Ghana Tomato Value Chain Preliminary Study Report: Gaps and key considerations to revamp the tomato industry

By

Irene S. Egyir (PhD)

Ag Unit, Real Sector Division (Ministry of Finance)

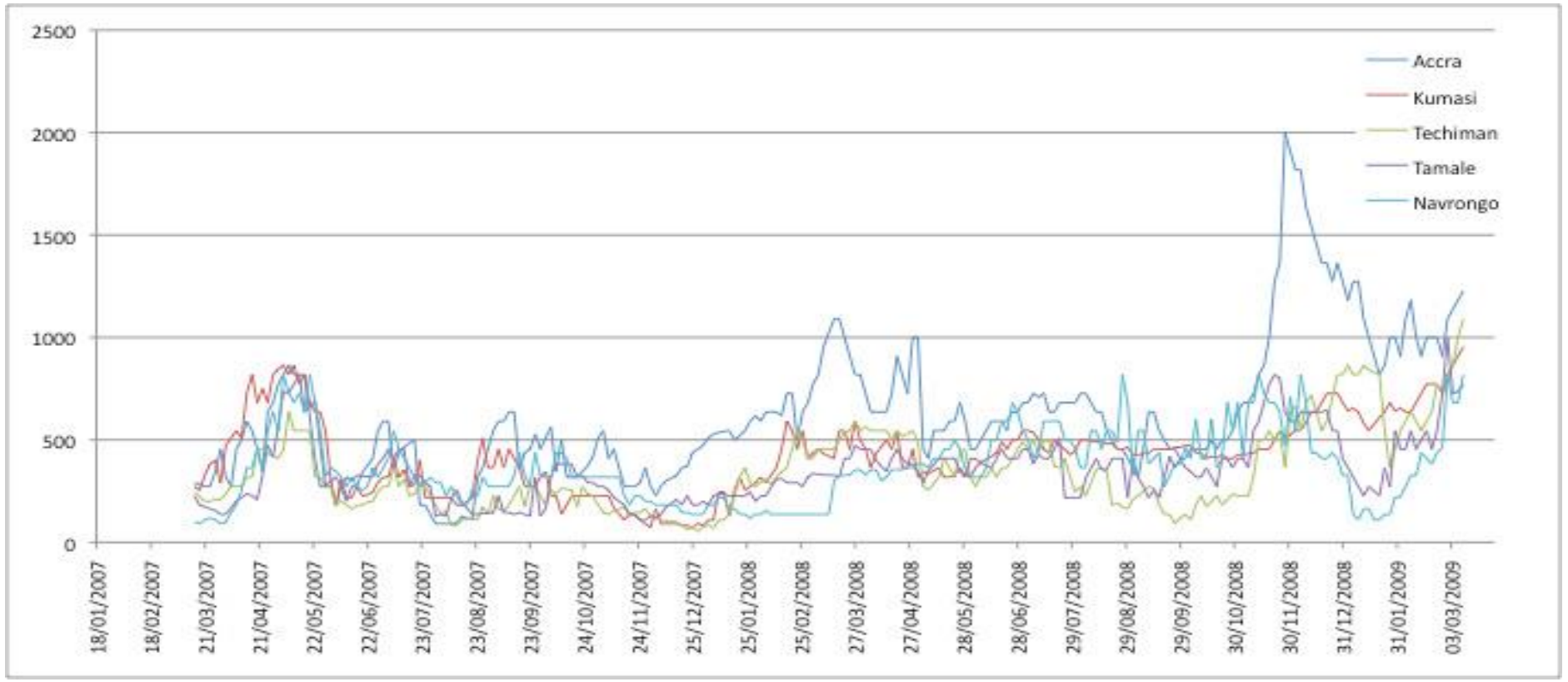
Outline

1. Introduction
2. Methodology
3. Findings
4. Conclusion
5. Recommendations

1. Introduction

- “The combination of Ghana‘s vast resources of agricultural land, plentiful water for irrigation, and available low-cost labour make it ideal for commercial farming” (Agosto, 2011).
- One crop that is always cultivated with the market in mind is tomato
- Tomato is a key ingredient used in the diet of all Ghanaians –soups, stews and salads
- Understanding the current situation of the industry should lead to effective strategizing for revitalizing it
- The assumption here is that the industry is performing below its potential (Robinson and Kolavalli, 2010)

Strategy: Product, price, place and promotion?



The Terms of Reference (TOR)

The TOR included:

- Documenting perspectives on how a successful tomato industry in Ghana can be accelerated
- Drawing out the inherent problems in the value chain (in a framework of government interest and solution finding)
- A quantitative financial assessment that focuses on the key drivers of interest to the government and other stakeholders in the tomato industry
- Testing a hypothesis about market segmentation, differentiated varieties and particularly processing tomatoes
- Studying how R&D and specifically breeding can make a contribution to the on-going discussions
- Testing appropriateness of seeking/advocating breeding and R&D for the tomato industry in Ghana, and the whole West African sub-region

What is Value Chain in agribusiness?

- The agribusiness system can be separated into a series of value generating activities referred to as the value chain.
- Porter (1985) identified primary and secondary (support) activities:

- The primary activities concern procuring of raw materials, transforming into finished products, packhousing/warehousing and distribution, identifying customer needs and the generation of sale and supporting customers after sales

- The secondary activities concern the infrastructure of the community/firm (including organisational structure, control systems and cultures), the human resource management (recruiting, hiring, training, development and compensation), research and technology development and procurement of materials, supplies and equipment)

Value chain analysis of agrifood commodities

- Porters' five primary elements (Porter, 1985)

Inbound logistics → operations ↓

marketing and sales ← out bound logistics

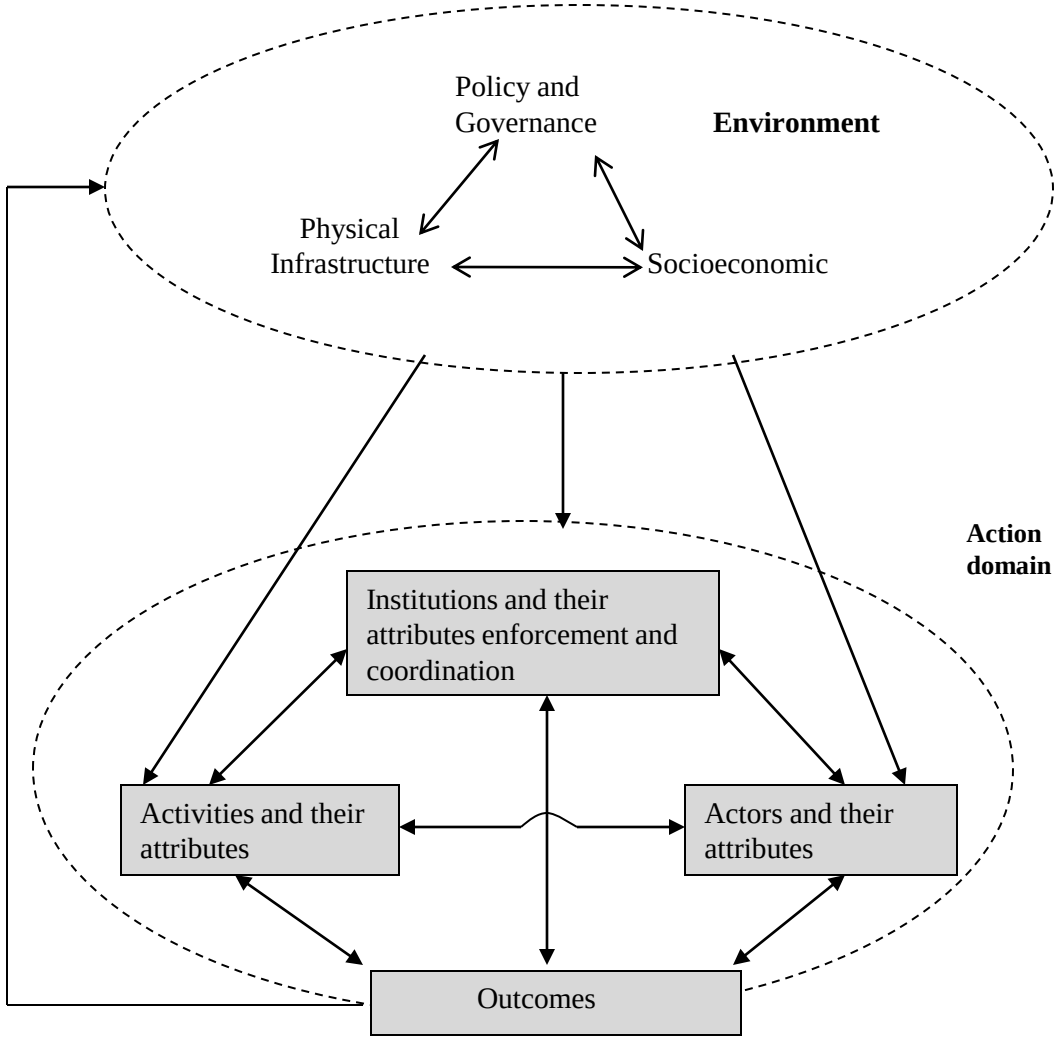
↓ (*supported by procurement, research & development, technology, human resources, and infrastructure)*

Services → Margins

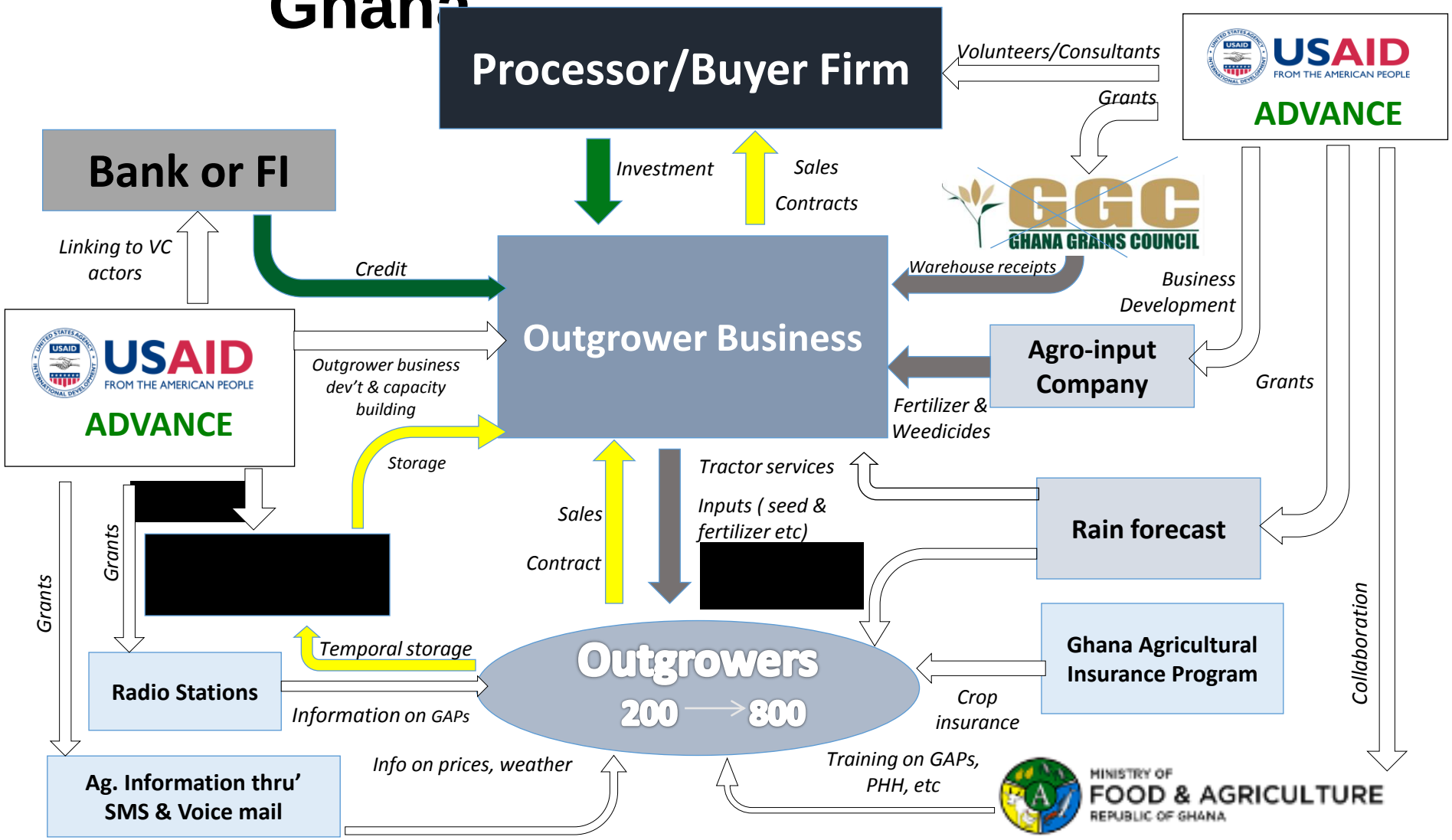
Frameworks that guide systems thinking

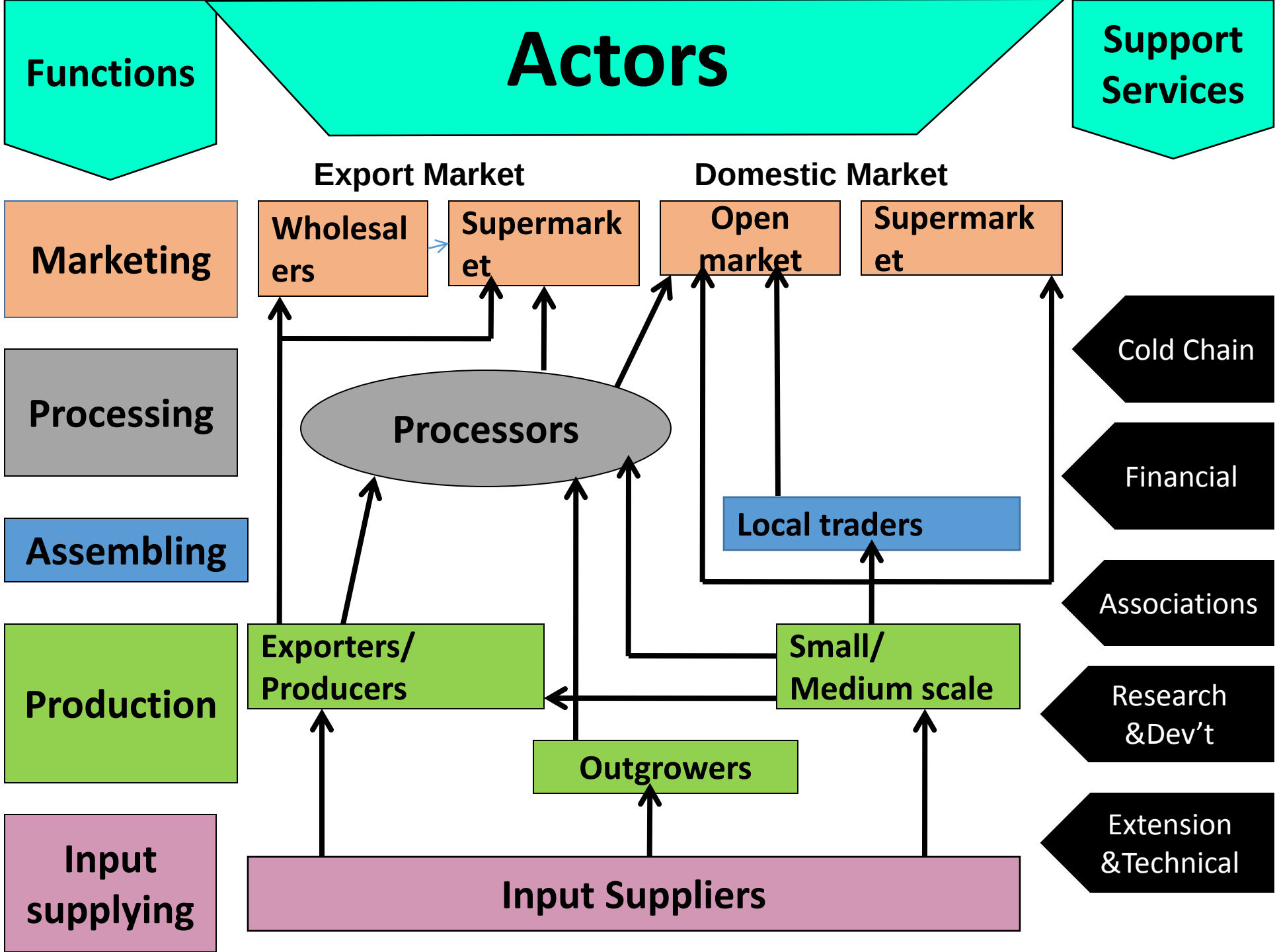
Framework	Author	Tenet
Agro-industrial project analysis	Austin, 1995	Focus on procurement, processing and marketing; bear in mind the production, macro-micro, institutional and international chain linkages
ASTI system	CTA, 2005	Review policy framework, map actors, analyse habits, practices, competencies and innovativeness, examine functions and assess linkages
New institutional economics: Institutional Analysis	Dorward et al 2009	Successful outcomes link action domains with effective environment
Inclusive business models	FAO, 2013	Lead actors are businesses and they include resource poor actors and build their capacity

Framework for Institutional Analysis (Dorward et al in Kirsten 2009:76-110)



Outgrower Business Model by ACDI VOCA - Ghana




Functions
Actors
Support Services
Export Market
Domestic Market
Marketing
Wholesalers
Supermarket
Open market
Supermarket
Processing
Processors
Assembling
Local traders
Production
Exporters/ Producers
Small/ Medium scale
Outgrowers
Input supplying
Input Suppliers
Cold Chain
Financial
Associations
Research &Dev't
Extension &Technical

2. Methodology: Rapid appraisal

Step	Action	Week
Step 1	Personal experiences, key informant interview / expert opinion (face-to-face and telephone)	1
Step 2	Literature review (student thesis, research reports, internet stories)	2
Step 3	Focus group discussion with agricultural extension agents in Dodowa, Shai Osudoku District	2
Step 4	Analysis of data: C-B analysis	3
Step 5	Report writing	3

Egyir personal experiences

Year	Action	Lesson
1987	Undergraduate course	Agronomy of vegetables
1989/1992	BSc. Dissertation and M.Phil. thesis	Effect of domestic policies on horticultural production and export
1995-2002	SADAOC: Reseau Ghaneen project	Cross border trade in agricultural commodities- tomatoes are exported to Togo; challenges of traders and transporters
2004	Student supervision Ofosu-Amoah (2004)	Effective packaging of fresh tomatoes for distribution
2004-2012	Urban agricultural research	The vegetable value chains in Accra
2005-2008	CORAF Study: Market surveys and sub sector analysis of vegetable production in West Africa:	Farmers' and consumers' awareness of pesticides risks and willingness to produce and consume organic vegetables
2009-2010	MoFA Baseline surveys of tree crops in Central and Western regions ACDI-VOCA baseline survey for ADVANCE 1	Vegetables as additional livelihoods for tree crop farmers Profiling value chains of selected horticultural crops I three southern regions
2011	IWMI study From seed to table	Farmer participation in studying critical issues in vegetable production and marketing
2012	REP study on Youth employment in Agriculture	Challenges of tomato production under block farming in Ahanta West district
2013	MFCS/ARCC project on climate	Irrigated vegetable farming as climate change coping strategy in Akrobi, Wenchi
2014	Consultancy work for University of Greenwich, NRI, UK	The role of innovative financing in creating conditions to scale up waste and spoilage reducing technologies in tomatoes in Ghana
2013-2015	ProEco Africa project	Farming system of organic and conventional farmers in Northern Ghana

List of key informants

Name	Designation	Contact	Key issue discussed
Mr. Samuel Darko	GIDA officer	sdarko22@yahoo.com 0245875958	Irrigation schemes in Ghana
Dr. G.T-M Kwadzo	Agricultural Policy Advisor	gtkwadzo@ug.edu.gh 0208161624	Experiences with quantifying the tomato value chain
Mr. Kwabena Adu-Gyamfi	Private agri-businessman (producer/processor)	Kwabena_adugyamfi@yahoo.com	Appropriateness of R&D
Mr. Kwesi Korboe	Agricultural Policy Advisor	kwesikorboe@yahoo.com 0244895760	The Vegpro experiment with outgrower schemes – accelerating success
Dr. Mamoud Akudugu	Research Fellow /Consultant	macmoudan@yahoo.com 0504395605	Status of value chain research in tomatoes
Mr. Clottey	Deputy Director of Agriculture	0208164558	Agronomic practices Sources of inputs Inherent problems Role of R&D
Chief James Adawina Kassim Al-Hassan	Farmer Farmer	0505604535 0209099091	Agronomic practices Sources of inputs Inherent problems Role of R&D
Mr. Haruna Agesheka	Trade Association (GAPTO)	gatosheka@yahoo.com 0244379268	Post-harvest and marketing challenges Farm management
Mr. Samuel Essah	Farmer	0274601758	Agronomic practices Sources of inputs Inherent problems Role of R&D

Findings 1: Inherent problems in the tomato value chain in Ghana

Problem	Description	Perception of intensity (rank)
External factors		
Political	Gov’ts intentions expressed (FASDEP) yet planned (METASIP) budget not supported adequately to improve domestic and international competitiveness	5
Economic	High interest rate Investment in market infrastructure yet to produce adequate number of good road network/surface condition Fertiliser subsidy programme is inconsistent	1
Ecological	Poor weather condition, moisture stress and increasing incidence of pest and disease	4
Social	Land tenure conflicts; poor farmer organisation culture	3
Technological	R&D inadequate: No specific packages for promotion: -experimental seed varieties-heat, storage, etc; fertiliser is not specific; agrochemicals are generic; and	2

Fertilizer subsidy programme – Dangme West Dist

Fertilizer Type	2010		2011		2012		Total	
	Qty Received	Qty Sold	Qty Received	Qty Sold	Qty Received	Qty Sold	Qty Received	Qty Sold
NPK	59,636	59,291	135,845	115,650	200,294	152,899	**395,775**	**327,840**
Sulphate of Ammonia	29,869	28,952	69,989	59,600	67,258	52,761	**167,116**	**141,313**
Urea	21,853	19,885	33,470	27,196	42,102	32,797	**97,425**	**79,878**

The fertilizer subsidy programme has contributed enormously to increased productivity of food crops within the Greater Accra Region. There is improved fertilizer accessibility both within the rural and urban communities.

The only challenge of the programme is the late start of the subsidy during the year. Due to climate change, the major season rains starts early (February) in the year whiles the subsidy takes effect May - June. Those who can afford, only buy at the commercial rate.

Varieties of seed used by farmers

Variety name known	Rainfed yield	Irrigation yield
Power Rano	16.0	-
Pectomech	8.8	13.8
Ada Lorry Tyre	4.8	-
Burkina	14.6	-
No name	-	15.7
Meenagiant	2.0	-
Nimagent F1	2.8	3.1
Techiman	4.2	11.2
Wosowoso	1.1	-

"there are more tomato varieties sold worldwide than any other vegetable" (Sacco 2008)

Inherent problems cont'd

Problem	Description	Perception of intensity
Internally generated		
Motivation/orientation	Low business orientation of actors: not positioning as agribusinesses so exploit limited markets	1
Competencies of actors	Minimum skill set –low literacy level reduces learning ability; scientists have low support to perform	2
Resources of actors/organisations	Low level investment in factors of production and marketing: farmers reuse seed; traders use inappropriate packaging materials and vehicles; processors use obsolete machinery;	3
Competitive edge	Low: Produce low volumes and low quality: settle with "Ghanaians do not want made in Ghana goods"; do not want to invest	4

"high temperatures and low humidity cause excessive flower drops and therefore reduces yields drastically" (MOFA, 2008)
"it is when market is available that tomatoes should be vine-ripe before harvesting" (Ozoleck et al, 2006)

Personal characteristics of farmers (MFCS, 2014)

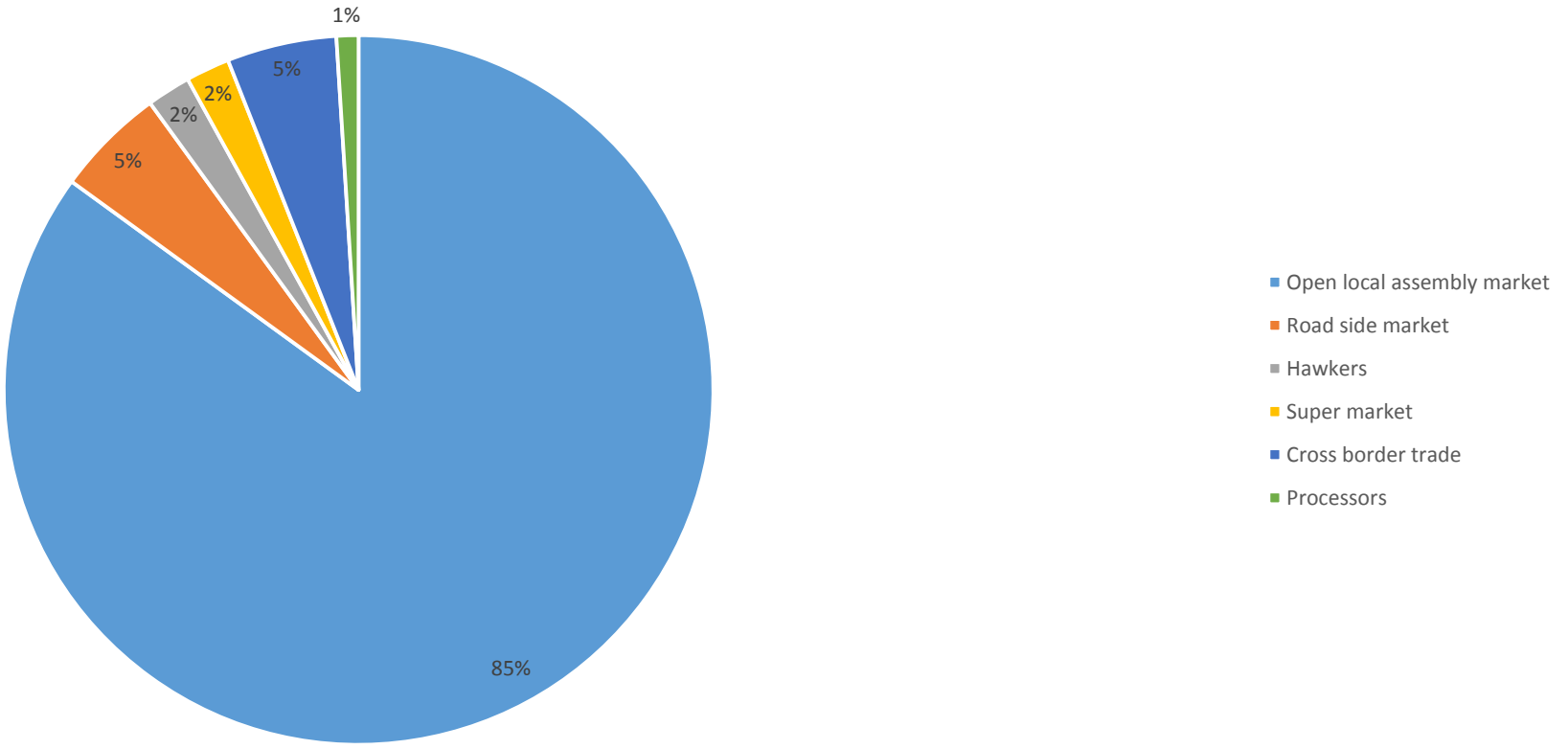
Variable	Ejura N (%)	Wenchi N (%)	Total N (%)
Gender			
Male	117 (40)	167 (52)	284 (46)
Female	175 (60)	153 (48)	328 (54)
Age			
40-50	169 (58)	149 (47)	318 (52)
51-60	108 (37)	148 (46)	256 (42)
61-70	14 (5)	23 (7)	37 (6)
>70	1 (0)	00 (0)	1 (0)
Literacy			
Literate	116 (40)	121 (38)	237 (39)
Illiterate	176 (60)	199 (62)	375 (61)
Marital Status			
Married	210 (72)	217 (68)	427 (70)
Not married	82 (28)	103 (32)	185 (30)
Religion			
Christians	235 (81)	261 (82)	496 (81)
Muslims	32 (11)	34 (11)	66 (11)
Traditional	20 (7)	21 (7)	41 (7)
Others	5 (2)	4 (1)	9 (2)
Residential Status			
Native	187 (64)	224 (70)	411 (67)
Migrant	105 (36)	96 (30)	201 (33)

The situation of packaging materials and transport in tomato value chain

Packaging materials:

- Aluminum pans
- Rubber containers,
- Plastic boxes
- Wooden boxes

Finding 2: Market segmentation: drive investments



Hypothesis: Increase for organized market-supermarket, processing, open market, cross border

Finding 3: The key drivers of interest: A quantitative financial assessment (scenario analysis based on seed variety, farming system, season, region and market segment– figures not widely validated

Cost-Benefit centres / Hectare/ season	Amount (GHS) HYV	Amount (GHS) LYV	Issue of interest
Production			
-land rent	100	100	Land market for agriculture-good soil
-weedicide	100	100	Closeness of good quality input market
-fertilizer	300	300	
-seed	400	100	
-irrigation water	50	50	Consistency of supply and cost
-growth regulators	50	50	
-pesticides	200	200	Crop protection
-labour	1000	500	Wage rate
Total cost	2200	1400	
Yield 1 (Rain only)	10 Mt	2.8 Mt	**GAPs and GEPs**
Total revenue 1	10000	1400	Market access stability
Yield 2 (irrigation only)	13 Mt	3.1 Mt	
Total revenue 2	13000	15300	

Findings 3 cont'd: The key drivers of interest: A quantitative financial assessment

Cost-Benefit centres / Hectare/ season	Amount (GHS) HYV	Amount (GHS) LV	Issue of interest
Wholesale market			
-Depreciation on packaging material	20	20	Post-harvest infrastructure
-vehicle hire	500	500	
-Pack House hire	100	100	
-Storage facility hire	-	-	
-tax	100	100	
-labour	200	200	Human resource development
Retail market (road side)			
-vehicle hire	500	500	
-tax	100	100	
-labour	200	200	

Findings 4: How R&D and specifically breeding can make a contribution to the on-going discussions

- “Natural variation in plant genes stopped being the best way to increase yield a while ago and yield gains are plateauing. That means a modern scientific approach is needed” (www.geneticliteracyproject.org)
- Researching into the wide range of options that exist, and developing cost effective ones for distribution to different markets is key
- Research brings out merits and demerits of biological/ chemical/ mechanical innovations
- Breeding is a selective process; it has a long history in Ghana- for processing and for salads, soups and stews

Findings 5: Appropriateness of seeking/advocating breeding and R&D for the tomato industry in Ghana

Observation (Robinson &Kolavalli (2010)	Burkina Faso	Ghana (Upper East Region)
Location of farms	Many farm catchment along the edge of the dam, where the land is particularly fertile. Fewer years of cultivation on the same plot resulting in lower incidence of soil borne disease	Farming in the catchment is illegal in Ghana. Farmers rely on dug wells or pumping from irrigation schemes for water Insufficient crop rotation
Disease and pest control	Insecticides use to control pests. No fungal diseases because of drier climatic conditions and cooler nights	Farmers use both insecticides and fungicides
Husbandry practice	Use pectomech but also live on the farm, use less water and give crop more attention	Use pectomech but do not live on the farm and use too much water 
[Breeding research should be placed in the framework of larger physical and socio-economic environment]		

Breed but teach core actors how to handle new breeds in different situations

From Greater Accra Region

- EMQAP has completed the construction of the Regional Horticultural Demonstration Centre at Amrahia. The centre is in full action and so far, about 300 farmers have received training from the centre.

Recommendations-understand the market to determine what to breed

Elements	Description of gap	Suggestion	Market
In-bound logistics	Seed Fertilizer Pesticides Water	Pectomech+ Precision Precision Community-based irrigation schemes that ensure user participation in maintenance is most desirable	Improve capacity of researchers; locate input market close to users
Operations	People and practices -	Climate smart and meet needs of the different market segments	Private sector-led using OGS
Out-bound logistics	Packaging materials Post-harvest infrastructure	Consider the market and select appropriate	locate input market close to users
Marketing and Sale	Product, price, place and promotion	-	-
Services (after sale)	Finding out what people want	Marketing research	

Recommendations cont'd

Human resource management	Availability and competencies of support actors	School system to breed right attitudes and teach hands-on
Procurement	Inputs needed for production	Planning by management
Technology	How to apply tools, equipment and organisms	Maintain the dams in all the regions
Research and development	From "breeding to table"	Multi-disciplinary research agenda
Infrastructure		

Thank you