



Commercialisation of plants biopesticides

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(ADAPPT)

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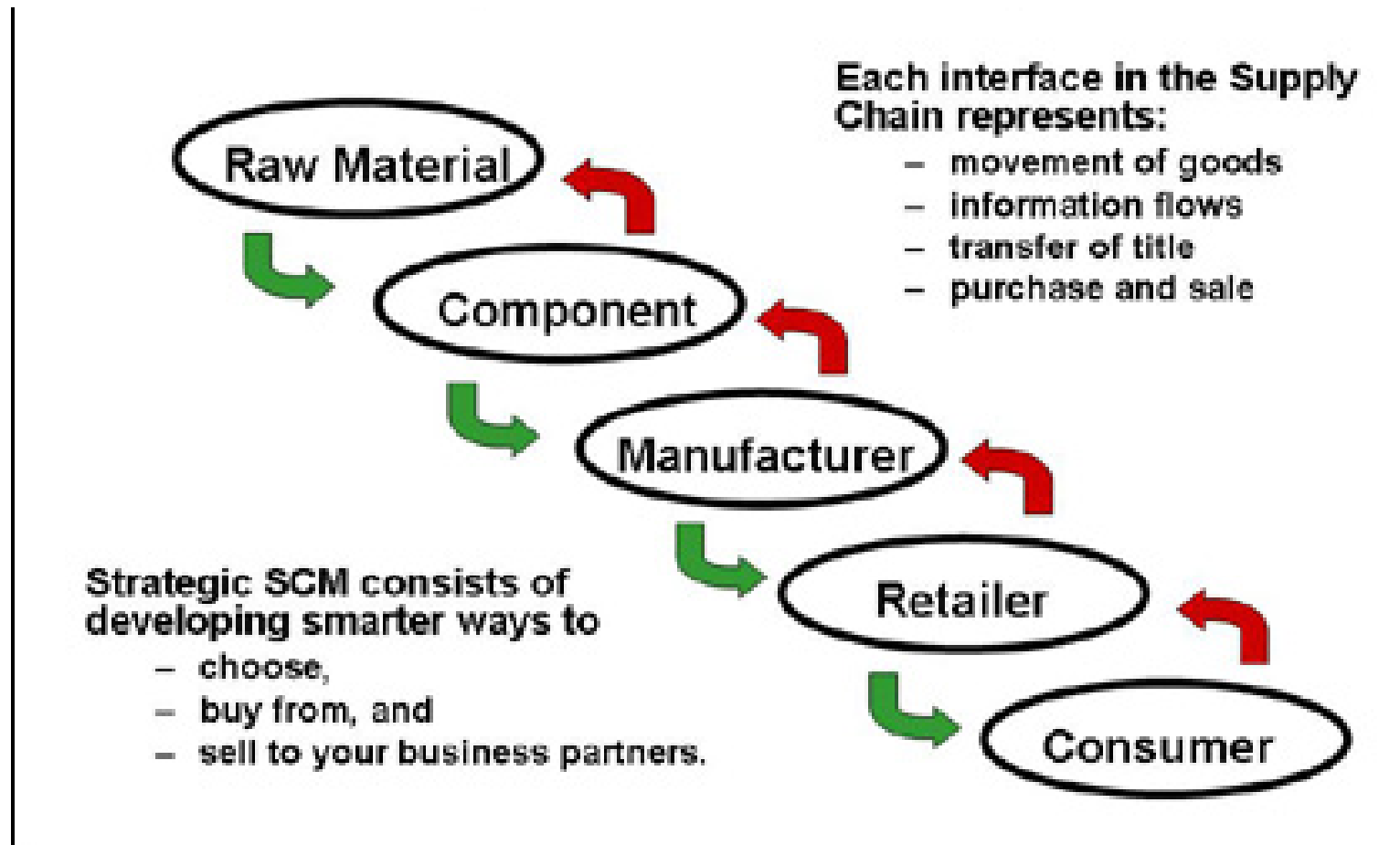
What is commercialisation?

- Developing and maintaining a supply and value chain of a product

What is a supply chain

- Network of activities for manufacturing and delivering a product according to customer specifications
- Supply chain is a network of supplier, manufacturing, assembly, distribution, and logistics facilities that perform the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these products to customers.
- Delivery of the right product of right quality at the right place and right time
- The primary purpose from the existence of any supply chain is to satisfy customer needs, in the process generating profits for itself
- Most supply chains are actually networks. These supply chain stages include:
 - Customers
 - Retailers
 - Wholesalers/Distributors
 - Manufacturers
 - Component/Raw material suppliers

What is a supply chain



Potential plant biopesticides products

- Pesticidal plants are still believed to be a promising alternative to synthetic pesticides has grown with the increases in organic farming practices
- Various crude and or processed products are being explored in several countries for commercial production
- But there are still very few successful commercial pesticidal plant products in use
- There is limited information available on application, efficacy and safety of most of these products
- By the end of the year 2000, there were approximately 195 registered biopesticide active ingredients and 780 products

Species name	Zam	Mal	Zim	Tan	Ken	Gha
Number of species (59) •Anti-fungal 11 •Anti-bacterial 8 •Anti-viral 4	26	24	16	21	15	11

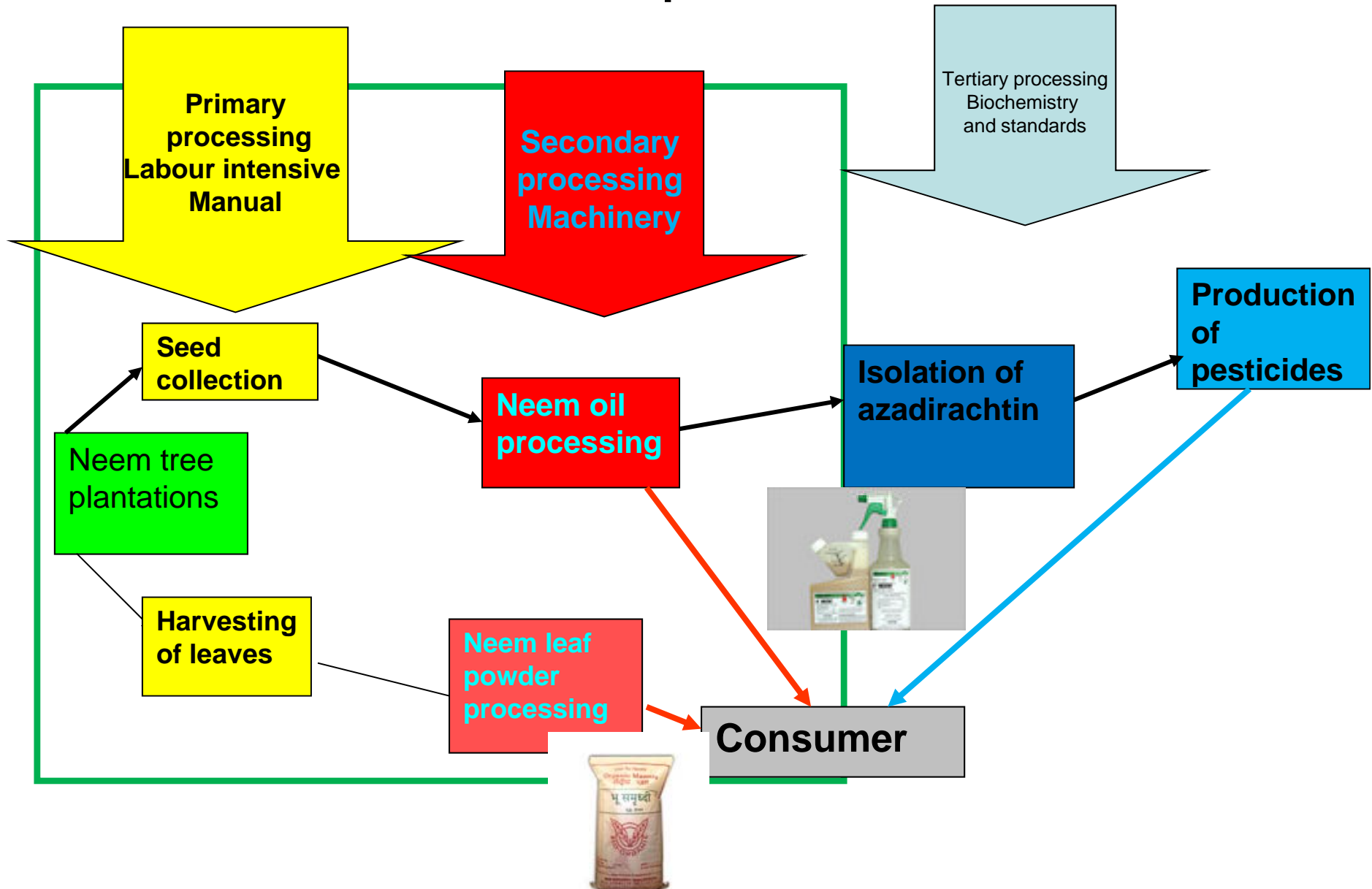
Value chain development

- What is a value chain
 - Vertical or strategic alliance between a number of independent business organizations within a supply chain from production up to the consumer
 - Full range of activities required to bring a product/service from raw material extraction through different phases of production up to delivery to the final consumer and final disposal after use.
 - Product change form
 - Product change value

Value chain development

- Who are the plant biopesticides customers?
- What are their needs and specifications?
- How do you reach them?
- Who are the key role players in the supply chain?
- What are the changes in product form/

Value chain development: Azadirachtin



Successful plant biopesticides

Rotenone (from roots tropical plants)

- Rotenone has made it into the market.
- But no local production is known in the countries under study.

Pyrethrum and permethrin insecticides from *Chrysanthemum cinerariifolium*

- Kenya is the world's leading producer of natural pyrethrum, accounting for 80 percent of the global demand (USA -60%, Europe -35% and African 5%).
- In Africa, Egypt and South Africa absorb 4% and the remaining 1% is used in Kenya
- Tanzania is another producer
- Industry very regulated , not left to market forces

Successful plant biopesticides

Neem products from *Azadirachta indica*

- One of the most successful pesticidal plants currently used in the world
- Active insecticidal component of neem oil is azadirachtin
- Traded in Kenya and Tanzania

Tephrosia vogelii (leaves)

- One of the most highly studied, promoted and widely used pesticidal plant in eastern and southern Africa
- No local processing and trade

Securidaca longependunculata (roots)

- Widely used to control storage pests
- No formulations have been developed and promoted
- No local production

Successful plant biopesticides

- Above examples are a clear indication that commercialisation of plant biopesticides is still in its infancy.
- Therefore need to invest in product development formulation, standardisation and application from the simple crude extracts to the refined active ingredient.
- The product development process should be in conjunction with market development so that a marketable product is produced.

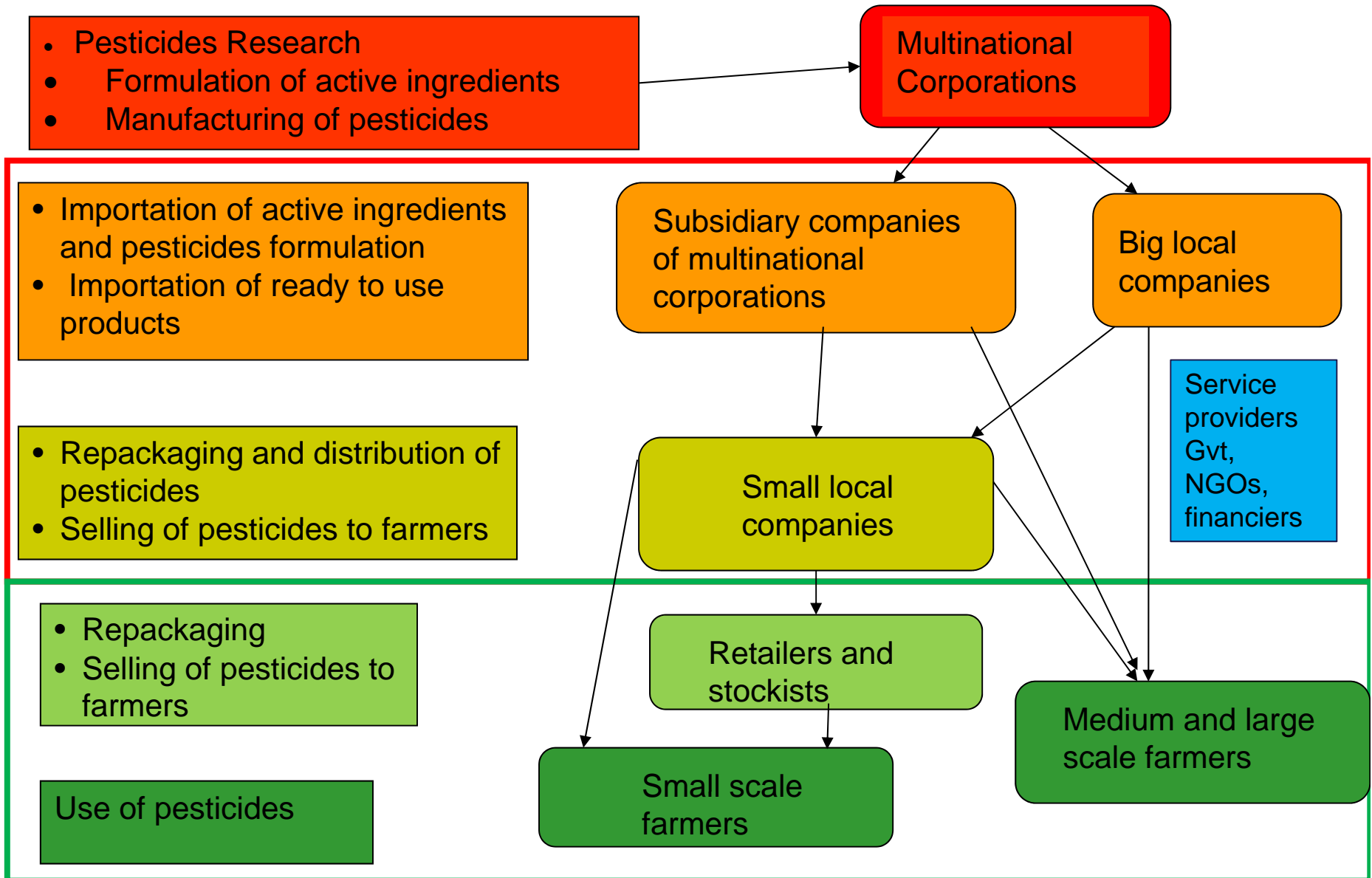
So what is the problem?

- Demand –plenty???
- Raw material –unknown quantity
- Marketable product-non existent

Synthetic pesticides industry structure

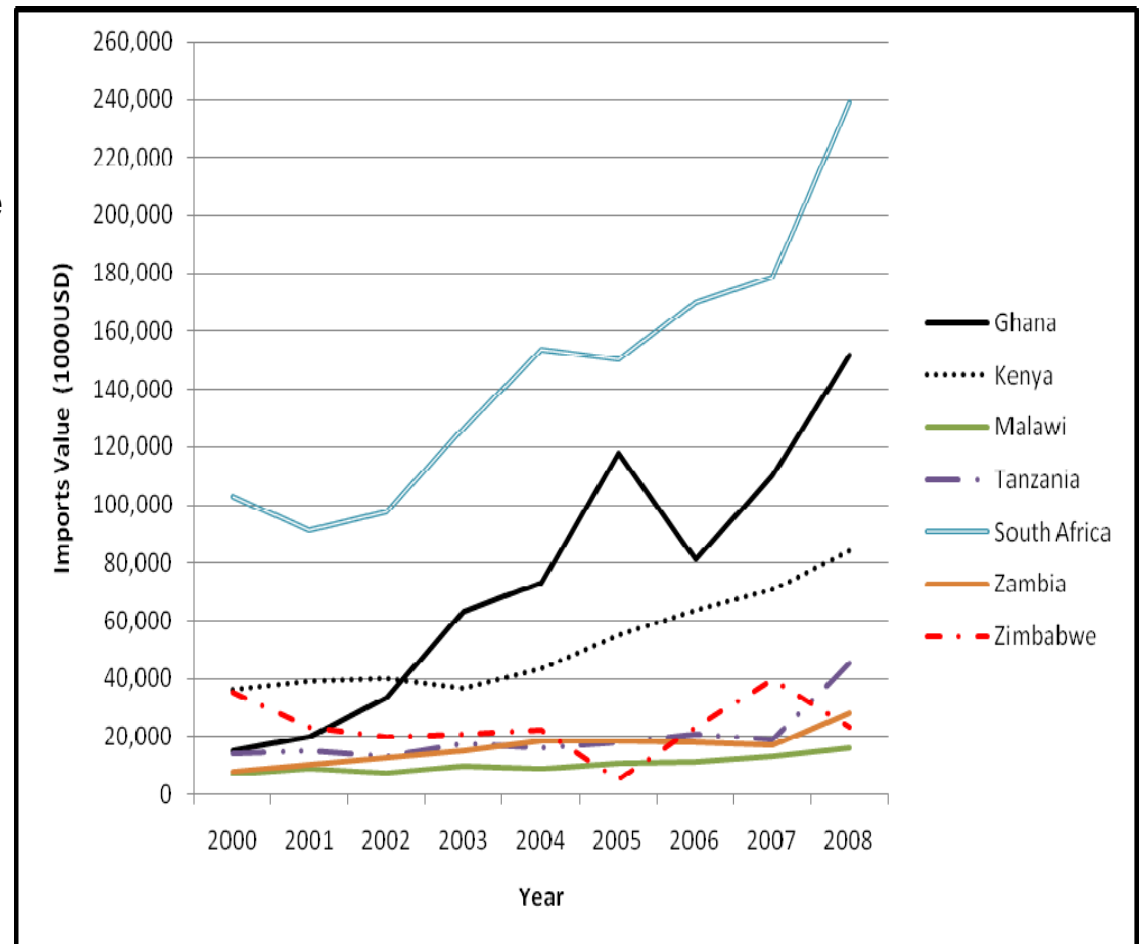
- Dominated by a relatively small number of manufacturers and formulators of active ingredients in Asia and Europe whilst African companies are merely importing, repackaging and or trading
- High costs of research and registration of new pesticides technically excludes small companies
- The pesticide sector is generally not very developed in Africa
-e.g. in a trading site with 2438 suppliers of pesticides only 164 were from Africa with Kenya, Ghana and South Africa among the top 10 countries
- Most African countries with the exception of the Republic of South Africa, have no production of active ingredients yet RSA does not have the production base (natural; plantations)

Synthetic pesticides industry structure



Markets and marketing-synthetics

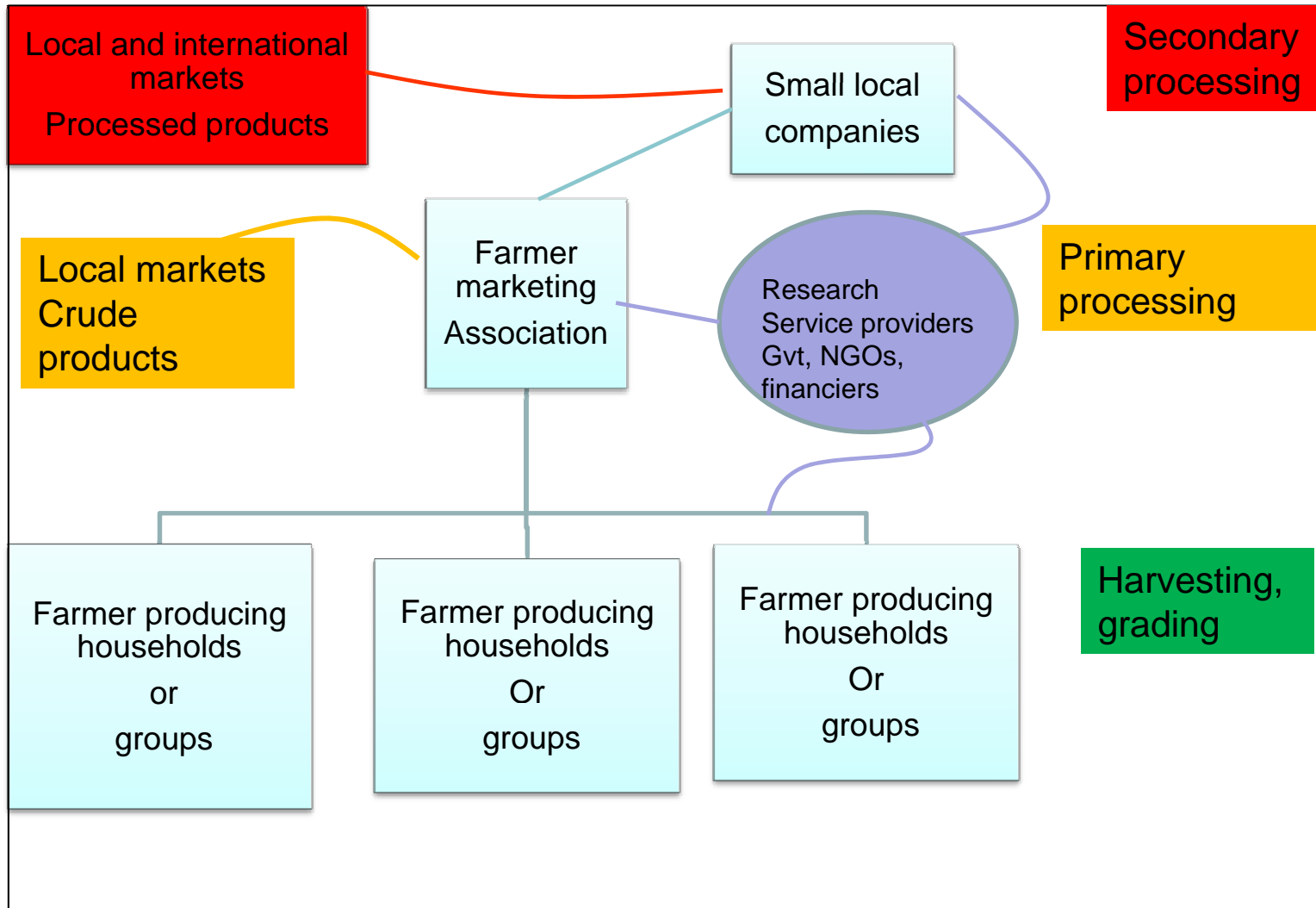
- Pesticides use in Africa is still low with only 2% market share
- Largely targeted at high-value cash crops predestined for export
- In the case of Ghana and Kenya increase is attributed to the huge increase in the horticultural industry.
- industry.



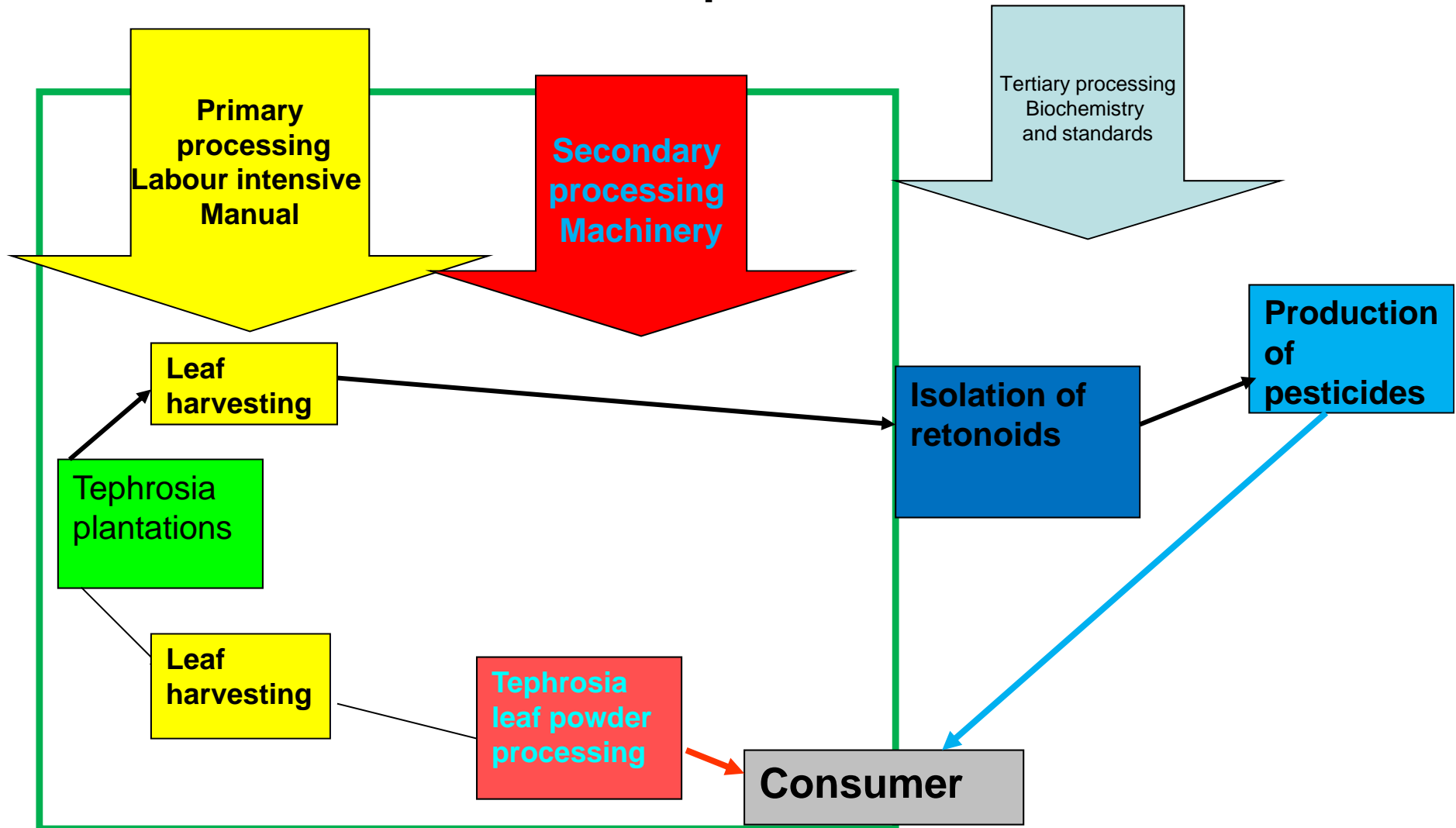
Emerging industry structure of plant biopesticides

- Natural pesticides (bio pesticides or botanicals) industry is a sub sector of the pesticides industry but it remains small and fragmented
- The emerging structure is inversely related to that of synthetic products
- Mostly driven by researchers and NGOs working with small scale farmers and small local companies.
- Large companies are still very sceptical about the return on investment on a product with unknown markets and raw material supply

Emerging structure of the biopesticide sub sector



Value chain development: Azadirachtin



Demand for biopesticides

- The market volume of biopesticides worldwide, including biocontrol products, has remained 1 to 2% of the total global plant protection inputs market
- Production and trade in bio-control agents is more advanced than plant biopesticides
- Plant biopesticides are becoming attractive in the in export crops for markets with strict minimum residue levels (MRLs) for synthetic pesticides
- Organic production of fruits and vegetables for the EU markets is of critical importance in Kenya, South Africa, Tanzania and Uganda
- Number of registered products increasing in Ghana, Kenya and Tanzania

Legal framework

- Developing and enforcing policies and legal frameworks for conflicting objectives of promoting agricultural productivity and avoiding environmental degradation in Africa has remained a challenge
- Rotterdam Convention -monitoring and controlling international trade in hazardous pesticides
- FAO International code of Conduct for the Distribution and Use of Pesticides (2002)
- According to FAO, a pesticide is defined as
 - any substance or mixture of substances intended for preventing, destroying or controlling pests
 - or substances which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies
 - Therefore plant biopesticides fall within the Code of Conduct
- .

Legal framework

- Most countries have developed clear legal frameworks to govern the distribution and use of pesticides
- Pesticide legislation in most countries states that:
 - no pesticides may be imported, exported, manufactured, distributed, advertised, sold or used unless they are registered according to the national pesticide regulations

Country	Legislation	Legislative authority
Ghana	Pesticide control and Management Act 1996 (Act 528)	The Environmental Protection Authority
Kenya	Pest Control Products Act, Cap 346 (1984)	Pest Control Product Board
Tanzania	Plant Protection Act of 1997 and its regulations of 2001	Tropical Pesticides Research Institute
Malawi	Fertilizers, Farm Feeds, and Remedies Regulations Act of 2002	
Zambia	Under the Pesticides and Toxic Substances Regulations 1994	Environmental Protection and Pollution Control Act in 1990,
Zimbabwe	-Fertiliser, Farm Feeds and Seeds and Remedies Act (Chapter 186, Section 24). -Environment Management Act 2002	Plant Protection Research Institute Environmental Management Agency

Tanzania : Plant Protection Act of 1997 and its regulations of 2001

Subject to the regulations provided under sections 16 and 42 of this Act, the application for plant protection substance shall contain:

1. the name and address of the applicant;
2. the designation of the plant protection substance;
3. details of its composition, particularly the nature and quantity of its ingredients, using the commonly employed scientific nomenclature;
4. details of the field of its application;
5. details on its possible dangers to human and animals health and the natural environment;
6. details of procedures for its proper disposal or neutralization;
7. a draft of the instructions for use;
8. the text of indications and markings intended for the containers and outer packaging or for the literature accompanying such packaging;
9. details of the nature of the packaging materials,
10. information on suitable analysis procedures which can be carried out using commonly employed equipment at a reasonable cost and which can be used
11. to reliably determine the residue left after the application of the plant protection substance, including degradation and reaction products which may be dangerous to the health of human, animals and the natural environment.

Registration mechanisms

- Pesticidal products whether synthetic or a plant extract are required to go through same registration procedures
- Conditions for registration are very similar in all the countries varying mostly in the level of specificity to groups of pesticides as detailed in the Kenya legislation
- All pesticides to be registered should have documented data and information on
 - Efficacy
 - Toxicity
 - Persistence
 - Shelf life: preferably two (2) years.
 - Safety Data:

Conclusion

- Despite the increasing interest in plant biopesticides, their commercial production remains limited due to:
 - lack of data on the efficacy and safety of plant biopesticides
 - there are no ready-to-use plant biopesticide products in production
 - pesticides manufacturing sector in Africa is not yet developed to cope with a new products,
 - the agricultural inputs supply market has been liberalised to an extent that no taxes are being levied on imported agricultural chemicals/inputs which acts as a disincentive for own production
 - lack of knowledge by the farmers

Conclusion

- The legal framework exists to guide production to consumption of plant bio pesticides
- Registration processes are not complicated but just detailed and require authentic rigorous scientific research that will provide data and information required
- Raw material supply will remain a challenge as quantities of active ingredients are not known and therefore 1000g is used where a few mg would suffice
- Need for investment in product and technology development, promotion and awareness raising if plant biopesticides are to be legally produced and used by the small holder farmers

Thank you
Obrigada
Merci
Asante sana