SNV Kenya Market-led Dairy Program (KMDP)

Presentation SNV KMDP Forage Interventions
Version 14032018

SNV Kenya Market-led Dairy Programme

Funded by the Embassy of the Kingdom of the Netherlands in Nairobi

Implemented by SNV – Kenya

Phase 1: July 2012 – December 2016

Phase 2: October 2016 – June 2019

3R Project Kenya – Wageningen University Research and Kenyan Universities: Documentation of KMDP fodder interventions (a.o.)

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SNV Kenya Market-led Dairy Programme

Fodder Interventions

- **SH, MSF and LSF: improved on-farm fodder production and preservation practices and/or technologies**

  ✓Focus on energy and protein rich fodder crops
  ✓Promotion of silages (maize, oats, fodder sorghums, grasses)

- **SH, MSF, LSF pasture management (rotational grazing, cut & carry)**

- **Commercial Fodder Producers: grass hay, lucerne hay , packaged/ baled silages**

- **Agricultural Contracting Services for dairy farmers (Service Providers Network SPEs, Maize & Grass Train)**

More milk, higher productivity, lower cost price, more profit

Part I. Fodder Production/Supply Chain – From Seed to Feed

A. Crop Production

Soil management and land preparation
Quality seeds, plant population, calibration, fertilization
Crop management

B. Pasture management

Weeding, seeding and fertilisation
Grazing regime and rotation
Cut and carry

C. Fodder Preservation

Optimize quality, reduce losses
Maximize daily fodder intake

Part II. Agricultural Contracting Services & Commercial Fodder Producers

A. Fodder Silage Train (maize, sorghum, oats, grass, …)

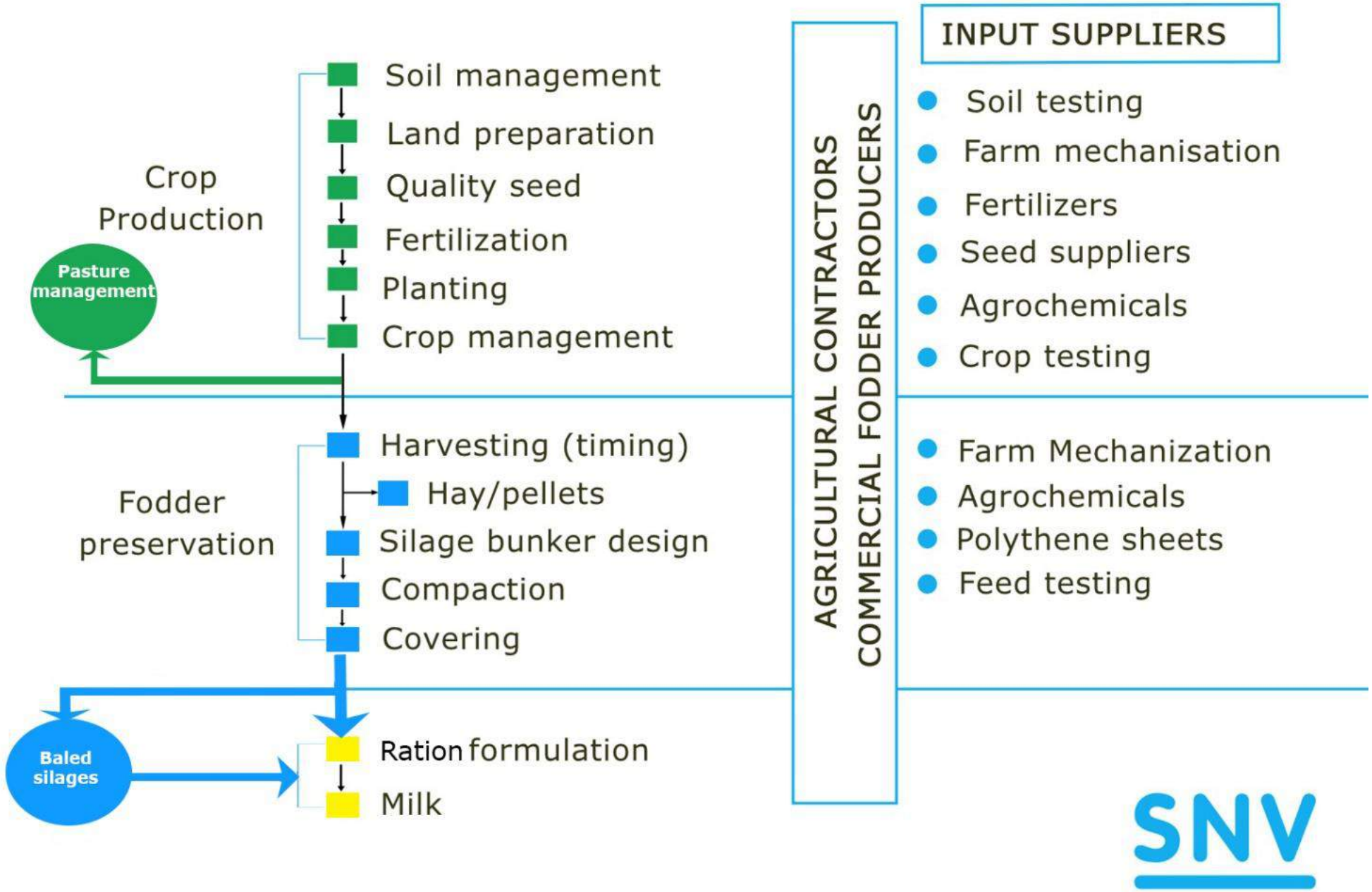
SPE Youth-led Service Provider Enterprises
Mechanized Fodder Trains

B. Commercializing Silage: Bales

Mechanized silage baling services (maize, sorghum, oats, grass)

Part I. Fodder Supply Chain – From Seed to Feed

FODDER CHAIN - FROM SEED TO FEED



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A. Crop Production: Total Yield = Quantity + Quality

Factors influencing yield:

- Soil management
- Land preparation
- Quality seeds
- Plant population (calibration / fertilization)
- Weather
- Crop management
- Discipline

Soil Management

- Soil Analysis
- Soil Improvement
- Soil Conservation
- Soil Fertilization
- Crop rotation

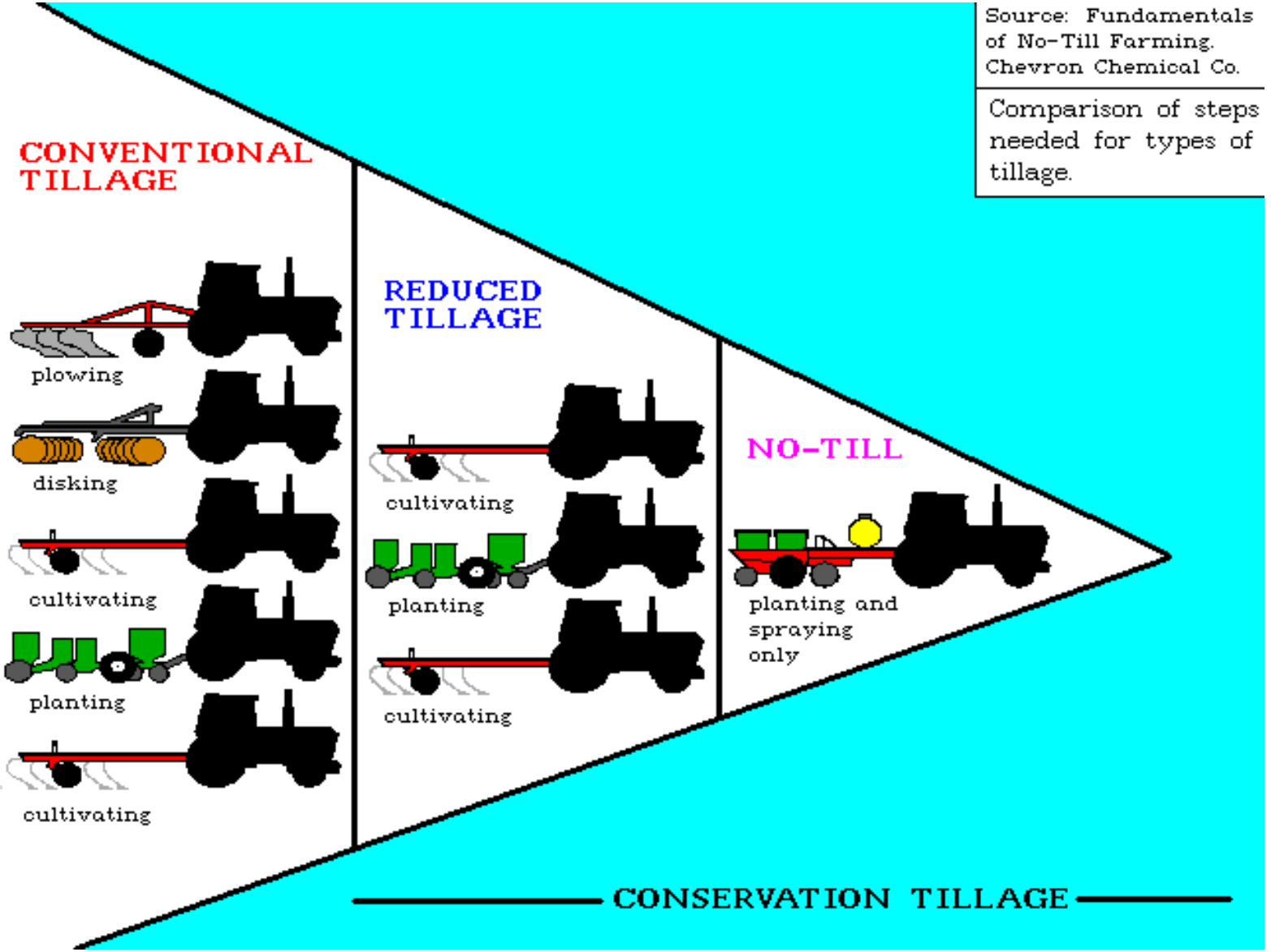
Key soil elements

- Organic matter (Humus)
- Soil Micro-organisms
- Soil PH

Sources of organic matter

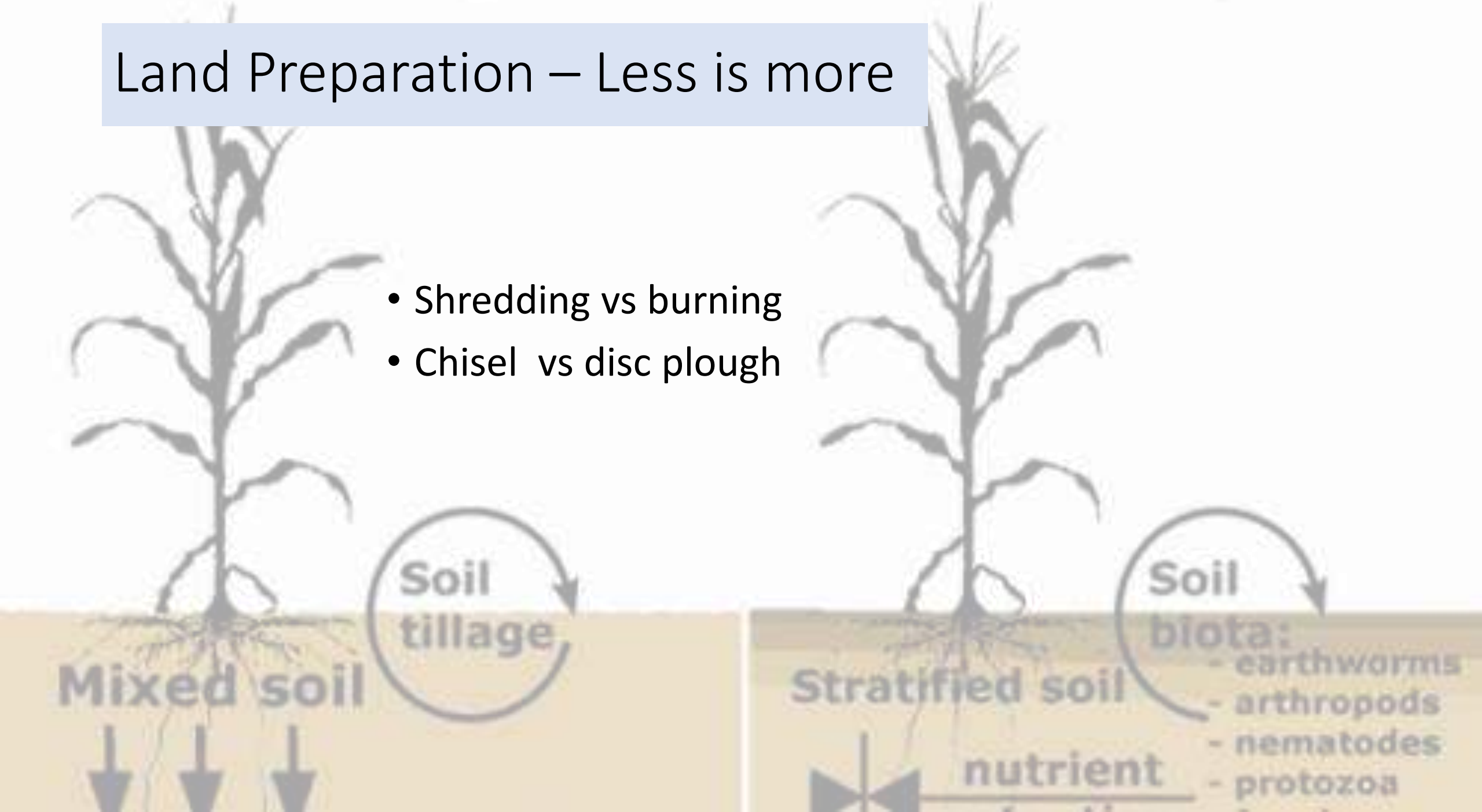
- Crop residues (maize stovers and wheat straws)
- Compost
- Manure
- Soil improvers (cover crops)

Land Preparation: Mould board and chisel ploughing



Land Preparation – Less is more

- Shredding vs burning
- Chisel vs disc plough



Seed Selection

- Choose fodder crops suitable for soil/climate
- Select quality seeds, certified and treated
- Calibrate planter to seed size / seed weight

Planting

- Calibration: manual, mechanical, pneumatic, precision
- Depth
- Plant spacing
- Plant population
- Day length

Fodder Crop Management

- Weeding control
- Crop protection
- Fertilization
- Grazing/Mowing/Harvesting at right stage

B. Pasture Management (Rehabilitation)

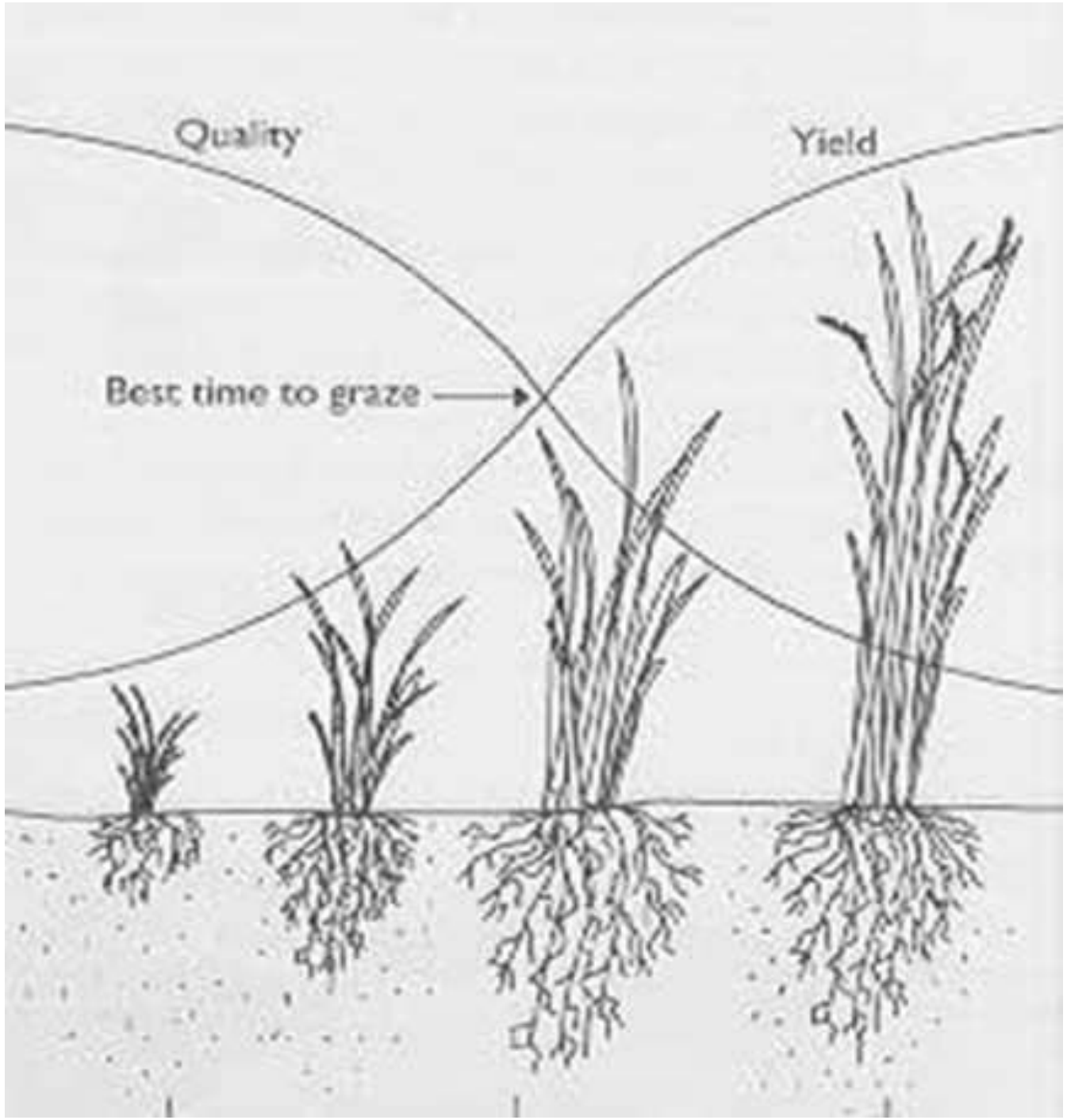
- Clearing of shrubs, weeds, stones, stubbles and levelling
- Before start of rainy season spread cow dung in the field with harrow
- Mowing (gyro-mower)
- Fertilisation (manure, top dressing CAN, minimum 50 kgs N/hectare)
- The aim is to get a very thick and dense grass cover
- Grazing: grasses to grow up to 15-17 cms, allow cows to enter, use paddock system for rotational grazing (refertilize after 2 grazings)
- Cut-and-carry: 23 cms and Silage: 35 cms
- Manure and CAN application directly after silage making


Minimal
grass growth

Grazing management: Why?

- High dry matter intake
- High protein in the Dry Matter (DM)
- High energy in the Dry Matter (DM)
- High production of grass/acre
- Low costs of feeding

Balance between Quantity and Quality



C. Fodder Preservation

- Optimize quality
- Reduce losses
- Maximize daily fodder intake

Optimize Fodder Quality

- Soil fertility/improvement
- Land preparation
- Right variety & quality seeds
- Crop management & crop rotation
- Right harvesting stage, crushing maize kernels
- High capacity while harvesting (cover silo bunker within 1 day)
- Compaction
- Use quality plastic to cover and protect the plastic cover
- Dimensions of silage bunkers match the herd size.

Reduce Losses

- While harvesting
- Capacity while harvesting
- Covering silage clamp/bunker within 1 day
- Protect plastic; not to be damaged
- Dimensions of silage clamp / bunker
- Feeding speed (1 meter/week)
- Avoid moulds and heating of silage
- Palatable / Quality silage increases daily feed intake, reducing losses

Maximize Feed Intake

- Good quality silage has a higher DM intake
- Good quality silage has a higher nutritive value (energy) per kg DM
- Good quality silage has less fermentation losses
- Resulting in a higher DM and energy intake from the silage and less feeding losses
- These factors combined will result in a much higher milk production per cow.

Part II. Agricultural Contracting Services & Commercial Fodder Producers

A. Fodder Silage Train (maize, sorghum, oats, grass, …)

- Specialized fodder production and preservation services for SHs, MSFs, LSFs
- From semi-manual (SPE) to fully mechanized 1-6 row forage harvesters
- From Seed to Feed:
  - ✓Soil management
  - ✓Crop management
  - ✓Harvesting, chopping and crushing
  - ✓Ensiling: high capacity (1-6 row forage harvesters), compaction
- Increasing fodder security and reduced seasonal fluctuations

A.1 SPE: Youth-led Service Provider Enterprises




SERVICES PROVIDER ENTERPRISES – SPEs




What is the SPE Model?

- Groups of youth-led agri-contracting service providers
- Initiated with SNV Kenya/KMDP sup-port since 2010 - practical training in silage making and basic dairy management.
- Offer “next door” services in fodder establishment, silage making & some advisory support to entrepreneurial SH farmers.
- SPE linked to Dairy Farmer Cooperative Societies (DFCS)
- Currently 29 active SPEs in 6 Counties with 160 members (53% are youth)

Performance of SPE model

- 3R and SNV-KMDP study to assess performance of SPEs in 4 Counties(n=8)
- SPE performance assessed from two dimensions:
  - Technical aspects – quality of service delivery
  - Entrepreneurial aspect-business outcomes

County	SPE Name	Active Mbrs	DFCS	Tons
Baringo	Bakimu	3	Mumberes	1,093
	IDM	4	Kiplombe	1,500
Meru	DRIP	6	Nkuene	1,270
	Bidii	4	Mbwinjeru	340
	DASPE	5	Naari	544
Nyandarua	Intertech	3	Nyala	8,500
Nyeri	Ngorika	4	N Ngorika	900
Nyeri	Unique	3	Kiunyu	80
		32		14,227

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Dimensions of Technical + Entrepreneurial Performance

Technical performance

- Technical soundness, quality of services
- Addressing clients' needs
- Timeliness of service delivery
- Feedback/learning related to services
- Other farm enterprise support

Business Performance

- Management of the enterprise (financial, planning)
- Selling/promoting the services/products
- Customer focus (satisfying needs)
- Growth of the enterprise (strategy)
- Access to markets
- Access to business development services

Technical + Entrepreneurial capacities of SPEs
(i.e. knowledge, skills and attitude)

Technical Performance

- SPEs offer a range of services
- In 2016 SPEs made 12,000 tons of silage
- Worth about US$ 50,000
- Contribution to increased in milk productivity
- Lower cost price, more profit
- Less seasonal fluctuations of milk to DFCS

Cost comparison

- 1 kg DM maize silage (SPE) : KES 16 (KES 5.3 per kg fresh product)
- 1 kg DM hay grass: KES 26 (1 bale 12kg/80% DM @ KES 250)
- 1 kg DM dairy meal: KES 34-40

Challenges: Lack of equipment, poor quality material, polythene sheets, poor quality fodder seeds, farmers' slow adoption of new practices …

Enterprise Performance

- Served about 950 farmers – approx. 7% of potential client base
- Silage made in 2016 worth about US$ 50,000
- Income from silage ranges from KES 5,000 to 46,000 monthly per member
- More income from fodder seeds sells

Challenges: Marketing of business, delayed payment by clients; seasonality of business; no investment in equipment; farmers no returning for service

Reflections, lessons learnt

- Huge client-base of DFCS members not reached is opportunity
- Seasonality of business and slow farmer adoption of services limits growth
- SPE need technical (equip) & business (mgmnt/ marketing) support to ensure quality & profitability
- Model scalable- but challenges to be addressed

A.2 Mechanized Maize & Grass Trains in North Rift

Grass Train

Key Data North Rift Maize Train

- Harvesting & ensiling — KES 13,000 / acre
- Cost price/kg ensiled product — KES 3.0-4.0 / kg fresh
- Cost price/kg DM — KES 12.0 / kg DM
- Cost price hay/kg DM (KES 250/12 kg bale/80% DM) — KES 26.0 / kg DM
- To date (since 2015) 3,000 acres ensiled by Nundoroto, Simam, Dejirene Ltd
- Turnover US $ 390,000 worth US $ 1.2 million of ensiled maize
- The nutritive value of maize silage (if only energy is considered) has potential to generate more than 16 million litres of milk with an economic value of > US $ 5.5 million at KES 35/litre (or US $ 6.2 million at KES 40/litre)
- Supply can no longer catch up with demand: crowding in of small contractors

B. Commercializing Silage: Vacuum Bales

- Highest quality fodder in the market for SHs, MSFs and LSFs
- Sizes of 50, 350-400, 800 kgs
- High compaction, no losses, long shelf life
- Strategic Fodder Reserve
- Reduced seasonal fluctuations in milk supply through fodder security
- Bigger bales, better compaction, better quality
- Proof of concept: Gogar Farm 50 kg bales (2015), Agventure Group/ AusQuest 50 and 400 kg bales and FIT Ltd Agronic Multibaler 350 kg bales (2018)
- Maize, oats, sorghum, grass

FIT Ltd. Multi Baler Maize-Sorghum- Grass Silage

Commercial Feasibility Baled Silages

- **Price of baled Maize Silage KES 10-12 per kg fresh = KES 30-36 / kg DM**
- **Approx. OMd: 70-80% - Metabolic Energy 11 MJ – Net Energy 6.3 MJ**

- **Price Hay 1 kg DM (12 kgs bale/KES 250/80% DM) = KES 26 / kg DM**
- **Price Hay 1 kg DM (12 kgs bale/KES 350/80% DM) = KES 36 / Kg DM**
- **Approx. OMd: 50-60% - Metabolic Energy 7.0 MJ – Net Energy 4.0 MJ**

- **Price Dairy Meal 1 kg DM = KES 34-40 / Kg DM**
- **Approx. OMd: 80-85% - Metabolic Energy 12 MJ – Net Energy 7.0 MJ**

Conclusion: With good quality maize (sorghum, grass) silages to replace hay in the total ration, the farmer can reduce the share of dairy meal in the ration and cost price of milk This also applies for baled silages that cost 2-2.5 times more per kg DM than silage from a bunker (SPE, Maize Train)

Part III. Recommendations/Observations

1. Increased supply of fodder with focus on quality is essential to meet the nutrient requirements of modern exotic breeds (pure and cross). Matching the genetic potential with feed management requires differentiation within the national forage strategy between intensive and extensive livestock production systems.
2. Professional, efficient fodder production embraces chain management and GAP in all steps of the process from seed-to-feed. This translates in very significant increases in productivity per acre per cow, reduced cost price of feeds and raw milk, reduced seasonality in production and lower carbon footprint per litre of milk produced.
3. Increased supply of quality forages – in combination with on-farm ration formulation - will result in more profitable dairy farms for SHs, MSFs and LSFs alike.
4. Research in fodder systems in EA is biased too much on SH dairy farming systems and on livestock systems in semi-arid areas (with focus mainly on hay).
6. Focus needs to be on applied research and improvement of practical knowledge and skills to produce and preserve quality fodder crops.

III. Recommendations/Observations (c'tnd)

7. Fodder crop production and preservation needs further mechanisation to assure scale, speed, proper timing, compaction and shelf-life for enhanced quality, nutritive value and reduction of losses.
8. Government and donors should create a conducive enabling environment for international fodder seed companies and for private investors in agricultural contracting and large scale mechanized commercial fodder production (CFP).
9. Focus on CFP business models that add value to the dairy sector and not only assures high return on investment for the CFP (i.e. current hay market).
10. Better use can be made of available information on agro-ecological zones, climate, weather data in relation to suitable fodder crops and timing of crop production related activities during the growing season and harvest.
11. Addressing these issues will bring innovations, create business opportunities, employment, income, enhanced profitability of the DVC, increased affordability of milk (products) to consumers, and a more climate smart sector.

SNV Kenya/KMDP & 3R Project Kenya
Feed & Fodder Publications/Reports/Seminars

1. BLGG Feed and Fodder Study (Reports I-VII)
2. Fodder Production and Service Centre (Feasibility Study Report)
3. Fodder Seeds (Survey Report)
4. Fodder Production and Preservation Demos
5. Status Report on Medium Scale Farmers and Commercial Fodder Producers
6. Performance of emerging dairy services agri-enterprises: A case of youth-led Service Provider Enterprises (SPE), 2018, WUR LR, 3R Project Kenya (plus video)
7. National Fodder and Agribusiness Conference, December 2018
8. Seminar: Review KMDP PUM forage interventions, December 2017

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