In2Poultry

(Pre-)final Topsector Seedmoney project results

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& project consortium

Objective

"Design of an

integrated **poultry**

production chain

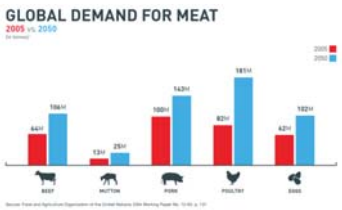
including **insects** as protein source

in India"

2

Generic trends in poultry consumption

- Global demand for poultry is rising three times as fast as poulation growth.
- Consumption in India is increasing with 12% per year because white meat is considered to be healthier and has a bigger protein content than lentils
- The use of antibiotics in livestock industry in Europe will be severly restricted to counteract increasing resistence problems in human health



3

Food security in India

- Significantly and increasingly import-dependent
- Demand for poultry products (both eggs and meat) is increasing
- Increasing import-dependence on import of protein-components of chicken feed (soy, fish meal)
- Frequent bird flu / pest outbreaks
  - Traditional production systems
  - Transport of birds over long distances

4

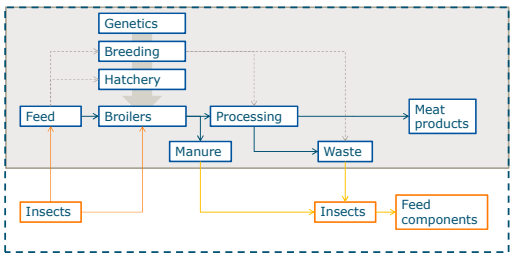
Client expectation

- Original request from IFFCO Kisan SEZ Nellore
- Local entrepreneur: Srinivasa hatcheries

- Turn key project implementation competence
- Handholding, training and education post-project implementation
- Equity contribution to qualify as co-investors in the project
  - Not a hard pre-condition for some but is preferred since it is "skin in the game" and not just considered as plain equipment supply
  - Need not be majority contribution but token equity contribution (5-10%) can also be acceptable

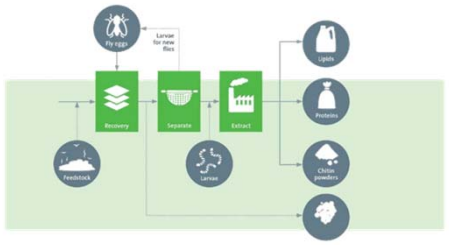
5

Integrated poultry chain with insects

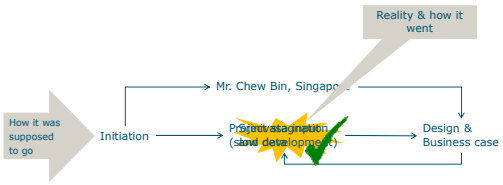


6

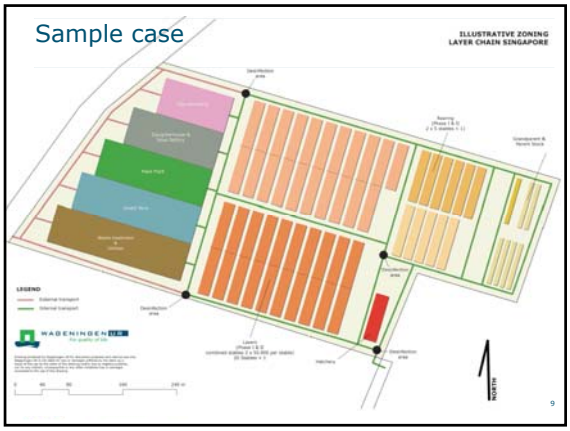
Schematic Production process: insects



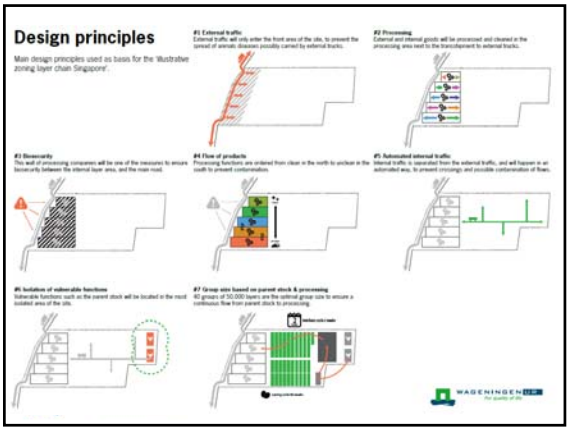
Process



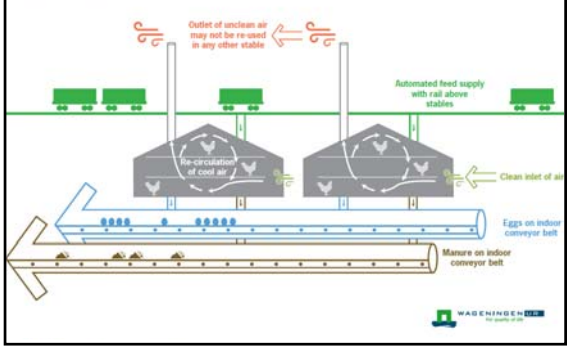
Sample case



Design principles

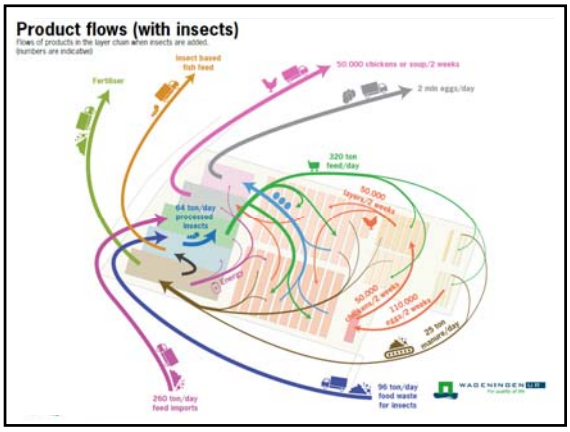


Flow of products



Hardware: reducing costs and adding value by vertical integration and industrial ecology

- Vertical integration and spatial clustering deminishes transportation costs and veterinary risks
- Processing of manure to biogas and power in CHP reduces costs for heat and power
- On site cleaning of waste water and recycling reduces costs for water intake
- Processing of layers to soup adds value
- Selling of manure digestate adds value
- Processing of slaughterhouse waste by insects and selling insects as aquafeed component adds value



Hardware: alignment of scale & production volumes

- Total commercial viability determined by scale of largest capacity chain constituent: slaughterline and (grand)parent stock
- At 2 million chicken places, inclusion of slaughter line and grandparent stock are in themselves not commercially viable unless through alternative added value
  - For grandparent stock, external sales of grandparent stock can be explored
  - External use of the slaughter line is technically possible but strongly advised against due to biosecurity risks
- Food- and biosecurity risks may be sufficient reason for a government to accept these costs
- Grandparent stock and slaughter line are cost-effective for poultry meat production at 2 mln chicken places

14

Business case: high-end eggs

All prices converted in euros at 14.12.15 running conversion rates

15

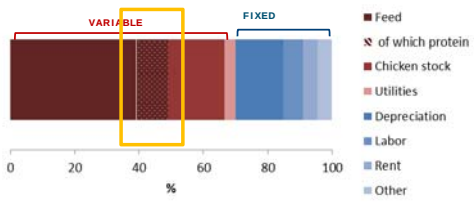
Supermarket margins

Higher supermarket margin makes for a significantly better business case both in India and Singapore

Country	Margin	Source
The Netherlands	60%	Dutch entrepreneur
Singapore	20-24%	DBS Group Research (2015)
India	20%	KPMG (2006)

16

Rationale: egg price composition (NL)



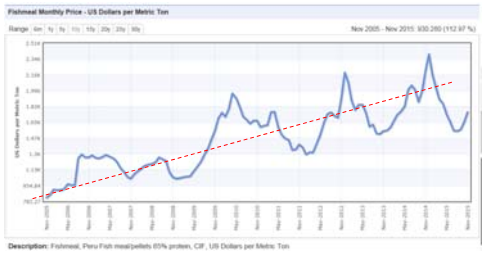
17

Insect inclusion: cost considerations

- Insect-based protein has specific nutritional and environmental benefits:
  - → Insects are a natural source of proteins for chickens and many other animals
  - → Additional benefits for animal health and well-being and sustainability create significant added value, mainly in the upper market segment
  - → The insect component is not yet commercially competitive with soy but competitiveness is expected to increase in the long-term as the industry matures
  - → Crude protein levels are 56-60% depending on processing techniques and highly digestable.
  - → Local market dynamics will be decisive in present viability for insect inclusion in the poultry chain
  - → Insects that feed on local waste products, reduce the dependence on imported feed components

18

Commodity prices of protein feed components (soy, fish meal) increasing



19

Inferences for the insect case in India

- Long-term expectation: competitive option
- Rationale for additional feed investment (India)
  - Feed quality <> flock health
  - Import independence
- Waste availability: controlled quality streams not yet identified, likely only available in limited qualities
- Labor cost: highly competitive
- Supermarket margins at about 1/3 of European standards
- Indian egg price: 0,21/egg
- Results will be fed back to selected poultry producers in India

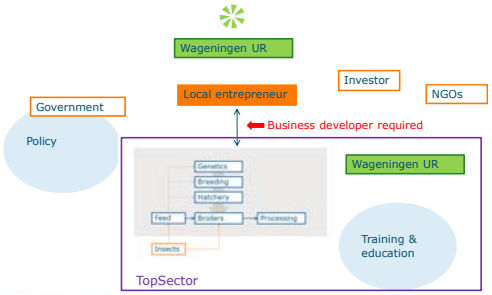
20

Orgware concerns

- How is the Dutch consortium constituted? (with various individual service providers...who get selected as consortium partners?)
- How do we address concerns of individual partners in the consortium on sharing their costing and price quotations with other (potential competitors) in the consortium?
- How do we ensure that the consortium is bound together during and after the negotiations with the client?

21

Integrated poultry chain: context



22

General terms for collaboration

- For specific cases, agreements will be signed with partners concerned
- In basis, the consortium intends to use the present consortium partners to do business in new projects. However:
  - All parties are free to do similar activities with other partners
  - Consortia for individual projects on the basis of requests to Wageningen UR will be based on initial expert judgment of WUR
  - If a client desires to work with a competitor of the partners in the consortium, the consortium partner will be responsible for arranging replacement
- Wageningen UR intends to also develop its own business model from its preliminary investments in business development (% of consortium partnners revenues for further research through revolving fund)

23

Follow-up perspectives

- Project remains innovative on various aspects:
  - Highly advanced vertical integration
  - Clustered at a single site (passive to pro-active biosecurity regimes)
  - Application of insects in poultry feed
  - Application of insects in waste and rest/by-products
- Business perspectives: based on current experiences in seed money project
  - Renewed visits to India to resume discussions
  - In Qatar and Singapore ongoing discussions
  - Generic building block for sustainable integrated poultry chain

24

Follow-up perspectives (2)

- Overall practice-based evaluation of poultry production systems:
  - Essential to substantiate quality claims regarding product quality of Dutch technology providers
  - Stimulus for new improvements and new innovations
  - Very costly for individual industry partners to finance

25

Thank you! On behalf of....

- Van Aarsen
- Jansen Poultry Systems
- Pas Reform
- Meyn
- Protix Biosystems
- Wageningen UR

26

Project timeline (March 15 –December 1)

(some project activities started before formal assignment because of suspended evaluation by TopSector)

- March 15: Submission of In2Poultry topsector proposal
- May 20: Preliminary design meeting poultry chain technology providers
- June 11: Approval of proposal by TopSector
- June 12: Visit of CEO Srinivasa to Wageningen UR, Jansen Poultry and Protix
- September: Meeting with CEO Srinivastra in India where he announces delay in decision making process
- September 17: Kick-off meeting consortium
- October 9: Meeting with Chew Chee Bin in Singapore*
- October 22: Orgware meeting, visit Protix. Consortium decision to use Singapore case as example
- November: Meeting with CEO Srinivasta (status quo unchanged)
- Detailed hardware design sessions with relevant partners:
  - Oktober 28: Jansen Poultry, Protix, Wageningen UR
  - November 10: Van Aarsen (op locatie), Meyn, Protix, Fulco, Wageningen UR

27

Project timeline (December 1 onwards)

- December 22: Meetings in Singapore, Wageningen UR and Protix to visit Chew Chee Bin, Agriculture and Veterinary Authority, Fairprice Retail, Temasec Polytechnic*
- January final proposal to Chew Chee Bin*
  Hardware design meeting with nutritionist, van Aarsen, Protix and poultry experts from Wageningen UR
  Final meeting consortium to discuss In2Poultry results
- February Feedback of results with Srinivasta and discussion other potential Indian partners

** These activities support the In2Poultry project but are not financed from its budget*

28