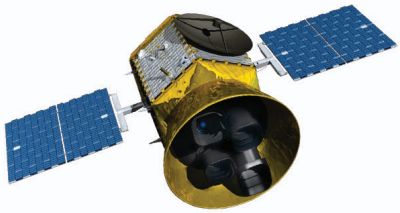


VEGETATION INDEX CROP INSURANCE GUIDELINE AND OPERATIONAL MANUAL

PFEA

Ethiopian ATA
Agricultural Transformation Agency

ETHIOPIAN INSURANCE CORPORATION

kifiya

NMA

ITC
UNIVERSITY OF TWENTE.

CONTENTS

1. Introduction

The following document explains in simplistic terms how the Vegetation Index Crop Insurance product works. For a more detailed understanding of the product please refer to annexure I.

2. Basic terms and concepts

In order to understand how the NDVI based Vegetation Index Crop Insurance product works, we need to be aware of the basic concepts in index based insurance:

a. Index based insurance scheme:-

An index based crop insurance scheme compensates farmers after certain conditions are met. These conditions can be in form of weather parameters, vegetation parameter etc. Once these conditions are met, loss of production is assumed and claims are triggered. In index based insurance field inspections are not required, and claims calculations are done on the basis of a pre-defined criteria. Hence, Index based crop insurance schemes are more cost effective than yield based crop insurance scheme wherein inspection of a farm's yield is carried out to ascertain losses.

b.Index insurance terms:-

Index: Index refers to parameters whose values will be monitored such as rainfall (mm), wind-speed (Kmph), Temperature ©, NDVI values.

Trigger: Trigger refers to value at which indemnity payouts are triggered. It is defined during the policy creation phase.

Exit: Exit refers to the value at which full sum insured is paid to the policy holder. It is defined during the policy creation phase.

Sum Insured: It is the maximum claim amount payable once the index crosses the exit value.

Product Term: It refers to the duration (period) for which insurance cover will exist.

c. The chosen index: NDVI

NDVI:- Normalized Difference Vegetation Index (NDVI) is a long standing index used by national and international agencies to monitor the occurrence of drought. The index reflects the amount of active chlorophyll in the vegetation present in the geographical area observed. It is a simple graphical indicator that can be used to analyze remote sensing measurements, typically but not necessarily from a space platform, and assess whether the target being observed contains live green vegetation or not. NDVI is an output based index and measures the current state of green vegetation i.e. it is a measure of the impact on vegetation of weather inputs like rainfall, wind, heat etc.

d. The source of NDVI data

The source of NDVI data used in the model is from the National Meteorological Agency (NMA) of Ethiopia. Kifiya, through the GIACIS project has invested in a system called GeoNetCast installed at NMA that provides it with the capability to convert the Satellite images to number: NDVI index is based on the converted tabular values of NDVI images obtained from a Geo satellite. The data in NDVI images are provided as Digital Numbers (DN-values), i.e. integers from 0 to 255.

e. The peril covered

The peril covered is drought as captured by the NDVI model.

f. Insured value

Insured is the monetary value of credit taken for agricultural input by the farmers or a fixed amount.

3. The NDVI model and its logic

a. How the NDVI data is captured?

NDVI data is captured by satellites orbiting the earth, called geo stationary satellites. They capture high resolution images which also contains encrypted data about the vegetation of the region being captured, the NDVI.

This NDVI data captured through the images are then converted into a digital form, values raning from 0 to 255, using a system called GeoCASTNet, that has been set up at the National Metrological Agency in Ethiopia.

The following figure describes how it works

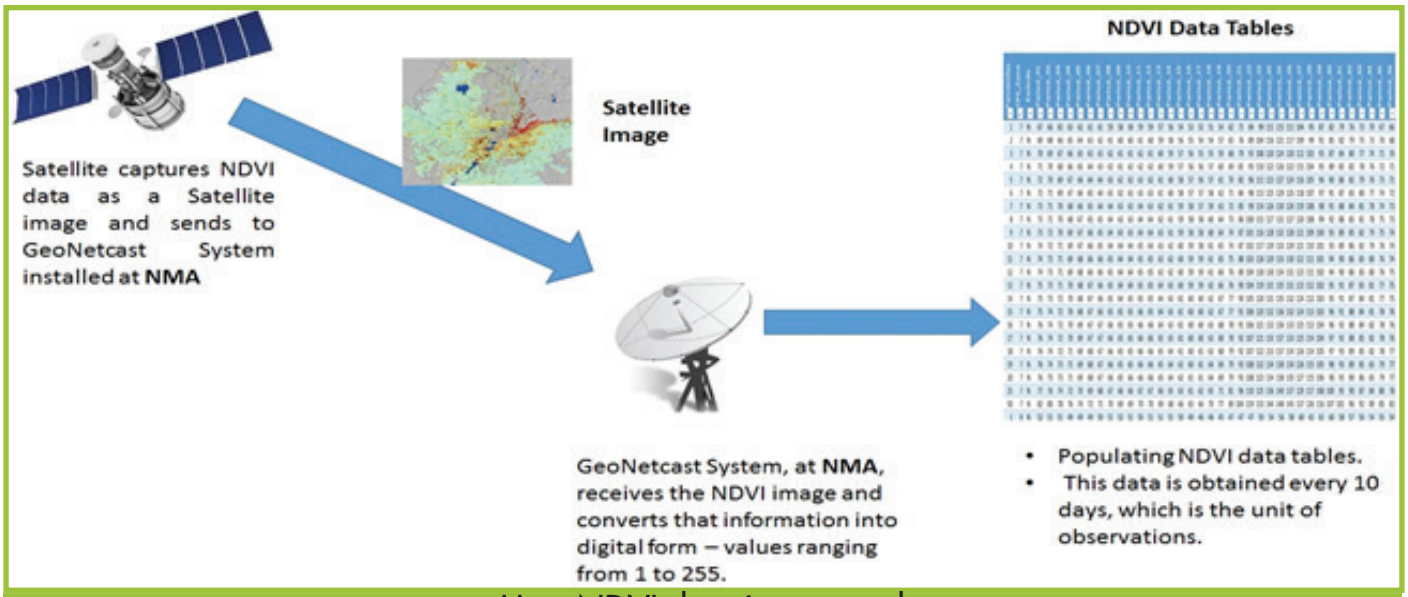
b. How this data is used?

The data so captured is used to design the products by doing the following do the following:

i. To set up Crop Production System (CPS) Zones

ii. To identify growing seasons all over Ethiopia in different CPS Zones

iii. Set Thresholds values of NDVI for each zone



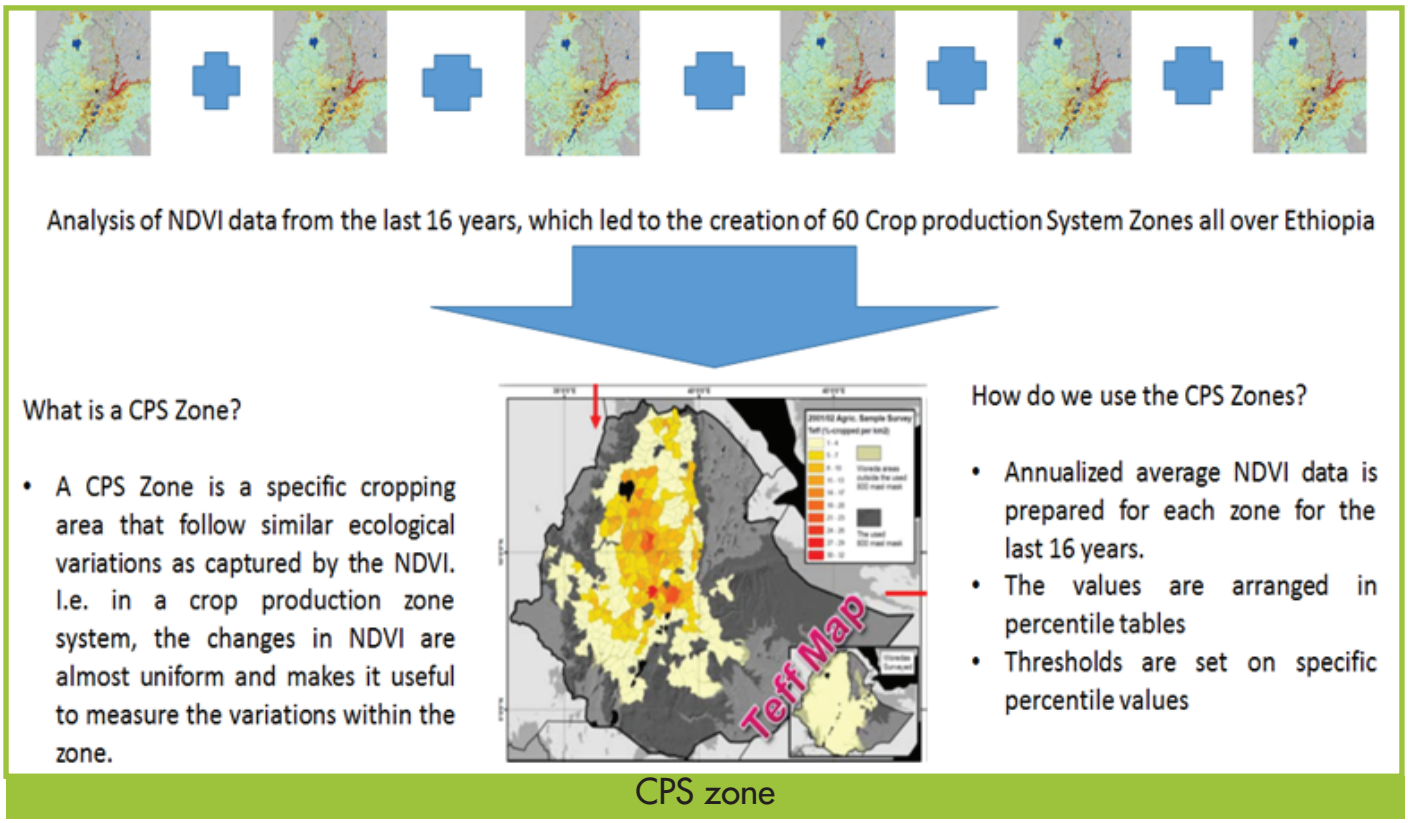
How NDVI data is captured

i. Setting up CPS zones

The researches of the product, have looked at the historical NDVI data from the last 16 years, measuring variations in vegetation all over Ethiopia. This has led to the setting up of Crop Production System (CPS) Zones. Simply put, a CPS Zone is a homogenous area as per NDVI data, i.e. all across the CPS Zone the variations in NDVI across 16 years have been homogenous, leading to the inference that this particular area has a set crop growing pattern, reflected via NDVI.

Each CPS zone has been defined on long-duration NDVI values that reflect by relatively similar agro-climatology (climate, terrain, altitude, soil, etc.) along with its long-duration impact on the land cover mainly natural vegetation & crops. The short-duration impacts of weather on the zoning effort is notably absent. The zoning has been done based on long term climatic and other factors. The following figure describes the process:

Setting the CPS Zones - using Historical data



CPS zone

ii. Growing seasons

For each CPS zone, a growing season has been defined. A growing season is that period of the calendar year which is suitable for growing crops based on the historical NDVI data analysis.

Each year has been divided into 10 day periods. i.e. a year of 365 days has been divided into 36 10 day period. Based on the historical data analysis, for each CPS Zone the growing season has been defined as those 10 day period during which crops can be grown in that particular zone. Hence, the period of insurance for VICI in a particular zone will only be this range of growing season.

Growing season table

Growing season's logic is implemented through a table in which CPS zones are numbered as rows, and 36 10-day periods are numbered as columns. A value "1" against any column indicates that 10 –day period falls within growing season and a value "0" under any column indicates that 10-day period is not part of the growing season.

Default Growing Seasons			*important zones*		Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov
CPS-Zone	Seasc	Seasc	Lengt	Valid	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
52	Main	1	11	Y	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
38	Early	1	10	Y	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
55	Main	1	10	Y	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
39	Early	1	9	Y	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Early	1	9	Y	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	Early	1	9	Y	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Early	1	8	Y	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Early	1	8	Y	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Early	1	8	Y	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Early	1	8	Y	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	Early	1	8	Y	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Early	1	8	Y	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	Early	1	8	Y	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	Early	1	7	Y	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	Early	1	7	Y	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Early	1	6	Y	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Early	1	6	Y	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Main	1	21	Y	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
43	Main	1	21	Y	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
54	Main	1	20	Y	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
59	Early	1	10	Y	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
51	Early	1	9	Y	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
60	Early	1	9	Y	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Early	1	8	Y	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	Early	1	8	Y	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	Early	1	8	Y	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Early	1	7	Y	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Early	1	6	Y	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	Early	1	20	Y	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
48	Main	1	20	Y	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
57	Main	1	20	Y	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
44	Main	1	19	Y	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
49	Main	1	18	Y	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
31	Early	1	7	Y	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	Early	1	7	Y	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Main	1	18	Y	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
26	Main	1	18	Y	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
21	Main	1	16	Y	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
32	Main	1	16	Y	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
16	Main	1	15	Y	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
10	Main	1	11	Y	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
7	Main	1	10	Y	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0
18	Main	1	12	Y	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0

Growing season table

iii. Setting thresholds - benchmark NDVI values:

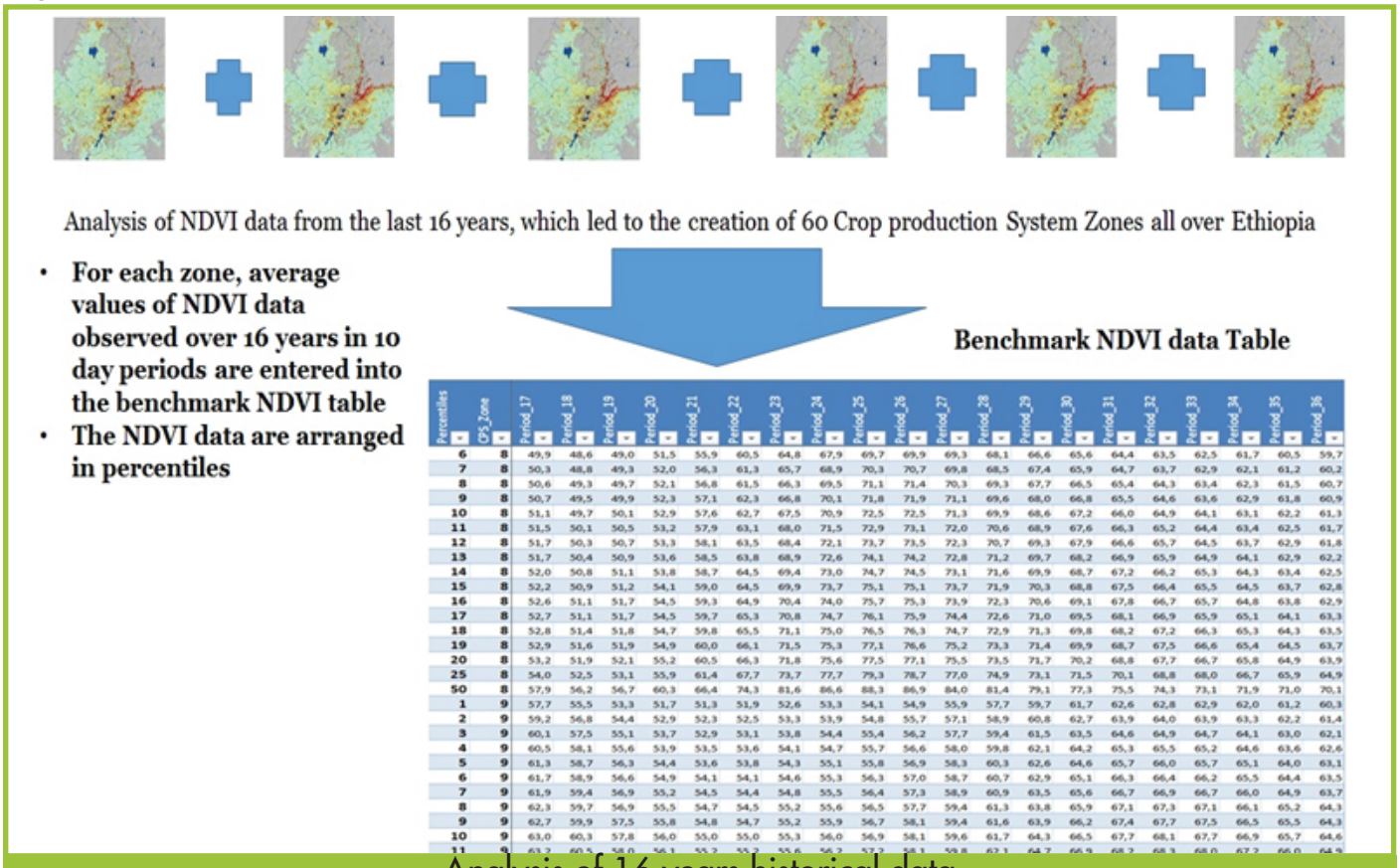
Using 16-year historical data, Average NDVI values have been calculated and stored for each CPS zone for each of the 36 10 day periods of a year.

A **percentile** is a measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall. For example, the 20th **percentile** is the value (or score) below which 20 percent of the observations may be found.

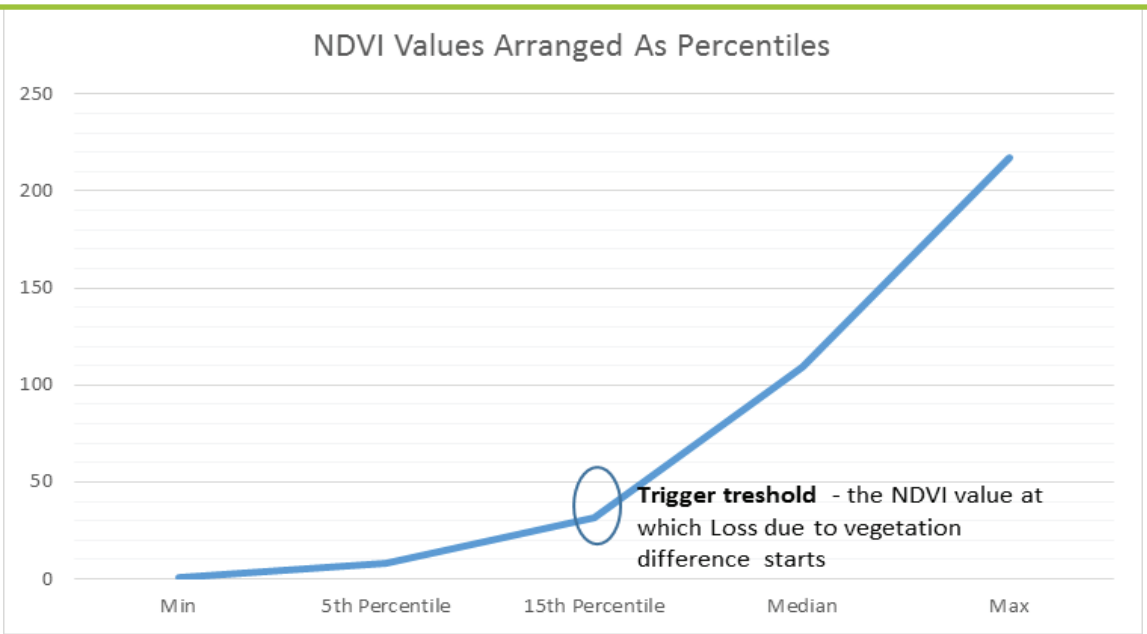
The Historical NDVI data for each zone has been arranged as per percentiles. This means that all historical data of each zone has been organized in percentiles from a minimum value observed (0% percentile) to the maximum value of NDVI data observed (100% Percentile). So when we say that an NDVI data observation is in the 15% (15th percentile) it means that this value falls within the 15% of the lowest NDVI data values observed in that region.

So if the 15% is set to be the trigger point, it means that the NDVI index declares the vegetation difference in that particular land grid where the NDVI data value that comes in falls in the lowest 15% of all NDVI data values observed for that period in the last 16 years.

Similarly, Exit value of a percentile is said to be the value at which the NDVI index declares the vegetation difference to be a 100% effective. So if the exit threshold is defined to be 5%, it means that the NDVI value that comes in is lower than the lowest 5% of all NDVI data values observed for the period in the last 16 years.



Analysis of 16 years historical data



Sample representation of percentiles

c. Product design description
i. Risk pricing and setting of thresholds

The VICI product is designed to be offered at pure risk premiums ranging from 5 % to 19.5 % of the sum insured. It is up to the Ethiopian Insurance Corporation (EIC) based on the rate of reinsurance to decide what rate of pure risk premium, i.e. Estimated Cost of Loss (ECL). Please note that this is the pure risk premium, EIC will have to add a loading on this rate to cover its operational costs.

Each ELC % offers a range of percentile values to be selected by EIC as the trigger and exit thresholds for the product. Following is the snapshot of the table

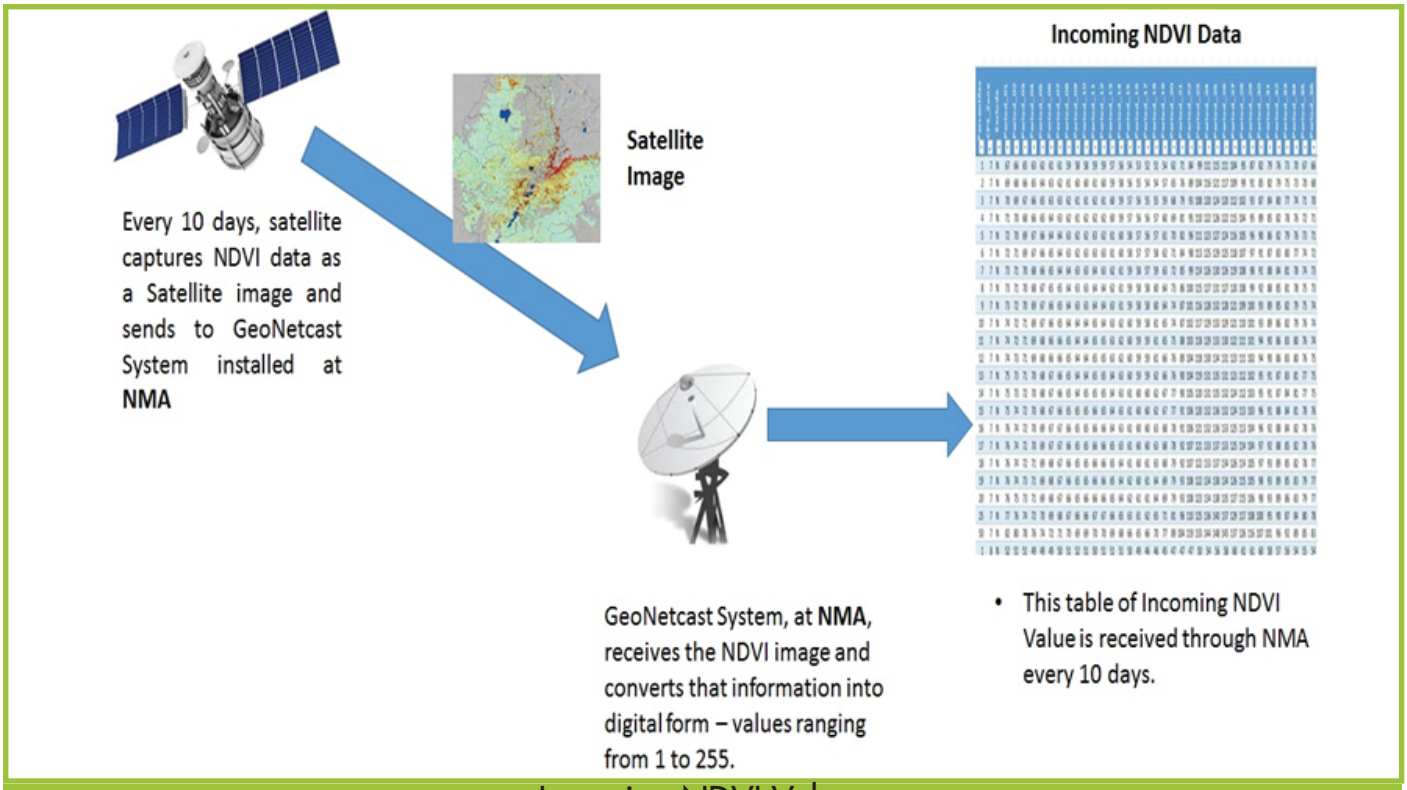
Policy	Trigge	Exit	ELC	Duration
Policy_119	17	1	9,0	11,1
Policy_120	16	2	9,0	11,1
Policy_121	15	3	9,0	11,1
Policy_122	14	4	9,0	11,1
Policy_123	13	5	9,0	11,1
Policy_124	12	6	9,0	11,1
Policy_125	11	7	9,0	11,1
Policy_126	10	8	9,0	11,1
Policy_110	18	1	9,5	10,5
Policy_111	17	2	9,5	10,5
Policy_112	16	3	9,5	10,5
Policy_113	15	4	9,5	10,5
Policy_114	14	5	9,5	10,5
Policy_115	13	6	9,5	10,5
Policy_116	12	7	9,5	10,5
Policy_117	11	8	9,5	10,5
Policy_118	10	9	9,5	10,5
Policy_101	19	1	10,0	10,0

VICI table

For instance, if EIC chooses the ELC (risk premium) at 9% of the sum insured, EIC can choose from the given combination of percentiles to fix the trigger and exit percentiles that will be applicable all over Ethiopia, for every Crop Production System zone. This enables the comparison of latest NDVI data that comes in with the historical thresholds set in the benchmark tables

ii. How the product works
Incoming NDVI data

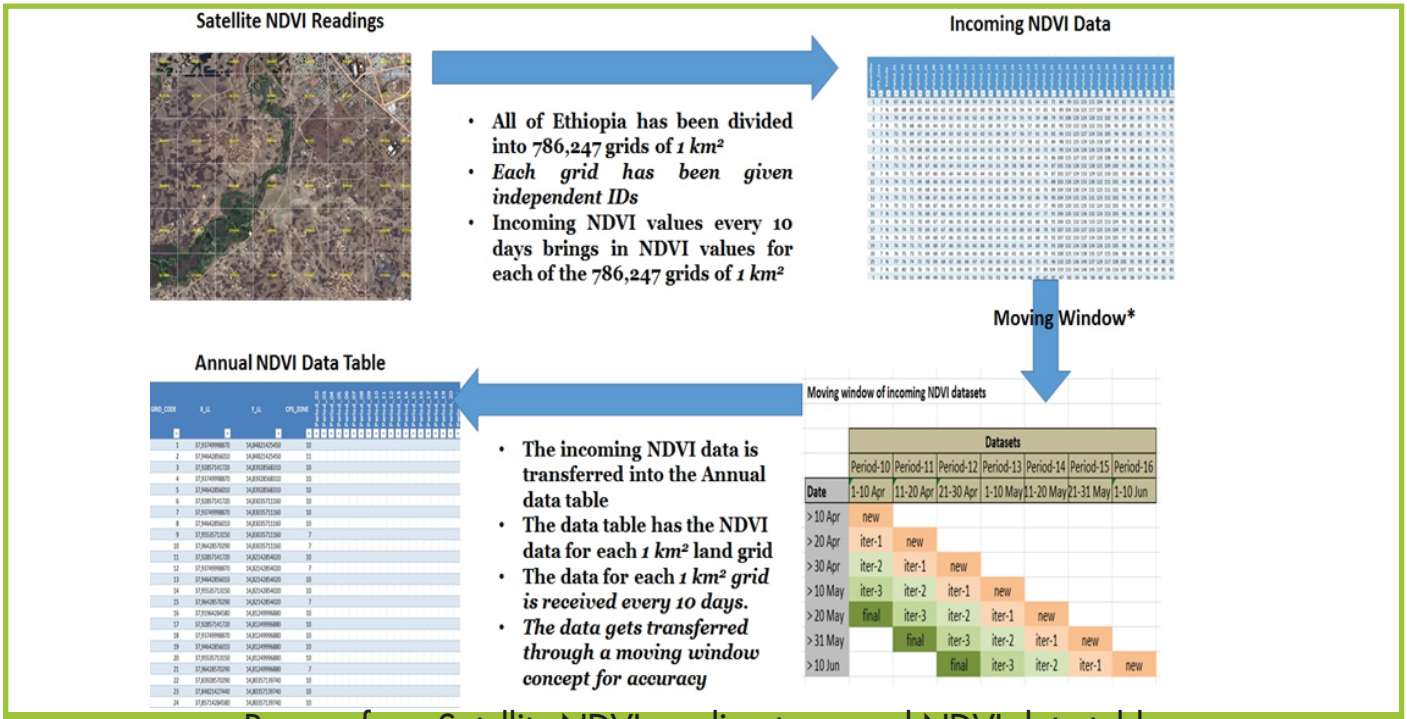
During the course of a specific year NDVI Values will be provided by National Meteorological Agency (NMA) at every 10-day period interval, these are called "Incoming NDVI Values". Incoming NDVI Values are provided at a more granular level, i.e. at the level of 1km2 called as Grid level. The country of Ethiopia has been divided into **1km2** grids and given specific grid IDs called Grid codes (Figure 1) and each Grid code is mapped to a particular CPS zone. Crop insurance policies are sold to the farmers at **Grid level.** Therefore, the incoming NDVI Values at each grid level are used to calculate the claims against benchmark NDVI Values for each individual policy holder (farmer).



Incoming NDVI Values

NDVI data annual table

This table is created to record the incoming NDVI values received from National Meteorological Agency. It must be updated for every Grid Code after every 10-day period of the year. The Incoming NDVI-data is received from NMA via FTP into the Kifiya Micro-insurance platform (immediately after each 10-day period). The data reflects NDVI-values (DN-format; 0-225 integers), recorded at the 1km^2 grid level



Process from Satellite NDVI reading to annual NDVI data table

Moving window note:

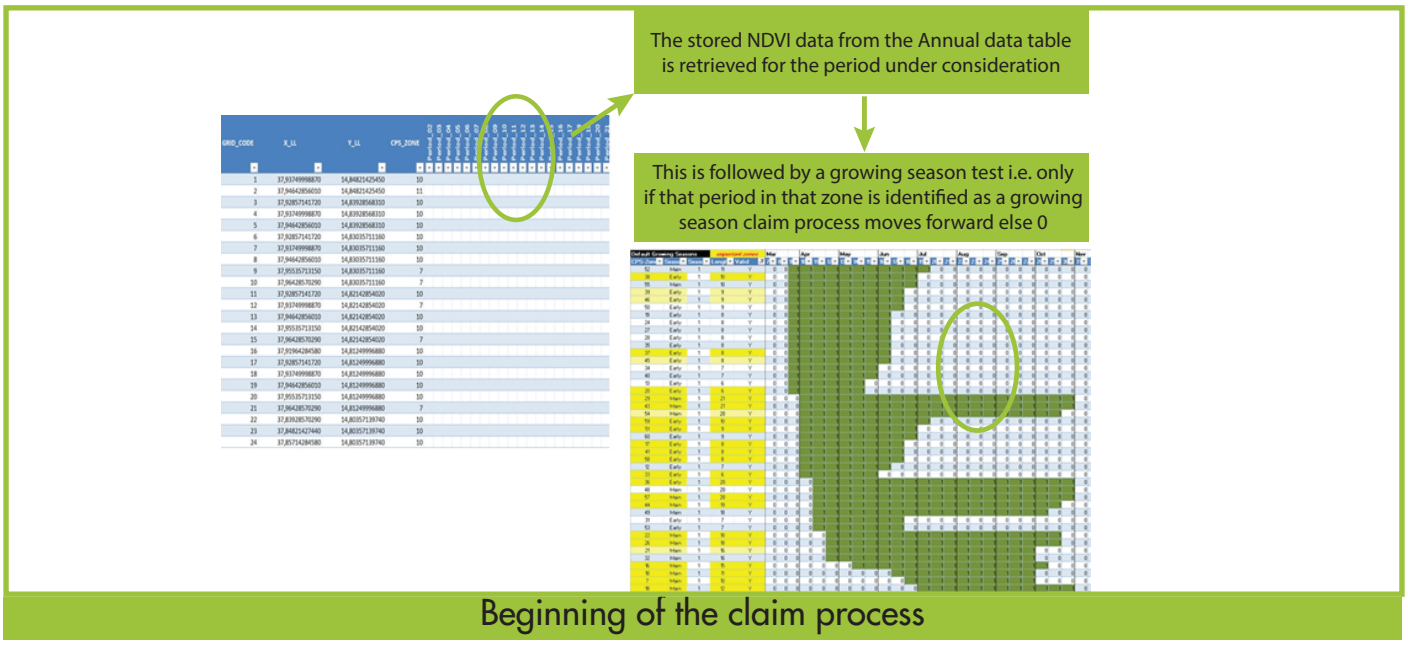
when a new 10-day NDVI dataset arrives at the microinsurance technology platform, it contains updated values of the 4 earlier 10-day datasets too (consequence of the used de-clouding algorithms in use at NMA). So effectively, each 10-days, 5 10-day NDVI datasets must be updated in the Annual Data Table. A 10-day dataset gets better-and-better after each iteration (after the 4th iteration it is the final 10-day dataset). Effectively that means that 40-50 days are required after the date that the period covered by a policy is passed, to financially fully close that policy.

d. Claims calculations

A unique feature of the VICI, like any other index insurance, is that the claims are triggered automatically, if the set thresholds are breached. For each policy sold, i.e. for a land grid id insured, a claims table will be created during the growing season and the following steps will be followed for every 10-day period:

The steps to be followed are:
a. For each Grid Code, incoming NDVI value stored in the Annual Data Table is retrieved.
b. CPS zone in which grid code lies is retrieved.
c. Growing season check

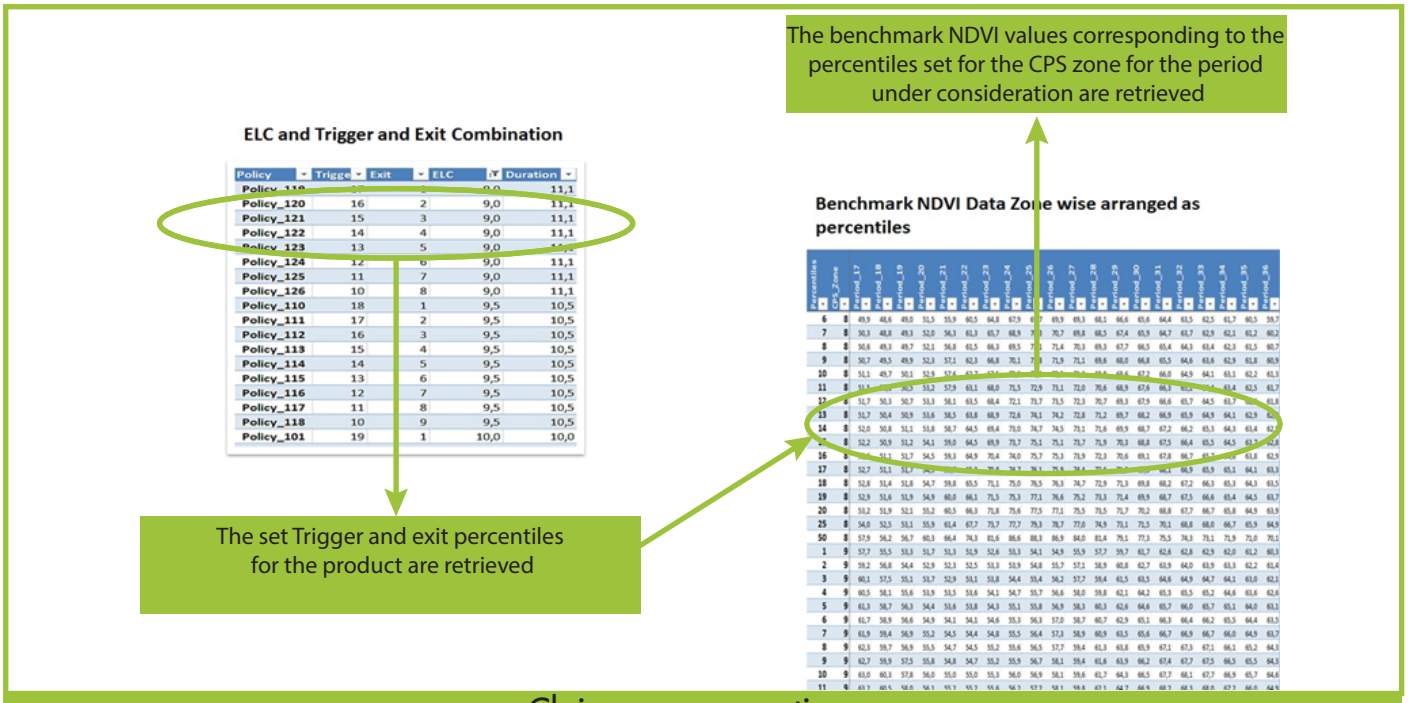
These three steps are depicted as below:



Beginning of the claim process

After the above three steps,
d. Trigger and Exit benchmarks of Policy ID whose claims are being calculated are retrieved from Policy Data Table.
e. Benchmark NDVI values corresponding to the trigger and exit percentiles and CPS Zone are retrieved from the Benchmark NDVI Table.
f. Benchmark NDVI Value are compared against the Incoming NDVI Value and claim calculation is done

These three steps are depicted on the next page:



Claim process continues

Hence, for a particular Policy ID, claim percentages is calculated for every grid code in Ethiopia. Claims thus calculated will be saved in a table created for each relevant policy and year (Policy Specific Claims table, figure as below). Hence, for each policy ID a claims table is created called "policy specific claims table". Aggregate claims due till now are updated. The policy calculation sheet is as below followed by a box on claims calculation logic:

Benchmark NDVI Table

Percentiles	CPS_Zone	Exclude	Period_01	Period_02	Period_03	Period_04	Period_05	Period_06	Period_07	Period_08	Period_09	Period_10	Period_11	Period_12	Period_13
Exit:	5	29	N	102,9	98,6	94,6	91,2	88,4	86,1	84,9	84,9	86,7	89,9	94,4	100,1	106,1
Trigger:	10	29	N	106,4	101,9	97,7	94,3	91,3	89,1	88,3	88,6	90,8	94,2	99,2	105,2	111,4

Incoming NDVI data:

Period_08	Period_09	Period_10	Period_11	Period_12
70	90	95	96	94

Growing Seasons table

CPS-Zo	Season	Seasor	Leng	Val	1	2	3	4	5	6	7	8	9	10	11	12	13
29	Main	1	21	Y	0	0	0	0	0	0	0	0	0	1	1	1	1

Calculation steps:						
Step-1:	Assess if within season:	no	no	yes	yes	yes
	If Yes then continu					
Step-2:	Assess if incoming > trigger					
	If Yes the enter 0			0,0		
Step-3:	Else, assess if incoming < exit					
	If Yes the enter 100					100,0
Step-4:	Else: apply formula:					
	[1-(Incoming-Exit)/(Trigger-Exit)]*100				66,2	
Result:		.	.	0,0	66,2	100,0

Policy calculation sheet

BOX 1.0: Claims Calculation Logic

Claims Calculations Steps for one grid code can be outlined as below:-

1. Assess if incoming NDVI value lies within the growing season, i.e., growing season is marked 1 for that 10-day period else don't calculate
2. Assess if incoming NDVI value> trigger, if yes put 0%
3. Assess if incoming NDVI value < exit ->100, if yes put 100%
4. Else Apply formula,

Payout=[(Trigger-Actual NDVI)/(Trigger-Exit)]*100%*Sum insured
OR
[1 - (Actual NDVI - exit)/ (Trigger-exit)] * 100

Indemnity calculations example for a 10 day-period of incoming NDVI value of

January 10-20 period, grid code "2534", and policy ID "ABCD34". Policy ID "ABCD34" has 25% percentile as Trigger and 15% as exit.

Benchmark Trigger percentile	20%
Benchmark Threshold percentile	15%
Historical Tabular NDVI Value for 25 % Percentile (from NDVI Benchmark Table)	110
Historical Tabular Value for 15 % Percentile(from NDVI Benchmark Table)	90
This season 1km2 grid data tabular value (from Annual Data table)	100

In the example given above, Indemnity (as % of sum assured): . [1-(tabular percentile value of Actual — tabular percentile data for Exit)/ (tabular percentile value of Exit– tabular percentile value of Trigger)] X 100

So in this case, it will be: [1- (100-90)/ (110-90)] X100 = [10/20] X100 = 50%

50% is the claims due percentage is calculated for a single 10-day period, similar values are calculated for all 10 day periods in the insurance coverage period as defined in the policy. Final claims are calculate by taking a weighted average of all 10-day periods. Weights are mentioned in the growing seasons* defined for the specific policy. 10-day claims and final claims are calculated for every 1km2 grid in the CPS zone for which policy is defined.

Policy ID	ABCD34			Claims due percentage per 10 day												
GRID ID	Latitude	Longitude	CPS ID	Jan			Feb			....			Dec			Aggregated Claims per Grid
grid code	X_LL	Y_LL	CPS_zone	1	2	3	1	2	3	1	2	3	1	2	3	
2543	37.9375	14.8482	10		50											

Aggregated Claims per grid calculations:-

Aggregated claims are calculated as the weighted average of individual 10 day claims. They must be updated as and when 10-day data comes, which will help Insurance Company to assess aggregated claims due till now. This information can also be shared with farmers, if required. E.g. for a policy covering 5 10-day periods, only the first 3 periods' claims are known, being: 0%, 15% and 7%. Then the accumulated claim percentage already amounts to (0+15+7) / 5 = 4.4%. In the case, all 5 values all known, for example, 0%,15%,7%, 12% and 15%, final claims will be (0+15+7+12+15)/5= 9.8%. This detail will be updated in against respective Grid code and under "Aggregated Claims per Grid".

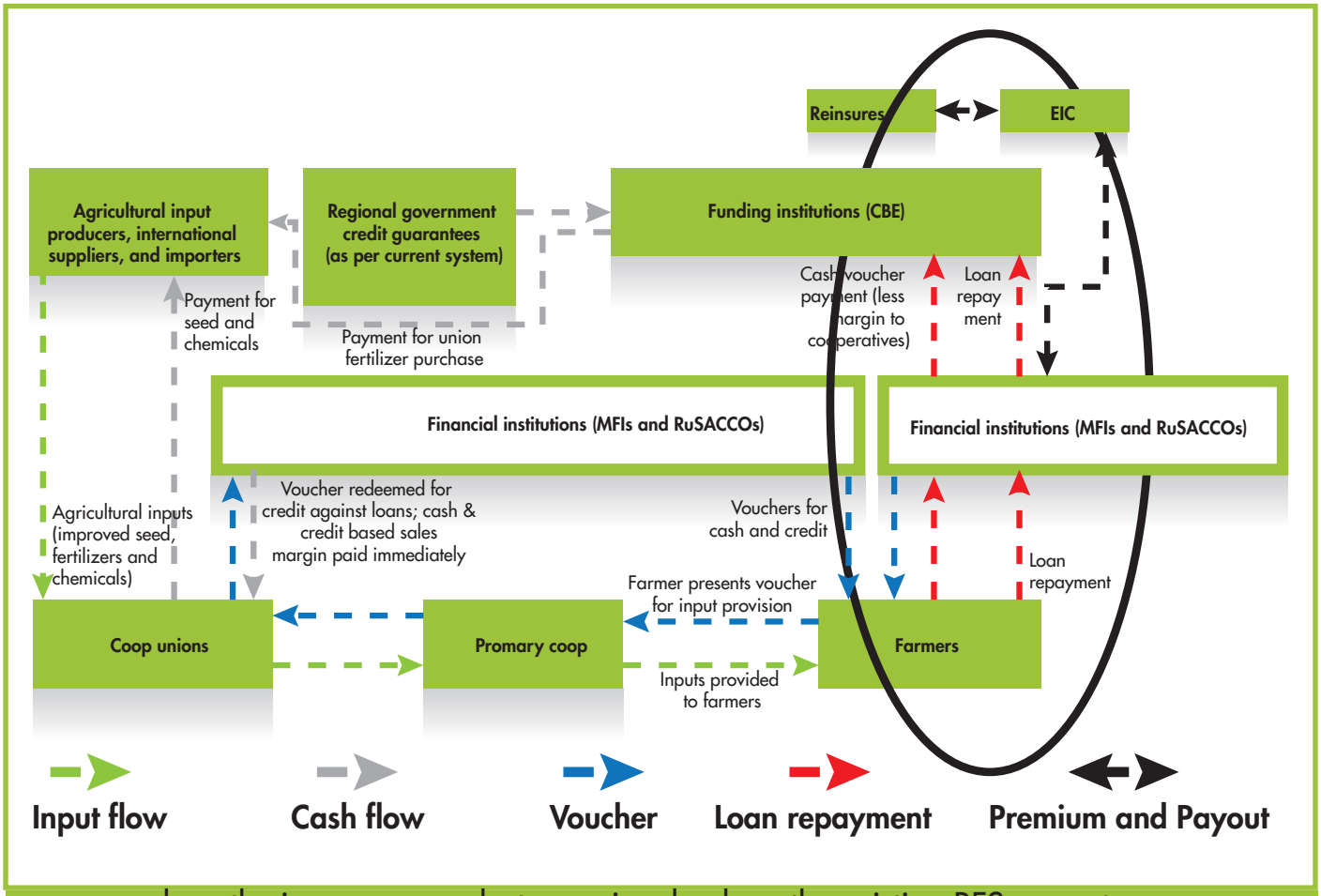
4. Broad overview of process flows and distribution options for VICI as part of ATA's RFS programme and MFIs and Cooperatives

Introduction

This documents describes how the VICI product works in partnership with ATA's RFS programme and its partner MFIs and Cooperatives. These structures will be led by ATA.

1. How VICI fit in the ATA's RFS programme?

The below diagram describes how the insurance product can piggyback on the existing RFS ecosystem.



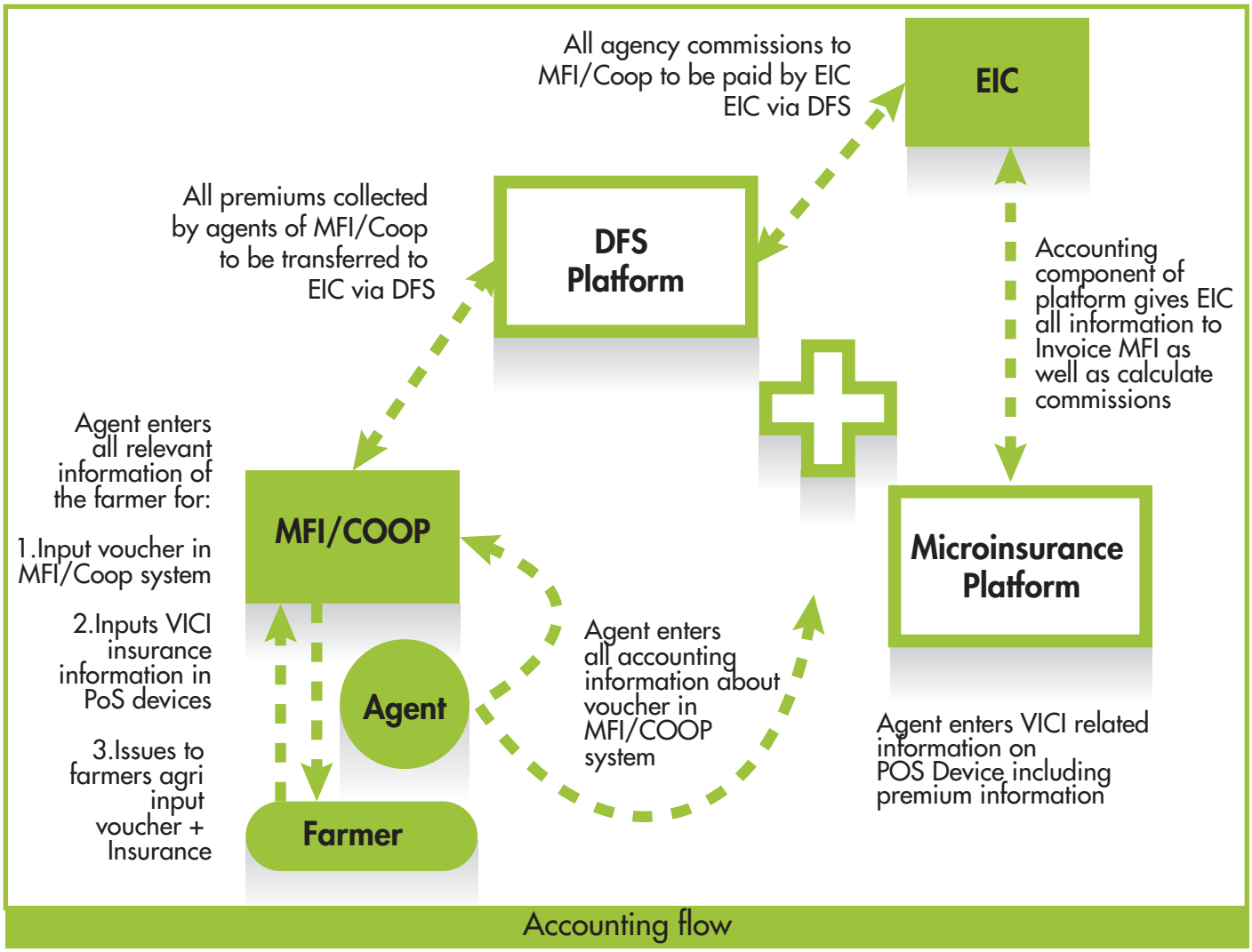
how the insurance product can piggyback on the existing RFS ecosystem.

2. Identifying the insurance value chain & process flows (broad level)

Given the fact that the VICI product will be well integrated in the RFS ecosystem, it becomes important to understand that the insurance value chain is separate yet integral. This is also revenant given the fact that with the adding on of insurance as an extra service in the RFS value chain, there is a need to consider the possible distribution structures that can be considered.

To understand this better, let's refer to the diagram as below which maps very broadly the value chain for VICI distribution from two perspectives

A. Accounting flow



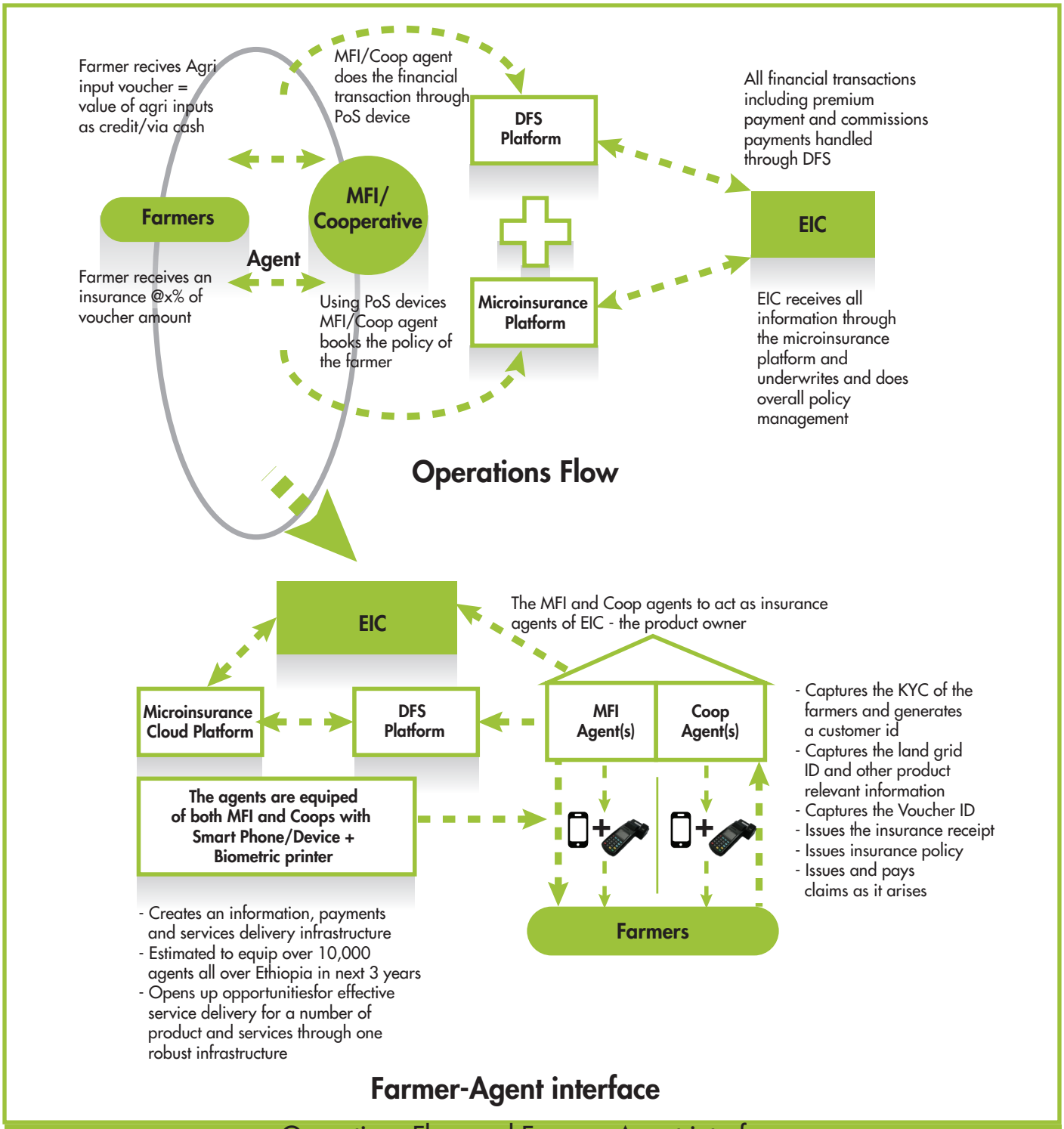
Accounting flow

B. Operations flow

The diagram below captures the following at the broad level

a. Operations flow – The overall operations flow depicting how the model will work when operationalized

b. Farmer – Agent interface - It further gives a more detailed depiction of how the agent – farmer interface will take place and how that fits in the overall model.



Operations Flow and Farmer- Agent interface

3. Distribution model options

The above mentioned operational flow can be made operation under the following models:

a. Mandatory – All farmers using the voucher have to buy insurance irrespective whether it's for cash or credit

b. Mandatory only for credit – All farmers availing credit from MFI/Coop have to buy insurance; farmers paying cash for vouchers may have the option to either buy or not buy insurance

c. Voluntary – All farmers have the option to either buy or not to buy insurance

4. Voucher distribution options

a. One voucher: The voucher will be equal to the amount of loan/value of agri inputs solicited by the farmer + Insurance premium

- Well suited for a mandatory distribution approach
- All farmers, using credit or cash, have one process

b. Two vouchers: One voucher with amount equal to credit/value of agri inputs solicited + One voucher equal to the value of insur ance premium

- Can support both voluntary and mandatory options
- Will add more costs as the MFI/Coops will now have to manage 2 loans in place of one

5. VICI operations processes manual

This document summarises the key processes that would be followed for the Commercialisation of the Vegetation Index Crop Insurance (VICI) to be underwritten by Ethiopian Insurance Corporation through the use of the Microinsurance Technology Platform to be developed by Kifiya.

These processes descriptions give a step by step manual of how these processes will be under taken.

This manual is not about the platform, but the processes of how EIC and other stakeholders interact with it.

Note: The manual currently lists down the theoretical flow of the processes and the steps that will be followed. A more detailed manual will follow when the microinsurance technology platform will become operational. For microinsurance technology platform related process flow charts please refer to the Product BRS.

Processes

Following processes are mapped in this document

a. Product configuration process
b. Agent Configuration process
c. Grid id intimation process
d. Sales process
e. Claims process

A. Product configuration process

The VICI product is designed to be offered at pure risk premiums ranging from 5 % to 19.5 % of the sum insured. All the rates will be pre-configured on the microinsurance technology platform. The final rate will be the one as offered by the reinsurance company. (Negotiations currently undergoing).

In order to configure the product onto the cloud microinsurance technology platform, the process is divided into four stages:

1. Configuration of risk pricing and trigger and exit threshold setup
2. Configuration of risk loading
3. Configuration of commissions
4. Definition of proposal form template for client KYC capturing

Risk pricing and trigger and exit process

This process describes the setting of reinsurance rate and Finalisation of trigger and exit thresholds for the product

Step 1 - EIC to log in onto the microinsurance technology platform using its login credentials to the product configuration module.

Step 2 - EIC chooses the ELC (Estimated Loss Cost)/Risk pricing configuration tab.

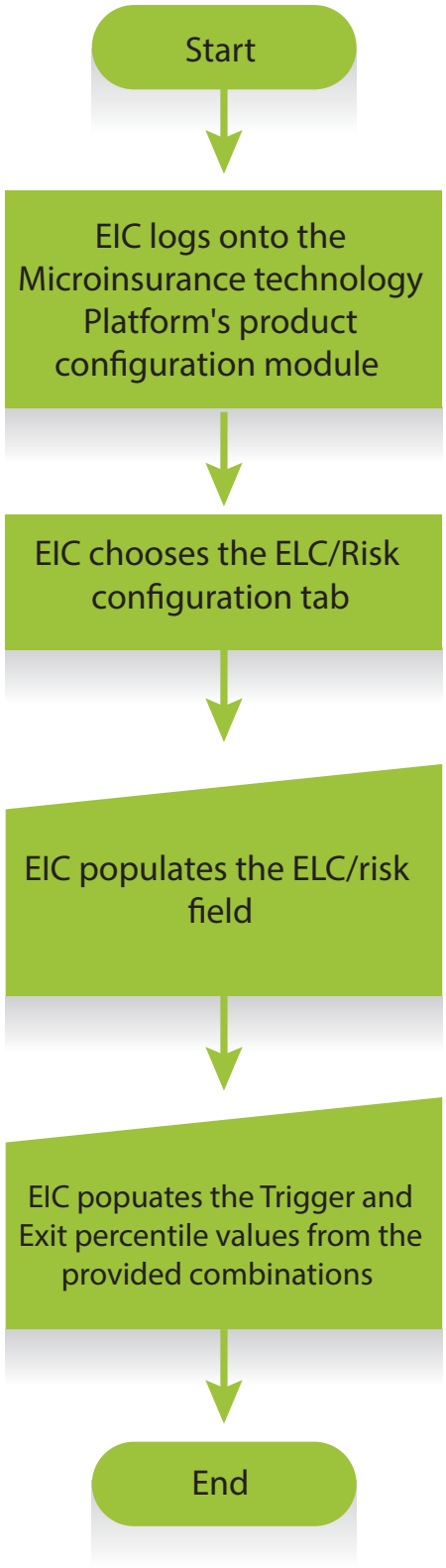
Step 3 – EIC populates the ELC field with the rate as applicable.

Step 4 – Corresponding to the rate chosen, the product configuration module will provide the combinations of trigger and exits values to be chosen.

Step 5 - EIC, based on its internal risk assessment chooses the preferred combination of values as trigger and exit for the product.

This completes the risk pricing part of the product configuration

Risk pricing and trigger setting process flowchart



Stage 1 - Configuration of risk pricing and trigger and exit threshold setup

Risk loading process

Risk loading is the % of risk price added by EIC onto the pure risk premium/reinsurance rate to manage its own overheads.

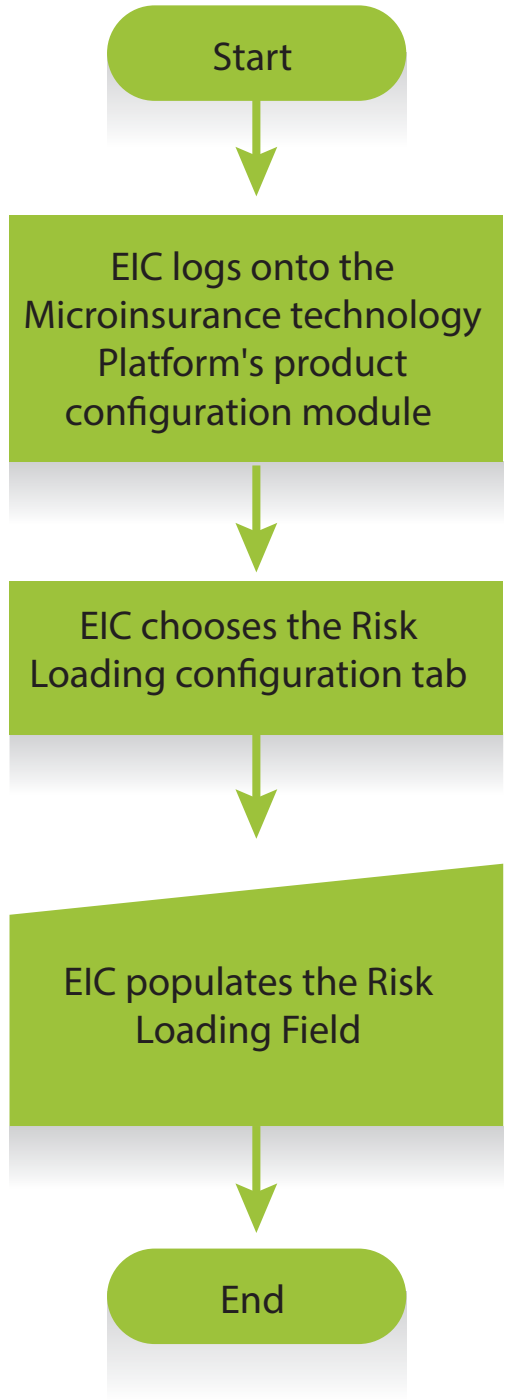
Step 1 - EIC logs in onto the product configuration module of the microinsurance technology platform.

Step 2 – EIC chooses the risk loading tab.

Step 3 - EIC populates the risk loading field of the product configuration module.

This ends the risk loading process.

Risk loading process flowchart



Stage 2 - Configuration of risk loading

Commissions heads and inputs process

During this stage of the product configuration process, EIC will populate the fields for the commissions to be paid out to the agents, Kifiya etc.

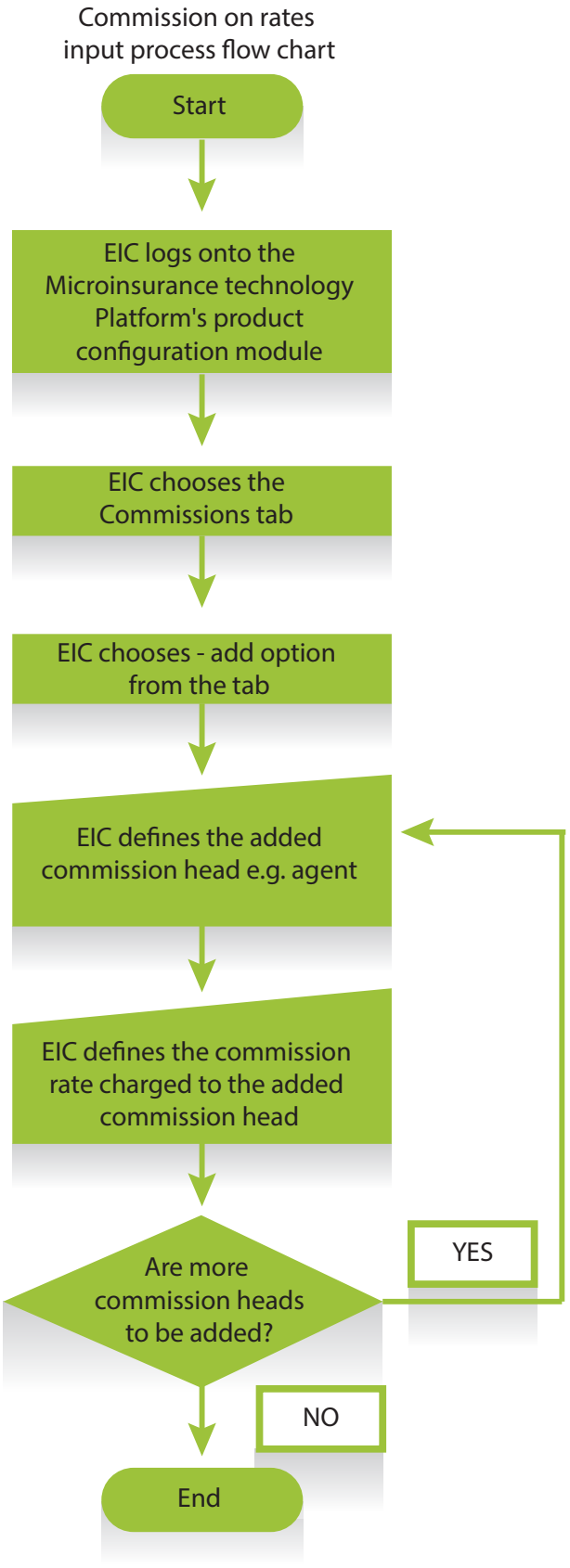
Step 1 - EIC personnel logs onto the product configuration module and chooses the commissions tab.

Step 2 – EIC personnel chooses the option of add commissions to generate a new commission head

Step 3 - EIC populates the requisite commission head and the rate of commission to be charged

Step 4 – EIC repeats the process as many times as needed for every commission head it wants to configure.

This ends the commissions rates input process



Stage 3 - Configuration of commissions

Proposal form definition process

During this stage of the product configuration process, EIC will define the fields of information to be captured from the client during the client enrolment process.

Step 1 - EIC personnel logs onto the product configuration module and chooses the proposal form tab.

Step 2 – EIC personnel chooses the option of add field to add a new data capturing field.

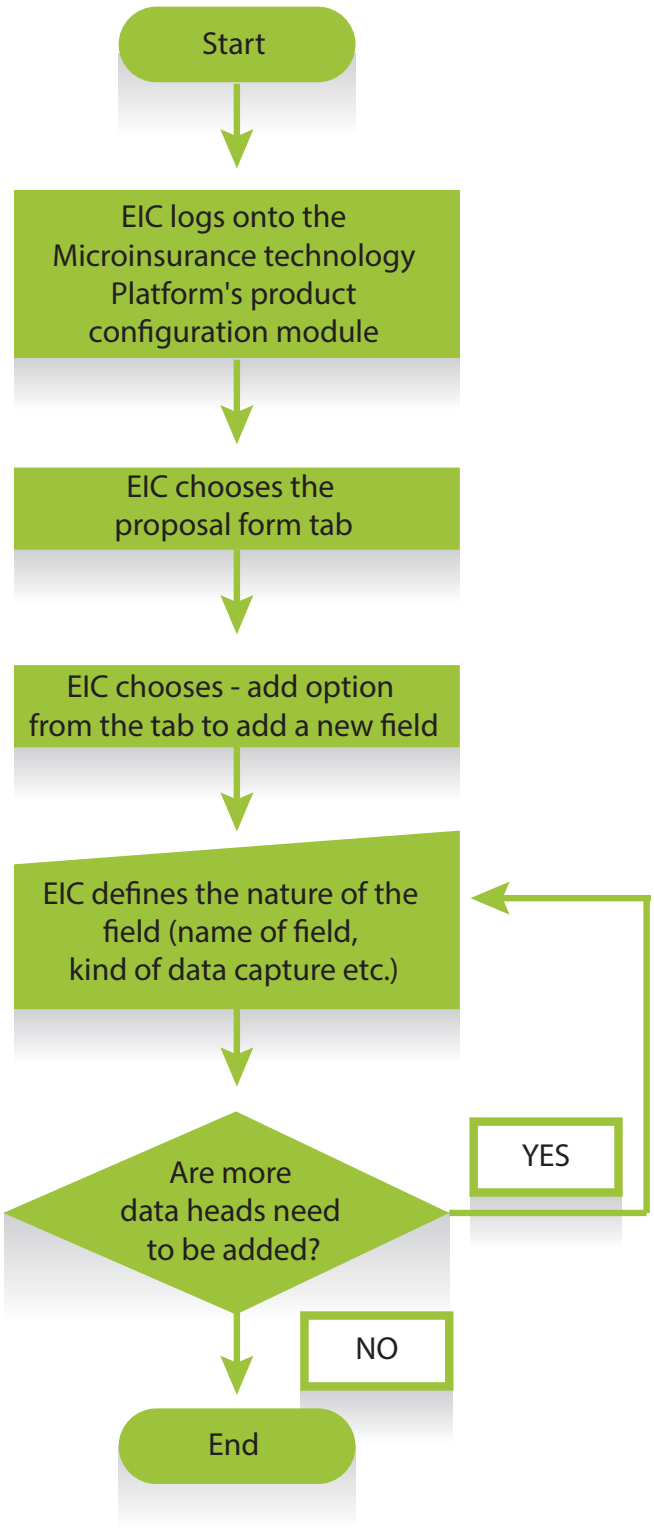
Step 3 - EIC defines the nature of the field (name of field, kind of data capture etc.)

Step 4 – EIC repeats the process as many times as needed for every data field it wants to configure onto the proposal form.

This ends the proposal form definition process.

The fields to be added here will be the same as defined in the sample proposal form submitted to the NBE by EIC

Proposal form data fields input process flow chart



Stage 4 - Definition of proposal form template for client KYC capturing

B. Agent registration and code generation process

Agent registration and code generation process

In order to sell the VICI, EIC will need to appoint agents. These agents will be configured onto the microinsurance technology platform. Once configured, the platform will generate an agent code for the agent. Following are the steps in this process:

Step 1 - EIC logs onto the agent management module

Step 2 – EIC selects the 'add agent' tab.

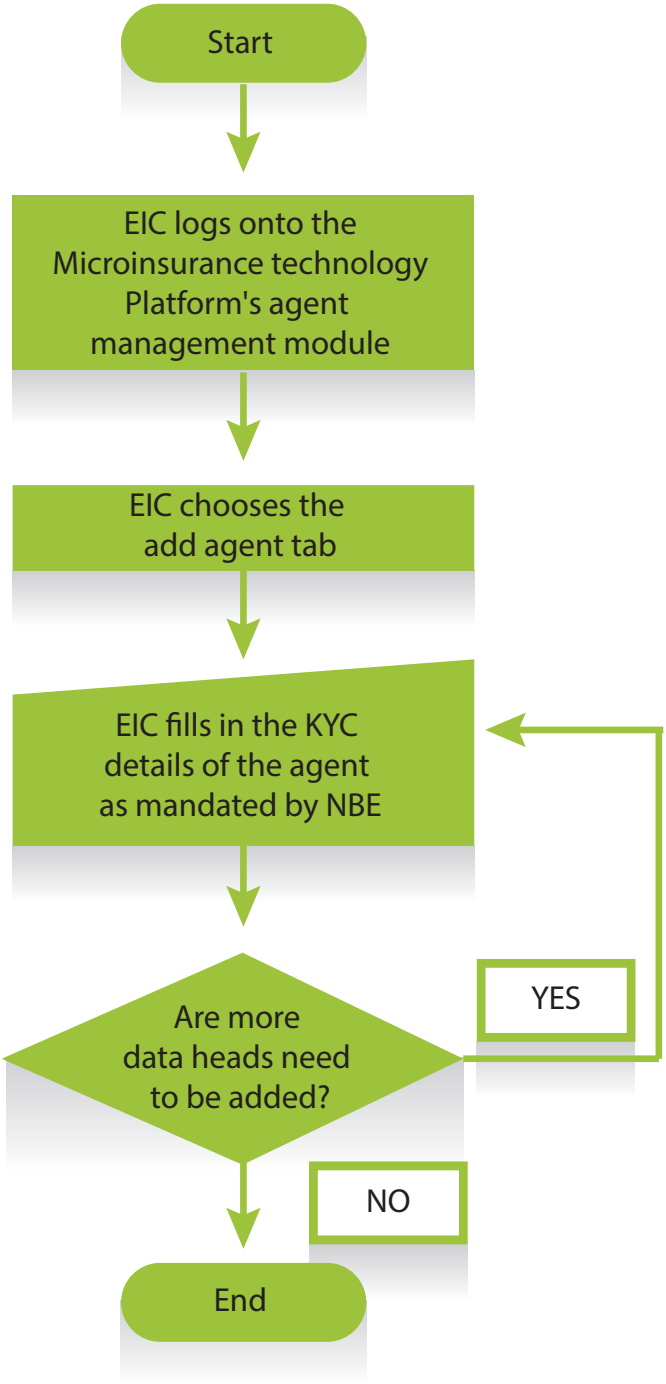
Step 3 - EIC inputs the KYC requirements into the respective fields

Step 4 – after all fields are populated, EIC clicks the tab – register agent.

Step 5 – Platform generates an agent code

This ends the agent configuration process.

Agent Code Generation process flow chart



Agent Registration and Code Generation Process

C. Grid id intimation process

Capturing the farmer's land coordinates is a critical component of the product, it is important that a farmer is made aware of under land grid id does his/her land fall in.

What is a land grid id?

The country of Ethiopia has been divided into 1km2 grids and given specific grid IDs called Grid codes (Figure below). Crop insurance policies are sold to the farmers at Grid level. Therefore the incoming NDVI Values at each grid level are used to calculate the claims against benchmark NDVI Values for each individual policy holder (farmer). There are a total of 786,247 grids.

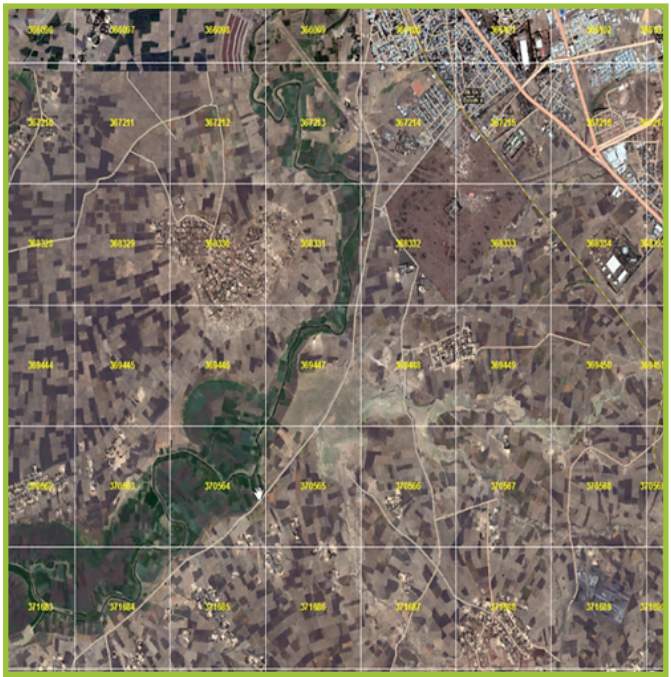


Figure 1: The 1 km2 grid codes (permanently fixed coding: 1 to 786,247)

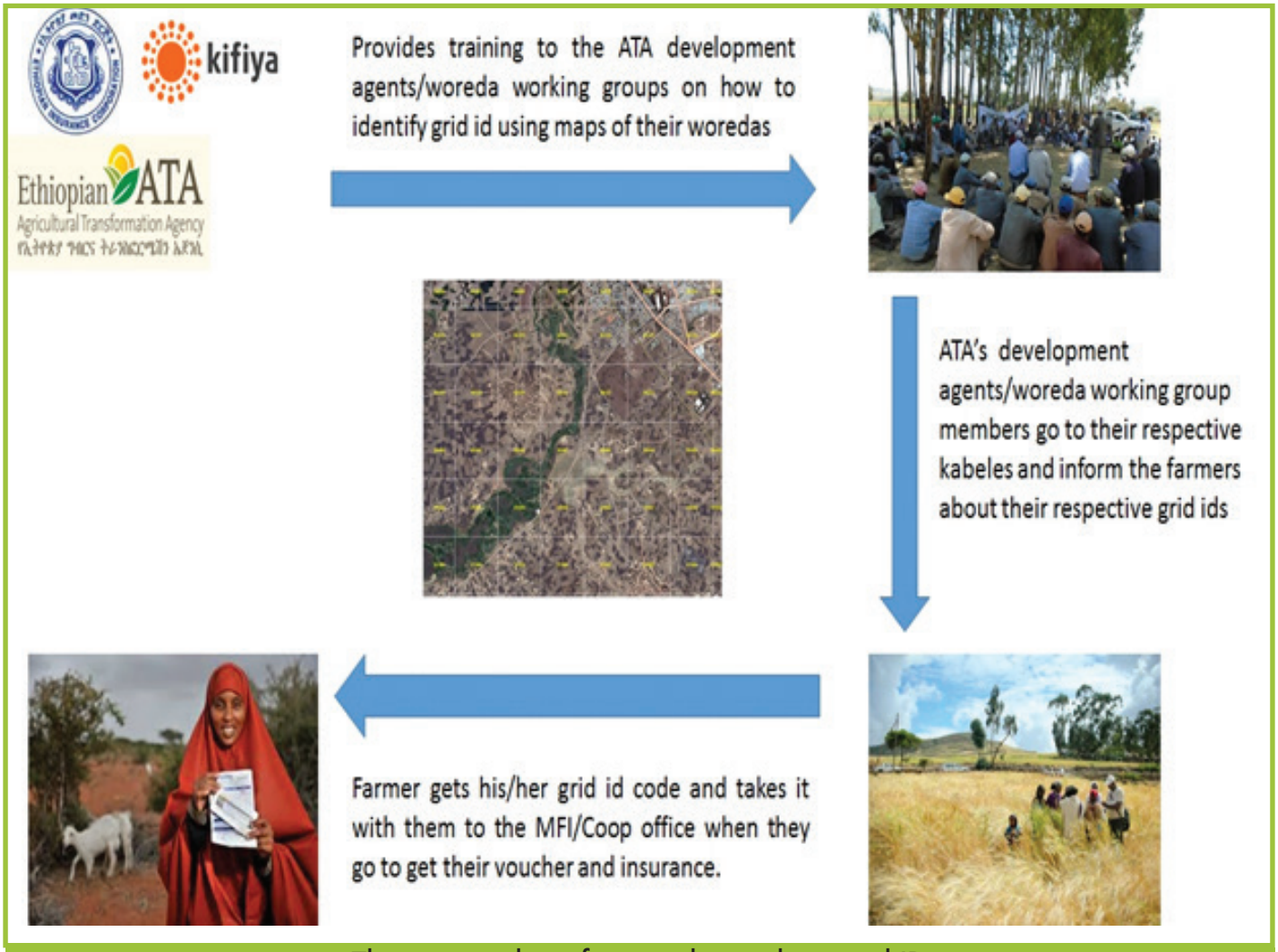
How will the farmers know their grid id?

• Training will be provided to the ATA development agents/woreda working groups on how to identify grid id using maps of their woredas (as show in the image above)

• ATA's development agents/woreda working group members will then go to their respective kabeles and inform the farmers about their respective grid ids

• Farmer gets his/her grid id code and takes it with them to the MFI/Coop office when they go to get their voucher and insurance.

The process is depicted in the diagram as below:



The process how farmers know their grid ID

Grid id identification process

Step 1 – ATA development agent/woreda working group members visits the kabele with kabele maps with grid id.

Step 2 – Agent meets with farmers and explains the maps and how to look for their land on the map

Step 3 – Agent helps the farmers locate their grid id and lets them know their grid id number

Step 4 – Agent ensures that the farmer takes his/her grid id number with them when they go to get their vouchers and enroll for insurance.

This completes the grid id identification process

Grid id identification process

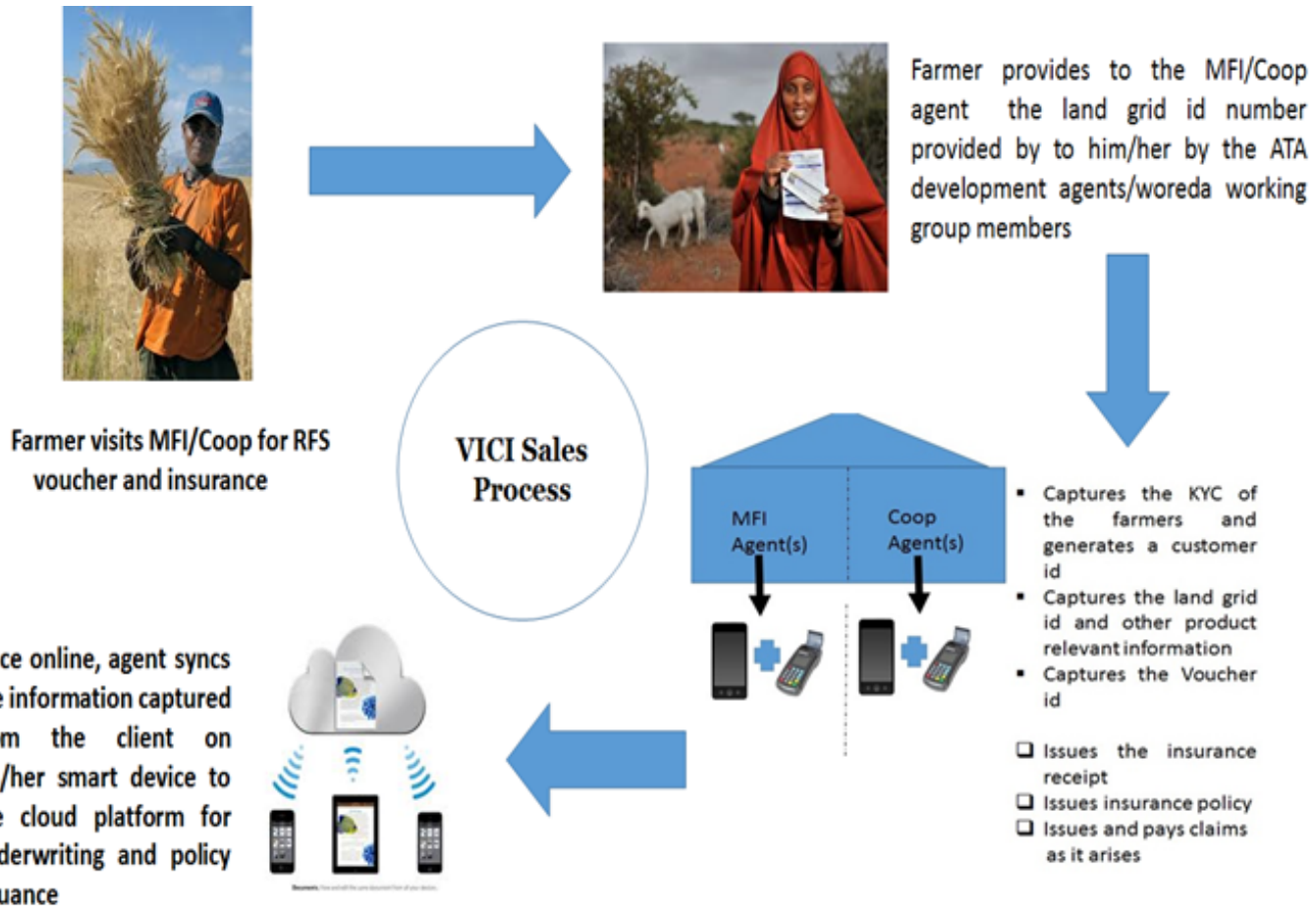
D. Sales process

The sales of VICI, in bundle with the ATA's RFS inputs voucher programme, will be a three step process:

1.Enrolment of client : This process captures the KYC details of the farmer when he visits the MFI/Cooperative to get his voucher and the insurance product

2.Policy Issuance: The sales process ends with the agent syncing the information captured through his smart phone/device onto the cloud microinsurance technology platform, leading to automated underwriting and issuance of the policy which would then be handed to the farmer.

The diagram captures the VICI sales process



VICI sales process

Client enrolment process

During this stage, the agent for EIC, at the Coop/MFI will capture the KYC information for the product as prescribed in the proposal form pre-loaded on his smart phone application

Step 1 - Agent logs into the mobile application on its smart device through his/her agent code

Step 2 – Agent captures all relevant information as per the proposal form fields

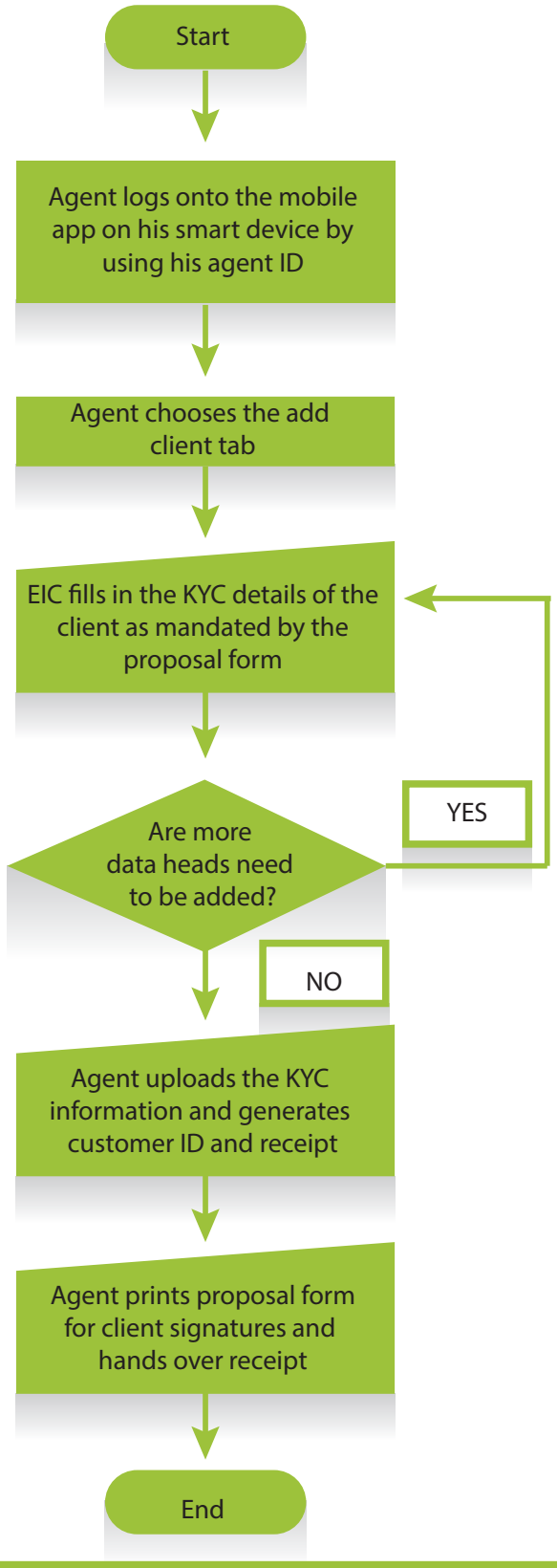
Step 3 – Agent completes the client enrolment process and generates a customer id

Step 4 – Agent prints the proposal form and gets client's signature in duplicate, one for the client and one for his own records

Step 5 - Agent issues a receipt of payment to the client

This completes the client enrolment process

Client enrolment process flow chart



Sales Process Stage 1 – Enrolment of the client

Policy issuance process

Step 1 – Agent syncs the completed proposal form with the technology platform

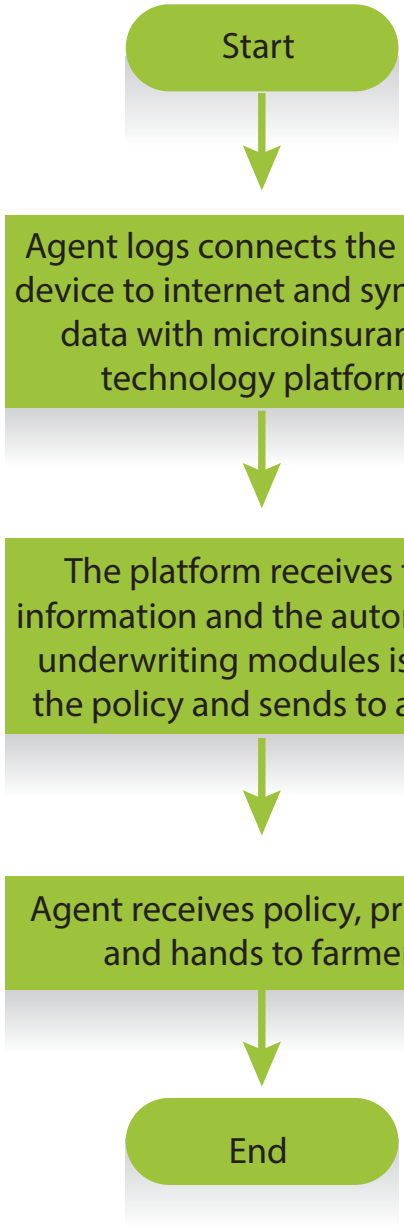
Step 2 – The platform checks if all mandatory information is present and if yes, the automated process generates the policy

Step 3 - Agent receives the soft copy of the policy document

Step 4 – Agent prints the policy document

Step 5 - Agent hands over the policy document to client

Policy issuance flow chart

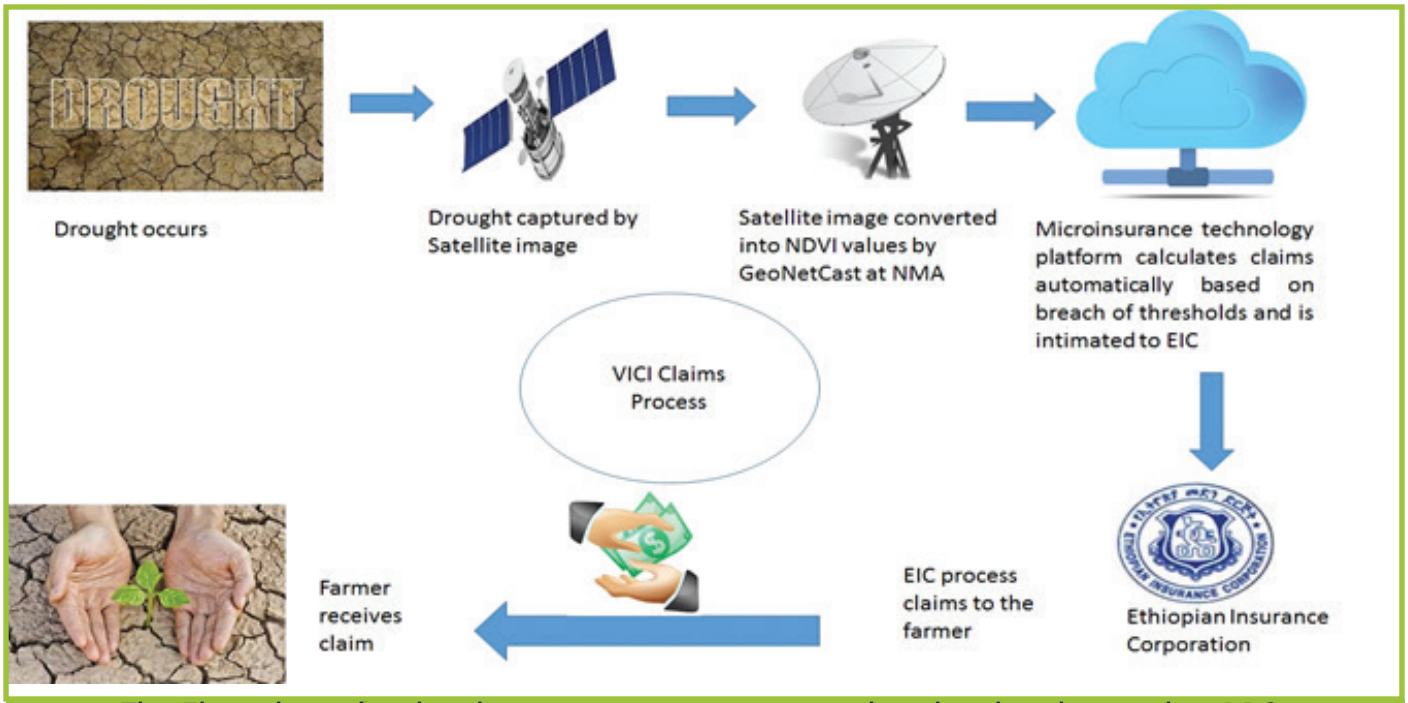


Sales process stage 2 - Policy Issuance process

E. Claims process

Being an index based insurance product, the claims process is self-triggered. i.e. when the incoming NDVI value falls below the thresholds set for the product, the claim is initiated and calculated.

The claims process is summarized as below:



The Flow charts for the claims process are projected in detail in the product BRS.

PFEA

PUBLIC FINANCIAL ENTERPRISE AGENCY (PFEA)

Ethiopian ATA
Agricultural Transformation Agency

AGRICULTURAL TRANSFORMATION AGENCY (ATA)

ETHIOPIAN INSURANCE CORPORATION (EIC)

kifiya

KIFIYA FINANCIAL TECHNOLOGIES (KFT)

NMA

NATIONAL METEOROLOGY AGENCY (NMA)

ITC
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ITC - UNIVERSITY OF TWENTE