Centenary Bank

Module 1

Agronomic Aspects of Agricultural Lending

Wasmus Consulting

Part 1

- Introduction

Content of module

- Key information on the following crops and activities:
  - Maize (ppt)
  - Robusta (ppt) and Arabica Coffee
  - Rice (ppt)
  - Banana (ppt)
  - Sunflower
  - Dairy & beef farming
  - Poultry farming – egg and meat production
  - Short notes on processing and produce trade

Content

- Technical aspects of each crop/ activity
  - Climatic & soil requirements
  - Production calendar
  - Yield indications
  - Income/ revenue analysis for 3 scenarios:
    - Traditional – ancient, traditional methods
    - Low input – limited application of fertilizer etc.
    - High input – modern, state of the art farming techniques with optimal use of high yielding varieties

Linking I/R analysis to agricultural loan analysis

- Centenary Banks's agricultural loan analysis methodology shall remain the basis for all agricultural production loans; with a focus on future household repayment capacity with help of projected a cash flow.

- Product-based income/ revenue analysis shall be complementary to it and not act as a substitute.

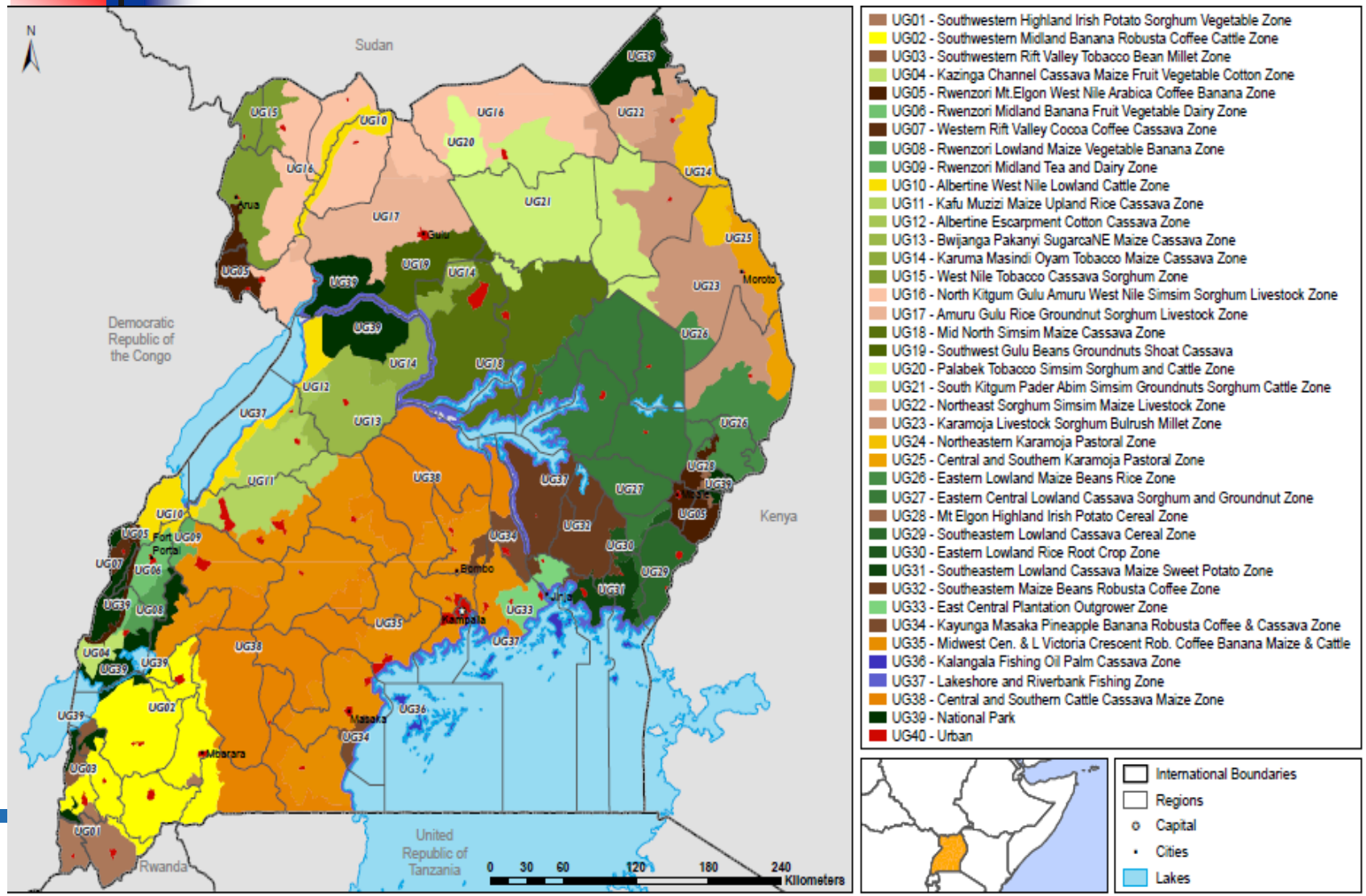
Linking I/R analysis to agricultural loan analysis

- What income/ revenue analysis does demonstrate is the profitability of a certain activity.
- It is partial analysis which helps better understand the costs and incomes associated with certain activities.
- As a general rule, each farming activity should be profitable in its own right.

Interpretation of yields and prices

- Manual contains best estimates of yields and prices and are indicative
- Not meant to be used in agricultural loan analysis:
  - Prices may fluctuate – use lowest price
  - Yields are dependent specific circumstances of individual farmer – use historical yield

Agricultural production livelihood zones



Part 2

- Maize

Maize

- **Background**
  - Staple food for large section of population
  - Exported to Kenya
  - World Food Program is large buyer
- **Climatic and soil requirements**
  - Can be grown on wide range of soils in most parts of Uganda
  - Does best on well drained, deep and loamy soils but NOT in swampy areas
  - Fertilizer is highly recommended

Maize

- **Land preparation**
  - Ploughed at least twice to kill weeds and loosen soil
  - Prepared at end of last rains
  - Seedbed should be rough
- **Time of planting**
  - Done according to 2 rainy seasons (mid Feb-June & mid Aug-Dec)

Maize

- **Planting**
  - In wet soil: 2-3 cm deep
  - In dry soil: 5-10 cm deep
  - Seed rate: 10kg/ acre (25kg/ Ha)
- **Spacing**
  - 75x30cm: 1 seed per hole
  - 75x60cm: 2 seeds per hole
- **Weed control**
  - Essential in 1st month to maintain yields
  - Hand weeding or herbicides: Lasso Azatrine or Alazine

Maize

- **Fertilizer application**
  - 2 types are generally recommended:
    - Urea: applied as a top dressing 3-4 weeks after planting by sprinkling between rows at a rate of 125-350 kg/ ha. Plot should be weeded before applying fertilizer
    - DAP: applied to soil at time of planting at a rate of 100-125 kg/ ha. 3-5 gr to be applied in the bottom of each planting hole
- **Major pests**
  - Maize stalk borer. *Control*: insecticides

Maize

- **Major diseases**
  - Maize streak virus
    - Control: use of improved seed, good crop rotation and use of hygiene measures
- **Field drying and harvesting**
  - Can be left in the field without undergoing deterioration provided pests/ diseases, humidity, temperature and moisture content is relatively low.
  - Left for up to 8 weeks to dry down
  - Late harvest is risky and can lead to losses

Maize

- **Drying and storage**
  - After harvest, the greatest enemy of grain is moisture.
  - Preferred low cost method of drying maize cobs is by using cribs that let air through.
  - Safe level of moisture for long storage is 12-15.5%

Maize

- **Production calendar**

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Land preparation												
Seed acquisition												
Planting												
Weed control												
Fertilizer application												
Pest and disease control												
Harvesting												
Post harvesting handling												

Maize

- **Maturity and yields**

Official name	Days to maturity	Yield range (Kg/acre)
Longe 1	115-120	1600 - 2400
Longe 4	100 – 105	1600 - 2400
Longe 5 (Nalongo)	115	2800 - 3200
Longe 6H	120	3200 - 3600
Longe 2H	125	2800 - 3200

Maize – income/ revenue analysis

Activity	Traditional/Subsistence (Shs/acre)	Low input (Shs/acre)	High input (Shs/acre)
Slashing	17,000	17,000	17,000
Round-up			25,000
Spraying			7,000
First ploughing	30,000	70,000	70,000
Second ploughing		70,000	70,000
Seed	6,000	45,000	45,000
DAP			60,000
Rope		3,000	3,000
Planting	9,000	15,000	20,000
First weeding	30,000	30,000	30,000
UREA			55,000
Top dressing			8,000
Second weeding	30,000	30,000	30,000
Harvesting	9,000	20,000	29,000
Transporting home	9,000	20,000	29,000
Drying	5,000	13,500	18,000
Shelling	9,000	22,000	31,000
Bags	7,200	14,900	22,200
Total Cost (Shs)	**201,200**	**370,400**	**569,200**
Yield (Kg/acre)	**750**	**1,700**	**2,800**
UCOP (Shs/Kg)	**268**	**218**	**203**
Farm Gate Price (Shs/Kg)	**350**	**350**	**350**
Gross Income (Shs)	**262,500**	**595,000**	**980,000**
Net Income (Shs)	**61,300**	**244,600**	**410,800**

Part 3

- Robusta coffee

Coffee

- **Background**
  - Robusta coffee accounts for 60-70 percent of total coffee exports.
  - Coffee also provides employment and cash income for a large number of people in the coffee growing areas of Eastern, Central and Western Uganda.
  - Growing on lower altitude area's around Lake Victoria (800-1200m above sea level)

Coffee

- **Climatic and soil requirements**
  - average loamy soils of good texture and rich in organic matter with pH of 5.3-6.0
  - Coffee requires evenly distributed rainfall (900 – 2000mm per annum) with average annual temperature of 24-26^{o}C
- **Land preparation**
  - Land should be prepared at least 6 months before the planting date. Planting holes should be dug 3 months before planting

Coffee

- **Planting**
  - The size of the fairly round hole should be 3ft (1m) in diameter and 3ft (1m) deep.
  - Mix soil with well rotten manure one month before planting
- **Spacing**
  - Coffee plants should be spaced at 10ft by 10ft (3.3m x 3.3m)

Coffee

- **Weed control**
  - Recommended weed control methods include manual weed control (hoeing, slashing, hand pulling) and chemical control using herbicides like Roundup.
- **Mulching**
  - helps to conserve soil moisture, adds nutrients and also keeps down the weeds

Coffee

- **Pruning**
  - Critical for good production as it rejuvenates the plant through removal of unproductive wood
  - The number of stems should be limited to 3-4
- **Fertilizer application**
  - As much as possible, organic manure (farm yard/compost) should be used
  - Nitrogen fertilizers are also generally recommended

Coffee

- Major pest and diseases
  - Coffee berry borer
  - Black coffee twig borer
  - Coffee wilt disease
  - For control see module 1, full text

Coffee – production calendar

Coffee production calendar

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Land clearing and preparation	■	■	■								■	■
Digging planting holes			■	■	■							
Hole filling	■	■				■	■					
Planting			■	■				■	■			
De-suckering	■	■	■	■	■	■	■	■	■	■	■	■
Stumping	■	■				■	■					
Weed control management			■	■	■			■	■	■	■	
Hoeing					■						■	■
Herbicides (Glyphosate)			■	■	■			■	■	■		
Mulching	■					■	■					■
Inorganic fertilizer application		■	■					■	■			
Harvesting peak season			■	■	■	■		■	■	■	■	
Drying				■	■	■	■		■	■	■	■
Marketing	■	■		■	■	■	■		■	■	■	■

Coffee

- **Harvesting and drying**
  - The final quality of coffee depends on how well the coffee has been picked and dried
  - Drying on tarpaulins takes about 3 to 4 weeks
  - End product are dry cherries (Kiboko)

Coffee

- **Yields**
  - In Uganda about 10 bags per acre, because of low use of inputs, poor agricultural practices.
  - Brasil 20 bags/acre and Vietnam over 30 bags/acre

Income/ revenue analysis

Activity	Traditional (Shs/acre)	Low input (Shs/acre)	High input (Shs/acre)
Main crop			
Weeding (twice)	50,000	30,000	30,000
Mulching		160,000	160,000
Fertilizer			110,000
Fertilizer application			20,000
Pruning	25,000	25,000	25,000
De-suckering	10,000	10,000	10,000
Harvesting	35,000	50,000	130,000
Drying	15,000	25,000	25,000
Fly crop			
Weeding	30,000	10,000	10,000
Pruning	25,000	25,000	25,000
De-suckering	10,000	10,000	10,000
Fertilizer			110,000
Fertilizer application			15,000
Harvesting	15,000	30,000	75,000
Drying	6,000	14,000	14,000
Tarpaulins		20,000	20,000
Total Cost (Shs)	**221,000**	**409,000**	**789,000**
Yield (Kg/acre)	**350**	**840**	**2,000**
UCOP (Shs/Kg)	**631**	**486**	**394**
Kiboko FG price (Shs/Kg)	**1,400**	**1,400**	**1,400**
Gross Income (Shs)	**490,000**	**1,176,000**	**2,800,000**
Net Income (Shs)	**269,000**	**767,000**	**2,011,000**

Part 4

- Rice

Rice

- **Background**
  - Domestic rice production can not meet the rising demands of domestic consumption
  - Uganda has become dependent on imports of rice.
  - Rice is now the second or third largest food import.
  - Upland rice (NERICA) is predominantly cultivated in Uganda compared to lowland (wet) rice

Rice

- **Land preparation**
  - For newly cleared areas, stumps of big trees should be removed before the rains
  - land should be ploughed twice and where possible disc harrowed twice with the first rains

Rice

- **Upland rice varieties**

Variety	Maturity period (days)	Attributes
NERICA 1	105 - 115	Black to purple grain tip, resistant to blast
NERICA 4 (SUPERICA 2 or Bukenya)	110-120	Resistant to blast, good milling ability, performs on poor soils.
NERICA 10	110- 120	Has long awns, resistant to blast
Sindano	150	Are renowned for their aroma but have a long maturity period of about six months
SUPA	150	SUPA rice is preferred because of its special attributes particularly on its palatability, taste and aroma but have a long maturity period of about six months

Rice

- **Seed treatment**
  - Before planting, bands should be constructed around and across the field to control water and improve water retention.
  - 20 kg of wood ash should be added to 30 kg of rice seed. Ash reduces termites and damage by the African mole cricket after planting.
  - One litre of water should be added to the ash mixture to prevent blowing away during drilling/planting.

Rice

- **Spacing**
  - Spacing between rows should be 30cm row to row and 5 cm between plants in the row.
- **Pest and diseases**
  - Rats, birds, insects and leaf/plant hoppers
  - Rice blast, yellow mottle virus, bacterial blight
  - See full document for prevention and cure

Rice – production calendar

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Land preparation	■					■	■					■
Seed acquisition	■				■							
Planting		■	■	■			■	■	■			
Weed control			■	■	■			■	■	■		
Fertilizer application			■	■	■			■	■	■		
Pest and disease control			■	■	■			■	■	■		
Bird scaring					■	■				■	■	
Harvesting						■					■	

Rice

- **Harvesting, threshing, drying**
  - harvest when 90% of the grain has turned brown, and the straw on the panicle neck is yellow in comparison to the colour of leaves
  - rice should be threshed immediately after cutting
  - winnowing and drying should be done immediately after cleaning the grains
  - rice should be dried for 3 or 4 days at intervals of 4 hours per day on a clean surface or tarpaulin.

Rice – I/R analysis

Activity/Input	Traditional (Shs/acre)	Low input (Shs/acre)	High input (Shs/acre)
Land clearing/burning	50,000	50,000	50,000
First ploughing (tractor)	70,000	70,000	70,000
Second ploughing (tractor)	70,000	70,000	70,000
Seed	10,000	48,000	48,000
Rope		3,000	3,000
TSP			22,500
Planting	20,000	35,000	40,000
Spraying			15,000
First weeding	40,000	40,000	
UREA			35,000
UREA application			10,000
Second weeding	40,000	40,000	
Bird scaring	40,000	40,000	40,000
Harvesting	27,500	50,000	70,000
Threshing/winnowing	10,000	30,000	42,000
Tarpaulins		8,000	8,000
Transporting home	7,500	10,500	12,000
Drying	9,000	12,000	14,000
Bags	13,500	20,500	24,000
Transporting to market/mills	35,000	52,000	72,000
Milling cost	78,000	130,000	170,000
Total Cost (Shs/acre)	**520,500**	**709,000**	**815,000**
Yield-Milled rice (Kg/acre)	**500**	**1,000**	**1,200**
UCOP (Shs/kg)	**1041**	**709**	**679**
Price at Miller (Shs/kg)	**1,500**	**1,500**	**1,500**
Gross Income (Shs)	**750,000**	**1,500,000**	**1,800,000**
Net Income (Shs)	**229,500**	**791,000**	**985,000**

Part 5

- Banana (matoke)

Banana

- **Background**
  - Uganda is the biggest producer and consumer of bananas per capita
  - estimated production of 300kg per person per year, almost all consumed locally
  - Staple food in large parts of the country

Banana

- **Soil and climatic requirement**
  - Banana's prefer deep, fertile, free draining soils, which have capacity to retain adequate moisture
  - Optimal mean monthly temperature is 27^{o}C, with a well-distributed average annual rainfall at least above 800mm

Banana

- **Planting and spacing**
  - Clean planting materials should be used, tissue culture, or pared corm (all roots and the outer layer of the corm peeled off)
  - spacing should be on average10 feet (3.3m) by 10 feet (3.3m), which results in about 440 stools per acre
  - tall types are widely spaced while the shorter ones are more closely spaced

Banana

- **Soil and fertilizer application**
  - Soil should be deep, well drained and loamy with high humus and optimal pH of 5.6-7.5
  - For high yields, nitrogen and potassium should be regularly added to the soil
  - The crop will benefit from farm yard manure
  - A dressing of 500g of single super phosphate (SSP), 500g of murate of potash (MOP) and 500g of calcium ammonium nitrate (CAN) at planting for each plant per season.

Banana

- **Weed control**
  - Mulching is preferred method for weed control, soil fertility improvement, and soil moisture conservation
  - Mulch should be laid at a distance of 2 feet from the stool, as much as possible

Banana

- **De-leafing, de-suckering, stacking**
  - These are management practices that have to be carried out regularly
  - Leave 3-4 stems per plant
  - Leaves should touch each other, to get optimum plant population and avoid direct sunshine to the ground
  - Stems are likely to break under the weight of heavy bunches, support them

Banana

- **Pest and diseases**
  - Banana weevil, nematodes
  - Banana bacterial wilt, fusarium, black sigatoka (black leaf streak)
  - See full text

Banana

- **Yield expectations**

Technology	Bunch size	Bunches per acre	KG per acre
Traditional	8kg/bunch	900	7,200
Low Input use	20kg/bunch	700	14,000
High Input use	35+kg/bunch	700	24.500

Banana

- **Maturity and marketing**
  - Average time to maturity is 12 – months, depending on cultivar
  - Harvesting is all year round although bumper harvests occur between July to August and February
  - Traders usually buy the bunches from farms and transport them using bicycles or lorries to open markets

Banana

- Production calendar

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Land clearing and preparation	■	■					■	■				
Planting			■	■	■				■	■		
Digging trenches		■						■				
Weeding			■	■	■			■	■	■	■	
De-leafing	■	■	■	■	■	■	■	■	■	■	■	■
De-suckering			■	■	■				■	■	■	
Mulching			■	■	■	■	■	■	■	■	■	
(In)organic fertilizer application			■	■	■				■	■	■	
Opening trenches	■	■					■	■				
Harvesting	■	■	■	■	■	■	■	■	■	■	■	■

Banana

- I/R analysis exercise
  - Complete I/R table for banana.

Activity	Traditional	Low input	High input
	Shs/acre	Shs/acre	Shs/acre
Pruning/de-suckering			
Digging trenches			
Weeding			
Herbicide application			
Ash application			
Trapping weevils			
Mulching			
Manuring			
Weeding			
Loosening soil			
Pesticide application			
Fertilizer application			
Removal of stumps			
Weeding			
Pruning/De-suckering			
Harvesting (Continuous)			
Total Cost (Shs/acre)			
Yield (Bunches/acre)			
Yield (Kg/bunch)			
Yield (Kg/acre)			
UCOP (Shs/bunch)			
UCOP (Shs/kg)			
Farm gate price (Shs/bunch)			
Gross income (Shs)			
Net income (Shs)			

Banana I/R analysis

Activity	Traditional	Low input	High input
	Shs/acre	Shs/acre	Shs/acre
Pruning/de-suckering	18,000	25,000	25,000
Digging trenches		70,000	70,000
Weeding	55,000	55,000	
Herbicide application			58,000
Ash application	8,000		
Trapping weevils		27,000	
Mulching		350,000	700,000
Manuring		200,000	400,000
Weeding	55,000	55,000	15,000
Loosening soil	37,000	25,000	25,000
Pesticide application			32,000
Fertilizer application			160,000
Removal of stumps	75,000	75,000	75,000
Weeding	55,000	55,000	17,000
Pruning/De-suckering	15,000	25,000	25,000
Harvesting (Continuous)	110,000	160,000	160,000
Total Cost (Shs/acre)	**428,000**	**1,122,000**	**1,762,000**
Yield (Bunches/acre)	**900**	**700**	**700**
Yield (Kg/bunch)	**8**	**20**	**35**
Yield (Kg/acre)	**7,200**	**14,000**	**24,500**
UCOP (Shs/bunch)	**475**	**1,602**	**2,517**
UCOP (Shs/kg)	**59**	**80**	**72**
Farm gate price (Shs/bunch)	**3,000**	**6,000**	**10,000**
Gross income (Shs)	**2,700,000**	**4,200,000**	**7,000,000**
Net income (Shs)	**2,272,000**	**3,078,000**	**5,238,000**

Final remarks

- The following crops/ activities are covered in the manual but not in the presentation.
  - Arabica Coffee
  - Sunflower
  - Dairy & beef farming
  - Poultry farming – egg and meat production
- The information on these crops/ activities follows the same content and order
- Any specific questions on these crops/ activities?