

Food Waste Reduction and Food Quality Living LAB

FORQLAB - Kenya

SIA - CoE Groen – International Food Systems (SDG2) – Kenya - PVG.DZ21.04.001

1.35 Final Seminar 23 May 2024



Day Programme

- Welcome
- Welcome by representatives of LNV (Min. Agri.)
- Project background – short update
- Lessons learned about reduction of food losses in dairy value chains
- Lessons learned about reduction of food losses in avocado value chains
- B2B results
- Video about food losses in avocado
- Photo exhibition
- Value creation in a living lab model
- Way forward - Panel discussion
- Closure

FORQLAB project goals

To contribute to structural reduction of post-harvest losses in Kenyan avocado and dairy chains via the application of technical solutions and tools as well as improved chain governance competences

The results are scalable to other fresh and processed product chains

Research Questions

1. What technical interventions are required?

2. What governance interventions are required?

to encourage safe products and reduced food losses of avocado/milk in both local and export-oriented food systems

Project Approach

- 2 commodities: Dairy and Avocado
- Sustainable Food system / value chain / farming systems approach
- B2B & Living Lab approach





TECHNICAL AND VOCATIONAL EDUCATION
AND TRAINING AUTHORITY



Dairy Brands

Kitinda Dairy Farmers
Cooperative Society
Kaptama Dairy Farmers
Cooperative Society



FORQLAB - Kenya

CoE GROEN
CENTRE OF EXPERTISE

Regieorgaan



3 Meru Avocado Growers
Cooperative Societies
Nandi Avocado Farmers
Cooperative Society



Ante BV
New and used dairy
processing equipment





Consortium



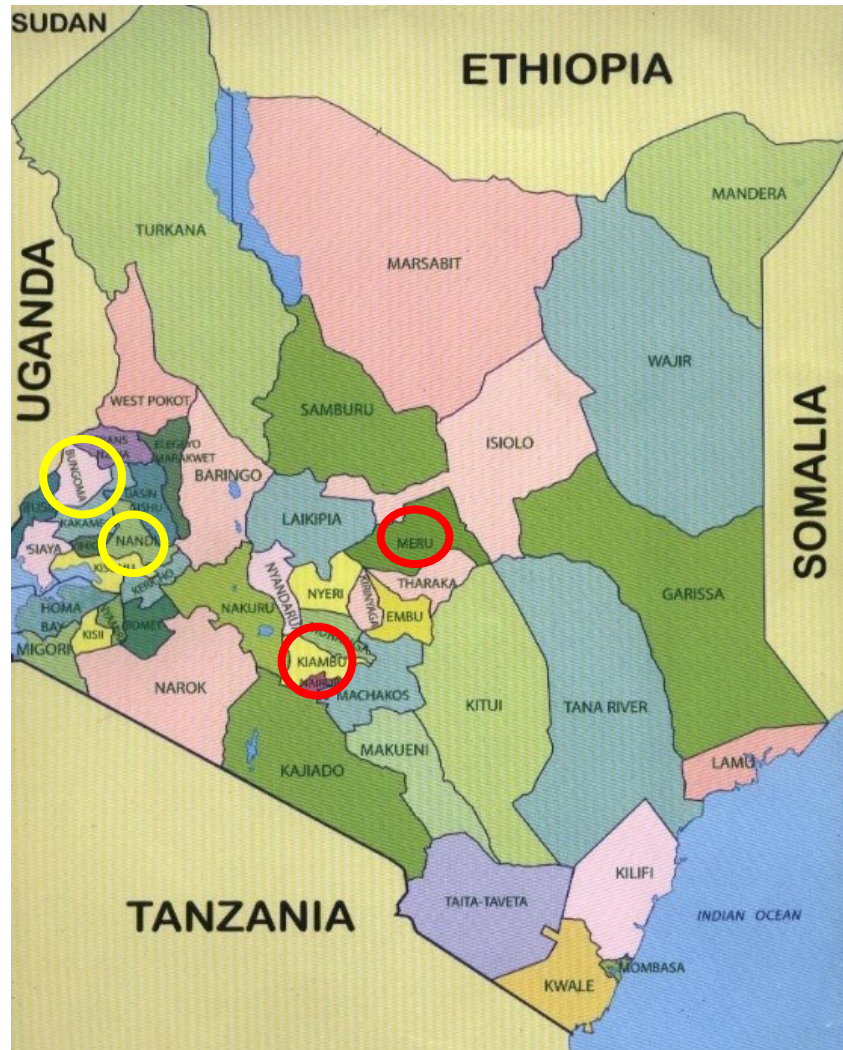
- **Dairy Food System = local chain**
- VHL - Aeres UASs
- EGU
- 3 coops (Fresha, Kitinda, Kaptama)
- NL/KE: Ante
- 1 KE alumni network

- **Avocado Food System = export chain**
- HAS - InHolland UASs
- MUST
- 2 cooperatives (Abogeta-W, Nandi)
- NL-Be Special Fruits, Fairtrasa, NL/KE Airflo, Q-point
- Network: Greenport West-Holland

• **Support & Impact**

- Netherland Food Partnership (NFP)
- KALRO + TVET-A

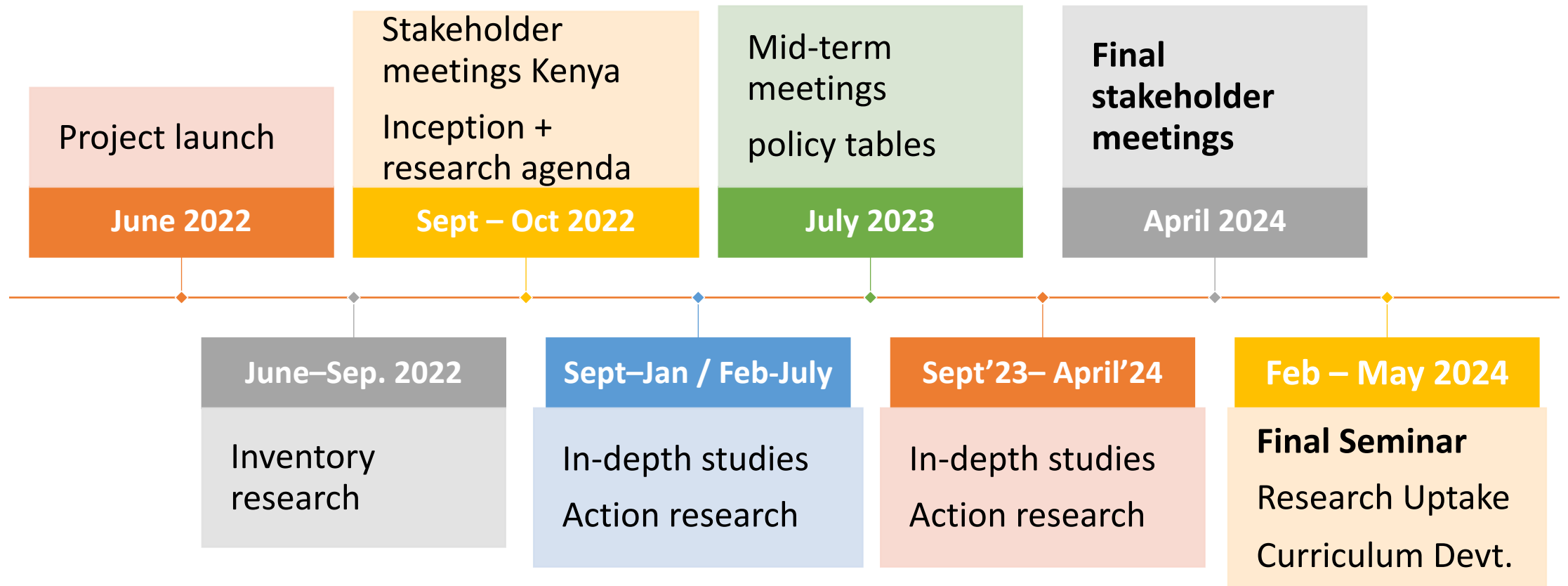
Research areas



	Avocado	Dairy
Well-developed	Meru (Central highlands)	Kiambu/Githunguri (Central highlands)
Less-developed	Nandi (West Kenya)	Bungoma (West Kenya)

7 cooperative societies, at least one in each county, as starting point in the living labs

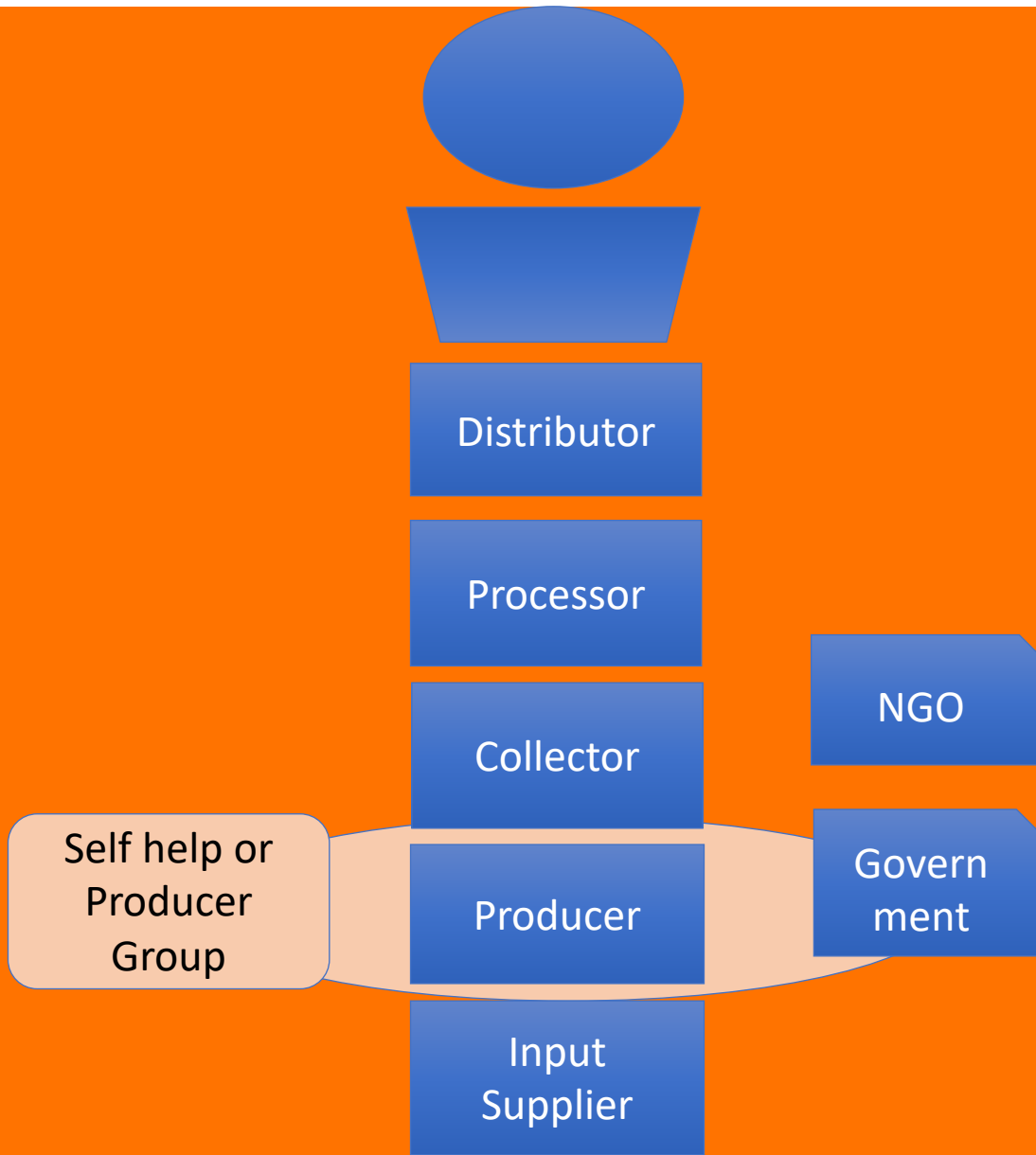
Project timeline 2022-2024



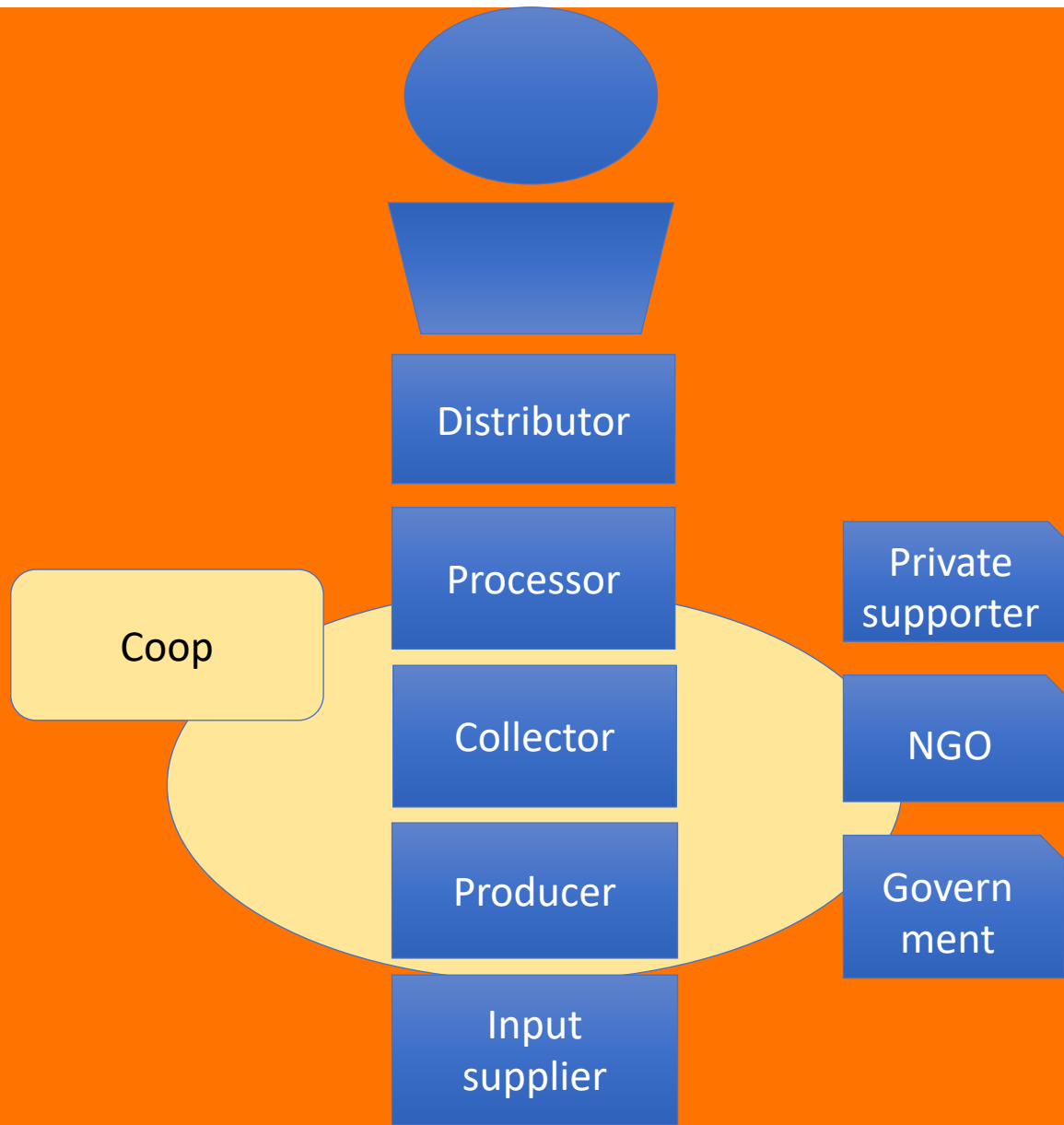
Living Lab Approach

- Solving complex problems, such as food losses
- Through creating sustainable solutions
- In cooperation with different stakeholders

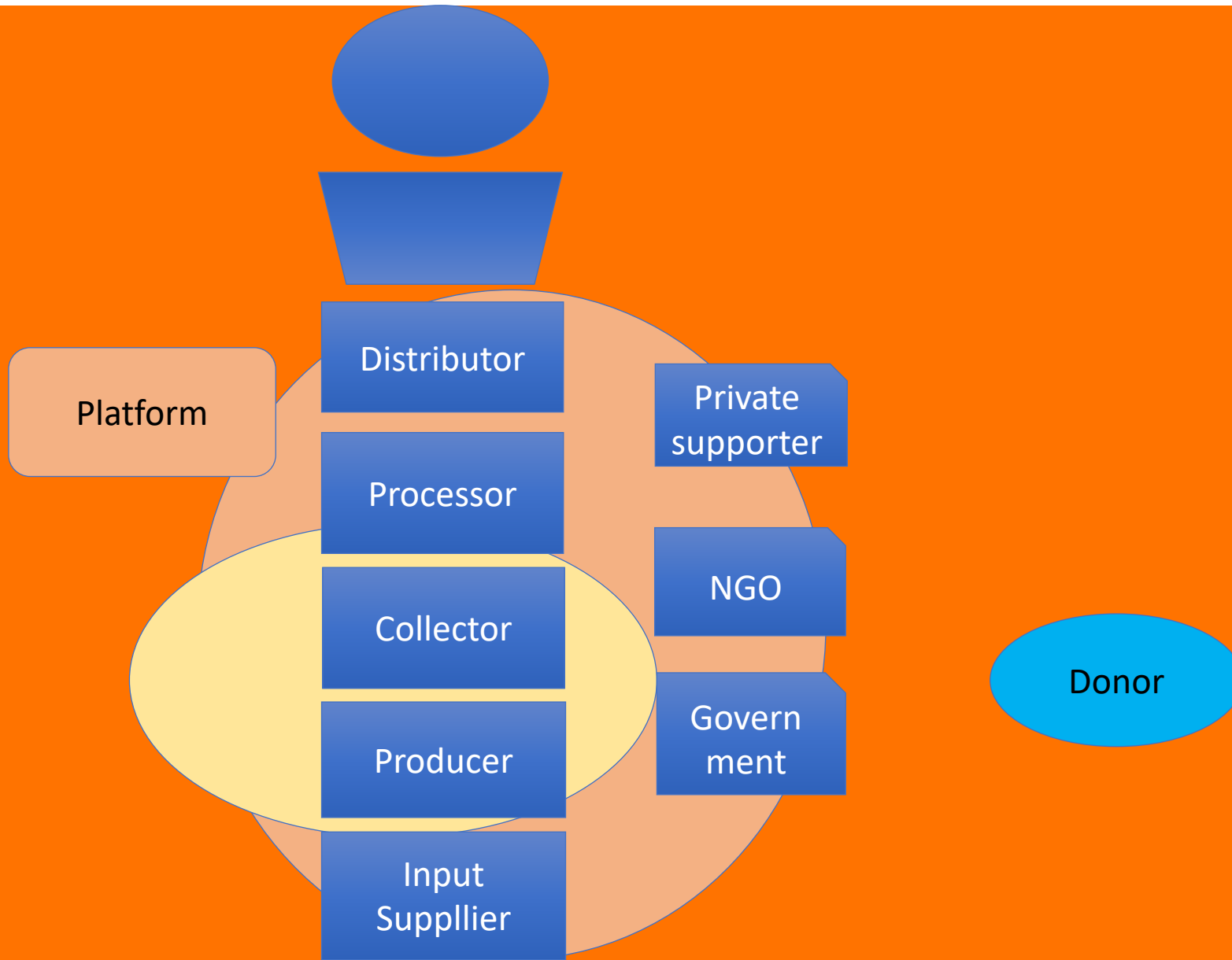
Producer group approach



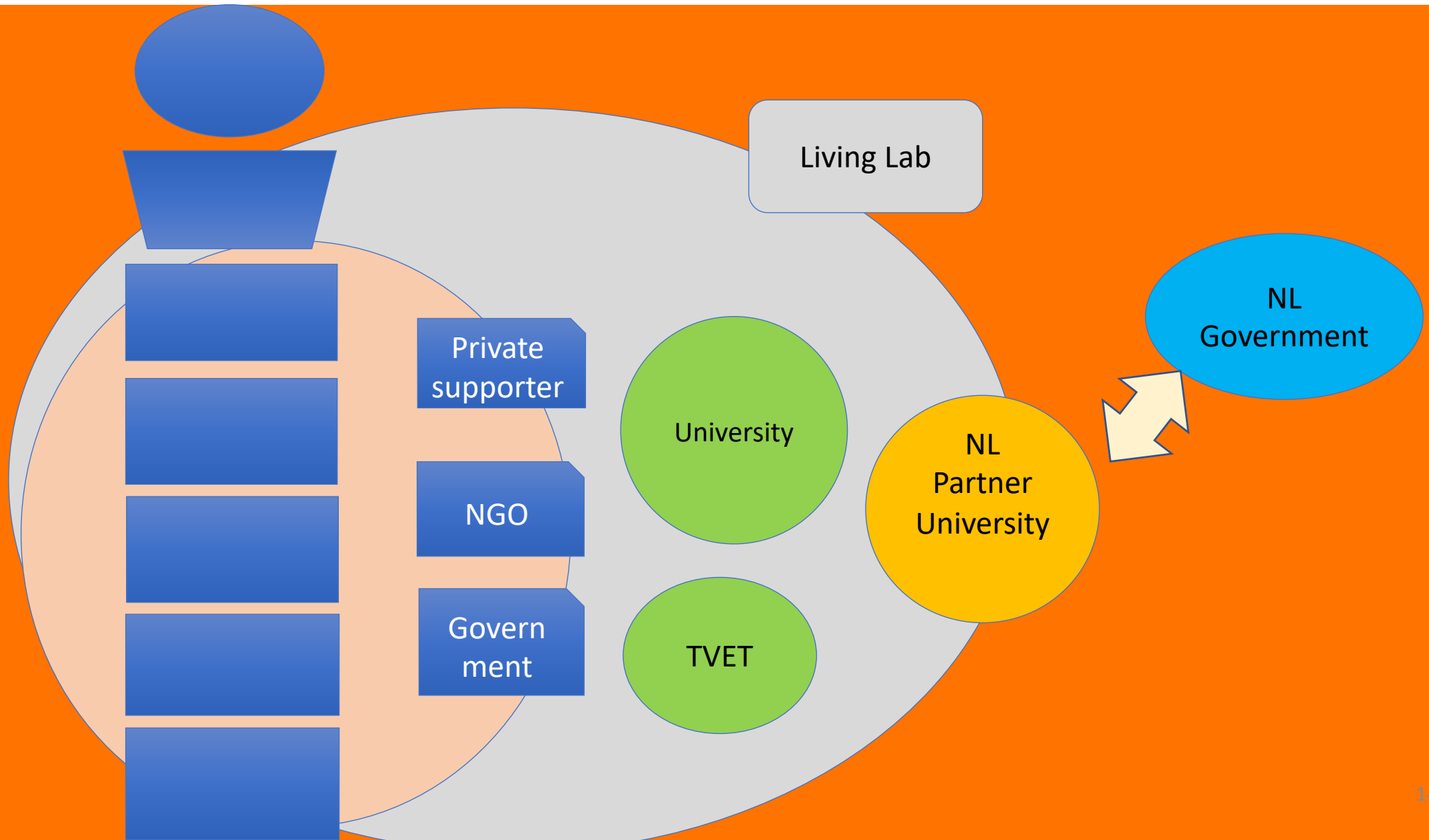
Coop approach



Platform or value chain approach



Living lab approach



Living Lab Approach – key elements

- Different stakeholders = Multi-stakeholder approach
- Integrating all levels of the value chain
- Technical and socio-economic issues = Inter- or multidisciplinary
- “Experimental learning” in reduction of food losses
- Innovations created and supported through active involvement of all stakeholders

Steps in Living Lab Development

Four stakeholder meetings/trainings/workshops in each living lab:

- Meeting 0 Acquaintance
- Meeting 1 Inception – Inventory; Agenda setting
- Meeting 2 Knowledge sharing & reflection
- Meeting 3 Consolidation of future plans

Project Deliverables – April 2024

Inception report

Research Reports (teaching materials)

- Thesis (22) – Business Case Reports (8)
- Practice Briefs
- 2 scientific papers

2 advisory reports (implementation plans)

- Interventions (2*3), incl action perspective
- Food loss chain maps (4)
- Proposal for ready solutions

2 Knowledge exchange platforms – living labs (4)

- 3 LL meetings/coop

Technology Transfer

- Teaching packages in each univ/uas,
- Modules for TVETs (2)
- Short training courses (2)
- Seminars (2)

Inception report

Research Reports (teaching materials)

- Thesis (14) – Business Case Reports (12); (9 in progress)
- coop scoping reports (6)
- Practice Briefs (12 ready; 8 in progress)

2 advisory reports (implementation plans)

- Interventions (2*3), first set up
- Food loss chain maps – almost completed (4)
- Expected: Functional ICT design; Readiness for QBMPS; video and photo use in coop and Living Lab development

2 Knowledge exchange platforms – living labs (4)

- 3 LL meetings/coop, including inception, mid-term, final

Technology Transfer

- Different modules or joint modules at UASs; Different videos (raw material); overview videos in progress
- 4 Modules for 7 TVETs ; 2 modules Meru Nat. Poly + MUST
- Short training courses (2) in Bungoma, exchange visit to Githunguri (DVC) & MyCoop training by Agriterro (AVC),
- Seminars (inception; mid-term, final, final); Photo exhibition

Dairy Value Chain - studies



Dairy Brands

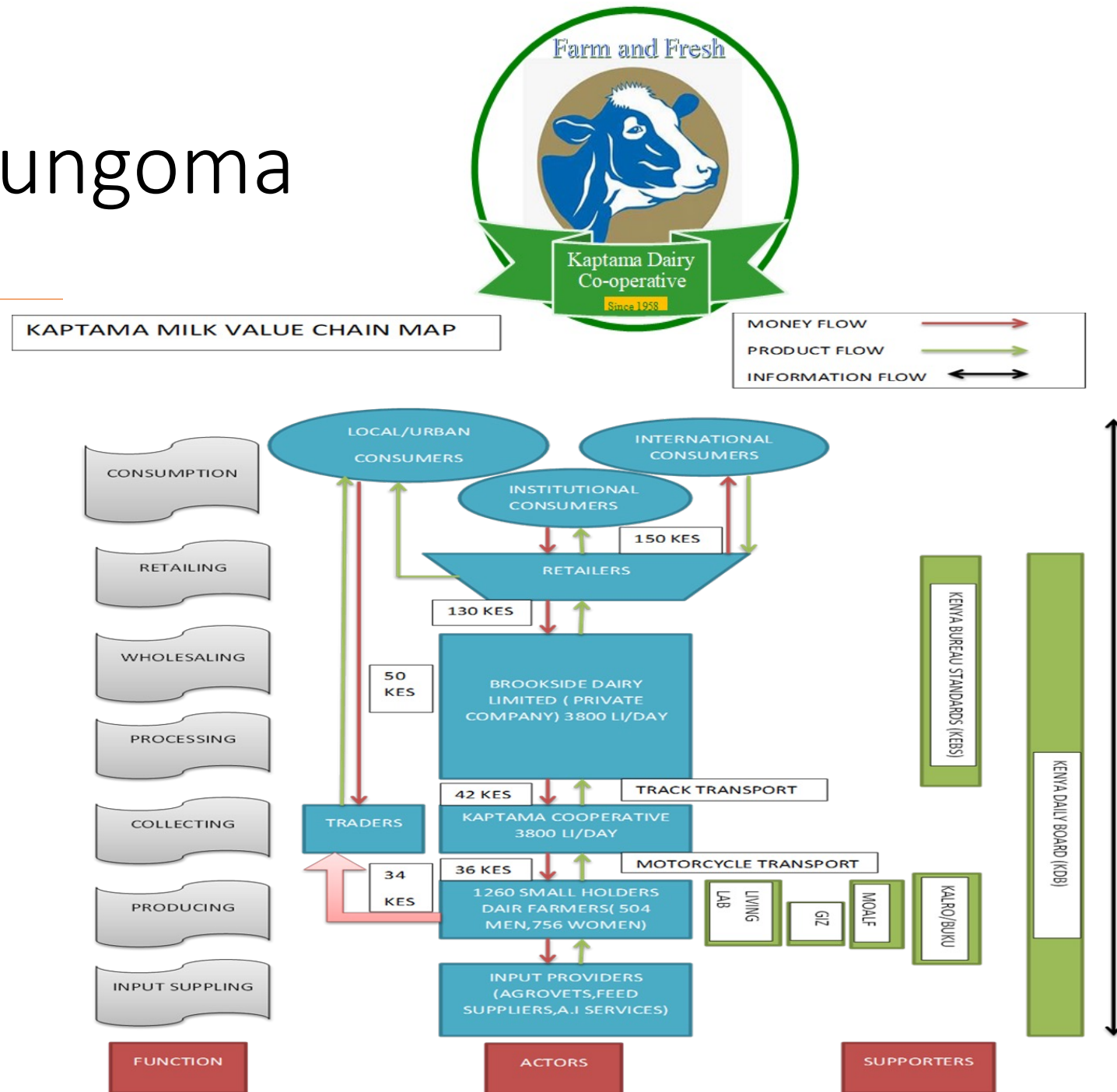
- Climate Smart Dairy project – VC analysis and climate smart practices
 - Mariam Katarama – food loss audit – short & longer routes
 - Njau Wanjahi – possibilities for milk bucket machines
-
- Linda van den Broek – Optimization milk transport
 - APCM students: new sustainable farm impact model
-
- Ilhan Guled - Readiness for QBMPS
 - APCM students: transition to climate safe production and milk stream
 - Maurice Simiyu – Digital info technology adoption reducing milk PHL

Overview studies Githunguri



Overview studies Bungoma

- Mercy Kemboi – Food loss audit
- Agriterra – Scoping studies
- Jo-Anne vdVoort & Tom van Mielick- milk handling practices
- APCM students: coop strengthening studies
- Exchange visit to Githunguri (1)
- Susan Njuguna – influence of nutritional practices on milk loss
- Wilson Karimi - Digital financial services
- Exchange visit to Githunguri (2)



Overview AVOCADO chain interventions

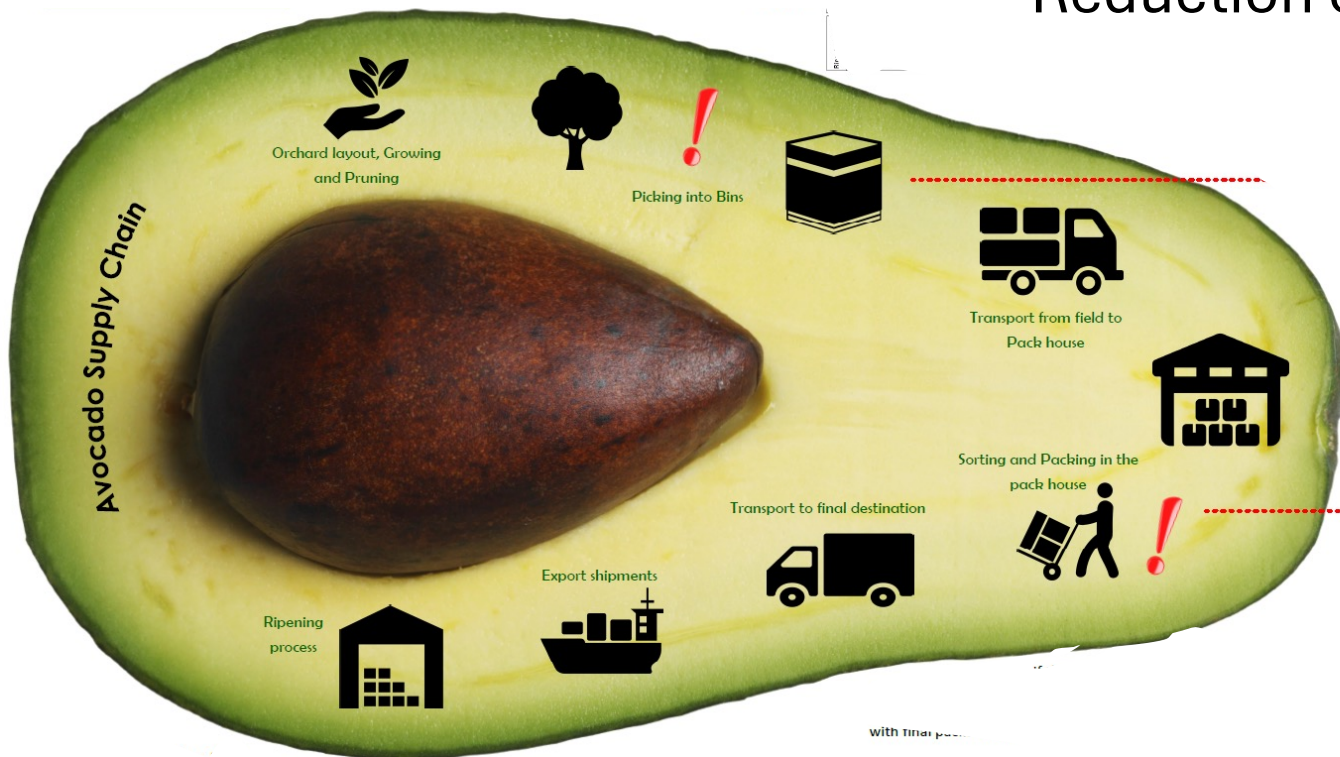
Reduction of food waste in the avocado (export) chain

May 25, 2024

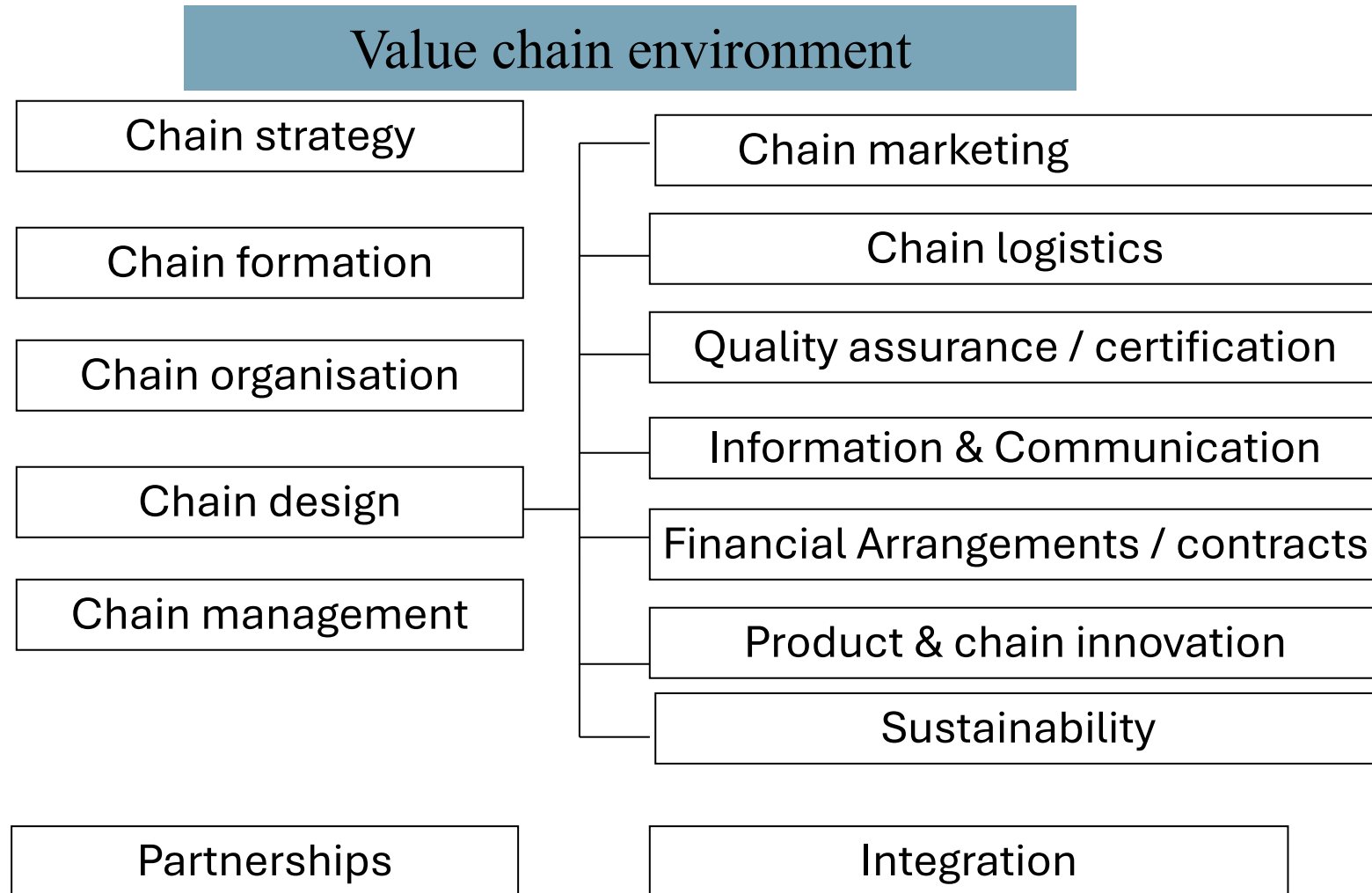
Woody Maijers (Inholland)

More info check the website:

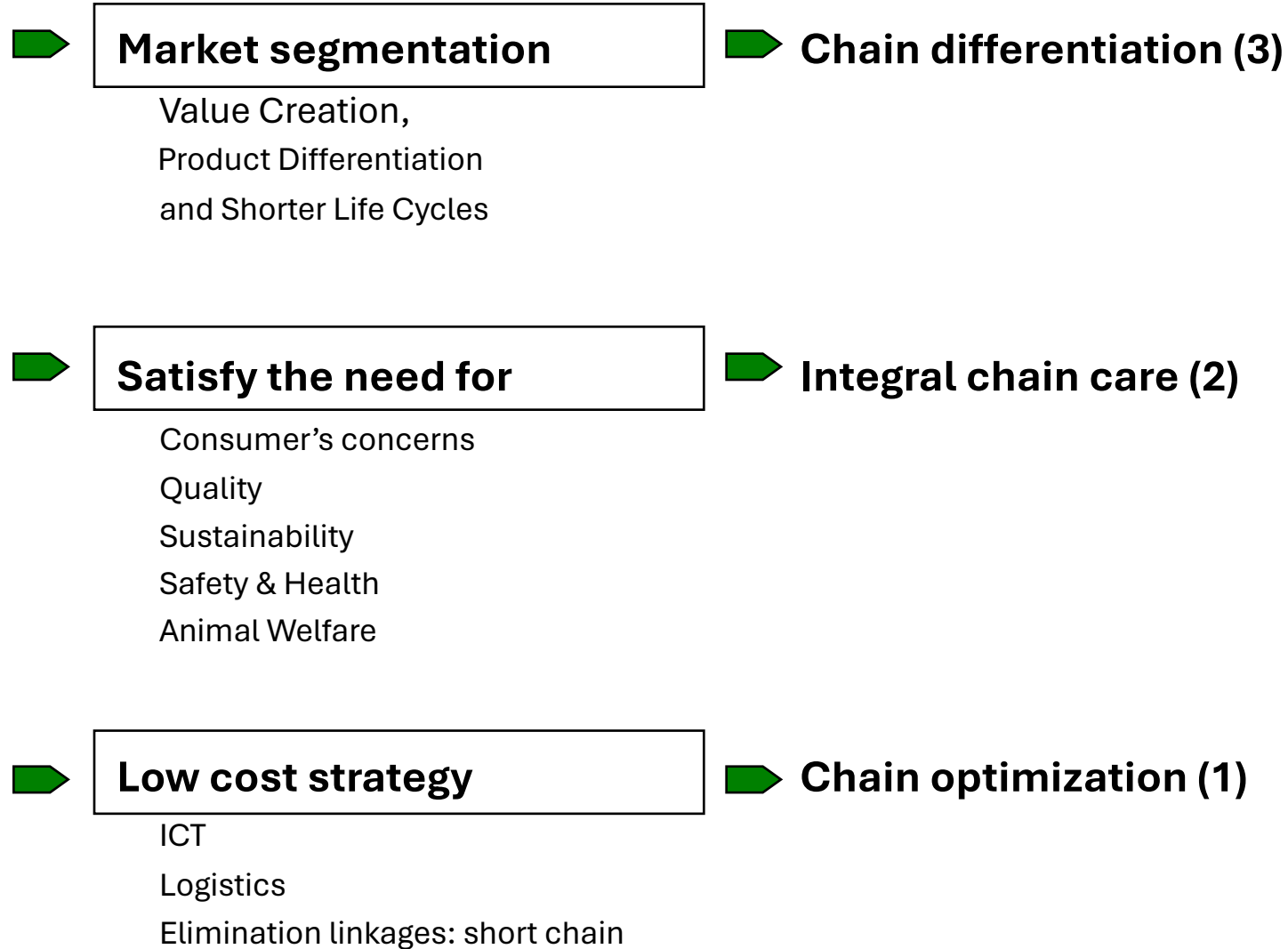
<https://www.nfpconnects.com/conversations/meet-the-forqlab-students>



Required steps and actions for value chain development



3 Strategies for chain development



Projects positioned in the value chain

All projects influence the final product quality for the consumer and the level of waste.



FARMING
BREEDING



FRUIT
TRADING



DISTRIBUTION
RETAIL



Consumer

Analyses of the value chain

REDUCING THE WASTE OF FRESH AVOCADOS FROM KENYA INTO THE NETHERLANDS BY USING THE ICEBERG MODEL

ANALYSIS OF FOOD LOSS AND WASTE IN AVOCADO VALUE CHAIN: A CASE STUDY OF AVOCADO VALUE CHAIN AMONG THE SMALLHOLDER FARMERS IN NANDI COUNTY, KENYA

FOODLOSS AND WASTE IN THE AVOCADO CHAIN. A VALUE- AND SUPPLY CHAIN ANALYSIS

REDUCTION OF FOOD LOSSES ALONG THE MERU AVOCADO VALUE CHAIN IN KENYA

THE POTENTIAL CONTRIBUTION OF VALUE CHAIN GOVERNANCE IN THE REDUCTION OF AVOCADO PRODUCTION LOSSES CASE OF ABOGETA WEST GROWERS' COOPERATIVE ASSOCIATION LTD IN MERU COUNTY, KENYA.

SCALING MECHANISMS FOR AVOCADO LOSS REDUCTION IN MERU COUNTY, KENYA.



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Consumer



Marketing Fresh Avocados



FARMING
BREEDING



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Consumer

FINDING THE RIGHT PRODUCT- MARKET FIT FOR AVOCADOS FROM THE NANDI COOPERATIVE.

Valorisation of rejected (fresh export) avocados

FREEZE DRYING PROCESS AVOCADO
PULP POWDER; FUNCTIONAL FOOD &
POTENTIAL IN COSMETIC INDUSTRY

THE POTENTIAL OF
BLACK SOLDIER FLY,
Hermetia illucens
LARVAE, TO
CONVERT AVOCADO
ORGANIC WASTE INTO
ORGANIC FERTILIZER

INTRODUCTION KENYAN FROZEN AVOCADO TO THE NETHERLANDS

REDUCTION OF WASTE AVOCADOS IN KENYA: NEW PRODUCTS & MARKETS



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BREEDING



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Consumer

Supply chain improvements



FARMING
BREEDING

MODELING OF HANDLING
AND TRANSPORTATION OF
AVOCADO FOR EXPORT
FROM MERU COUNTY IN
KENYA



TRADING

TO EXPLORE THE EFFECT OF SUPPLY
CHAIN OPTIMIZATION ON THE
EXPORT PERFORMANCE OF
AVOCADO FRUIT IN MERU COUNTY-
KENYA



DISTRIBUTION
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BUSINESS AND IMPLEMENTATION
PLAN CONTAINER TRANSPORT FOR
KENYAN AVOCADOS. ADVISORY
REPORT AIRFLOW LTD.



Consumer

SUSTAINABLE SOURCING- DEVELOPMENT
OF TRACEABILITY IN THE AVOCADO VALUE
CHAIN FOR SMALL AND
MEDIUM SCALE FARMERS

REDUCING THE COSTS OF
INTERNATIONAL TRADE IN AVOCADO
VALUE CHAIN

Tech options and impact

CAN MICROWAVE TECHNOLOGY BE USED TO DETERMINE AVOCADOS QUALITY PARAMETERS?

ICT-READINESS ASSESMENT FOR AN INTEGRATED CHAIN-WIDE TRACIBILITY SYSTEM: CASE STUDY OF THE AVOCADO VALUE CHAIN IN NANDI COUNTY, KENYA



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Consumer

Intervention overview

1. Level of food waste in the chain is significant (30 – 50%)
2. The financial impact of food waste effects the small farmers
3. All actors can reduce food loss in the chain: starts at the farm
4. Awareness is step one and next step is training
5. Technology can support (quality control, cold chain, new products)



FARMING
BREEDING



FRUIT
TRADING



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FRUIT
TRANSFORMATION



four cooperative societies:

Mt. Kenya Avocado Growers' Cooperative

Mt. Kenya Abogeta East Avocado Growers' Cooperative

Abothuguchi Avocado Growers' Cooperative

Nandi Cooperative Society

**Thank you,
Asante**

questions?



Business
incorporation

Linking the real world



Business Plan
seafreight

Full support
Cash contribution
next to kind

Support export
process





Interest in sourcing

**How to source
directly and
sustainable**

Subtitle

**Reception first (non
commercial)
shipment**

University of applied sciences for
agriculture, food and the living environment



Support of Local exporters:

Keitt Exporters

Sunripe exporters

AAA growers

EOSTA
(importer)

FPEAK

University of applied sciences for
agriculture, food and the living environment

LIMBUA FOUNDATION

Avocado oil processing

University of applied sciences for
agriculture, food and the living environment

Frigoken



Thank
you!

**IF LIFE GIVES
YOU AVOCADOS**



**MAKE
GUACAMOLE**

NFP and FORQLAB

Overview, reflections and pending actions



Why did NFP support?



a) Relevant topic: Food Losses and Waste

NFP sees the **reduction of food losses and waste** as an important element of **more sustainable food systems**. Not only through positive effects on climate and biodiversity, but also by the business and employment opportunities that the valorisation of waste streams present.

FORQLAB Living Lab (Kenya)

Applied research with business partners to find and test technical solutions and tools as well as look into better coordination in the avocado and dairy value chains.

Partners: Van Hall Larenstein, HAS, InHolland, Aeres, Egerton University, Meru University

Insect Farming (Kenya/East Africa)

Advancing insect farming as a business to reduce food losses and waste and support a transition to more sustainable protein sources.

Partners: Fair & Sustainable Consulting, Association for Insect Farming and Its Products, New Generation Nutrition

FLW Exploration (East Africa)

Exploring opportunities to reduce FLW in East Africa on the nexus of energy and agro-logistics.

Partners: Ministry of Agriculture, EKN's East Africa, Wageningen University and Research, Flying Swans, Rabobank, Enviu, TRAIDE

KOM Toolbox (Global)

Collection of food loss and waste data and relevant protocols and tools for interventions for practitioners to reduce FLW in their businesses or projects.

Partners: Wageningen University and Research, IDH, Van Hall Larenstein

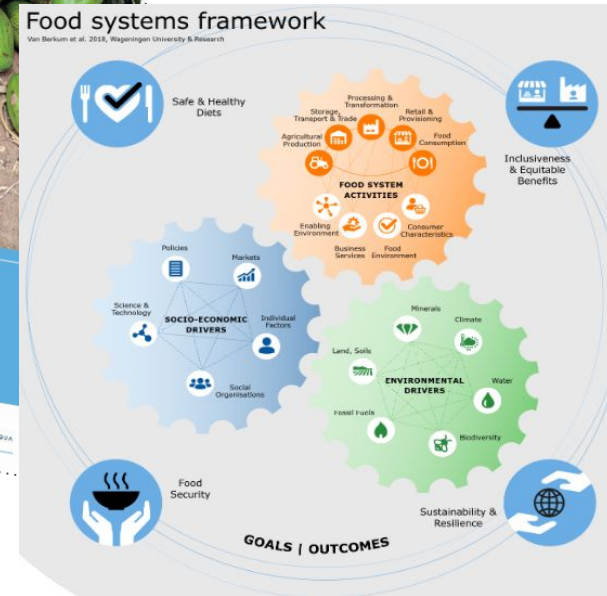
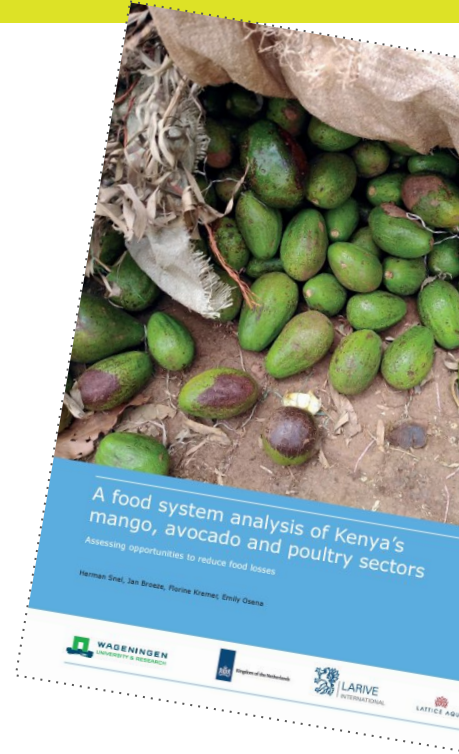
Cassava Peels for Animal Feed (Nigeria)

Development of a viable business model regarding the valorisation of high-quality cassava peels into ingredients for animal feed.

Partners: Bopinc, Circular Economy Innovation Partnership, Asanita, Promise Point Ltd, RajoBeheer



b) The living lab approach meets food system thinking



Verder bouwen oppaar concrete voorbeelden...

- **Lopend beleidsondersteunend onderzoek**

- door klimaatverandering verschuiven productiezones belangrijkste voedselgewassen in de wereld. Wat betekent dit voor voedselzekerheid in Afrika, EU, Nederland? Welke kansen biedt dit?
- hoe meten voortgang transitie voedselsysteem?

- **Toegepast onderzoek ism NWO/SIA** : WUR studie FLW Kenia -> Toegepast onderzoek NLD –Kenia (opvolging van Orange Knowledge Program (BZ) - FORQLAB Living Lab

- **EU Horizon PARTNERSCHAP FUTURE FOODS (22 landen)** – living labs en kennishub – inzet NLD ook aandacht voor link AU

- **Kennis op maat**: Academische kennis op FLW toepasbaar maken voor bedrijfsleven en LNV-raden -> FLW CGIAR Mitigate+ (KoM FL solution) publications

- AU-EU onderzoek naar bedrijfsleven brengen via **Seed Money Projecten** – casus NUTRIFOODS: Breads from African Climate-Resilient Crops for Improving Diets and Food Security
<https://www.trouw.nl/verdieping/voedselcrisis-en-klimaatverandering-dwingen-oeganda-lokale-alternatieven-voor-tarwe-te-vinden~b01f964f/>



What did NFP support?



a) communication

b) scoping coops & training farmers

NFPConnects

22 contributions

FORQLAB Food Losses Kenya

Food waste reduction and food quality living lab (FORQLAB) is a consortium led by four Dutch universities Van Hall Larenstein, HAS Green Academy, Inholland and Aeres,...

Kenya

Newsletters

Community update • Feb. 19, '24

Forqlab Newsletter 2024 issue 3



COOPERATIVE SCOPING

ABOTHOGUCHI FARMERS COOPERATIVE SOCIETY

19th DECEMBER 2022, MERU, KENYA

22ATKE 9242
SCO. 15891

ESTHER KALANZA
MARY MUTHONI



www.agriterra.org



c) photo competition (*cancelled and replaced by ...*) d) pubquiz and photo exhibit

FORQLAB photo video competition

Edition Kenya 2024
Deadline March 31

Food losses in dairy and avocado chains have huge economic and environmental implications. The FORQLAB partners study the options to reduce these losses via technological and governance solutions. In this final phase of the FORQLAB collaboration, the partners organise a photo and video competition for their students and cooperative members.



The awards in this competition are for practices that reduce food losses and increase food quality in the following categories :



In our planning Q2



FORQLAB Newsletter Issue 4, 2024:

- 1. New reports/ thesis by students (Marco)**
- 2. Farmer exchange in Githunguri (Ken)**
- 3. Farmer exchange in Nandi (Esther/Peter)**
- 4. Workshop and Photo exhibition Nakuru (Ken)**
- 5. Student exchange (Ken)**
- 6. Teacher visit to NL / Final Workshop- Delft (Ken)**
- 7. Suggestions?**



NFP activities - food losses 2024:

e) Knowledge products :

- Insight article: Living lab * Food systems
- World Food Day: Food loss cinema

f) Bring the Food for Thought expo to Kenya?

g) Do we have other wild ideas ?

