Developing Sustainable Supply Chain and Enhancing value of MAPs at Grass-Root Level

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Use Pattern of MAPs

Phytopharmaceutical

Ethnobotanical

Traditional

Cosmetic

Applied to body for cleansing, beautifying or altering appearance.

Drug

Used to diagnose, cure, mitigate, treat or prevent disease

Herb

Consumed for its taste, aroma or nutritive value

Food

Ingested to affect structure or function of body

Ingested to supplement diet

Dietary supplement

Is it intended for use as a drug under

Yes

No

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AYUSH Industry in India

System	Colleges	Doctors	Hospitals	Beds	Dispensaries	Reg. Mfctrs.
Ayurveda	196	4,38,721*	753	35,182	15,193	7997
Unani	33	19,685	177	3892	958	28
Siddha	6	17,560	276	2386	444	446

* Institutionally Qualified : **3,39,233, NIQ: 99,488**

Source: AYUSH, Ministry of Health Govt of India

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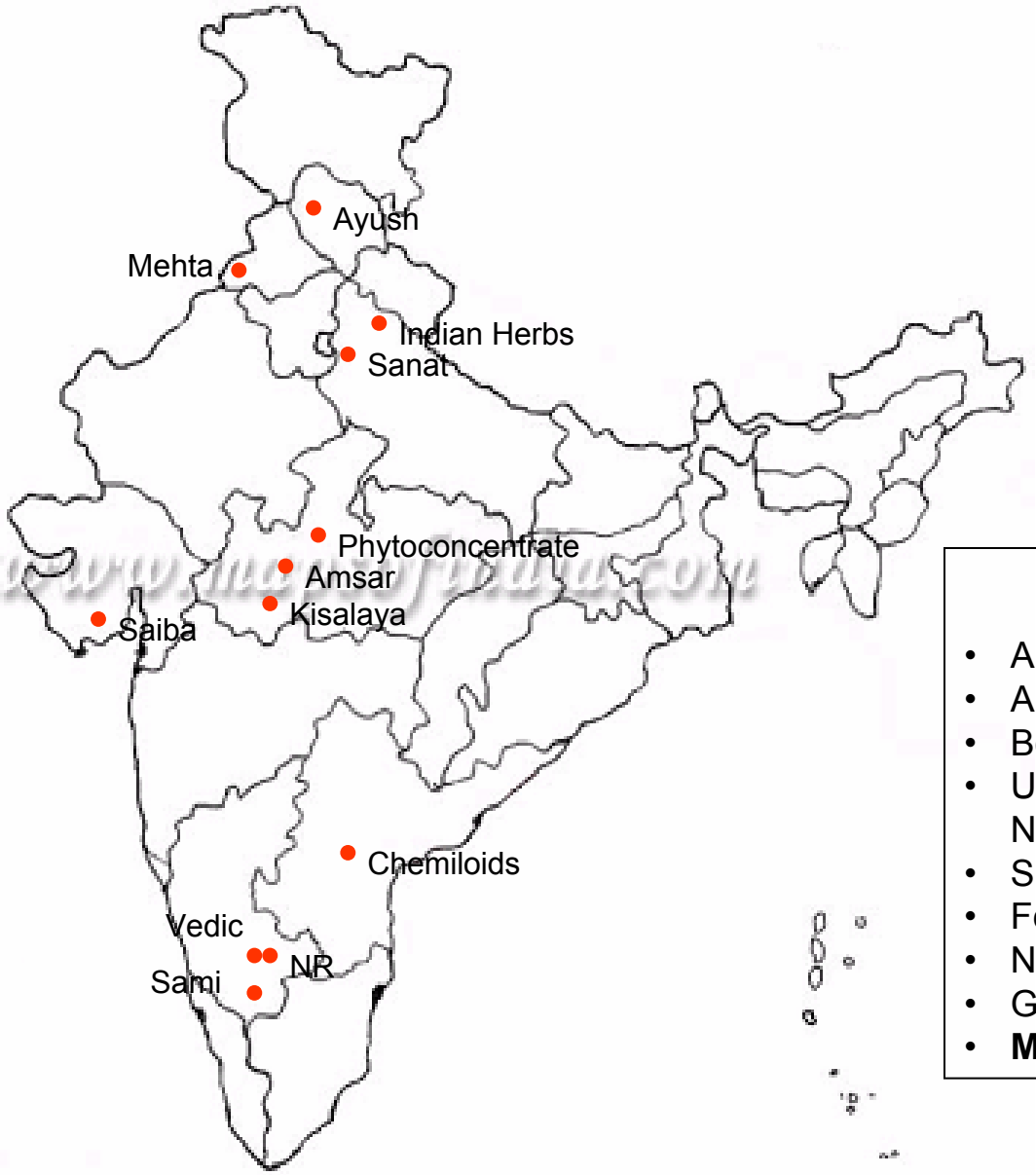
Plant Extract Industry in India: An Overview



(Significant) Newcomers

- Reliance Life Sciences
- Konark Herbals
- Techni Tuber Inc.
- Patel Group
- India Glycols
- Nisarg Biotech, and many more

Plant Extract Industry and Trade

- A turn over of about 8000 Mill INR
- About 150 plant extracts made
- Both Aqueous and Solvent Extracts
- Used by Herbaceuticals, Foods, Nutraceuticals and Cosmetics
- Significant quantity is exported
- Few Extracts imported as well
- No licensing
- Great scope for improvement in all aspects
- **Major users of MAPs**

Some Facts about NWFPs in India

- India has 48,736 Higher Plants compared to World's 3,22,000
  (Budh dev Sharma & Tej Kumari, Indian Wildlife: Threats and Preservation, 2002)
- About 15,000 plants in India are known to be used in Ethno botany for various ailments
- Though Ayurveda alone mentions about 1500 plants, currently only around 800 plants are used in regularly
- About 400 plants are in active trade
- 500 million people living in and around the forests whose survival can be said to be dependent on supplementary income from NWFP (ICFRE 2002).
- 17% landless depend on daily wages related to collection of NWFPs (ICFRE 2002)
- 50% of forest revenue and 70% of forest export revenue comes from NWFPs (Tewari & Campbell 1997)
- About 150 plant extracts are made

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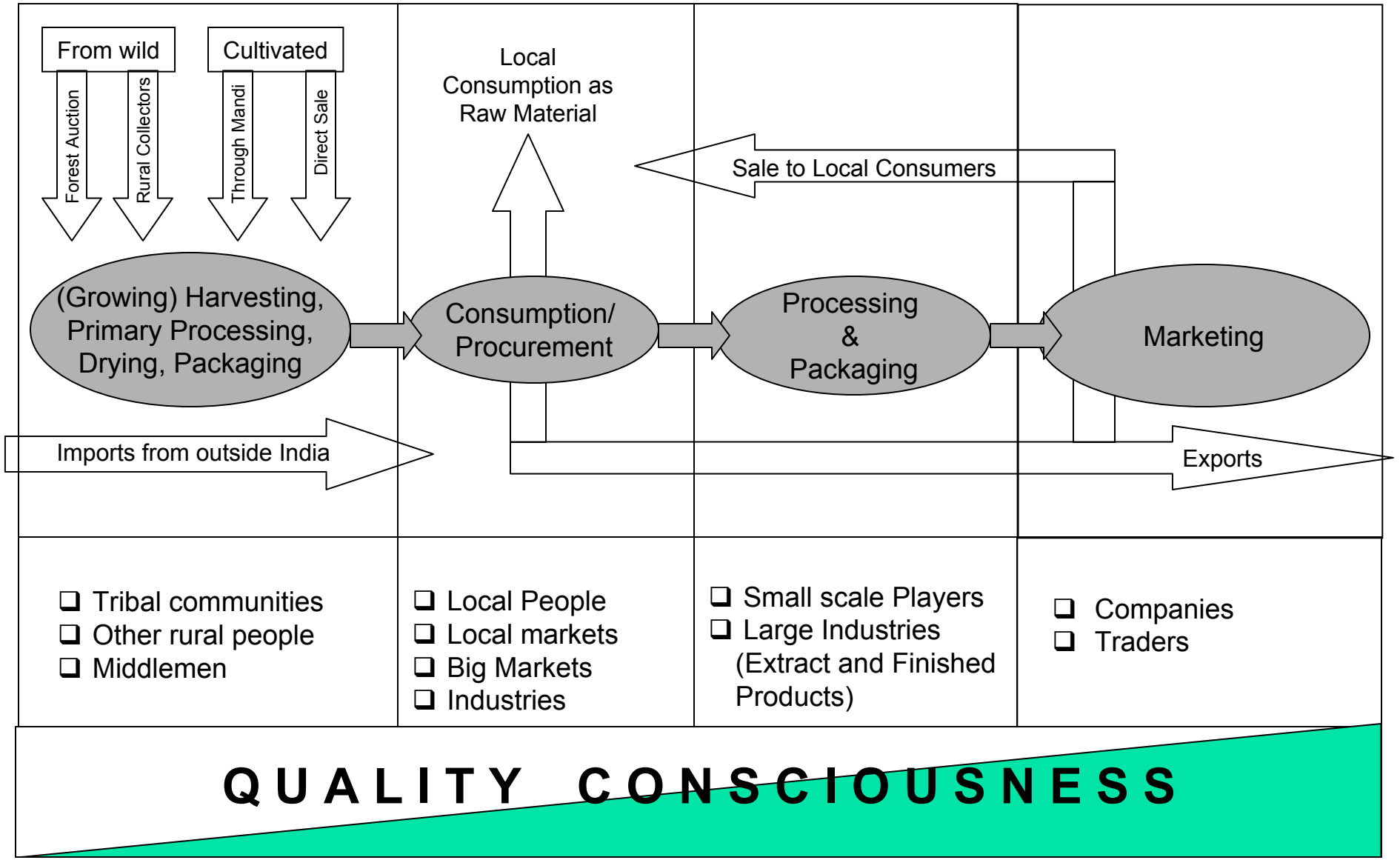
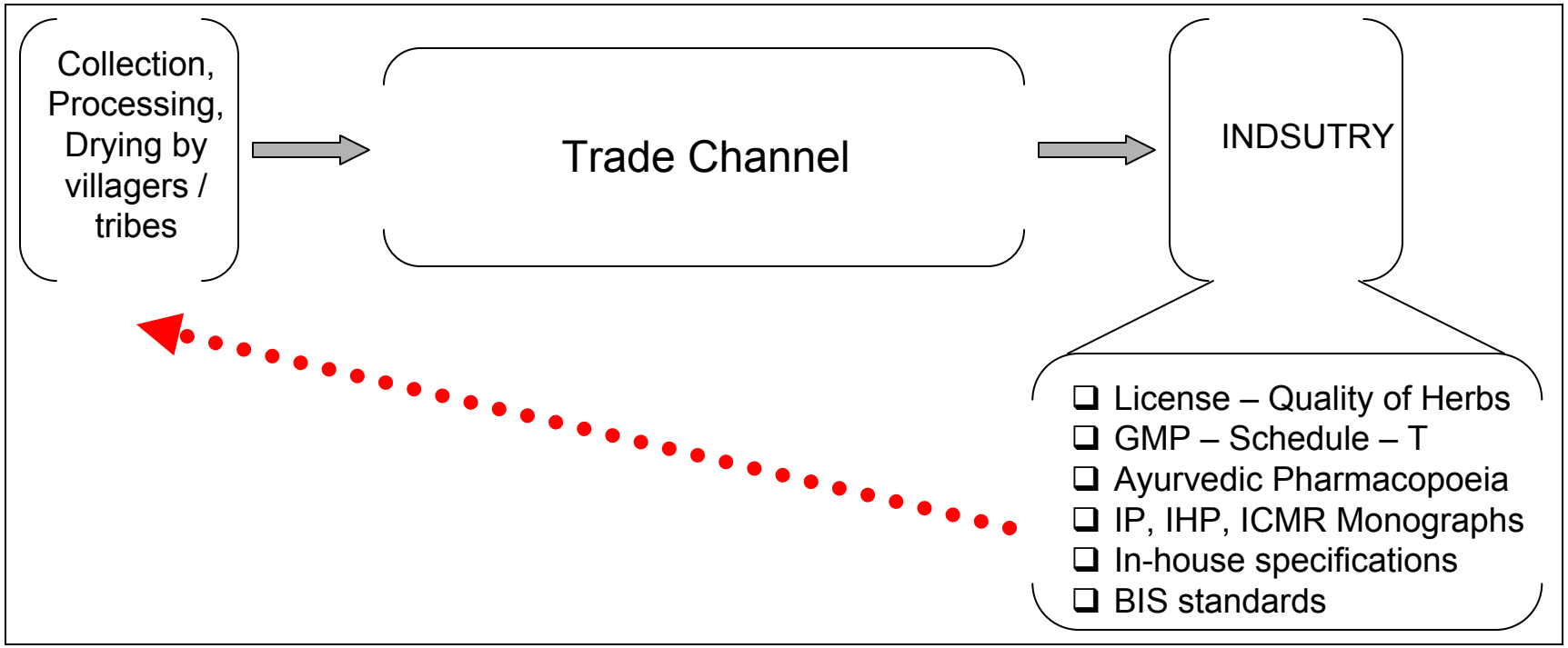
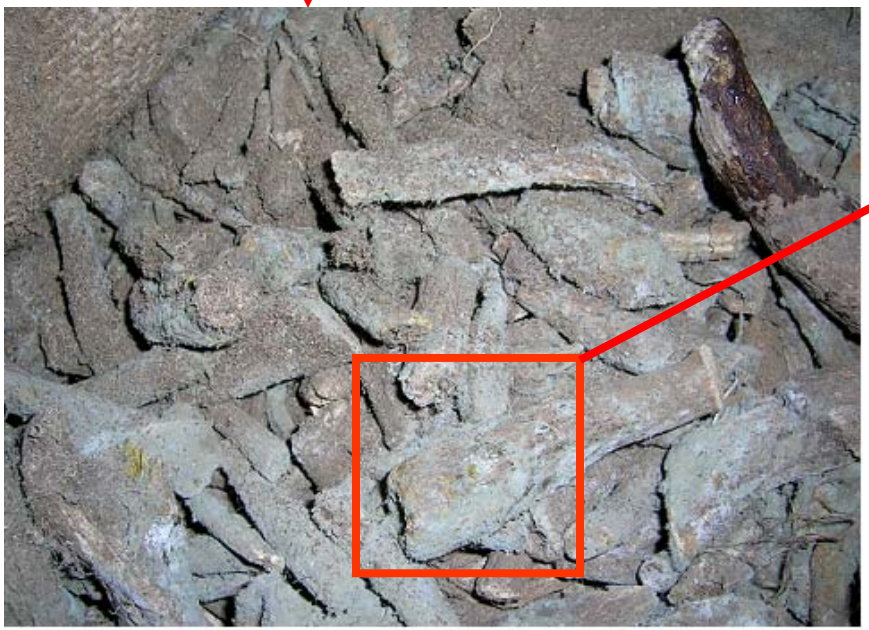
MAPs Supply Chain



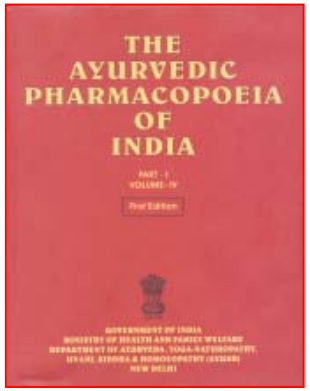

Collection, Processing, Drying by villagers / tribes
Trade Channel
INDSUTRY
License – Quality of Herbs
GMP – Schedule – T
Ayurvedic Pharmacopoeia
IP, IHP, ICMR Monographs
In-house specifications
BIS standards

Wrong packaging and Storage…



Which one to Harvest ?

The cost of “Poor Quality”



- Single dried *Tagar* Rhizome weighs between 434 to 832 mg; Average: 633 mg
- 1 ton of material will come from = 15,79,778 plants

What if the -

- Foreign matter - more than 2 %, OR
- Ash - more than 12 %, OR
- Acid insoluble ash - more than 10%, OR
- Alcohol Extr. - less than 30 %, OR
- Water Extr. - less than 19 %

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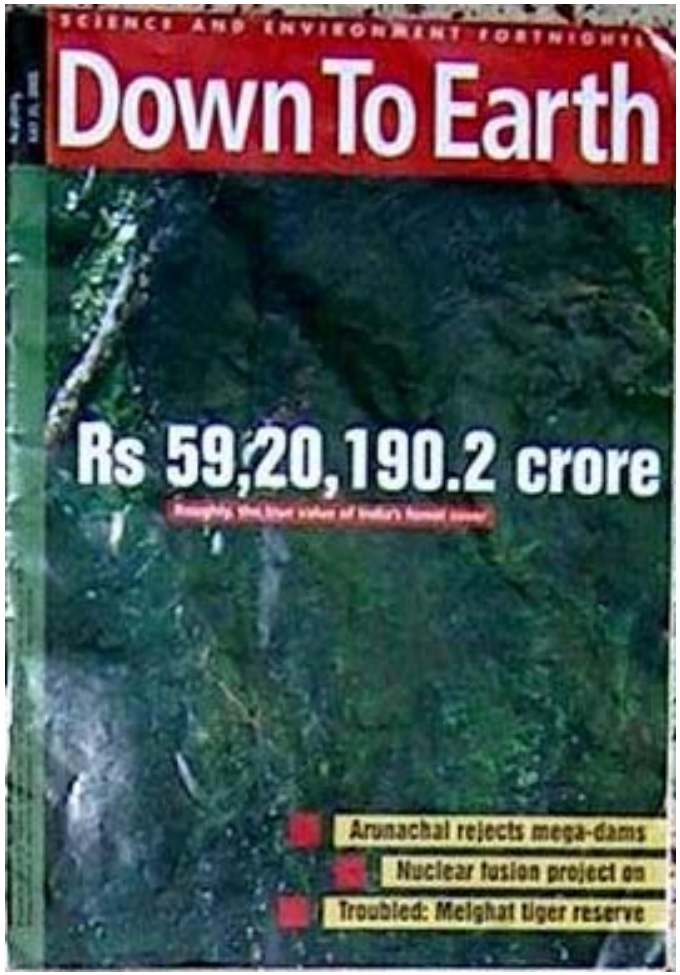
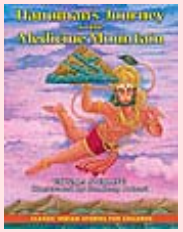
Spped = Damage = Cost of Repair


SCIENCE AND ENVIRONMENT FORTNIGHTLY
Down To Earth
Rs 59,20,190.2 crore
Arunachal rejects mega-dams
Nuclear fusion project on
Troubled: Melghat tiger reserve

Environmental Impacts of Un-scientific Harvesting

Plant Part	Species Level	Population / Ecosystem Level
Whole Plants Roots / Rhizomes	Mortality	Reduced Regeneration
Exudates Resin / Gums/ Latex	Restricted Growth	Changes in Population Structures
Bark / Stem/ Wood /Heartwood	Hampered Pollination / dispersal /Re-germination	
Leaves / Shoots		
Reproductive Parts (Buds, Flowers, Stamina, Stigma, Seeds, Flowers)		

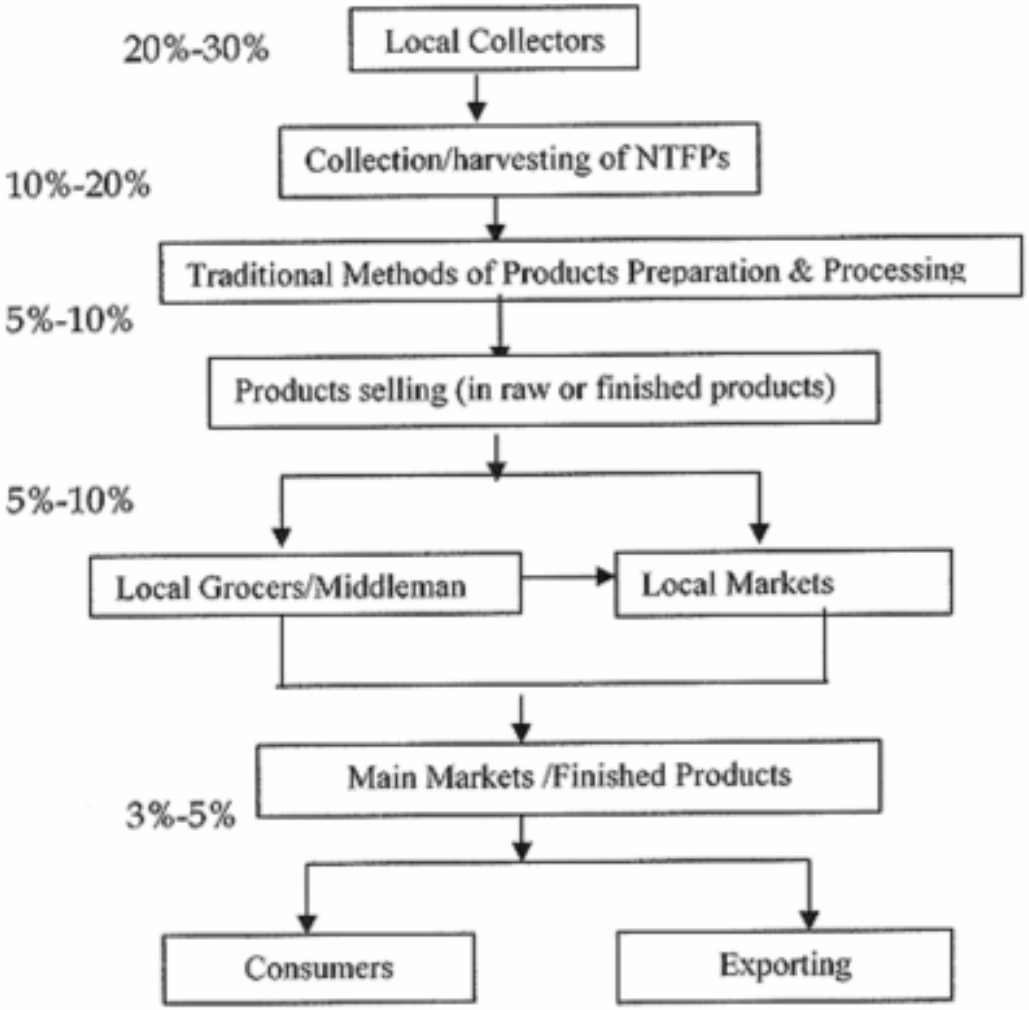
- ❑ Habitat Losses
- ❑ Soil Erosion
- ❑ Dependent wild life population
- ❑ Other anthropogenic disturbances



Losses due to Rejection at Industry

- ➢ Lack of Quality
- ➢ Undue Foreign Matter
- ➢ Insufficient / inconsistent quantity of actives
- ➢ Changes in Physical appearance

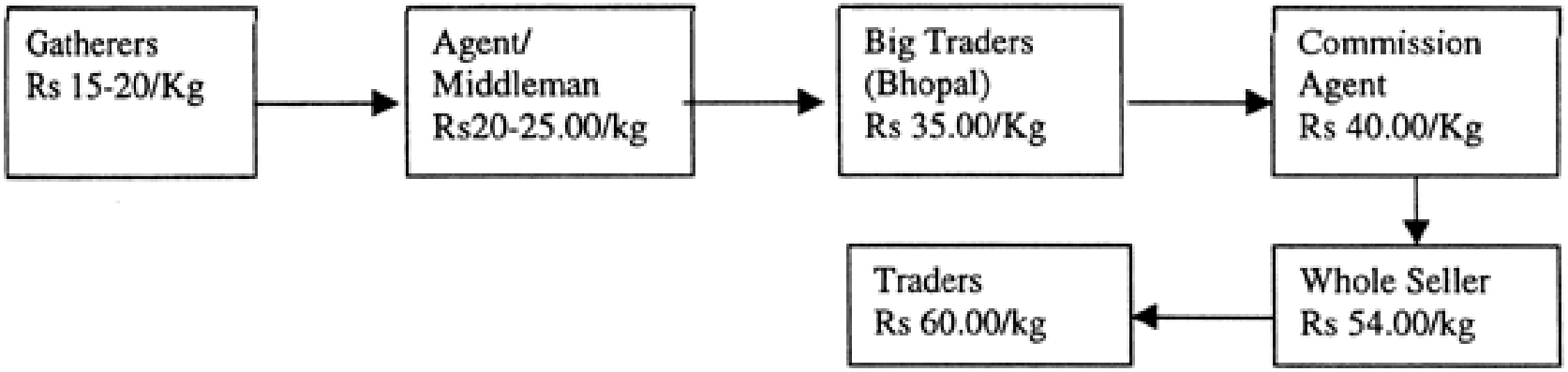
Material loss during collection, processing and marketing of various NTFPs



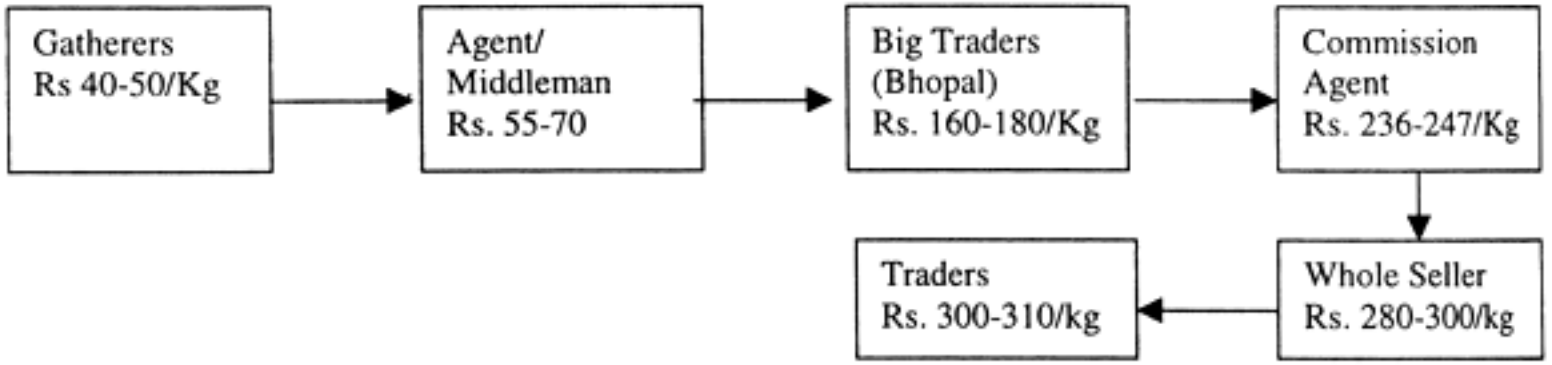
Source: Latif, A. & Srinwari, ZK, 2007, Sustainable market development for non timber forest products in Pakistan, Kohat University of Science and Technology, Pakistan

The Price, Collectors are Getting?

Marketing channels of *Curcuma caesia* (Rhizome)



Marketing channels of Rauvolfia serpentina (Dried roots)



Source: Mishra, Harvesting of NWFPs, 2000

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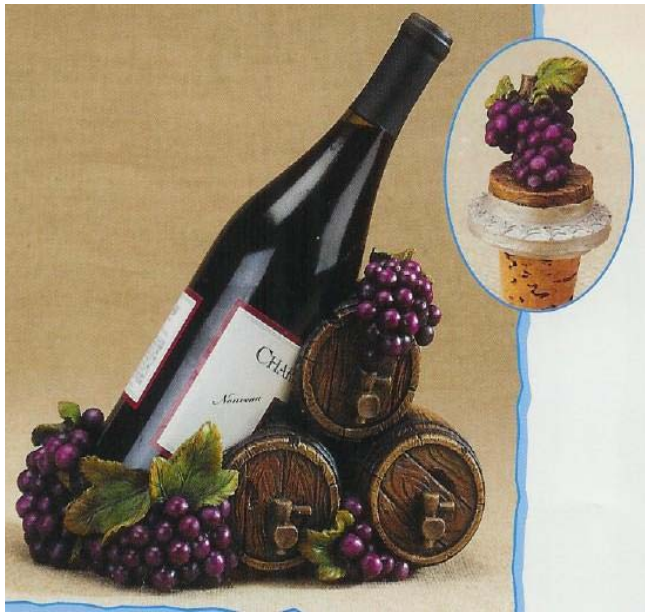

Not the Technology alone but
"Quality of Grapes" equally, in fact more important

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Value Addition

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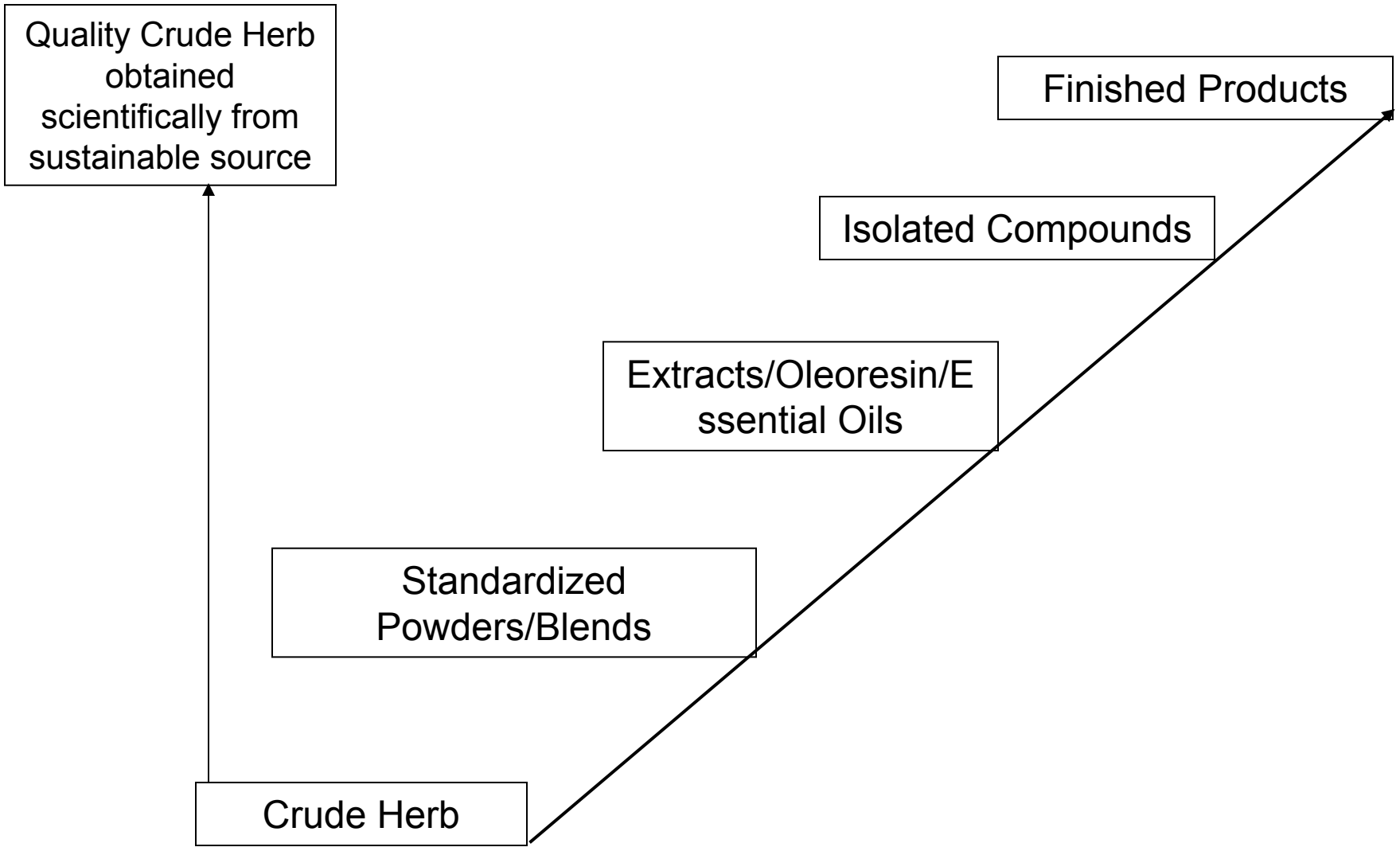
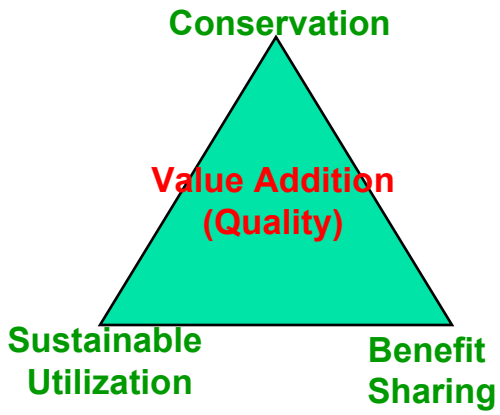
Value Addition



Foundation for Rural Enterprise for Sustainable Herbs



Authentication

Sustainable Harvesting

Sorting and Cleaning
(Right Part)

Cutting/Shearing
(to facilitate drying)

Drying

Sorting & Grading

Grinding

Packing and Labeling

Quality Certification

Training and
Support
from Govt.
Industry
&
Develop
ment
Banks

Industry

"Value
Added
Products"

Collection/Harvesting period of some of the common NWFP

(After Gupta and Guleria, 1982)

NWFP	Months of Collection											
	J	F	M	A	M	J	J	A	S	O	N	D
Grasses	■	■	■	■								
Fibres					■	■	■					
Mahua (*Madhuca latifolia*)					■	■	■					
Neem (*Azadiercta Indica*)						■	■					
Karanj (*Pongamia Pinnota*)						■	■	■	■	■	■	
Kusum (*Schliechera Oliosa*)							■	■				
Sal seeds				■	■	■						
Khakan seeds					■	■						
Gums & resins			■	■	■	■						
Myrobalans	■	■	■									
Tendu Leaves (*Diaspyros Melanoxyion*)				■	■	■						
Imli (*Tamerindus Indica*)	■	■	■									
Lac				■	■	■	■	■				
Tasar *(Cocoon)*									■	■	■	■
Wild Fruits	■	■	■	■	■	■	■	■	■	■	■	■

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Right Season of Collection

Name of the herb	Part Used	Right Time of Collection			
		Feb-Apl	May-Jul	Aug-Oct	Nov-Jan
Abies webbiana	Leaves		◎	◎	
Acacia catechu	Wood				◎
Acacia nilotica	Bark			◎	
Achyranthes aspera	Whole Plant	◎			
Aconitum ferox	Rhizome			◎	
Aconitum heterophyllum	Rhizome			◎	
Acorus calamus	Rhizome		◎		
Adhatoda vasica	Leaves	◎			
Aegle marmelos	Fruit Bark	-- ◎	◎ --		
Alpinia galanga	Rhizome			◎	
Alstonia scholaris	Bark		◎		
Andrographis paniculata	Aerial Parts	◎			◎
Aquilaria agallocha	Stem		◎		
Argyreia speciosa	Root		◎		
Asparagus adscendens	Root			◎	
Asparagus racemosus	Root			◎	
Azadirachta indica	Leaves Bark		◎ --		-- ◎

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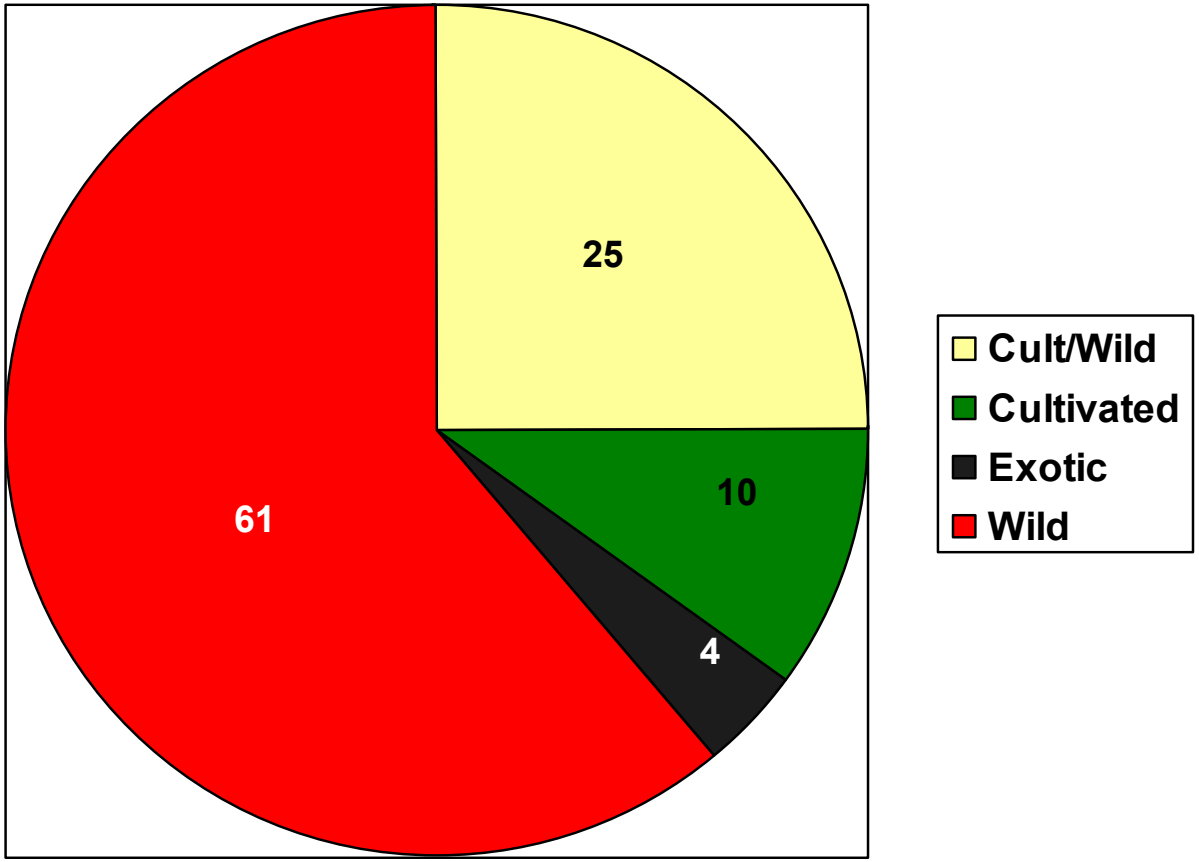
Kalmegh (*Andrographis paniculata*) case

Collected from Bastar (Madhya Pradesh)

Harvesting Time	**Andrographolide Content**
March	0.72% w/w
November	0.41
January	0.57

Origin wise categorization of Traded Medicinal Plants



Source: Export Potential of Indian Medicinal Plants and Products, Exim Bank, 2003

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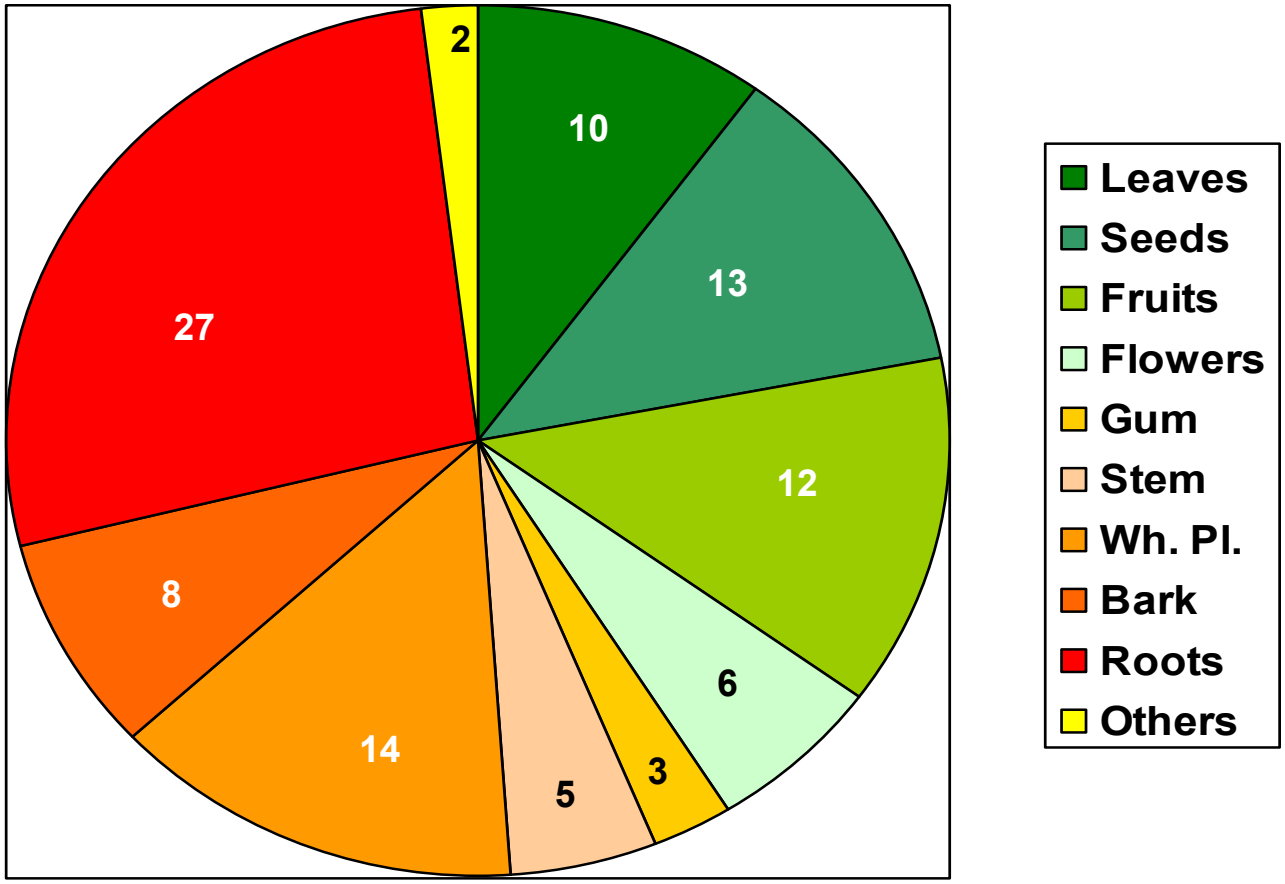
Part wise classification of Traded Medicinal Plants



Source: Export Potential of Indian Medicinal Plants and Products, Exim Bank, 2003

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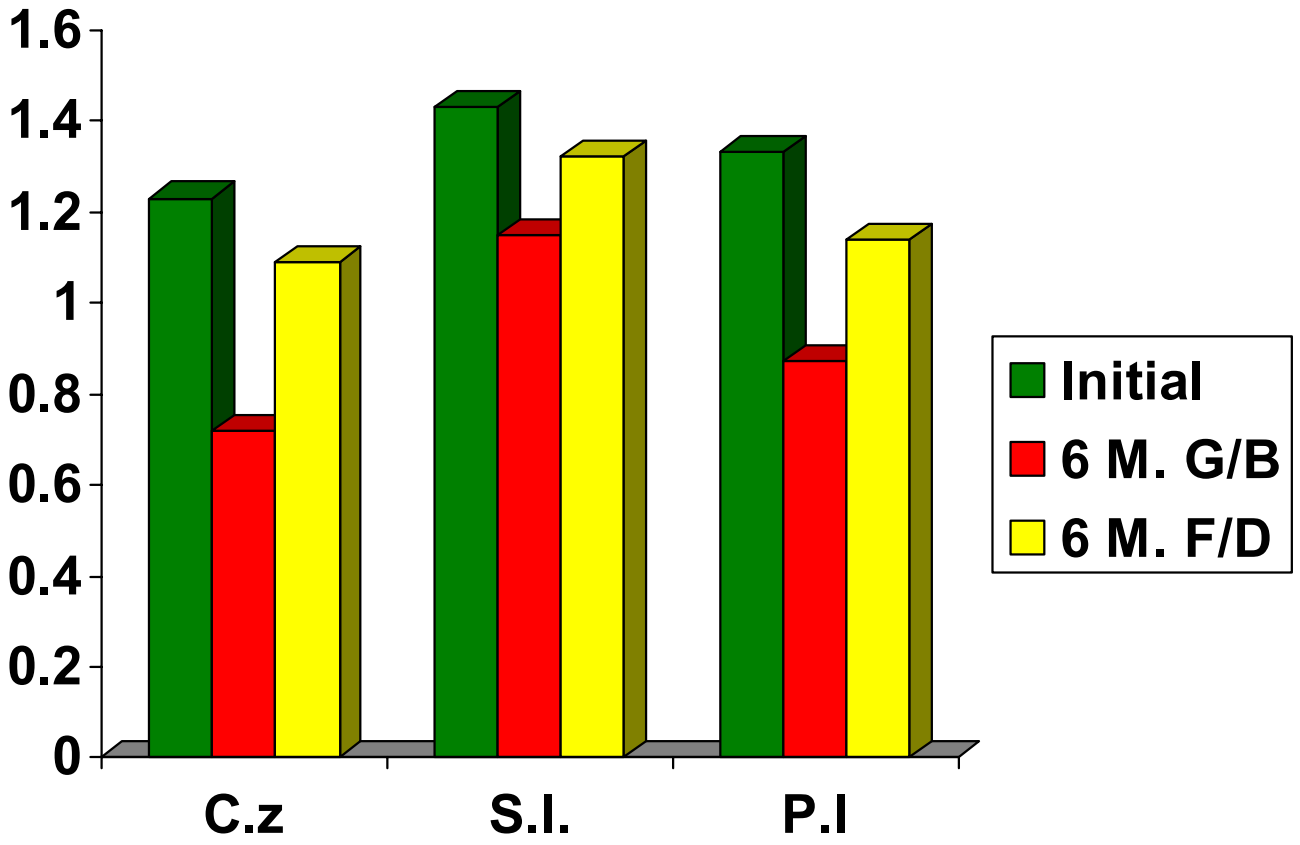
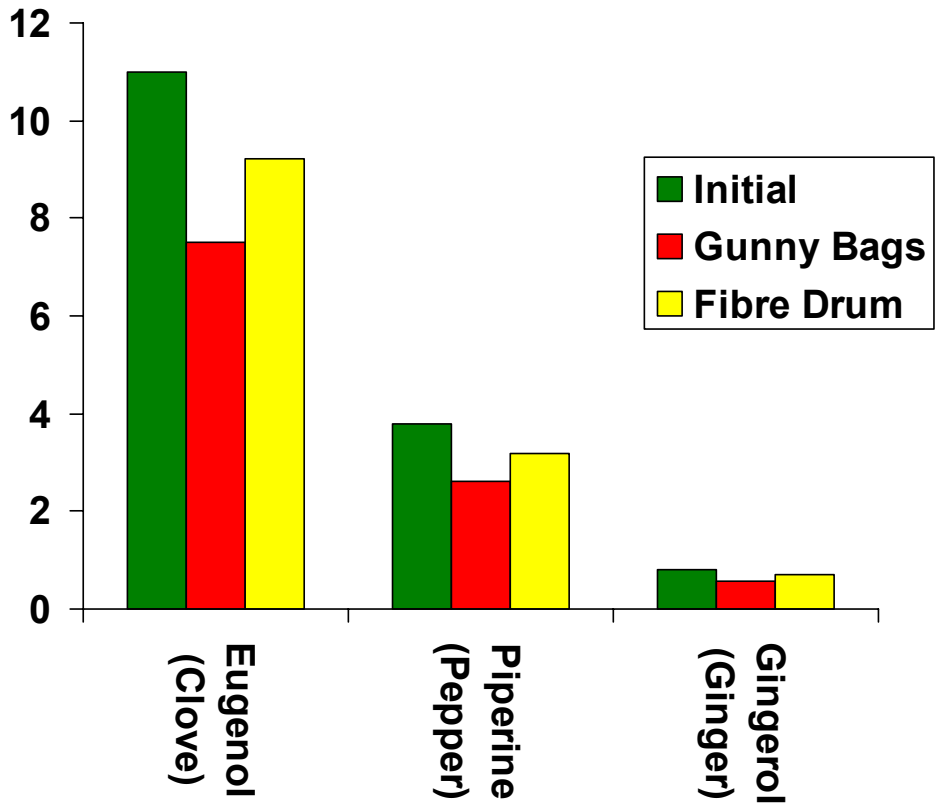
Effect of Wrong Packaging on Quality of Drugs: Volatile Oil

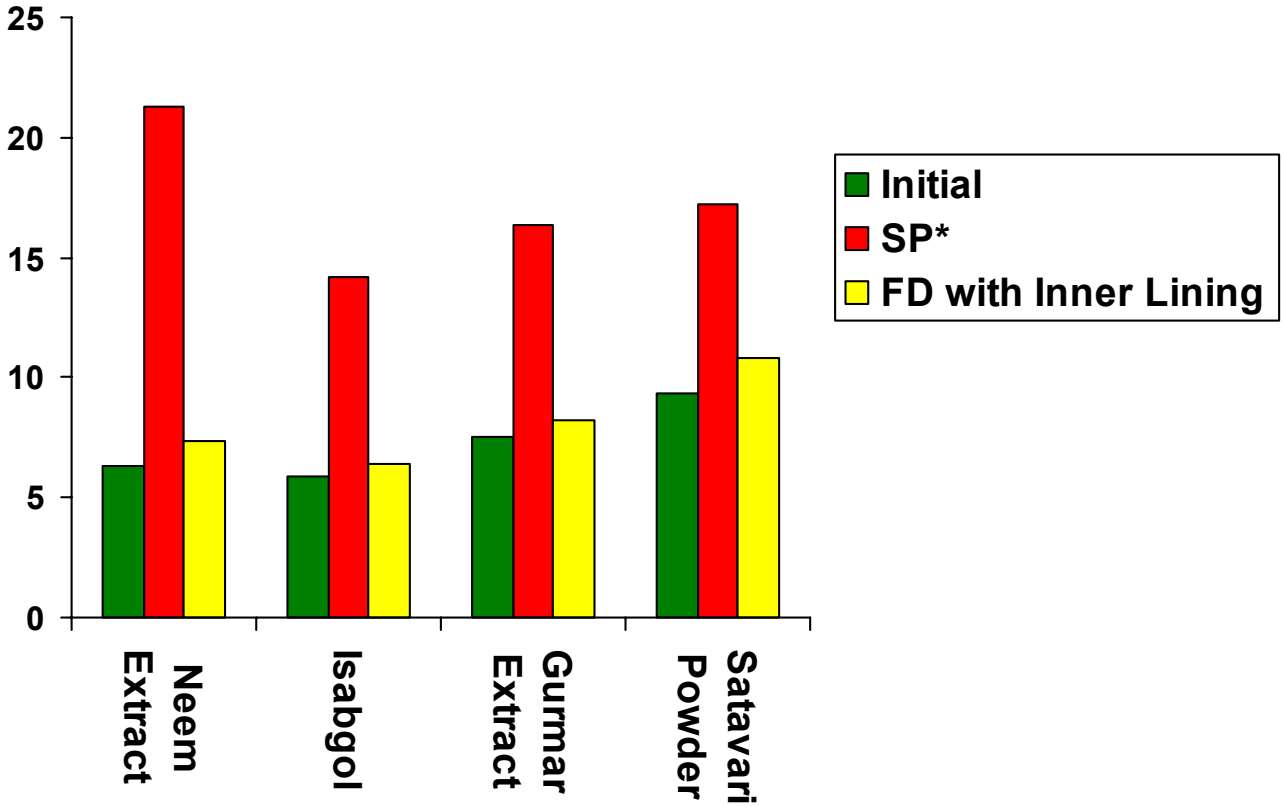


G/B: Ordinary Gunny Bags; F/D: Fibre Drum

Effect of Wrong Packaging on Quality of Drugs: Markers

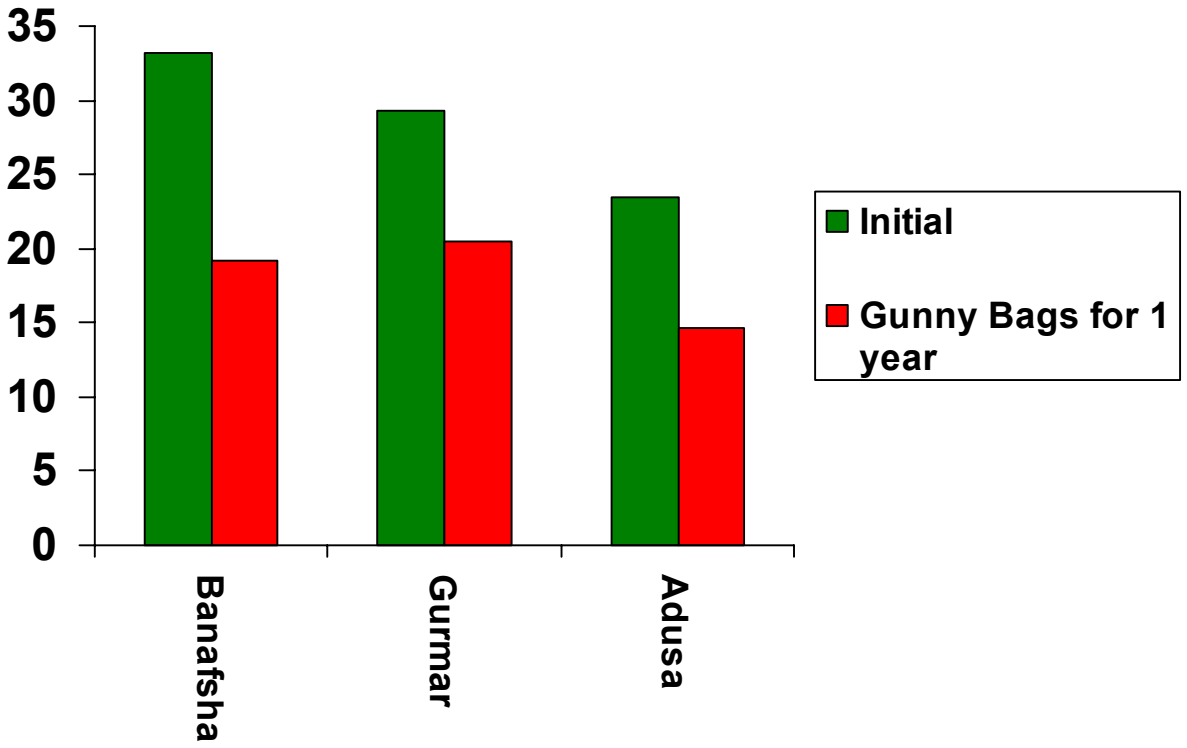


Effect of Wrong Packaging on Quality of Drugs: Moisture Content



SP* - Single Polypack , FD - Fibre Drum; After 75 Days

Effect of Wrong Packaging on Quality of Drugs: Water Soluble Extractives



Recommended Packaging

	Category	Packaging Material
A	Woody in nature (Root/Stem)	1. Gunny Bags 2. Woven Sacks
B	Leafy (creepers, annuals)	1. High gauge HMHD Bags 2. Woven Sacks with LD liner 3. High gauge Polyethylene Bags
C	Fleshy in nature (rhizomes, fruits)	1. High Gauge HMMD Bags 2. Woven Sacks with LD liner
D	Flowers, Anthers, Stigma etc.	1. Corrugated Box with Propylene woven sacks 2. HDPE Containers 3. Fibre Board Drums
E	Having volatile matter	1. Air Tight HDPE Containers 2. Air tight HDPE Corboys 3. C.B.Box with Polyethylene liner
F	Herbal extracts/Compounds	1. Air tight HDPE containers 2. Corrugated Box with Propylene woven sacks 3. Fibre Board drums with Polyethylene bags

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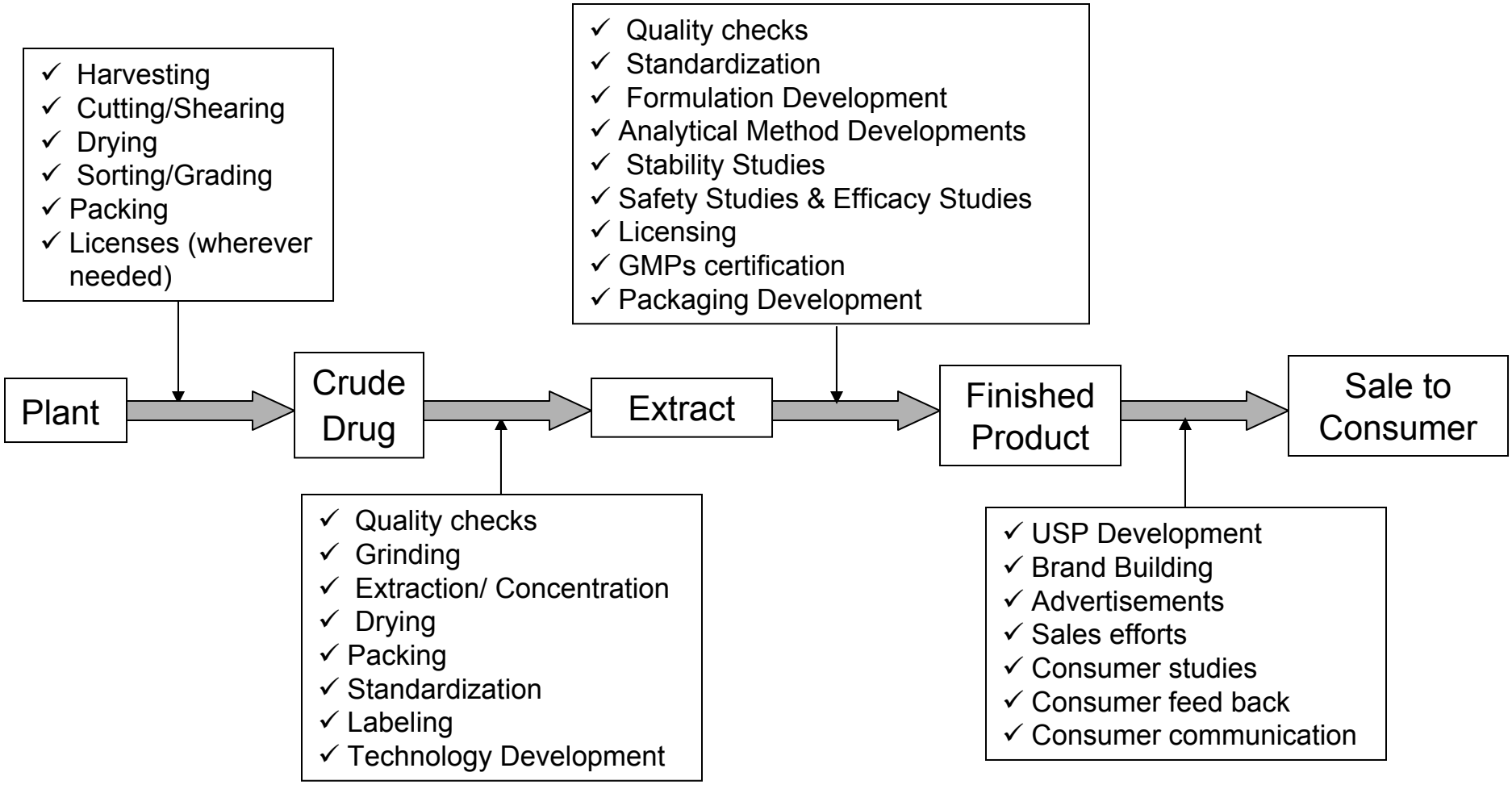
The value Addition



The Benefit Sharing

- ✓ Cost of Bio-resource and Govt. Taxes
- ✓ Cost of Extracts and Govt. of Taxes
- ✓ License Fees

- ✓ Excise
- ✓ Sales tax/ VAT on Finished Product
- ✓ Value to the consumer (Health, food or Cosmetics)

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The Benefits

Collectors/Processors

- Employment Generation
- Skill up-gradation
- Better Returns

Industry/Vaidyas/Consumers

- Better Quality
- Better Therapeutic Benefits
- Consistent availability
- Value addition

Economic Benefits

Social Benefits

Quality Produce

Environmental Benefits

Nature

- Resource sustainability
- *In-situ* Conservation
- Better Regeneration

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Sustainability / Availability Issues

- Industry is open to cultivation provided it is economically feasible
- Perennials be introduced under Forest Plan for in-situ cultivation
- Research should be encouraged to evaluate use of alternate herb/ Alternate parts for the existing use pattern of the herb
- Regulation should allow for use of non-textual herbs/ non-textual parts, once their efficacy is found at par with textual herbs/parts
- Industry should be allowed to participate state funded cultivation projects (i.e. NMPB projects should be extended to Industry as well)
- Industry/Trade representatives should be involved in any new regulation or while amending the existing regulation
- Regulatory control of any material should be justified and linked to development of concrete alternative program in Himalayas

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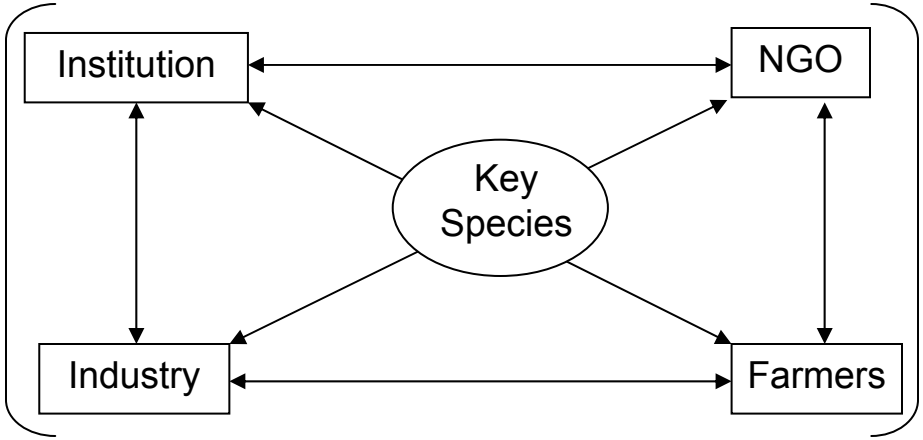
Adopting a species of Medicinal Plant

- Technical Feasibility
- Economical Sustainability
- Quality of the produce



- Time Network
- Build Accountability
- Consistent Monitoring

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FRONTLINE
At stake

Saigata community, Maharashtra

Dongaria Kondh tribe, Niyamgiri Hills, Orissa.

Araku valley – women returning from the forests with NTFPs

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Meeting of a self help group in progress

First Hand Experience

Pragya Meeting in Progress

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