ILRI

INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

Workshop outputs

ILRI Design Workshop #2 - DAIRY

19 March 2019

Facilitated by: foodagility

Our Ambition

What if we Could Increase the Impact of Livestock Innovation in Africa & Asia

100x

…by Transforming Small-Holder Capability?

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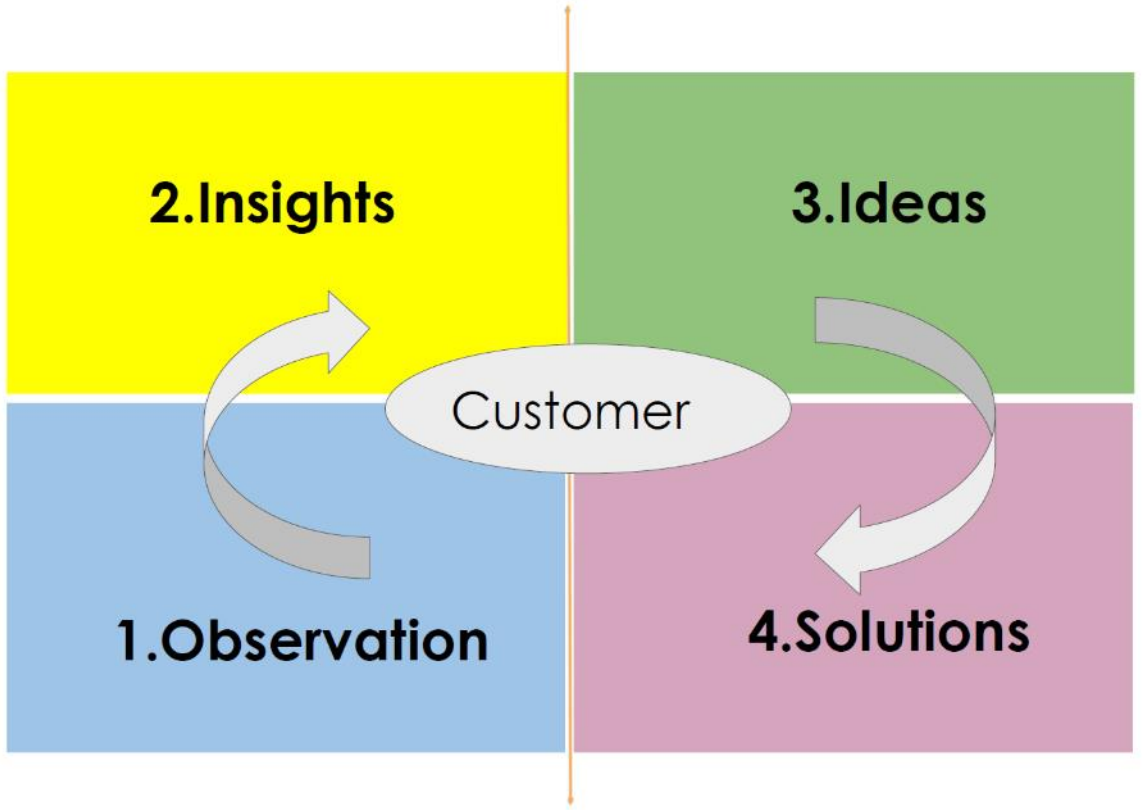
Quote – Jimmy Smith

"At ILRI we perceive and assess opportunities for livestock to change livelihoods in the developing world.

Now is the time to make it happen."

Design Thinking – Let's begin!



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Finding the beneficiary – Smallholder #1

Where do you want to be in 5 years time?

He wishes to continue to increase the scale of his production, including selling to the export market.

What are the barriers or challenges that you face in achieving that goal?

Cows give birth to a high percentage of bulls, would prefer to have cows (via sexed semen). Extension services are limited by transportation constraints – these workers provide knowledge on husbandry, health, financial management, etc.

Dairy farmer from Sululta, Ethiopia, named Gatu. He began with one dairy cow, but now has 5; he uses AI for reproduction.

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Finding the beneficiary – Smallholder #2

Where do you want to be in 5 years time?

Wishes to grow his production capacity, ideally supported by further land provided by the government.

What are the barriers or challenges that you face in achieving that goal?

Birth of male calves – he would prefer cows to bulls. There is only one extension worker in the community, which he feels is overworked and under-resourced. Land space is also a constraint.

Erko started in his house with a small mixed enterprise and was given land by the government to improve his scale of production.

Finding the beneficiary – Smallholder #3

Where do you want to be in 5 years time?

In 5 years he would like to have 50 animals.

What are the barriers or challenges that you face in achieving that goal?

A reliable formal market for milk, especially during rainy season.
Streamlined disease control.
Accessibility of improved animals; he had to travel 800km to get his improved cow.

Dairy farmer from Tanzania who owns a 1ha farm that he grew from 2 cows to 20

Finding the beneficiary – Smallholder #4

Where do you want to be in 5 years time?

Larger scale milk production, including use of artificial insemination to increase production.

What are the barriers or challenges that you face in achieving that goal?

Milking cows more than 20 litres leads to mastitis and it's difficult to source medication.

Market price of milk. Expensive feed.

Deformed calves – some born with one eye and others with deformed spinal structure

Amha, a dairy farmer from Sululta, 38km from Addis Ababa who has grown his dairy operation from 2 cows to 14 using artificial insemination

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So... Who are the key actors?

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So... Who are the key actors?

INPUTS:

- Feed suppliers
- Veterinarians
- Cold chain transporters
- Women's time/labor
- Credit suppliers
- Genetics suppliers
- Replacement stock suppliers
- Women/men AI technicians
- Agrovet retail shops

PEOPLE & ENVIRONMENT:

- Crop health
- Information providers
- Dairy co-ops, associations
- Women's control of land/cows
- Traditional chiefs
- Water system managers
- Land & land access
- Consumer awareness

ENABLERS:

- Data holders & aggregators
- Market intelligence
- Researchers & research institutes
- Mobile network operators
- Energy providers
- Engineers & fabricators
- Farmer groups
- Community animal health workers
- Government extension workers
- Banks & Donors
- Commercial farms
- Government regulators & policymakers

DEMAND:

- Milk collectors
- Milk processors
- Village traders
- Farmers & their families
- Calves
- Schools
- Milk shops, kiosks
- Supermarkets
- Informal markets
- Family consumption
- Consumers
- Subsistence
- Export
- Manure fertilizer

Personas – Breeding Company

More info:

- Abroad and local (government)
- Genetic improvement engineers

Strengths:

- Access to better genetics and a variety of genetics
- Logistics and storage

Key Challenges :

- Limited resource base
- Quality control
- Right matching of breeds to production system

Impact of our innovation

BEFORE

What they think:
- Black & white is it!

What they feel:
- Disappointed
- Not performing well

What they do:
- Selling what they have with little care for results

AFTER

What they think:
- More diverse & targeted breeds

What they feel:
- Customer needs are considered and met

What they do:
- Start local breeding program

Personas – Veterinarian

More info:

- Men
- Located at the district level
- Mostly government workers, not private vets
- Some have side businesses

Strengths:

- Book knowledge and skills
- Human capital

Key Challenges:

- Limited clinical & diagnostic skills
- More cases and connection to cases
- Quality drugs, vaccines and regulations

Impact of our innovation

BEFORE

What they think:
- Know there is a need
- Should have opportunities

What they feel:
- Powerless
- Undervalued & Disincentivised

What they do:
- Sit in offices or alternate jobs in other sectors

AFTER

What they think:
- Allowed to do what they are trained for

What they feel:
- Empowered
- Happy

What they do:
- Hub and spoke models that better address market needs

Personas – Feed Supplier

More info:

- Male, living in urban Addis Ababa
- Different models: low input; use waste from other mills; concentrate; feed mill

Strengths:

- Crop residues managed OK
- Some pockets of production
- Emerging market for feed

Key Challenges:

- Irrigation, water supply, land for crops
- Price of milk to justify cost of input
- Quality feed

Impact of our innovation

BEFORE

What they think:

- Think they are responsible for supporting the dairy value chain

What they feel:

What they do:

AFTER

What they think:

- Regulated and responsible

What they feel:

- Empowered
- Happy

What they do:

- More precision feeding
- Match feed with genetics, health, etc

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Personas – Small multi-species mixed farmer

More info:

- Erko, a male peri-urban farmer based in Adama, Ethiopia
- Ten dairy cattle, a mix of local breed and Holstein
- Mixes his own feed but buys ingredients
- Has three farm assistants

Strengths:

- Low feed cost due to self-mixing and not dependent on one market product

Key Challenges:

- Local breeds not productive
- Extension service limited
- Availability of land for expansion

Impact of our innovation

BEFORE	AFTER
What they think: • Need to get female calves	**What they think:** • Sexed semen
What they feel: • Lack of support	**What they feel:**
What they do: • Expanding business despite the limitations	**What they do:** • Get more milk from the new generation animals

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Personas – Small mixed farmer

More info:

- Located in central Wakiso, Uganda, mixed gender
- Keeps dairy cattle, poultry, swine, goat, and crops

Strengths:

- Will to learn
- Diversity
- Ingenuity & labour

Key Challenges:

- Market access
- Climate resilience
- Feed insecurity
- Education on farms and farming

Impact of our innovation

BEFORE

What they think:
- Traditional thinking

What they feel:
- Desperate

What they do:
- Low subsistence farming

AFTER

What they think:
- Entrepreneur mindset

What they feel:
- Empowered

What they do:
- Commercialization

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Personas – Peri-urban farmer

More info:

- Female dairy farmer located in Addis Ababa

Strengths:

- Access to markets and extension services (in comparison to remote farmers)
- Committed entrepreneur
- Key decision-maker

Key Challenges:

- Space -> limited herd size
- Needs capacity building in business skills
- Milk price, milk safety (aflatoxins, milk transport

Impact of our innovation

BEFORE

What they think:
- Struggling to expand business
- Can't find needed support

What they feel:
- Discouraged on the whole (optimistic about market access)

What they do:
- Struggle on
- Request help (for land, extension)

AFTER

What they think:
- How to invest and profit
- How to be more competitive

What they feel:
- More optimistic
- Supported

What they do:
- More informed decision making
- Higher input genetics
- More business orientated
- Participate in multi-stakeholder platforms and collective action

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ILRI Design Workshop #2 - DAIRY

Personas – Dairy Processor

More info:

- Co-operative or private, large/small, rural/peri-urban
- Mostly old male

Strengths:

- Access to market and can negotiate
- Scalability and infrastructure
- Diverse products

Key Challenges:

- Consistent supply
- Milk quality and safety
- Governance and trade policy
- Cold chain logistics

Impact of our innovation

BEFORE

What they think:
- Too much risk
- Too costly

What they feel:
- Don't trust the farmer
- Prices too low

What they do:
- Don't invest in the farmer
- Extractive

AFTER

What they think:
- More stability
- Confidence

What they feel:
- Confident

What they do:
- Scale
- Invest in farmers
- Formalise

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Personas – Consumer

More info:

- Low-income mother from rural Tanzania

Strengths:

- Embedded in rural community
- Subsistence farmer

Key Challenges:

- Access to supply
- Milk quality and consistency

Impact of our innovation

BEFORE

What they think:
- Milk is desirable but hard to get

What they feel:
- Sorry she cannot regularly give to her children

What they do:
- Ad hoc purchases

AFTER

What they think:
- Milk is available daily

What they feel:
- Reassured and happy her children have access

What they do:
- Buys milk more often

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Challenges – Supply chain & market

- Consistency of supply
- Collection not organised
- Not enough cooling stations
- Market information and market signals
- Farm management information
- Variation in milk prices
- Payment not based on quality
- Lifestyle dairy products
- New products and packaging information
- Delayed payments
- Affordability of milk
- Decision between subsistence or milk sale

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Challenges – Policy

- Supportive policy for local dairy
- Imported milk powder
- Land size and accessibility
- Limitation and accessibility of extension workers
- Dairy-crop conflict
- Water access
- Informal milk market regulations
- Taxation regimes
- Access to rural supply
- Weak value chain governance
- Farmer groups

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Challenges – Digital & data

- Record keeping
- ICT policy
- Mobile-enabled community breeding services
- How to use available technology

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Challenges – Sustainability

- Wildlife-livestock conflict
- Managing producer risk
- Climate change
- Sustainable farming
- CO2/methane emissions
- Energy availability and price
- Support during climate shocks

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Challenges – Animal productivity

- Long-term genetic improvement
- Productivity of local breeds
- Accessibility of improved animals
- Reliability of artificial insemination
- Scalability of artificial insemination
- AI technician training
- Full animal utilisation (including waste)
- Cost and quality of feed inputs
- Accurate record keeping and herd management

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Challenges – One health

- Zoonoses
- Animal disease and disease management
- Milk borne brucellosis
- Milk perishability with multiple pressures and informal markets
- Crowd sourced disease reporting
- Antibiotic residues
- Minimal clinical vet training
- Vet expertise matched appropriately to tasks
- Animal welfare
- Cost and availability of veterinary medicines
- Reliable diagnosis
- Competition between public and private vets
- Many quacks

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Challenges – Women & youth economic empowerment

- Multiple pressures on women with multiple roles
- Motivation and capacity to expand
- Women barriers to dairy sector
- Limited co-operatives
- Only male AI providers
- Male dominated industry
- Youth not represented
- Diversity of “small holders”
- Confidence
- Logistics
- Limited ownership of productive resources e.g. land, cattle

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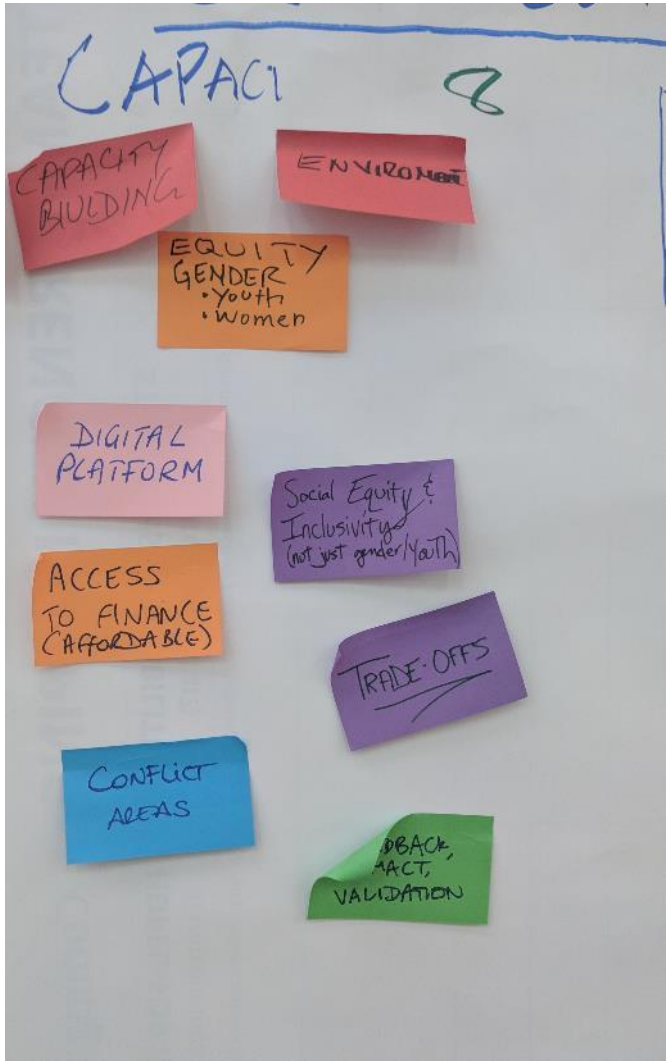
Challenges – Capacity building

- Digital platforms for capacity building
- Trade-offs in capacity building
- Environmental knowledge
- Building capacity in an equitable way (inclusive of women and youth)
- Affordable access to finance
- Conflict areas
- Feedback, impact, validation



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Challenges – Human nutrition

- Global agendas
- Food safety
- Nutrition education
- Availability & affordability of livestock products
- Food waste and food losses

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Challenges – Supportive infrastructure

- Equipment & mechanization
- Farm infrastructure: crushes, pens
- ICT infrastructure
- Cold chains, other options
- Water supply
- Renewable energy
- Roads
- Transport
- Water production & harvesting infrastructure
- Community breeding infrastructure, locally

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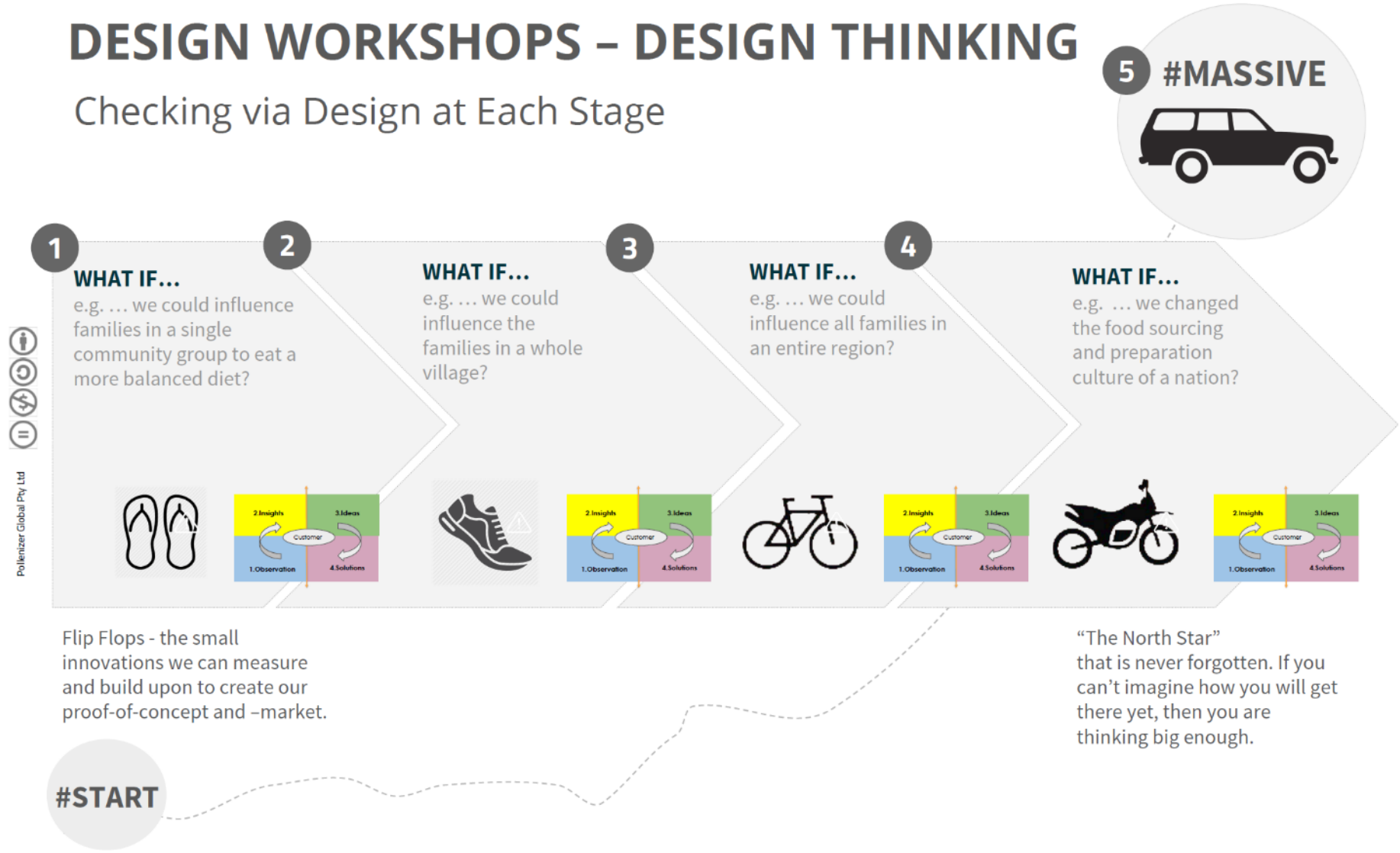
DESIGN WORKSHOPS – DESIGN THINKING

Checking via Design at Each Stage



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The #MASSIVES - By 2030 success will mean...

Markets and Supply Chain Development

1. Meet increasing milk demand (3-5x) with additional and regional products
2. Value added product developments increase 10-fold
3. Market barrier reduced, efficient markets

Policy

1. The public and private investment in the livestock sector matches its contribution to agriculture GDP

Digital & Data

1. A digital data utopia: Traceability, markets, information, records, trade, financial services, machine learning

The #MASSIVES - By 2030 success will mean...

Sustainability

1. Rural livelihoods are more viable and desirable
2. Production practices enhance environmental health

Animal Productivity

1. Optimised mix of large and small profitable dairy farmers
2. Stable income from productive and healthy animals
3. Safe milk and milk products for all at affordable prices
4. Continued and ongoing research
5. Production and emissions optimized across all milk production

The #MASSIVES - By 2030 success will mean...

One Health

1. Functional health services that detect, control, and manage animal and human health challenges
2. Adequate supply of safe and nutritious LDF to prevent cognitive impairment and stunting

Women's Empowerment

1. We see adequate representation of women capturing equitable value across the dairy chain
2. Women will have unrestrained choice and opportunity and authority to engage and benefit equitably in the dairy value chain

Capacity Building

1. 50% of dairy enterprises are knowledgeable on how to run a profitable business
2. 100% of women and youth have access to financial services

The #MASSIVES - By 2030 success will mean...

Nutrition

1. Community education results in families spending farm income on nutritionally sound foods
2. School children have access to free and safe milk
3. No undernutrition or malnutrition in the world
4. Milk is accessible and affordable to those who desire it

Supportive Infrastructure

1. Accessible equipment, machinery, water, and cold chain facilities that reduce drudgery among the youth and women
2. Decrease rural-urban migration
3. Young people participate in dairy farming

ILRI Design Workshop #1 - POULTRY

Taking the first step – SANDAL #1 – Markets & Supply Chain

What if we…

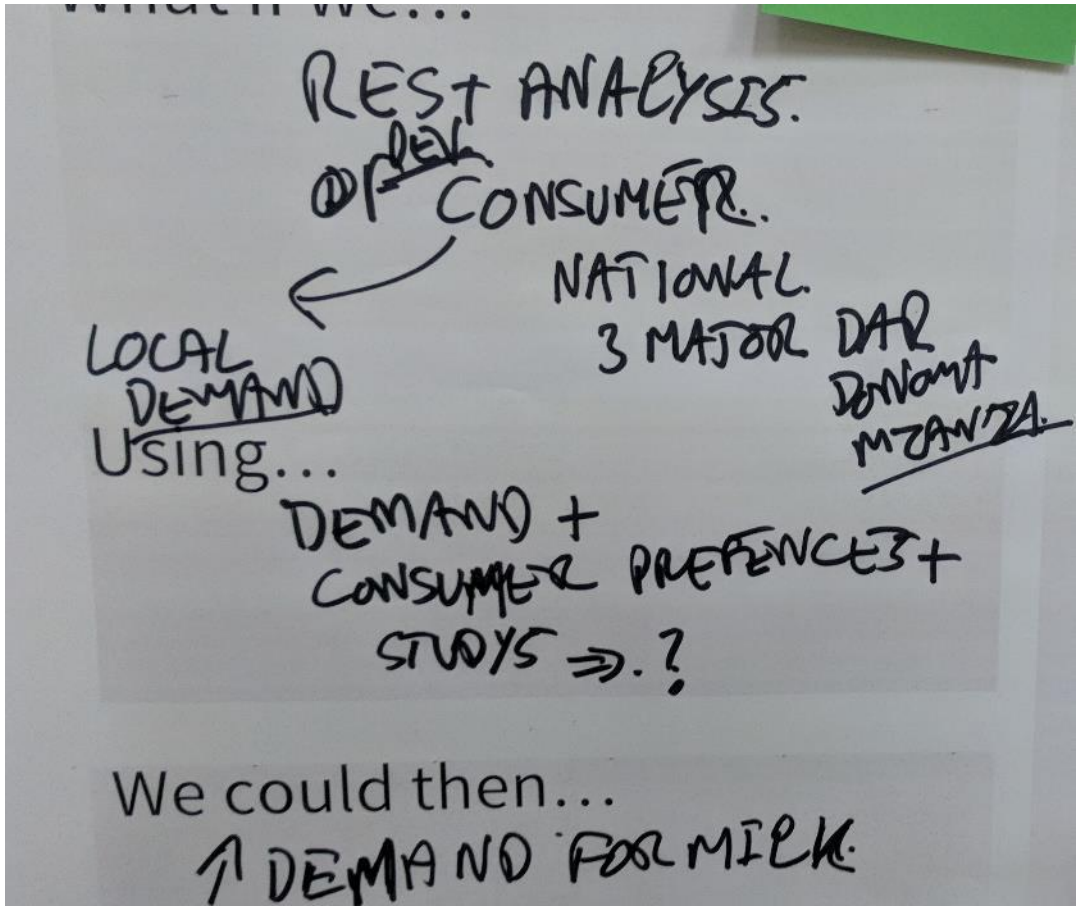
Conduct demand and consumer preference studies in Tanzania

Using…

Partnerships with Tanga Fresh dairy processor and the Tanzania Dairy Association

We could then…

Identify ways to increase demand for milk.



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Taking the first step – SANDAL #2 – Policy

What if we…

Present an investment case for the returns on dairy for income / livelihoods / nutrition / food security for different actors in Bihar

Using…

Existing data from the Living Standards Measurement Survey, and primary collection

We could then…

Inform improvements in the modelling analyses for Livestock Master Plans, prioritise investments in dairy, monitoring and evaluation to influence investment throughout the dairy value chain in Bihar and beyond.

Taking the first step – SANDAL #3 – Policy

What if we…

Start with the required changes in the modelling work for the Livestock Master Plan, make the tool more user-friendly at a national level

Using…

Existing models, lessons from Sandal #2, and partners (ICT supplier, FAO, CIRAD, and others)

We could then…

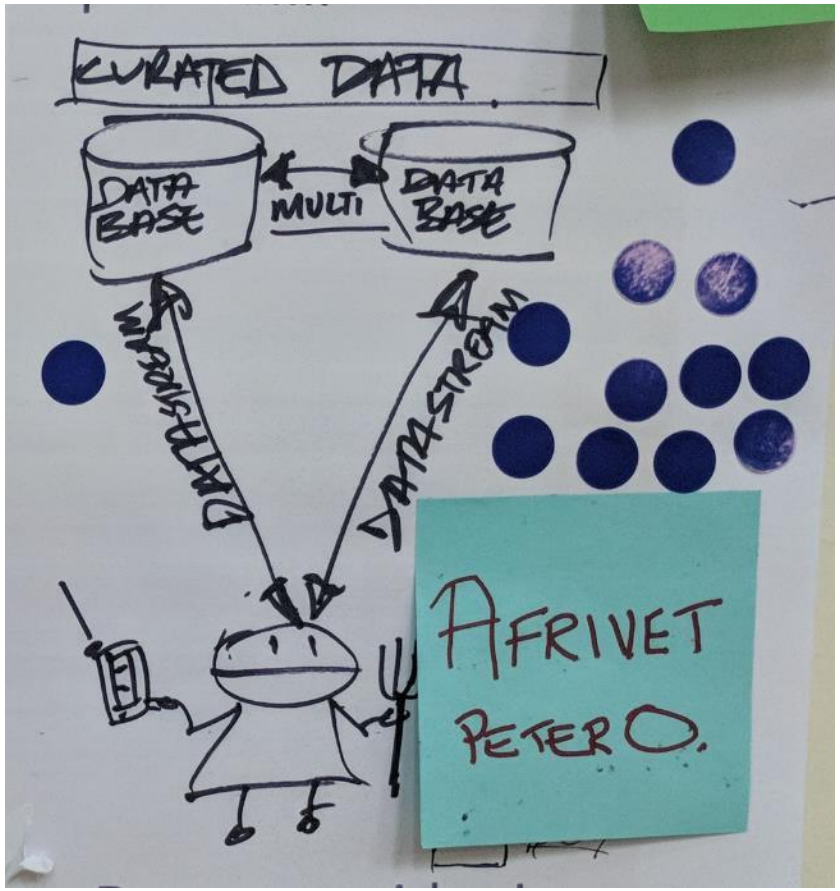
Create more reliable evidence for a Return-on-Investment analysis.

Taking the first step – SANDAL #4 – Digital & Data

What if we…
Had a two-way farmer-centric hyper-localised digital extension platform in four provinces in Ethiopia and three in Kenya

Using…
Existing and curated dairy extension content, hyper-localised individual data from a range of available sources, and partners such as LIC, CTLGH, tech companies
Partners: Afrivet and iCow volunteered to provide data

We could then…
Increase profitability between 80-120% in 6 months within 2 markets



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Taking the first step – SANDAL #5 – Sustainability

What if we…

Develop a set of metrics that assess environmental performance against productivity and socio-economics

Using…

Existing datasets (Machatos, ILRI data, CIAT data, and GLEAM) and the FAO link program

Partnering with LEAP-Agri and the iCow marketplace for data

We could then…

Help prioritise projects that show positive environmental, social, and environmental benefit

Taking the first step – SANDAL #6 – Sustainability

What if we…

Set up a prototype fodder outgrower scheme while opening dialogues for certification and value chain development in Kenya

Using…

Proven seeds within existing farmer/policy networks
Partners: outgrowers (Monsanto, specialist outgrowers); traders; Kenyan Ministry of Agriculture

We could then…

Build a value chain development platform for improved fodder seed systems.

Taking the first step – SANDAL #7 – Animal Productivity

What if we…

Selected the best bulls from communities via crowd sourcing, then genomically verified their genetic profile, created a contract to use them as a future bull dam using artificial AI to create better bulls

Using…

Geo-referencing, genomic tests, and verification using agents/villages

Partner with genomics companies, ICT partners, AI companies, and milk processors

We could then…

Identify and promote a starting population for future breeding

Taking the first step – SANDAL #8 – Animal Productivity

What if we…
Could test milk quality on farm instantly and cheaply
(connects to Sandal #9)

Using…
Technology, e.g., sensors, partner with a tech developer, and distribution through milk processors and milk traders

We could then…
Link payments for milk to milk quality and provide an incentive to improve farm management and productivity.

Taking the first step – SANDAL #9 – Animal Productivity

What if we…
Linked milk pricing to milk quality to create a demand for premium quality milk
(connects to Sandal #8)

Using…
Partnership with a premium processor for milk and other dairy products

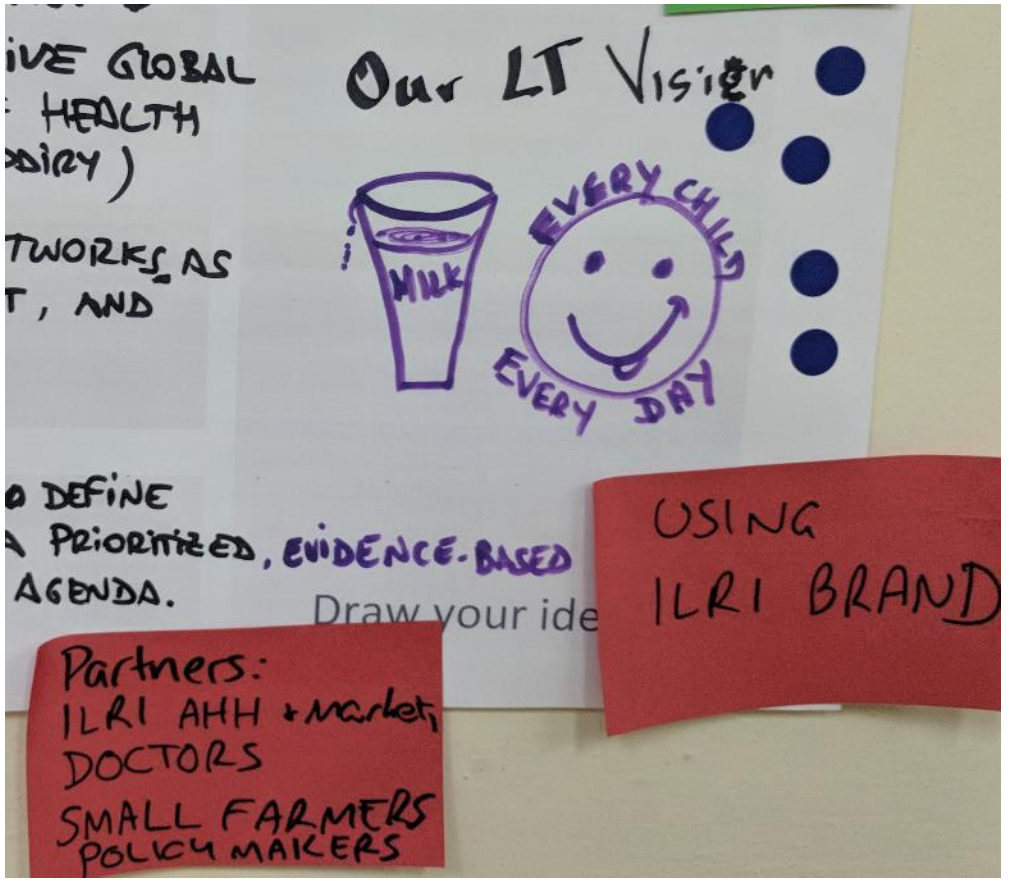
We could then…
Test and trial with milk aggregators.

Taking the first step – SANDAL #10 – Animal Health

What if we…
Create a needs-driven, action-based, impact delivering, inclusive global alliance of health stakeholders in dairy

Using…
Existing networks as resources, ILRI as a catalyst, ILRI brand, and donor funds
Partners: ILRI animal and human health, doctors, small farmers, policy makers

We could then…
Define and align around a prioritized, dairy development agenda.



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Taking the first step – SANDAL #11 – Gender

What if we…
Create a business model for women veterinary and AI technicians

Using…
Data around their constraints, negotiation power, knowledge, access to resources, cultural norms, etc
Partners: ADGG volunteered to supply data

We could then…
Set up a women's incubator center to refine and scale the model.

Taking the first step – SANDAL #12 – Animal Health

What if we…

Develop a gender sensitivity training module and dissemination strategy for the national dairy research and extension system

Using…

Data created and synthesized from the Ethiopia Livestock Master Plan

Partners: Government of Kenya

We could then…

Create a national dairy research and extension system that is gender sensitive and will demand more support to ensure gender equity.

Taking the first step – SANDAL #13 – Capacity Building

What if we…

Develop content for an entrepreneur short course in milk schools in Addis Ababa and Nairobi

Using…

ILRI expertise in capacity development
Targeted community agriculture extension workers, dairy cooperatives, and farmers groups around Nairobi
Partners: Heifer International volunteered their existing course content

We could then…

Create a national dairy research and extension system that is gender sensitive and will demand more support to ensure gender equity.

Taking the first step – SANDAL #14 – Capacity Building

What if we…
Formalised existing cooperatives and farmers groups to access credit

Using…
Milk Kenya
Existing farmers cooperatives for some investment
Existing digital platforms (Bailcash, Kiva.com) for infrastructure
Banks that specialise in agriculture to provide credit
Women co-operatives that specialise in savings and credit

We could then…
Increase farmers' access to credit

Taking the first step – SANDAL #15 – Nutrition

What if we…

Educated all decision makers in Njombe district, Tanzania, on household diets with nutritionally sound food

Using…

Field-ready mobile milk devices
Assessments of locally available foods and diet development
Participatory research with community educators
Partners: iCow volunteered data, nutritionist from Tanzania Food and Nutrition Centre

We could then…

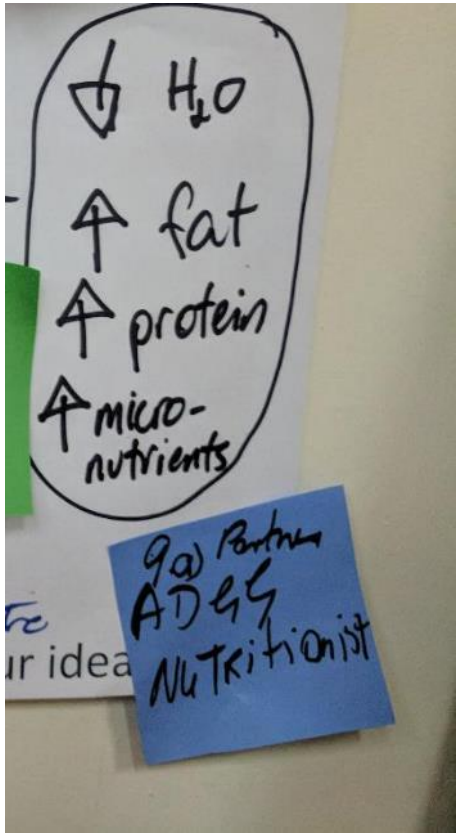
Scale out to other target sites and new sites

Taking the first step – SANDAL #16 – Nutrition

What if we…
Ensure milk available in local market is of high nutritional content in Njombe district, Tanzania

Using…
Currently available technologies/machines
Data from iCow and ADGG
Tanzania Food and Nutrition Centre

We could then…
Incorporate milk quality as a breeding objective and target interventions in feed and milk handling



Taking the first step – SANDAL #17 – Infrastructure

What if we…
Modify hay balers for rural smallholder mixed crop-livestock farmers in Wakiso, Uganda

Using…
Specialist artisan youth groups in Wakiso and tech from UIRI and NAGRIC
Pay-as-you-go machinery

We could then…
Reduce drudgery in dairy farming

Powerful Questions from the day...

- How to create business from a different model, adapted for the conditions?
- Does gender diversity in AI technicians boost adoption and capacity?
- How to match veterinary supply with areas of demand?
- How to negotiate and discuss trade-offs?
- How to encourage supportive policies for smallholders?
- Dairy for children's nutrition and health
- What is appropriate mechanization?
- How to facilitate flow of animal-based foods to those with nutritional need?
- How to get value beyond milk – dung? Urine?
- How do consumers of dairy in developed markets influence local milk markets?
- How can payment for milk quality open new opportunities? Are there other market signals?
- How to get milk from supplied to unsupplied areas?
- How to attract youth into dairy?
- Can disease become a leverage point?
- Can feed become a leverage theme?
- How to re-frame trade policy?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MARKET
POLICY
DIGITAL & DATA
SUSTAINABILITY
ONE HEALTH
CROSS-CUTTING

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Thankyou for a great workshop!

We look forward to working with you further.

If you have any questions about the Food Agility process or would like to know more about us, visit www.foodagility.com or find @foodagility.