Reduction of food waste and losses

A global priority with environmental, social and economic impact

16 September 2015, Rome

The world around us

of the world's poor live in rural areas

agriculture is the main source of income and employment.

of the MVA typically comes from

agro-related enterprises

of the total employment

lies in the agricultural sector

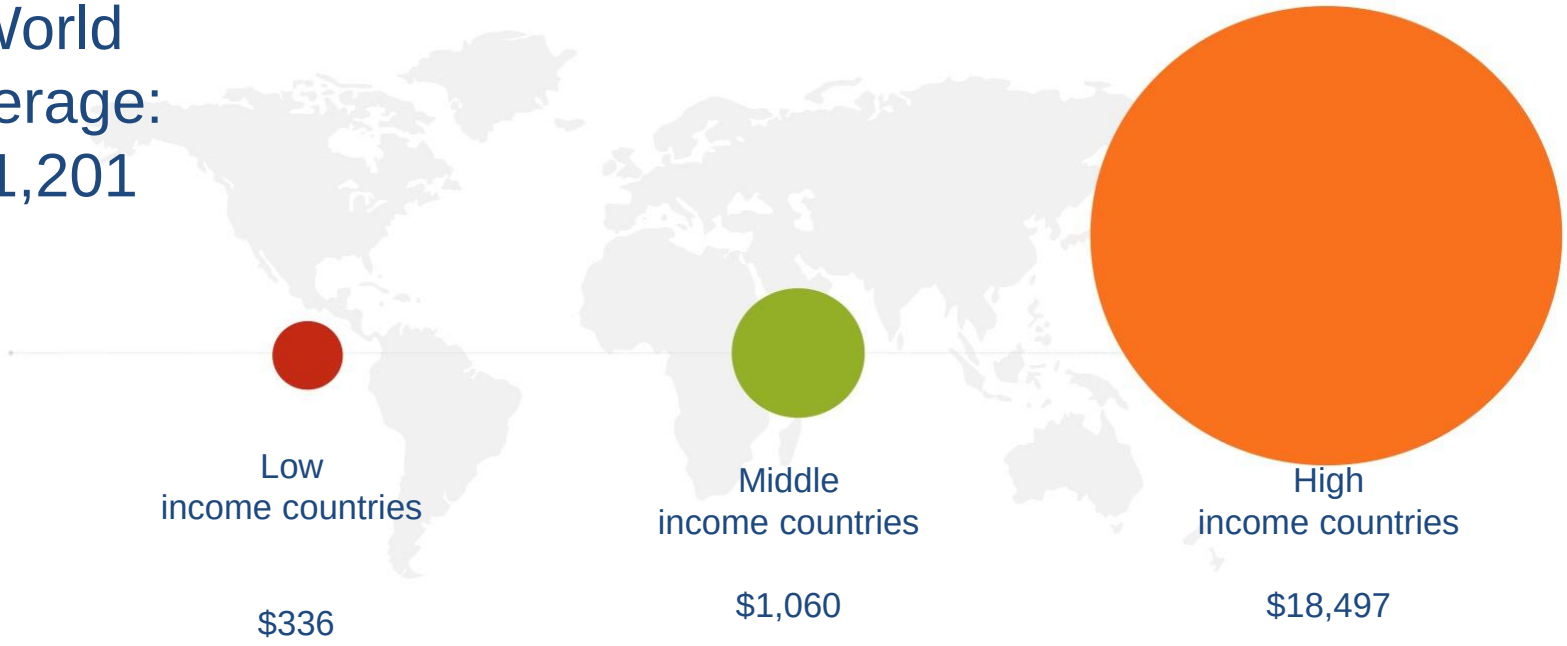
of the exports

are linked to the agricultural sector

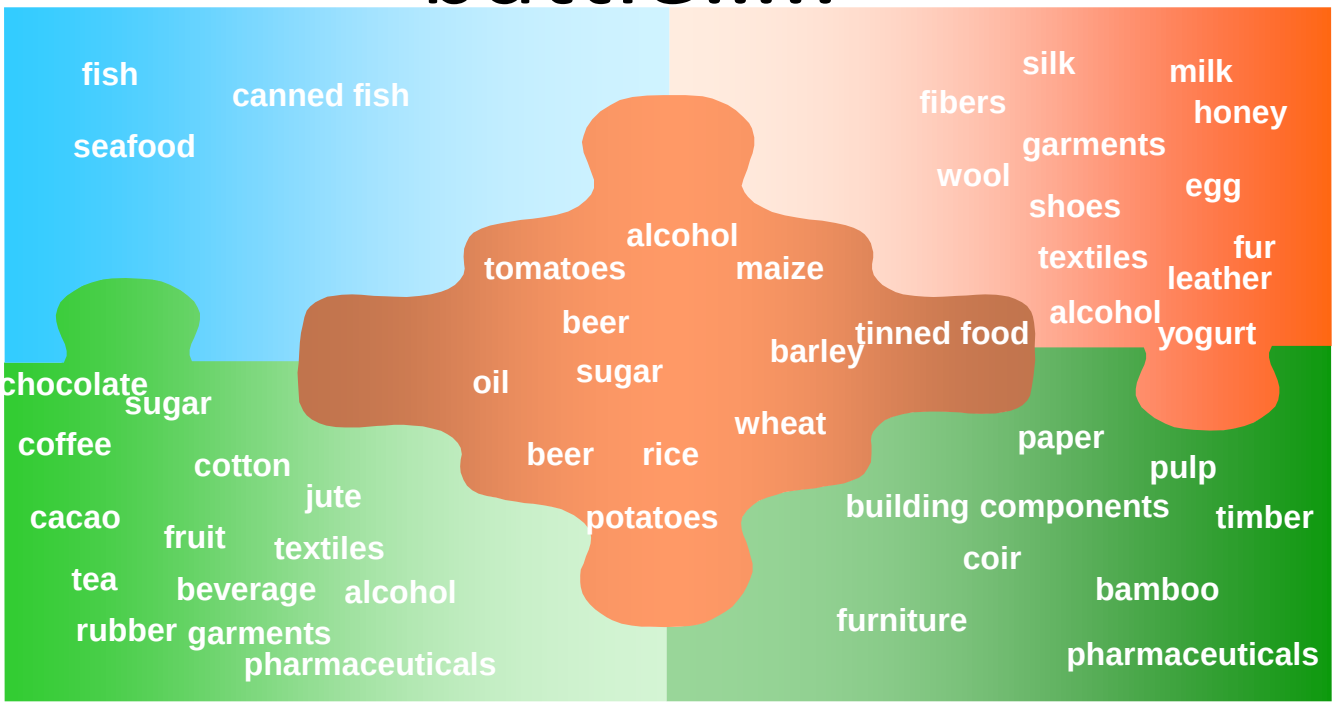
Agricultural productivity

Agriculture value added per worker (2013)

World average: $1,201



Producing enough food is only half the battle.....



What is needed in addition is improved efficiency of the agro-value-chain and reduced post-harvest losses

In least developed countries, only 38% of products are processed

Effects:

- **Lost jobs in the processing sector**
- **Lost income generation**
- **Post Harvest Losses**

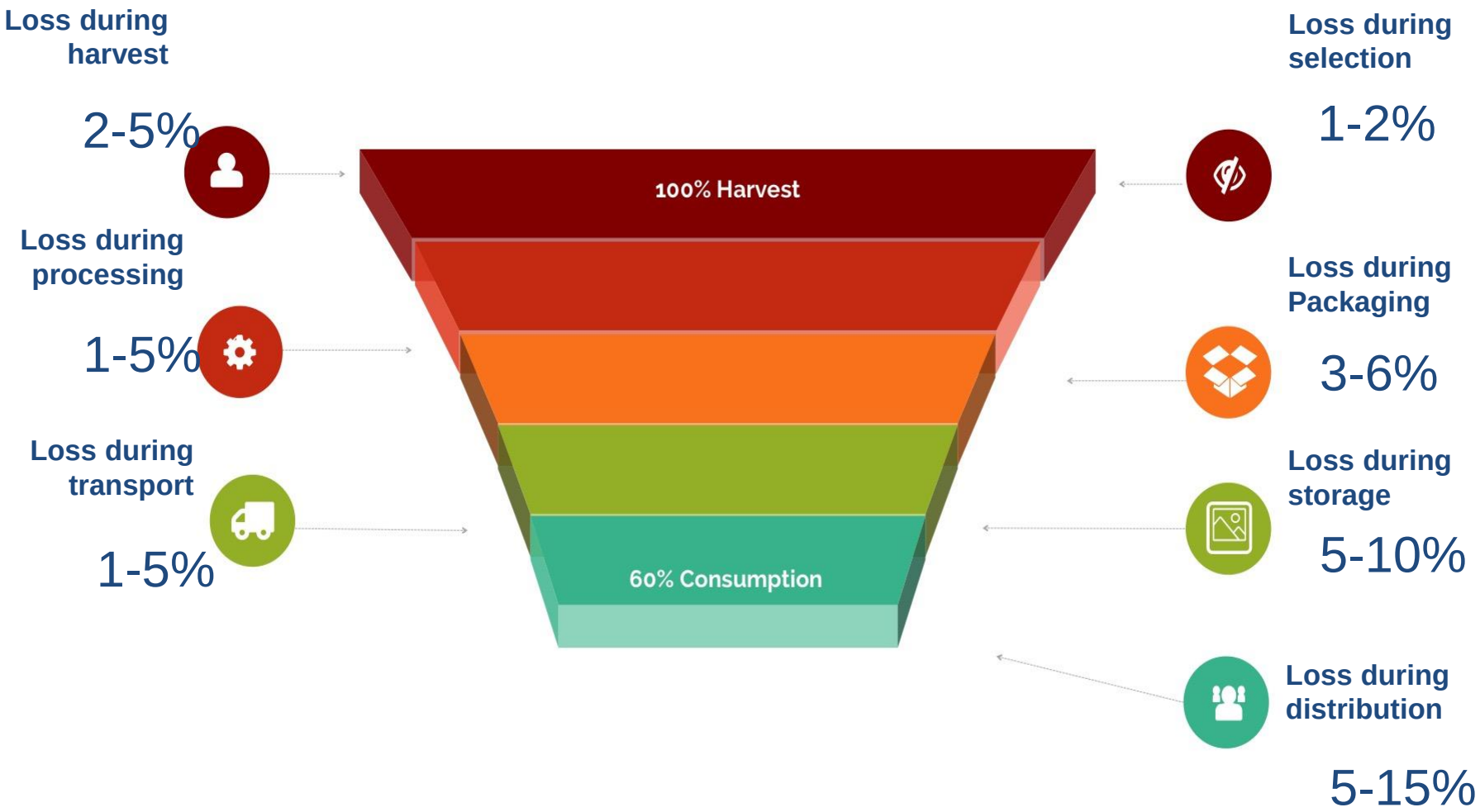
Food

~60%

Loss & Waste

~40%

The only objective of producing food in the field is to feed the maximum number of people


Loss during harvest
2-5%
Loss during processing
1-5%
Loss during transport
1-5%
100% Harvest
60% Consumption
Loss during selection
1-2%
Loss during Packaging
3-6%
Loss during storage
5-10%
Loss during distribution
5-15%

Environmental and Economic Impact of Post Harvest Loses

~40% of all food is wasted

3,3 Gtonnes of CO2

550 bn m3 of water

about 550 bn cubic metres of water are wasted globally in growing crops that never reach the consumer

.

Waste of land

Uneaten food occupies 1.4 bn hectares of land (30 percent of the world's agricultural land)

$ 750 bn

huge costs for society; direct economic costs of wastage (excl. fish and seafood and based on producer prices is about USD 750 bn (equivalent to the GDP of Switzerland)

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Food Losses an Economic Problem

- The loss of agricultural produce not only creates losses to the farmers but also hits the country's economy. (e.g. imports against foreign exchange,…)
- Farmers, cooperatives and private players can play vital role in bringing the change in the sector.
- Moreover, the sector also seeks favorable policy interventions and an enabling environment for sustainable development.

Social Component

- Social trend such as urbanization has driven more and more people from rural area to large cities, resulting in a high demand for food products at urban centers, increasing the need for more efficient and extended food supply chains (urban agriculture)
- Urban populations make up 50.5 percent of the world's population with the rate of urbanization increasing by almost 2 percent per year from 2010 to 2015.

Processing of food commodities can significantly reduce such food losses

If food waste is reduced to zero, approximately 3 billion people could be fed. A 30% reduction of food losses and waste could feed 1 billion undernourished people.

How to do

- Upon analyzing the adoption rates of the postharvest technologies considered, it was found that the simpler the postharvest technology, the better its chance of adoption, sustainability and its being still in use over the long term.
- Small scale postharvest practices such as the use of maturity indices to identify proper harvest timing,
- improved containers to protect crops from damage during
- handling and transport,
- the use of shade, sorting/grading to enhance market value, and use of on-farm storage practices have been found to be simple, easy to try and successful.

How to do

- Improved practices were adopted if they fit well into an existing value chain and marketing system (representing small steps of incremental improvement rather than requiring big)
- Sustainability of the adoption of technological innovations depended mostly upon their profitability in the local setting.
- Developing new or improved market links was found to help sustain the use of technical improvements.
- Development of upgraded or alternative value chains (through cooling, temporary storage or processing) were found to be appealing changes in practices).

Interventions

- Policy level
  - Enabling framework
- Support level
  - Research
  - Extension services
- Enterprise level
  - Warehousing
  - Processing technologies
  - Packaging
  - Transportation
- Farm level
  - Seeds
  - Harvest
  - Grading
  - Warehousing
  - Information

Enabling framework

- Only about 34 percent of the farmers in low- and middle-income countries have access to adequate resources and markets, the basis of a successful agricultural business.
- In many parts of Africa, Asia, and South America, the nearest market is two to four hours drive from the farm. In other parts of the world, motorized transport is not even possible.
- Increased infrastructure, market access and information technology, and creative financial solutions are necessary for sustainable increases in productivity.

Issues to be addressed by the governments

- Financial framework, incentives, banking system ...
- Infrastructrure (roads, electricity, communication ...)
- Education , R&D
- Technology transfer
- National and international regulations

The Needs

- Availability of well-trained local technical personnel with command of the English language to run the production and processing aspects as well as marketing operations.
- A basic science and technology and innovation system that provides support to the local industry and promotes the entrance of new small and medium entrepreneurs into the business.
- Specialized centres for adaptation, demonstration and transfer of technologies. (National or even regional)
- Geographical associations in the form of interconnected technology clusters where suppliers, food processors, government agencies and institutions such as universities, research centres and trade associations, merge to empower the innovation process.
- A central regulatory food authority that protects consumers' interests. (Global players take over responsibility from Governments)

Capacity Building

- a variety of postharvest e-learning programs for young professionals who work with small scale farmers in developing countries.
- free postharvest training materials for those involved in extension work and training of farmers, produce handlers, small scale food processors and marketers
- access to postharvest tools and basic equipment for use in applied research and for improving practical field operations
- postharvest workshops for e-learners who successfully complete their online programs
- long term mentoring for participants in e-learning programs via social networking websites
- short courses
- study tours and workshops
- advice and guidance for establishing local postharvest training centers

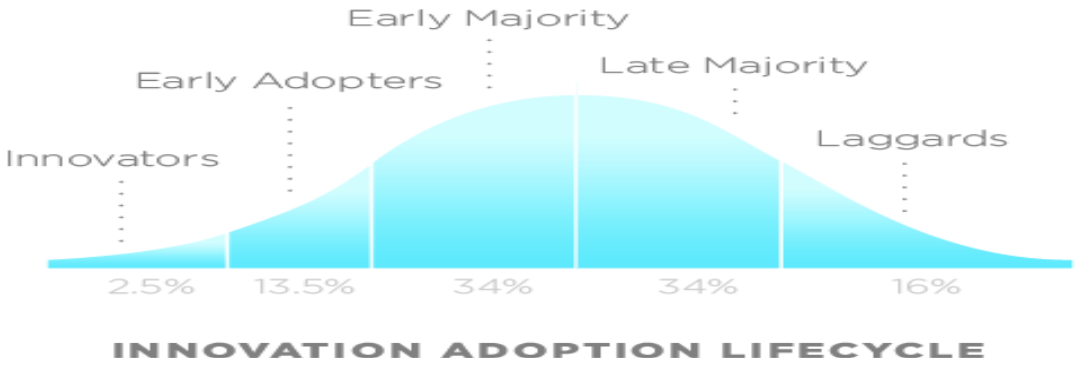
Technology selection

- There is no SME technology but

- There is product related technology

  (The need to know what is demanded)

How SMEs react



Early Adopters

Technology focused
Proponents of revolutionary change
Visionary users
Project oriented
Willing to take risks
Willing to experiment
Individually self-sufficient
Tend to communicate horizontally (focused across disciplines)

Early Majority

Not technically focused
Proponents of evolutionary change
Pragmatic users
Process oriented
Averse to taking risks
Look for proven applications
May require support
Tend to communicate vertically (focused within a discipline)

Warehousing

- Appropriate temperature, atmosphere, moisture
- Prevention from rodents and insects
- Create better market linkage with the warehousing
- Creating a regular cycle of procuring and dispatching the food to the end consumers
- Negotiable Warehouse Receipt System (NWRS)

Under this system, farmers can deposit their produce to the registered warehouses, and get 80 percent advance from banks against their valued produce. They can sell the produce later when they feel prices are good for them.

Drying

- Traditional
  - Solar etc.
- Technical solutions

Type	Variants
Rotary	• Internal heat exchanger coils • Axial flow replaced by jets of hot air injection into rolling bed
Nauta Dryers	• Planetary mixer; vacuum; heated jacket + microwave heating
Spray Dryer	• Horizontal spray dryer • Various spray chambers/atomizer • Cylinder-on-parabolic cone chamber to minimize wall deposits • Nano-spray dryer; ink-jet technology to generate spray
Fluid Bed/Spouted Bed Dryers	• Pulsed flows • Intermittent, local fluidization/spouting • Mechanical agitation • Conductive heat transfer (internal heat exchangers), jacket heating
	• Improved gas distribution system • Gas for fluidization/spouting (Air, superheated steam, combustion gas)

Packaging

- It requires to look at
  - the package design,
  - choice of materials,
  - competition with food,
  - processing,
  - and life cycle.
- But also to optimize
  - material use,
  - water use,
  - energy use,
  - material health,
  - clean production and transport,
  - cost and performance,
  - community impact,
  - worker impact
  -

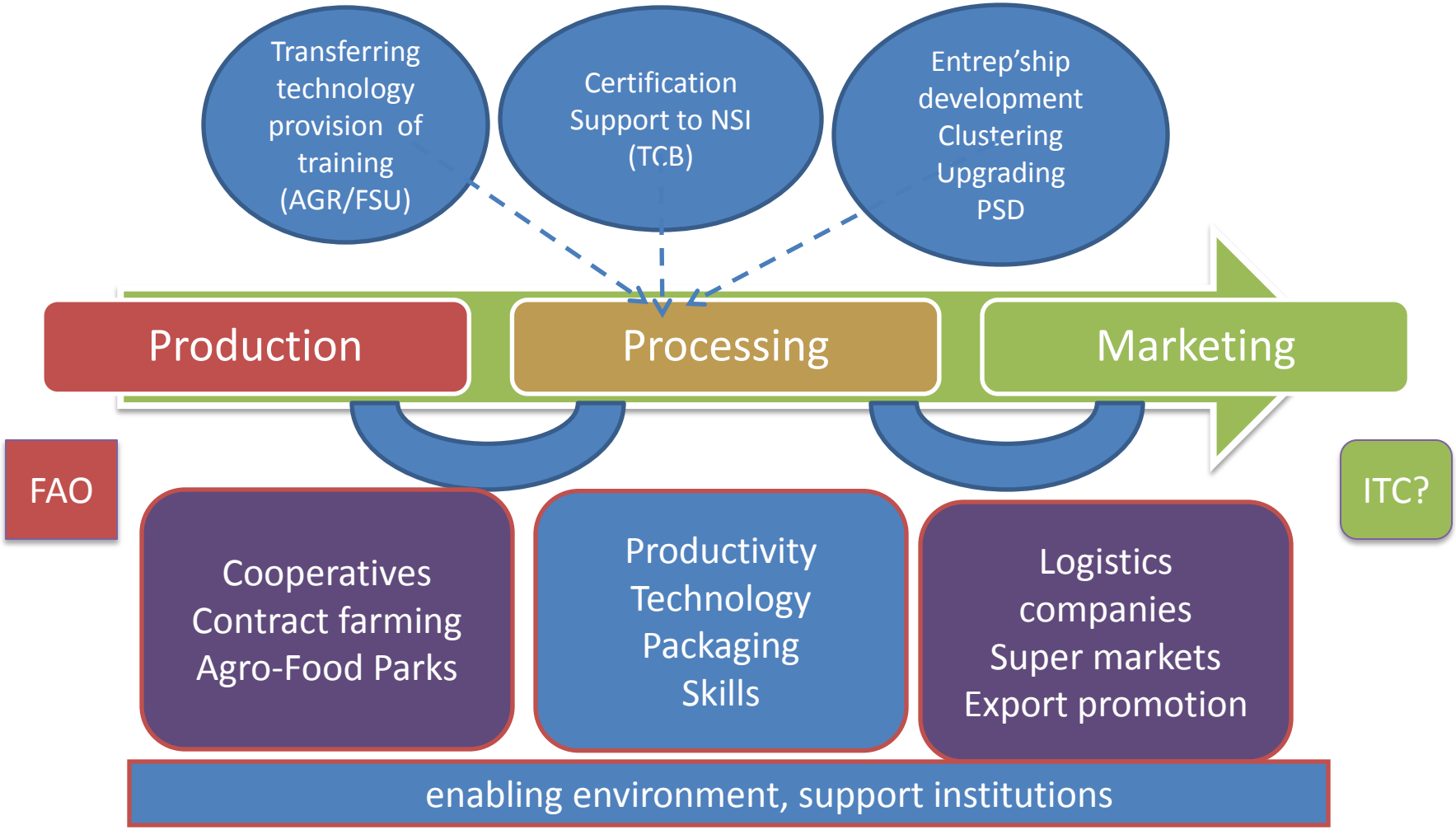
Sustainable packaging

- Is beneficial, safe & healthy for individuals and communities throughout its life cycle
- Meets market criteria for performance and cost
- Is designed in a holistic way.
- Is sourced, manufactured, transported, and recycled using renewable energy
- Optimizes the use of renewable or recycled source materials
- Is manufactured using clean production technologies and best practices
- Is made from materials healthy throughout the life cycle
- Is physically designed to optimize materials and energy
- Is effectively recovered and utilized in biological and/or industrial closed loop cycles
- Has tremendous resource-saving potential

Transport

- Primary challenges in the transportation stage of the supply chain include poor infrastructure (roads, bridges, etc.), lack of appropriate transport systems, and a lack of refrigerated transport.
- Roads are not adequate for proper transport of horticultural crops.
- Transport vehicles and other modes of transport, especially those suitable for perishable crops, are not widely available. This is true both for local marketing and export to other countries.
- Most producers have small holdings and cannot afford to purchase their transport vehicles.
- In a few cases, marketing organizations and cooperatives have been able to acquire transport vehicles but cannot alleviate poor road conditions

How we could work together



Thank you

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