ILRI Livestock projects - FA 1

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Global Agenda of Action. The Agenda, Focus Area 1
Meeting: *19-20 Sept. 2013. Rome*, Italy

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

CGIAR

ILRI

ILRI

- **a member of the CGIAR Consortium which conducts food and environmental research**
  - **to help alleviate poverty and increase food security,**
  - **while protecting the natural resource base.**

- 700 staff
- 130 scientists and researchers
- 30+ scientific disciplines
- 70% research in SSA
- Two large campuses (Kenya, Ethiopia).
- Budget: USD 60 million
- ILRI works with a range of partners.
- offices: Kampala, Uganda; Harare, Zimbabwe

- ***ILRI vision*** **A world made better for poor people in developing countries by improving agricultural systems in which livestock are important.**

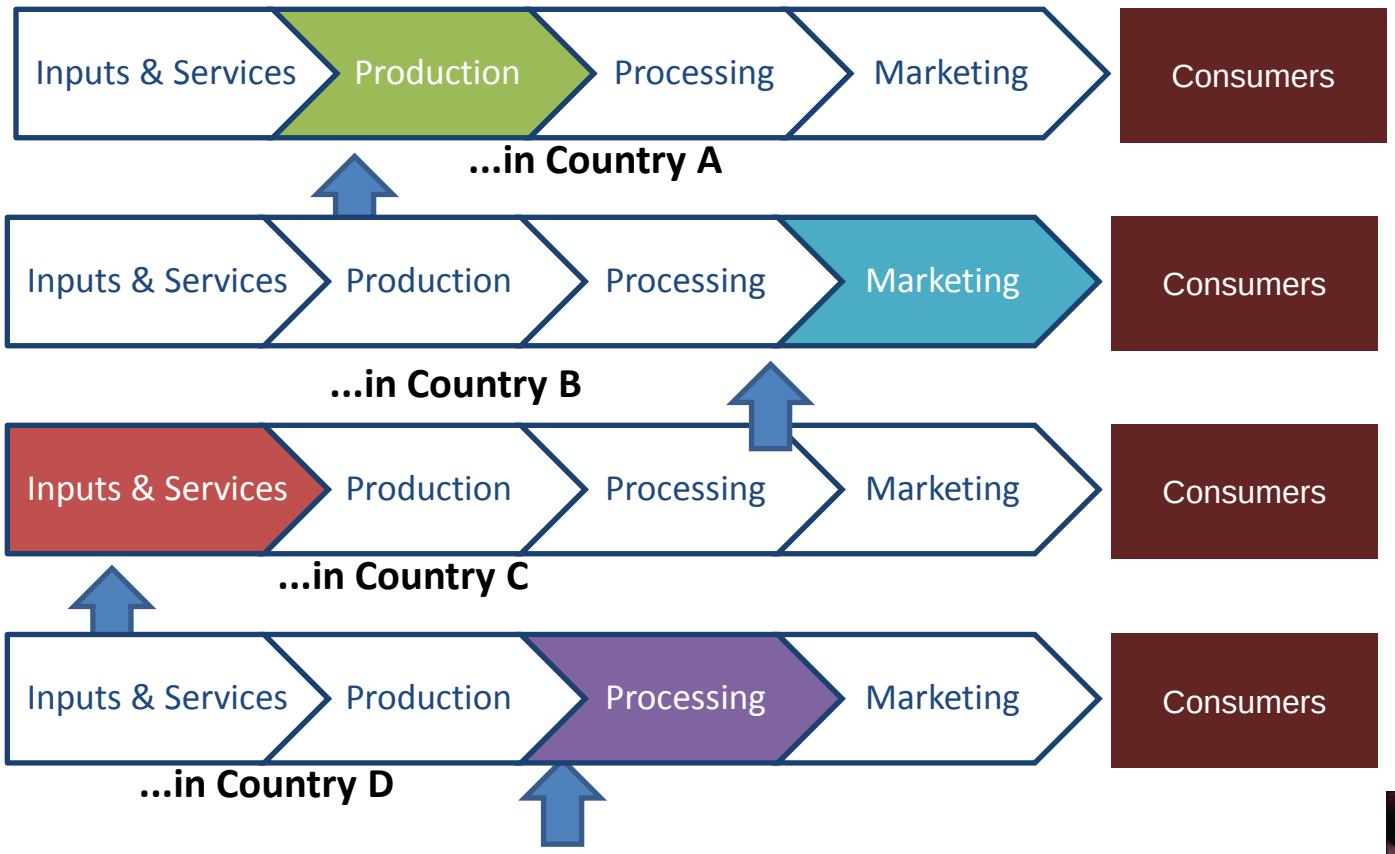
Outline

1. Institutional approach – Value chain approach
2. Focus: smallholder production systems
3. Research programs/projects – FA1

1. Michael Blummel: Detailed project presentation

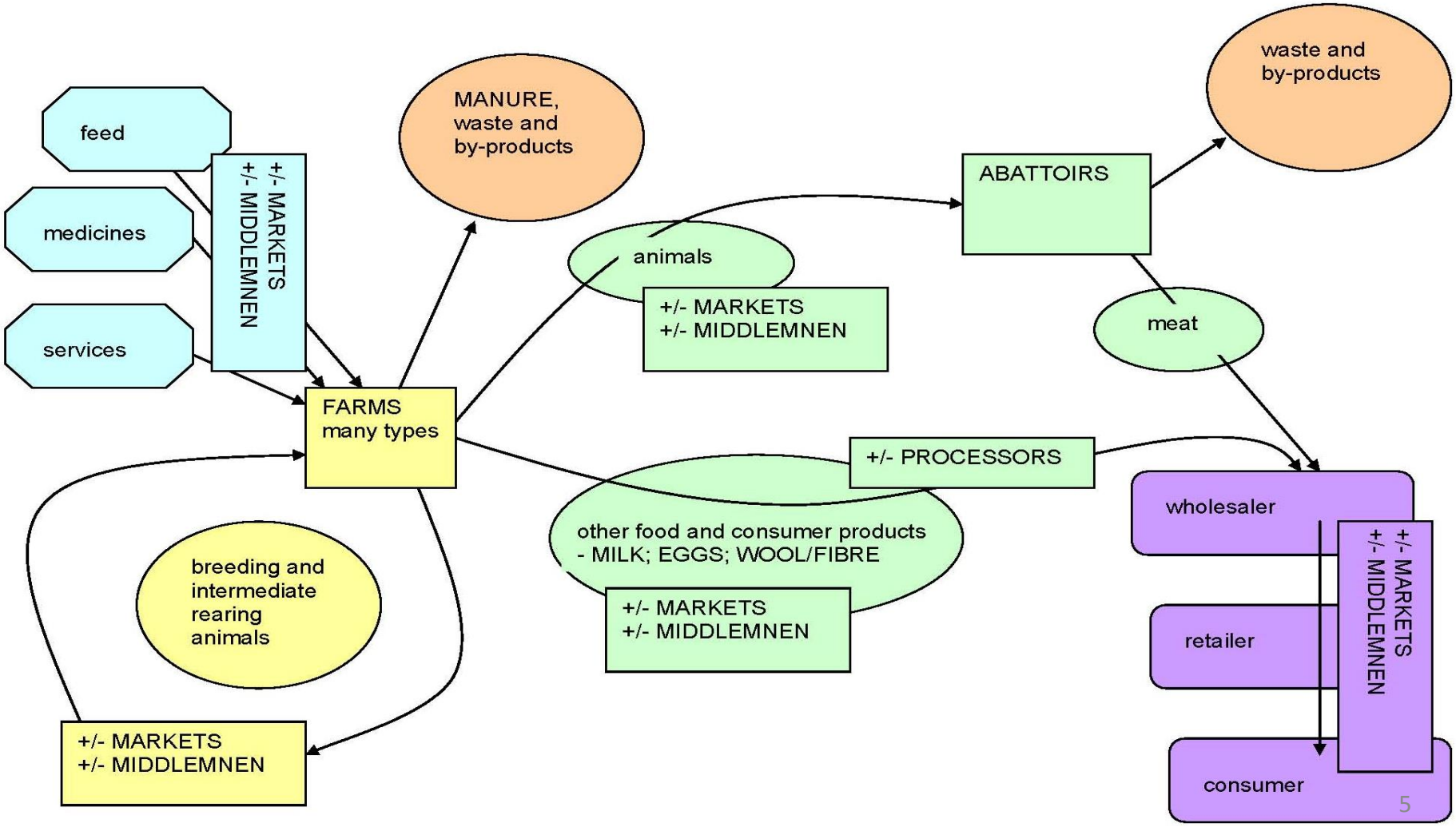
Value chain approach

Traditional approach: piecemeal



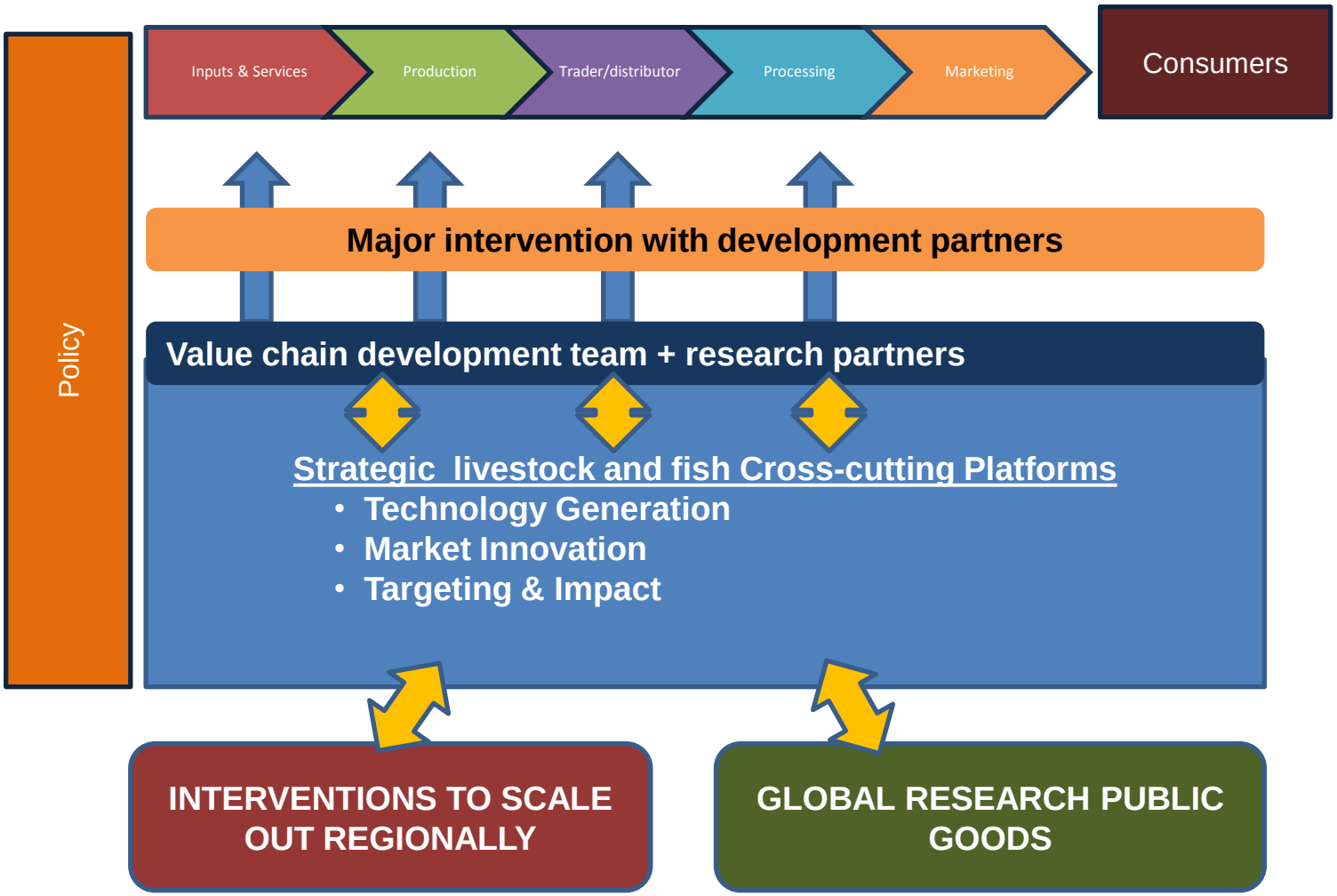
Value chain approach

A value chain is the set of actors, transactions, information flows, and institutions that enable value to be delivered to the customer (Baker, 2007)



Value chain analysis approach

- Address the whole value chain



Source: Adapted from Tom Randolph (2012)

Example: smallholder dairy project

Small holder dairy project: Kenya (smallholderdairy.org)

- Collaborative research and development project (1997-2004): funded by DFID
- Partnerships: ILRI, Government, KARI ; key objective: increase efficiency

1. **Initial focus: increasing productivity at farm level**
   - better feeding strategies
   - access for forage

2. **Marketing : key constraint was at the marketing level**
   - Highly concentrated: little competition & interest (dairy board) to limit no. of players
   - Small holder farmers kept out market: licensing
   - Key issue: raw milk perceived as risky; small traders of raw milk kept out key markets
   - Research by ILRI: showed that risk levels were exaggerated

3. **Policy engagement**
   - Information dissemination
   - Engagement of civil society, government and advocacy group
   - Policy briefs, strategies and dialogue

Impact

- Policy change: market liberalization
- Training and certification: milk testing, quality control and maintenance
- Increase in quantity of milk supplied

Smallholder production systems

- Size and nature of transaction costs in the value chain influence efficiency
- Key constraints to efficiency improvement include access to capital and inputs
- Value chain analysis: allows for a system approach and looks at efficiency holistically
- Moving beyond pictures & maps: quantifying VC performance

ILRI Livestock projects – FA1

Livestock and fish CGIAR Research program

Coverage

Uganda (pig), Ethiopia (sheep & goats), Tanzania (dairy), Vietnam (pig), India (dairy), Nicaragua (dairy), Mali (sheep and goats) and Egypt (fish)

Data & results

- Uganda pig: VCA & implementing detailed benchmarking survey
- Tanzania dairy: value chain analysis and baseline data
- Ethiopia: VCA & implementing detailed benchmarking survey

Efficiency and FA1 link

- Assess productivity, feed, animal health and economic efficiency
- Data covers most of the indicators discussed by FA1
- Technological interventions: feed, animal disease, breed/genetics levels, and marketing innovations
- Need: tools to assess environmental chain performance

ILRI Livestock projects – FA1

Smallholder livestock competitiveness project- Botswana

- Identify factors affecting productivity
- Assess competitiveness including technical, cost and economic efficiency

Coverage & livestock commodity

- Botswana (potentially Namibia in the future)
- Cattle and small stock (goats and sheep)

Data and results

- Value chain analysis assessment
- Detailed producer level household farm level data: July –Aug. 2013
- Results on efficiency available early next year

Efficiency and FA1 link

- Assess productivity, feed and economic efficiency
- Data covers most of the indicators covered by FA1
- Need: tools to assess environmental chain performance

ILRI Livestock projects – FA1

Livestock systems and the environment

- Analyze interactions among livestock and plant systems and the environment (at global and local scale).

Approach

- Combines empirical and modeling approaches
- Econometric methods to estimate livestock feed-yield relationship
- Models: GLOBIUM (PE model) and ruminants model (diet)

Data and results

- Source: FAO-stats country level animal stocks and commodity: used minimum herd dynamics and animal nutrition modeling techniques to disaggregate data

Efficiency and FA1 link

- Models impacts of change in diet on yield, manure, GHG emissions, land use change, soil fertility

Thank you

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International Livestock Research Institute

Efficiency methods and approaches

***Technical level:* Animal feed**

Production

- Test eco-efficient technologies: (e.g. forage into mixed systems)
- Reduction in level of land degradation

Utilization level – feed resource conversion

- Test different technologies: chopping, fortification and densification
- Measure intake differences
- Quantify conversion efficiency at animal level
- Quantify changes in yield levels
- Maintenance energy – convert to no. of days that feed can support the animal

Examples: East African Dairy Development

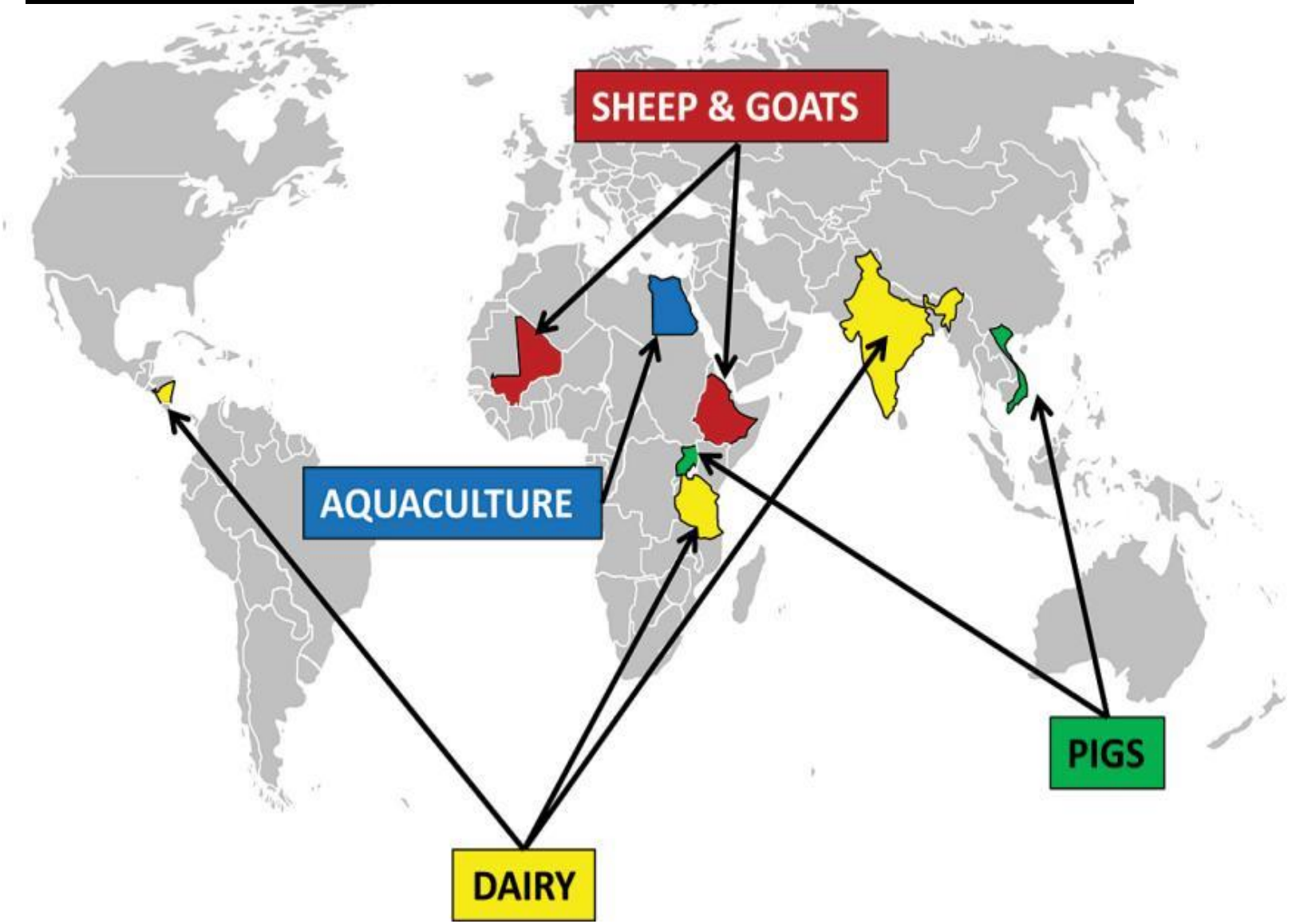
- Efficiency from chopping crop residues; calves status diet
- Dry season feed supplementation in pastoral systems (Uganda)
- Intergrading forages into mixed systems (Rwanda, Uganda & Kenya)
- Feed gap at site level: estimate target/optimum requirement at site level accounting for seasonality

Lessons

- When farmers see the benefits, they adopt selective feeding strategies – potential entry point to reduce animal numbers in the long term
- Make technologies user-friendly: should be less demanding in knowledge requirement
- Extensive system more challenging then intensive systems: costs and land tenure systems

Approach: Solution-driven R4D to achieve impact

#3: Focus on 9 target value chains



International Livestock Research Institute (ILRI)
Livestock and Fish Program

International Livestock Research Institute

Outline of Presentation

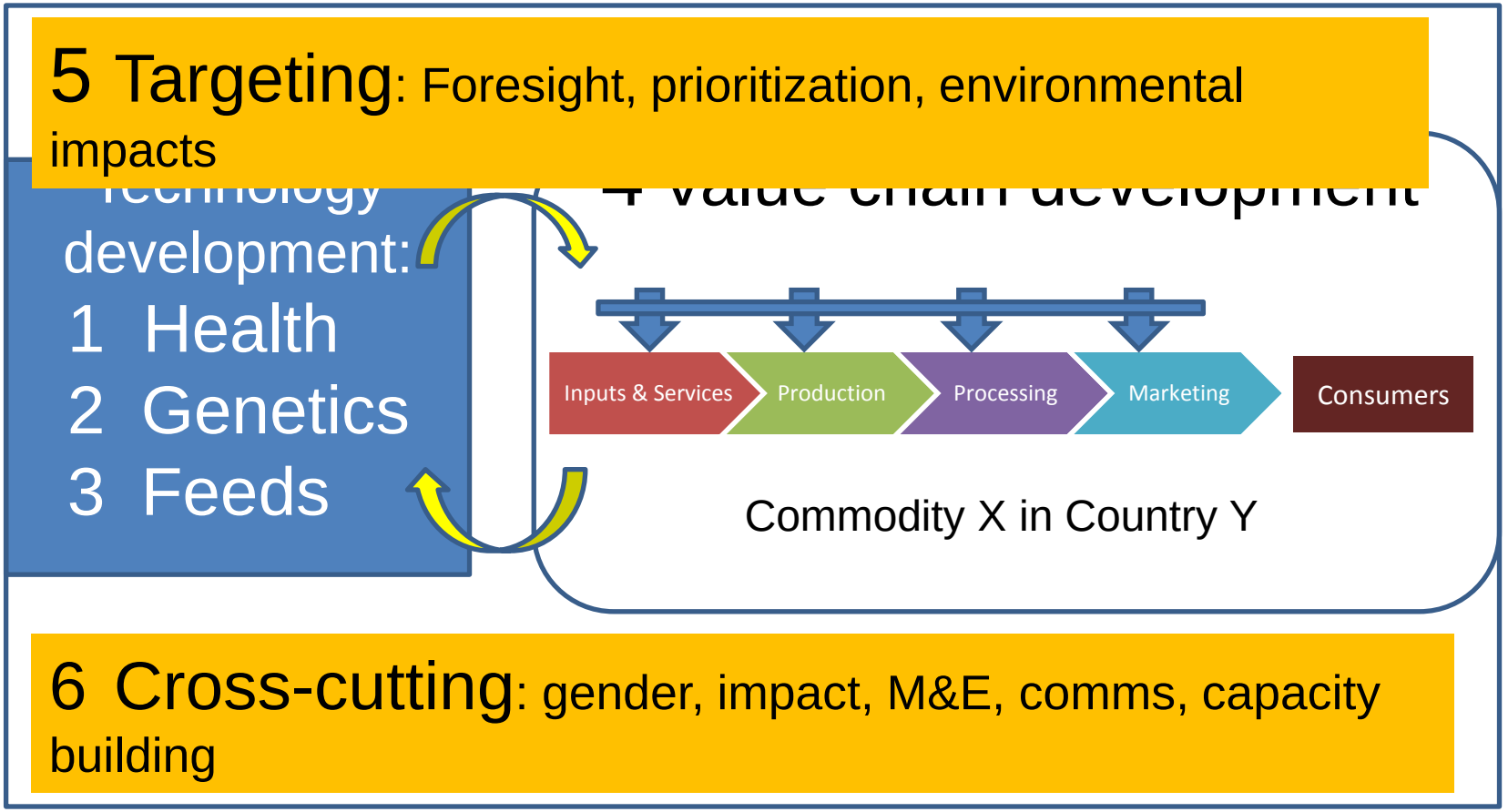
- New departures for interventions into livestock production

- Primary objectives: increase availability of affordable AFS and improve livelihoods of small holder producers
- Feed resourcing at the interface of positive and negative effect from livestock

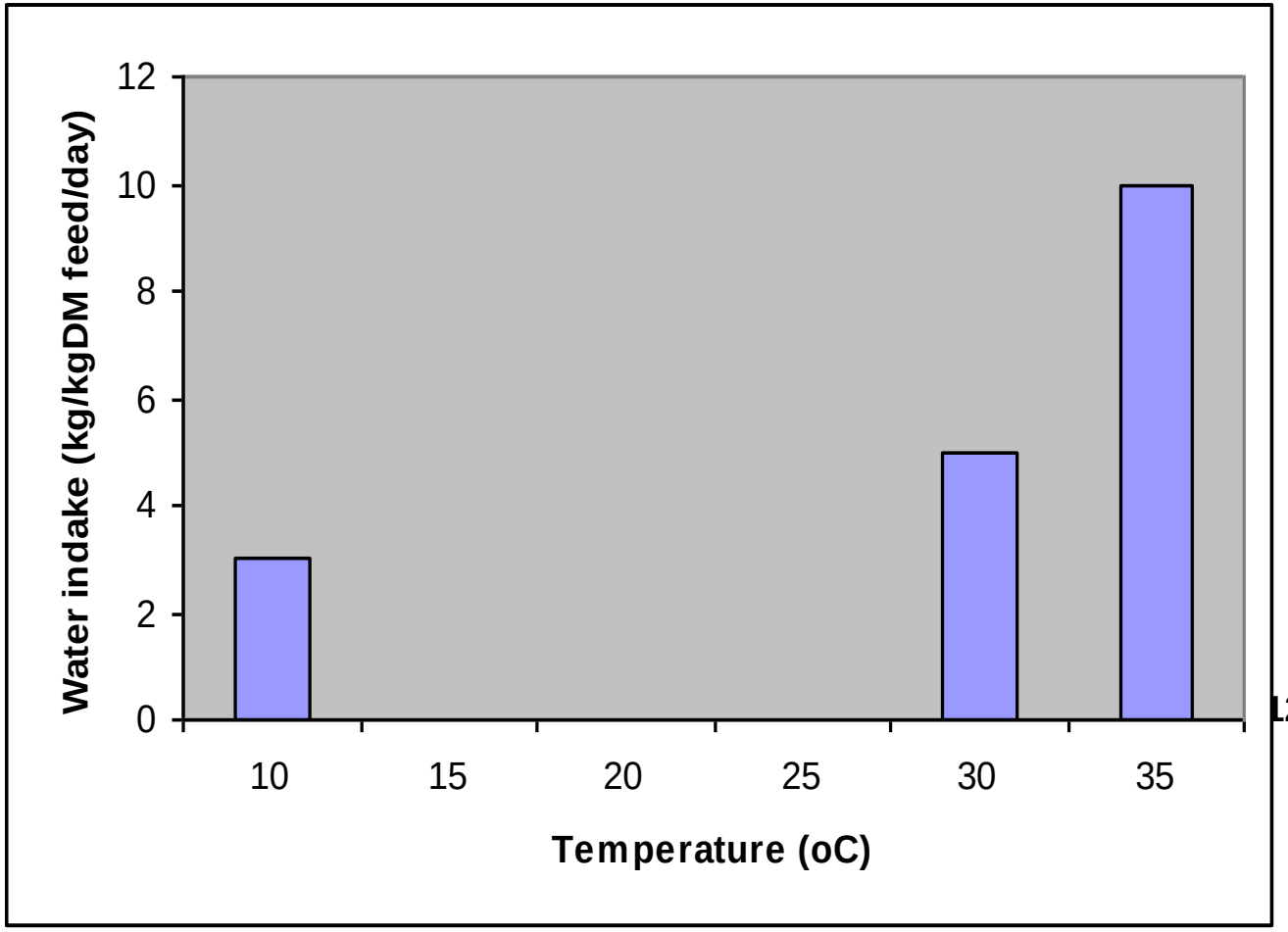
- Key variables/key problem for linking livestock productivity and natural resource use efficiency in ILRI Value Chains

Delivering the Livestock and Fish Program

Structure: Six integrated components



Water: where does it go?



Water for milk and fodder

Gujerat	3 400 l of water per kg of milk
	10 000 l of water for fodder/animal/day
Gobal	900 l of water per kg of milk

Source: Singh, Sharma, Singh, Shah (2004)

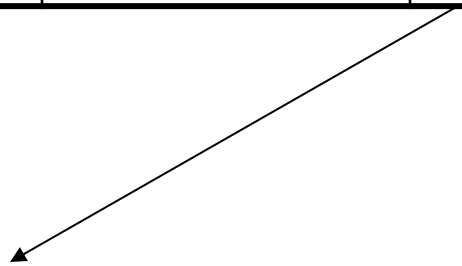
Predicting water requirement for milk production by feed-H_2O estimates ?

	S. Gujarat	W. Gujarat	N. Gujarat
	Liters of H_2O per MJ ME		
Alfalfa	32.3	45.8	126.8
Green maize	43.5	21.7	131.5
Wheat straw	17.4	8.6	52.4
Millet stover	20.9	18.1	61.5
Rice straw	29.0		
Groundnut haulm		8.8	
Mean H_2O / liter of milk	2 557	1 810	3 775

Blummel et al., 2009 calculated from data of Singh et al., 2004

Feed allocation, methane production and natural resource utilization

India: Livestock and milk in 2005-06			
	Milch animals	Total animals	Milk yield
	x 10^3		kg/d
Cross Bred	8 216	28 391	6.44
Local	28 370	155 805	1.97
Buffalo	33 137	101 253	4.40



Overall herd mean 3.61 l/d

Feed energy needs of milch animals in dependence of average daily milk yields

	ME required (MJ x 10^9)		
Milk (kg/d)	Maintenance	Production	Total
3.61 (05/06)	1247.6	573.9	1821.5
6 (Scenario 1)	749.9	573.9	1323.8
9 (Scenario 2)	499.9	573.9	1073.8
12 (Scenario 3)	374.9	573.9	948.8
15 (Scenario 4)	299.9	573.9	873.9

It seems obvious but….

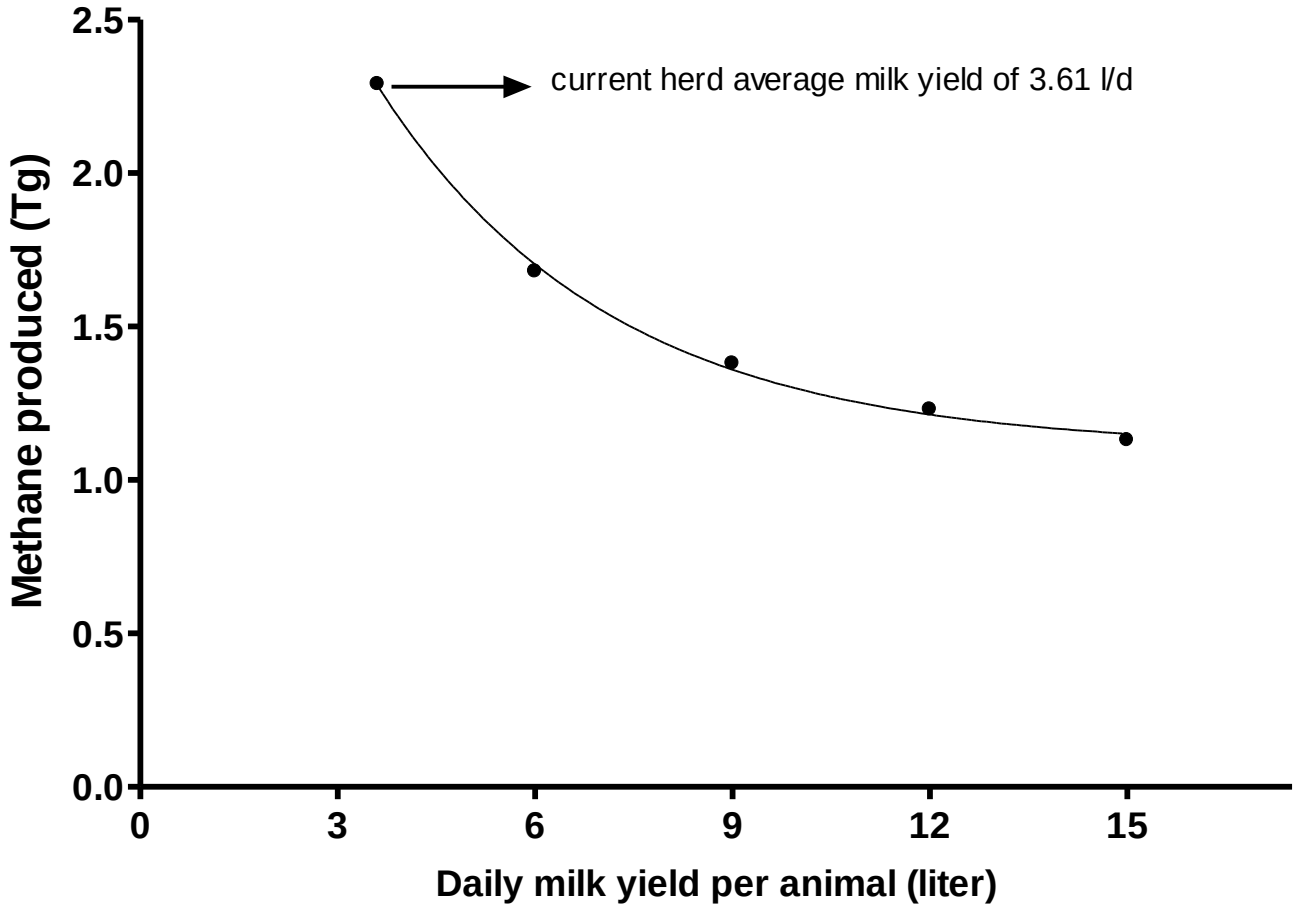
Assume:

Farmer A: 5 cattle each giving 2 liter milk day

Farmer B: 1 cattle giving 10 liters milk per day

Which farmer needs more feed and why?

Effect of increasing average daily milk yields on overall methane emissions from dairy in India



Blummel et al 2009

Livestock revolution: Impact on energy and feed requirements

	(2005-06)	2020	2020 (fixed LP
Milk (million tons)	91.8	172	172
yield/day (kg)	3.6	5.24	6.76
Numbers (000)	69759	89920 *	69759
Metabolizable energy requirements (MJ x 10^9)			
Maintenance	1247.64	1608.22	1247.6
Production	573.94	1075.00	1075.00
total	1821.58	2683.22	2326.66
Feed Req.(m tons)	247.50	364.57	315.6

* Calculated based on Component Annual Growth Rate (CAGR)

BAIF success with cross bred cow performance in rural WM 1997-2001

Land use	Milk (kg/d)
Irrigated areas	8.5
Non-irrigated areas	7.7

Data from Ghokale et al 2007 calculated for 365 day lactations

Feed block manufacturing: supplementation, densification

Ingredients	%
Sorghum stover	50
Bran/husks/hulls	18
Oilcakes	18
Molasses	8
Grains	4
Minerals, vitamins, urea	2

Courtesy: Miracle Fodder and Feeds PVT LTD

Comparisons of premium and low cost sorghum stover based complete feed blocks in dairy buffalo

	Block Premium	Block Low Cost
CP	17.2 %	17.1%
ME (MJ/kg)	8.46 MJ/kg	7.37 MJ/kg
DMI	19.7 kg/d	18.0 kg/d
DMI per kg LW	3.6 %	3.3 %
Milk Potential	16.6 kg/d	11.8 kg/d

Anandan et al. (2009a)

Comparisons of premium and low cost sorghum stover based complete feed block in dairy buffalo

	Block Premium Stover dig 47%	Block Low Stover dig 52%
CP	17.2 %	17.1%
ME (MJ/kg)	8.46 MJ/kg	7.37 MJ/kg
DMI	19.7 kg/d	18.0 kg/d
DMI per kg LW	3.6 %	3.3 %
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Key problems

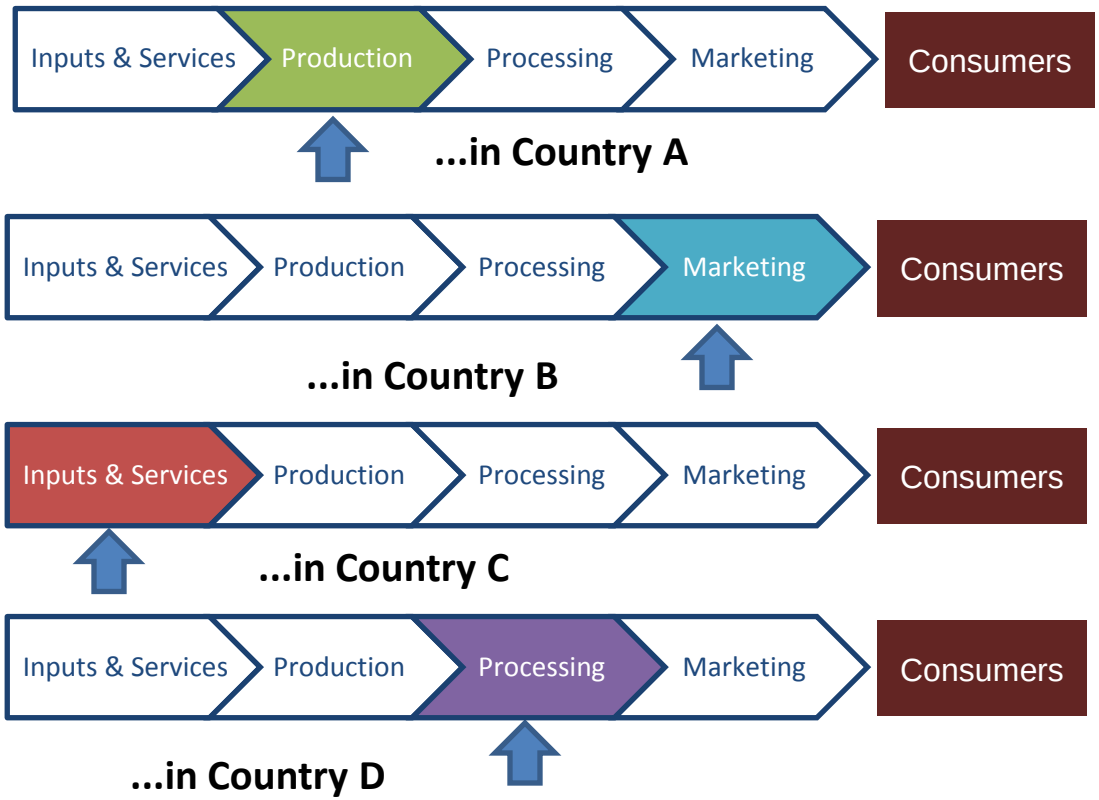
- Opportunistic management for example considerable variations in quantity and qual
  of feed from day to day and season to season
  (investment priority?)

- Frequent drastic disagreements between estimations of feed quantity and quality as
  obtained from farmers questionnaires and surveys and triangulation
  results based on number of animals and their productivity

Thank you for your attention!

Traditional approach to increasing livestock productivity was piecemeal

Past research has focused specific aspects of given value chains, commodities and country.



A value chain approach: a set of actors, transactions, information flows, and institutions that enable value to be delivered to the customer (Baker 2007)

Approach: Solution-driven R4D to achieve impact

#1: Addressing the whole value chain

R4D integrated to transform selected value chains
In targeted commodities and countries.