
- ▶ The Himalaya Drug Co. (HDC), Mumbai
- ▶ Kancor Flavours and Extracts Limited, Kerala
- ▶ Medimix Group of Companies, Chennai
- ▶ Excel Industries Ltd., Mumbai
- ▶ Flavex Aromats (I) Ltd., Pune
- ▶ Flavours & Essences Pvt. Ltd., Mysore
- ▶ Global Herbs, Pune
- ▶ Gufic Biosciences Ltd./Gufic Ltd. Gujarat
- ▶ Gujarat Terce Laboratories Ltd., Ahmedabad
- ▶ Indfrag Biosciences Ltd./Indfrag Ltd., Tamil Nadu
- ▶ Laxmi Natural Products Pvt. Ltd., Mumbai
- ▶ Pioma Chemicals, Mumbai

List of plant and machinery

- ▶ Hammer mill with dust extraction system of (100kg/hr) with 5H.P. electric motor
- ▶ SS Vertical Extractor (5k litre capacity) with 5H.P. electric motor
- ▶ Horizontal Extractor (5k litre capacity) with 5H.P. electric motor
- ▶ Nutsche filter with 2H.P. electric motor
- ▶ S.S. Cylindrical tanks for storage
- ▶ Portable Mechanical sifter of 22 inch dia with 2H.P electric motor
- ▶ Portable Dehumidifier, 2HP motor
- ▶ Lab. Equipments like HPTLC, Microscope, Refractometer, pH meter etc.
- ▶ Process pump sets, 2H.P electric motor
- ▶ DM Water plant of 1000 LPH
- ▶ Boiler (300 kgs/hrs.)
- ▶ HDPE storage tanks
- ▶ Tray dryer, Vacuum dryer (32 trays) each
- ▶ Digital balance 100 Kgs.
- ▶ Mechanical Balance

Major machinery suppliers

- ▶ Acmas Technocracy (Pvt) Ltd –Delhi
- ▶ Anand Refrigeration Co. Pvt Ltd – Delhi
- ▶ Cethar Vessels Ltd., Trichy
- ▶ ELGI Equipments Ltd., Coimbatore
- ▶ Fluid Control Equipments, Coimbatore
- ▶ HI-Tech Chemi Equip, Mumbai Techno Process Equipments (India) Pvt. Ltd.- Mumbai
- ▶ K.G. Khosla Compressors Ltd, Faridabad
- ▶ Kumar Metal Industries-MumbaiDee Development Engineers Ltd Haryana
- ▶ M A Engineering Corporation- Mumbai
- ▶ Oilex Engineers (India) Pvt. Ltd.- Mumbai Kumar Metal Industries-Mumbai
- ▶ Real Engineers and Boilers Repairers, Ahmedabad, Gujarat
- ▶ Richard Engineering (Bombay) Pvt. Ltd., Mumbai
- ▶ Thermax Limited, Vadodara, Gujarat
- ▶ Virajka Machinery Mfg. Co
- ▶ Voltas Ltd., Chennai

Potential collaboration opportunities for technology

- ▶ National Research Development Corporation
- ▶ Central Institute of Medicinal and Aromatic Plants
- ▶ Central Drug Research Institute

Key considerations

The proposed project is for medicinal herbs extraction and has domestic and export market in advance countries like USA, Canada, Europe, Japan and CIS countries. The unit will require to get register their product with Food and Drugs Administration (FDA) in these countries, apart from registration with Indian and state food and drugs administration. Strict quality standards to be followed being an export oriented unit.

Project Financials

Project cost and manpower estimates

Project components & specifications	
Product	Medicinal plants extraction unit
Quality standard	As per Ayurvedic standards
Production capacity	22 MT

Cost break-up (INR)		
Fixed capital	Land and building	On rent
	Machinery and equipments	43,46,000
Working capital (per month)	Utilities (electricity charges 4,500 units @ Rs.5.00 , fuel, water)	31,800
	Rent	26,500
	Other expenses (Power, rent, water, utilities, etc.)	47,700

Working capital (per month)	Raw material	Herbs (Guggal, Onion and Cardamom)	21,20,000
		Dextrine	79,500
		Activated Charcoal	1,590
		Amonia	12,720
		Glacial Acetic Acid	63,600
		Chemicals (Methanol, Ethanol, Toluene, etc.)	2,66,590
		total	25,44,000

Working capital (per month)	Manpower	General Manager (1)	15,900
		Sales staff (1)	11,660
		Supervisor production (2)	25,440
		skilled workers (2)	21,200
		Semi-skilled workers (3)	25,440
		Accountant (1)	10,600
		Clerk cum Personal asst (2)	21,200
		Peon/Chowkidar (2)	16,960
		Perquisite @ 15%	22,260
		total	1,70,660

Approximately 3.5 years of payback period is expected

Source: Micro Small Medium Enterprises Development Institute

Project Financials

Fixed capital (Machinery and equipments) in INR	43,46,000
Working capital for 3 months in INR	84,61,980
Total capital investment in INR	1,28,07,980

Estimated Profit (INR)

Estimated sales per year	4,02,80,000	
Cost of production (per annum)	Recurring expenditure	3,38,47,920
	Depreciation on plant & m/c @10%	2,96,800
	Depreciation on office & lab equipment @ 20%	1,90,800
	Interest on Total capital investment @15%	19,21,197
Total cost per year	3,62,56,717	
Profit per year	40,23,283	

Break even

Fixed cost in INR (per annum)	Rent	3,18,000
	Total depreciation	4,87,600
	40% of staff & labour	8,19,168
	40% of other expenses	2,18,784
	Insurance	25,440
	Interest on total capital investment @ 15%	19,21,197
Total Fixed cost per year	37,90,189	
Break even point {Fixed cost/(fixed cost + Profit)*100}	48.5%	

Basis and presumptions

No. of working shift in a day	Two
No. of working days in an year	330
Motive Power	20 KWH
Land and building (covered and uncovered area)	1200 sq. m
Cost of installation/electrification as % of the cost of machinery and equipment	10%

Source: Micro Small Medium Enterprises Development Institute study Delhi govt; av. Inflation rate used for the calculations (2014-16) is 6%

Clearances required

- Registration with Secretariat of Industrial Approvals (SIA), Ministry of Industries and Government of India, by filing Industrial Entrepreneur's memorandum (IEM) – as the extraction unit requires plant and machinery investment of more than INR 10 million.
- Clearances from respective regulatory authorities of the export countries, apart from registration with Indian and state food and drugs administration.
- Export Oriented Unit (EOU) registration from RBI, Directorate General of Foreign Trade (DGFT) and with CHEMEXCIL (Basic Chemicals, Cosmetics & Dyes Export Promotion Council) as registered manufacturer exporter to avail export incentives.

Incentives from the Government of India

Central Sector Scheme for Conservation, Development and Sustainable Management of Medicinal Plants

- National Medicinal Plants Board (NMPB) of Ministry of AYUSH has implemented this scheme, under which a grant of Rs.144.28 crores was released since 2012 to multiple organizations for taking up the development of medicinal plant sector.
- As a part of the scheme, an area of ~30,929 hectare has been covered for resource augmentation, in-situ conservation and setting up Medicinal Plants Conservation Areas (MPCAs).
- The NMPB has released Rs.140.43 crores to different State Governments since 2012 for cultivation of medicinal plants on farmers land, along with backward and forward linkages.

Programmes of Ministry of Environment, Forest and Climate Change

- A network of 670 protected areas (102 National Parks, 517 Wild Life Sanctuaries, four Community Reserves and 47 Conservations Reserves) in the country have been setup under the programmes of Ministry of Environment, Forest and Climate Change, for conservation and management of flora and fauna of the country, including medicinal plants.

Financial Assistance by NMPB

Program	Estimated cost (INR lacs)	Assistance
Post harvest management		
a) Drying sheds	10	100% assistance for Govt. / Semi-Govt. / Public Sector and 50% for Self Help groups (SHGs) / Cooperatives/ Private sector
b) Storage godowns	10	100% assistance for Govt. / Semi-govt. / Public Sector and 50% for SHGs / Cooperatives/ Private sector
Processing and value addition		
a) Processing unit	400	100% assistance in case of Govt / Semi-govt. / SHGs / Cooperatives / Public Sector limited to INR 400 lacs / unit
b) Marketing infrastructure	<ul style="list-style-type: none"> ▶ INR 10 lacs for rural collection center ▶ INR 200 lacs for district collection center 	Project based. 100% assistance to Public Sector and 50% assistance to Private Sector /SHGs / Cooperatives
c) Organic/ GAP certification	INR 5 lacs for 50 ha.	Assistance up to 50% of the cost limited to INR 10,000/ha for maximum area of 4 ha/ beneficiary spread over a period of three years would be provided for organic / GAP cultivation. For certification INR 5 lacs for 50 ha. will be provided
d) Demonstration plots	-	Project based depending upon species cultivated and infrastructure created limited to INR 10 lacs / plot of minimum 2 acres
e) Setting up of seed/germ plasm centres	-	INR 25 lacs/ centre

National Horticulture Board (NHB) Schemes

- ▶ Capital Subsidy on investment for horticulture produce
- ▶ Back Ended subsidy for production and post harvest management
- ▶ Financial assistance for technology development and transfer
- ▶ Financial assistance for Market Information service for Horticulture crops

Incentives/ Initiatives from Government of Gujarat

Comprehensive Agro Business Policy – 2016 - 2021

- ▶ Capital Subsidy on investment to agro and food processing industries
- ▶ Assistance of Back Ended Interest Subsidy on the Term Loan
- ▶ Freight Subsidy will be available to Micro, Small and Medium Enterprises (MSME)
- ▶ Assistance in Sample Testing
- ▶ Assistance for 'Quality Certification Mark'
- ▶ Financial Assistance for Skill Enhancement
- ▶ Reimbursement of VAT and Sales Tax
- ▶ Encouragement in Electricity Rate and Duty
- ▶ Refund on Registration Fee and Stamp Duty
- ▶ Assistance for Research and Development
- ▶ Assistance for Patent Registration

Department of Forest & Environment, Government of Gujarat

<http://www.envforguj.in/>

GEER Foundation

<http://www.geerfoundation.gujarat.gov.in/>

Gujarat State Forest Development Corporation Ltd.

<http://www.gsfdcltd.co.in/>

Gujarat State Biodiversity Board

<http://www.gsbb.in/>

Gujarat Ecology Commission

<http://www.gec.gujarat.gov.in/>

Gujarat Environment Management Institute

<http://www.gemi-india.org/>

Agriculture and Co-operation Department

www.agri.gujarat.gov.in/index.htm

Gujarat Industrial Development Corporation

www.gidc.gov.in/

Industries Commissionerate

www.ic.gujarat.gov.in

This project profile is based on preliminary study to facilitate prospective entrepreneurs to assess a prima facie scope. It is, however, advisable to get a detailed feasibility study prepared before taking a final investment decision.

For further details:

INDEXTb
INDUSTRIAL EXTENSION BUREAU
(A GOVT. OF GUJARAT ORGANISATION)
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