



AICCRA

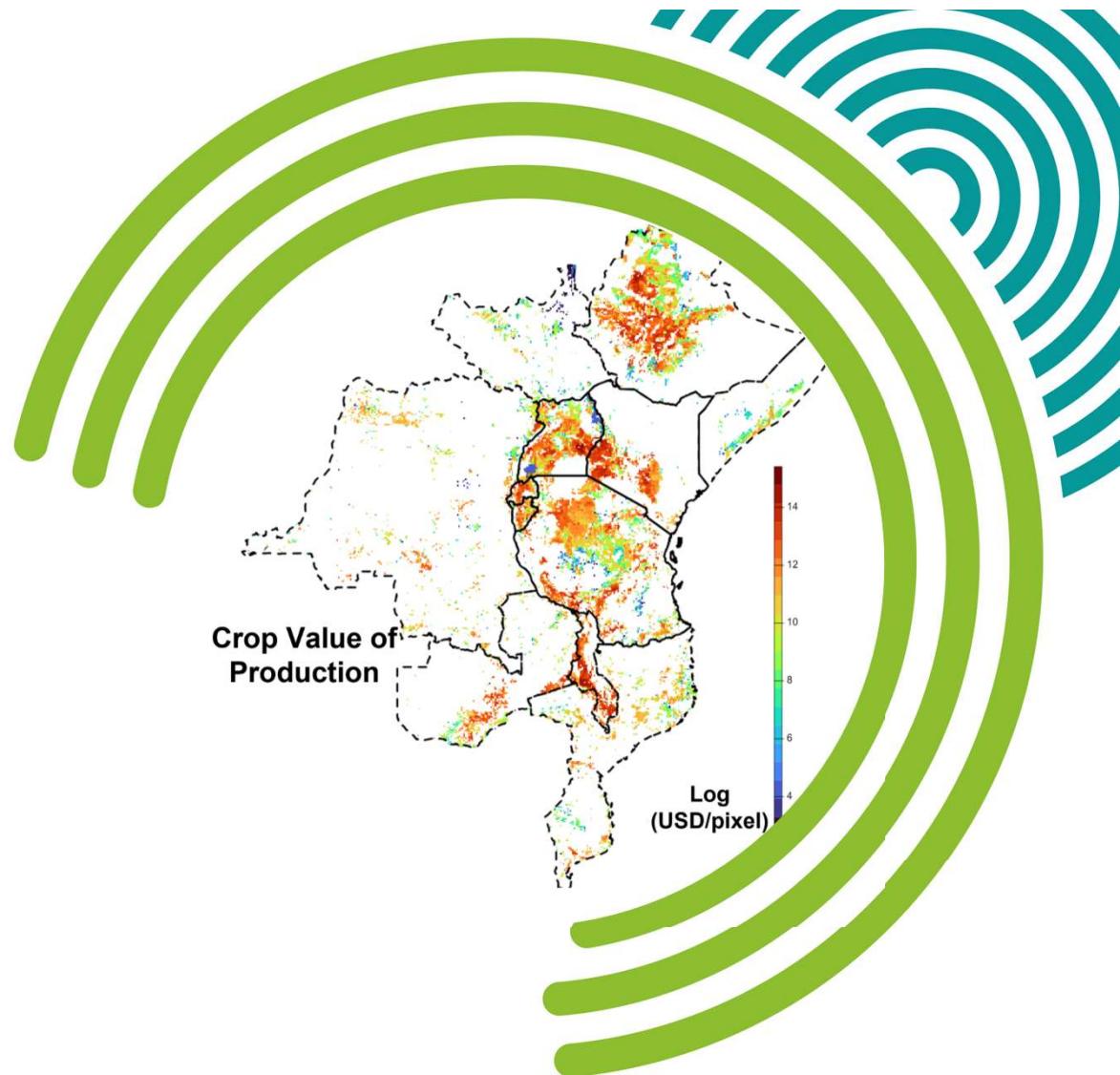
Accelerating the Impact of CGIAR  
Climate Research for Africa

# Economic & Financial Analysis Tool for Climate Change Adaptation Proposals

## User Guide

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## What is this tool for?

The AICCRA EFA tool is designed to provide the high level Economic and Financial analysis (EFA) needed to inform programme development and evidence large-scale funding proposals.

It is suitable for macro-scale planning, for example Global Climate Fund (GCF) proposals. In fact, this tool uses the approach employed in the EFA used to support the AICCRA project. We suggest you read the [AICCRA EFA](#) to understand how this tool can be employed.

The approach is simple and pragmatic. You choose countries, farming systems, one or more crops or livestock types for your project. Then you set some simple technology performance and project economic parameters. Tables and maps are output that can be saved and inserted in your proposal.

# Download & Installation

## Get R & RStudio

The tool runs in R-Studio using an interactive R markdown script.

You will need to download and install R and RStudio.

[Download R](#)

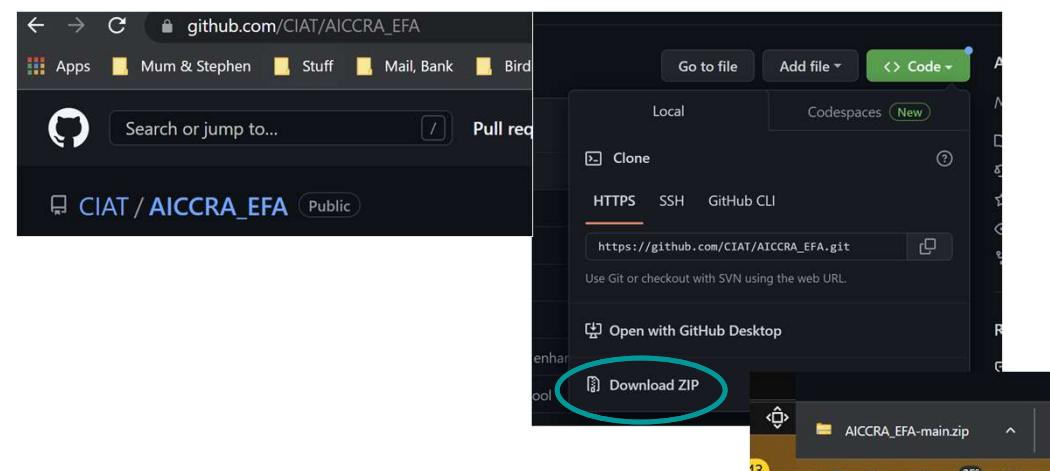
[Download RStudio](#)

[A user guide for installation.](#)

## Get the AICCRA EFA tool

The tool is hosted on github:  
[https://github.com/CIAT/AICCRA\\_EFA](https://github.com/CIAT/AICCRA_EFA)

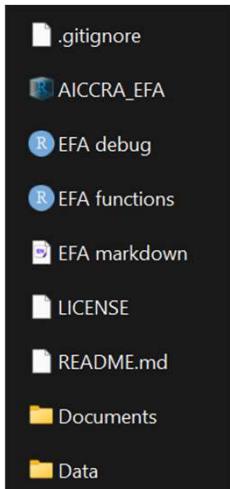
Download the tool as a .zip folder to your local machine



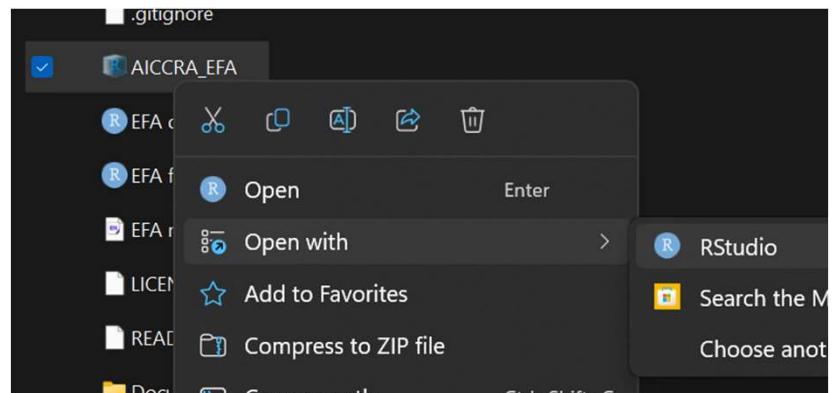
# Running the script

## Unzip & open the project

- Unzip the downloaded folder
  - You should see the files as per the image left



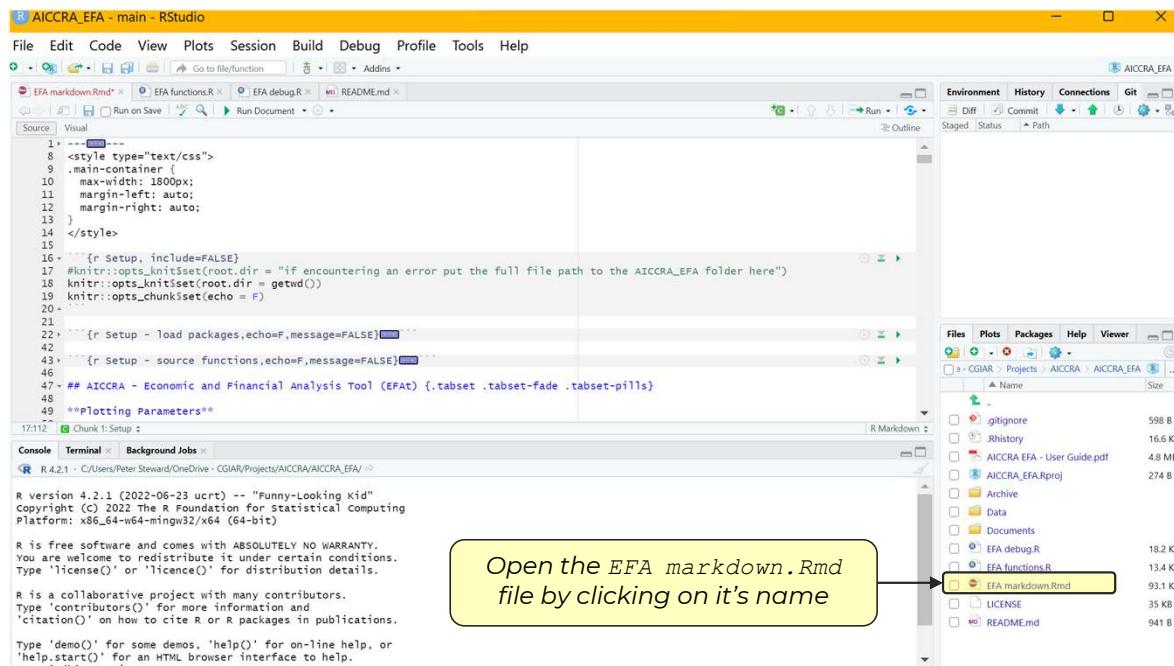
- Open the AICCRA\_EFA.Rproj file using RStudio



## Getting Started

# Running the script

## **Open the R Markdown file**



You should see this Rstudio window when you open the `.Rproj` file.

Next open the ERA  
markdown.Rmd file

# Running the script

## How to fix working directory issues

If you get errors like:

Error: cannot change working directory

Error: Cannot open "/private/var/folders/32/pjhmw8j520j0v3v391nq3c6r0000gn/T/Rtmp7zRNL6/file1123b2d0c2e92/Data/CGIAR\_region/CGIAR\_countries\_simplified.shp"; The source could be corrupt or not supported. See 'st\_drivers()' for a list of supported formats.

Then you will need to edit the code on l17-18:

```
16 - ``{r Setup, include=FALSE}
17 #knitr::opts_knit$set(root.dir = "if encountering an error put the full file path to the AICCRA_EFA folder here")
18 knitr::opts_knit$set(root.dir = getwd())
19 knitr::opts_chunk$set(echo = F)
20 ...
21
```

Add hash to l18, and remove hash from l17:

```
16 - ``{r Setup, include=FALSE}
17 knitr::opts_knit$set(root.dir = "if encountering an error put the full file path to the AICCRA_EFA folder here")
18 #knitr::opts_knit$set(root.dir = getwd())
19 knitr::opts_chunk$set(echo = F)
20 ...
```

Insert the full path to your AICCRA\_EFA folder on l17:

```
1 ``{r Setup, include=FALSE}
2 knitr::opts_knit$set(root.dir = "C:/AICCRA_EFA")
3 #knitr::opts_knit$set(root.dir = getwd())
4 knitr::opts_chunk$set(echo = F)
```

This is an example, you will need to amend to where you have saved on your machine. Windows users please note path syntax uses a forward slash not a backslash (e.g., C:/ not C:\)

# Running the script

## **Run the rmarkdown file**

*Run the markdown by selecting the Run Document command.*

*The first time you run the script it may take a while to open the tool as Rstudio will need to download several required packages. You may also need to update packages.*

## Getting Started

# Running the script

The screenshot shows the AICCRA - EFA software interface. At the top, there's a header with a link to '127.0.0.1:5050?view=markdown' and a 'Publish' button. Below the header, the title 'AICCRA - EFA' is displayed, along with author information: Peter Steward and date: 5/12/2022. The main area is titled 'AICCRA - Economic and Financial Analysis Tool (EFAt)'. It features a 'Plotting Parameters' section with various input fields for 'Fill palette', 'Text size', 'Plot width (px)', 'Adjust height', 'Adjust width', 'Legend position (factors only)', 'Legend columns', 'Border width', and 'Log plot values?'. Below this are color selection boxes for 'Core country border colour' (#000000) and 'Spillover country border colour' (#000000). At the bottom of the interface, there are tabs for 'Approach' (which is selected), 'Datasets', 'Analysis', and 'Annex'.

*If the script has run successfully, you should see a new window that looks like the image left.*

All spatial variables are standardized to grids of 5 arcminute resolution (9.26 km or 85.75km<sup>2</sup> at the equator).

## How to use the tool

# AICCRA - EFA

Peter Steward

5/12/2022

This section adjusts map plot aesthetics  
and size

## AICCRA - Economic and Financial Analysis Tool (EFA)

### Plotting Parameters

Fill palette	Text size	Plot width (px)	Adjust height	Adjust width	Legend position	Legend columns	Border width	Core country border colour	Spillover country border colour
turbo ▾	1.2	1200	0.5	1	bottomleft ▾	2	2	#000000	#000000

Philosophy   Datasets   Analysis   Annex

This economic and financial analysis (EFA) of project benefits is designed to explore:

- Increased productivity and enhanced climate resilience (reduced production variability) of technology adoption
- More widespread adoption of CSA technologies due to regional spillovers.

Caveat: These benefits fall under the sphere of influence of the Project, but not under the sphere of control, because they depend in part on factors beyond the control of the Project (e.g., price incentives, availability of purchased inputs, weather conditions, etc.).

The EFA is carried out in several stages:

1. **Datasets:** Choose the core and spillover countries that will benefit from project activities;
2. **Datasets:** Choose farm classification system and target classes;
3. **Datasets:** Choose target crops, type of MapSPAM cropping system (e.g. rainfed, irrigated or all) and type of MapSPAM area statistic (physical area or harvested area);
4. **Datasets:** Choose target Herrero livestock categories;
5. **Analysis: Productivity increment value** Calculate the value of the benefit that would result from a 1% increase in crop and livestock productivity over the selected core areas (the increment can be adjusted);
6. **Analysis: Marginal increase in value** The value of the benefits is adjusted in recognition of the fact that adoption will occur gradually over time and will not reach the entire area.
7. **Analysis: Avoided losses from reduction in CV**
8. **Analysis: Investment indicators**

All spatial variables are standardized to grids of 5 arcminute resolution.

## Set-up: Choose the farming systems the project will work in

Approach    **Datasets**    Analysis    Annex

**Core and spillover countries** Choose core countries 1st (changing core resets spillover) and always keep 1 core country selected else the script may crash

### Core countries

- Algeria  Angola  Benin  Botswana  Burkina Faso  Burundi
- Cameroon  Central African Republic  Chad  Comoros  Cote d'Ivoire
- Democratic Republic of the Congo  Djibouti  Egypt  Equatorial Guinea
- Eritrea  Ethiopia  Gabon  Gambia  Ghana  Guinea
- Guinea-Bissau  Kenya  Lesotho  Liberia  Libya  Madagascar
- Malawi  Mali  Mauritania  Mayotte  Morocco  Mozambique

### Spillover countries

- Algeria  Angola  Benin  Botswana  Burkina Faso  Burundi
- Cameroon  Central African Republic  Chad  Comoros  Cote d'Ivoire
- Democratic Republic of the Congo  Djibouti  Egypt  Equatorial Guinea
- Eritrea  Ethiopia  Gabon  Gambia  Ghana  Guinea
- Guinea-Bissau  Lesotho  Liberia  Libya  Madagascar  Malawi
- Mali  Mauritania  Mayotte  Morocco  Mozambique  Namibia

### Choose a farming system classification

#### Farming systems

Classification

GLPS

### Choose the farming systems the project will work in \*you must select at least one\*

- Mixed Irrigated Arid  Mixed Irrigated Humid  Mixed Irrigated Temperate  Mixed Rainfed Arid  Mixed Rainfed Humid
- Mixed Rainfed Temperate  Other  Rangelands Arid  Rangelands Humid  Rangelands Temperate  Urban

#### Crops (MapSPAM)

##### Technology

all technologies

##### Area type

harvested

##### Extract totals?

No

#### Livestock

- All livestock  All livestock exc. low density poultry  All livestock exc. poultry  Bovine meat  Bovine milk  Pig meat  Poultry  Ruminants
- Sheep and goat meat  Sheep and goat milk

Countries

Farming systems

Crops (MapSPAM)

Livestock

FAOSTAT

Human population

Climate hazards

Combine selections

#### Livestock

- All livestock  All livestock exc. low density poultry  All livestock exc. poultry  Bovine meat  Bovine milk  Pig meat  Poultry  Ruminants
- Sheep and goat meat  Sheep and goat milk

Countries

Farming systems

Livestock

FAOSTAT

Human population

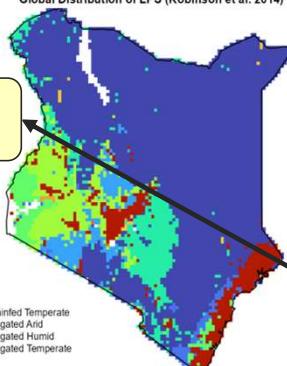
Climate hazards

Combine select

ADD DETAILS FOR ADAPTATION ATLAS LAYERS

Global Distribution of LPS (Robinson et al. 2014)

Make maps of farming systems



## Set-up: Choose the crops the project will work with

Approach      **Datasets**      Analysis      Annex

**Core and spillover countries** Choose core countries 1st (changing core resets spillover) and always keep 1 core country selected else the script may crash

**Core countries**

- Algeria     Angola     Benin     Botswana     Burkina Faso     Burundi
- Cameroon     Central African Republic     Chad     Comoros     Côte d'Ivoire
- Democratic Republic of the Congo     Djibouti     Egypt     Equatorial Guinea
- Eritrea     Ethiopia     Gabon     Gambia     Ghana     Guinea
- Guinea-Bissau     Kenya     Lesotho     Liberia     Libya     Madagascar
- Malawi     Mali     Mauritania     Mayotte     Morocco     Mozambique
- Namibia     Niger     Nigeria     Republic of the Congo     Reunion (France)
- Rwanda     Senegal     Seychelles     Sierra Leone     Somalia     Somaliland
- South Africa     South Sudan     Sudan     Tanzania     Togo     Tunisia
- Uganda     Western Sahara     Zambia

**Spillover countries**

- Algeria     Angola     Benin     Botswana     Burkina Faso     Burundi
- Cameroon     Central African Republic     Chad     Comoros     Côte d'Ivoire
- Democratic Republic of the Congo     Djibouti     Egypt     Equatorial Guinea
- Eritrea     Ethiopia     Gabon     Gambia     Ghana     Guinea
- Guinea-Bissau     Lesotho     Liberia     Libya     Madagascar     Malawi
- Mali     Mauritania     Mayotte     Morocco     Mozambique     Namibia
- Niger     Nigeria     Republic of the Congo     Reunion (France)     Rwanda
- Senegal     Seychelles     Sierra Leone     Somalia     Somaliland
- Tanzania     Togo     Tunisia
- Zimbabwe     eSwatini

**Crops**

**MapSPAM technology**

- all technologies
- irrigated
- rainfed all
- rainfed high inputs
- rainfed low inputs
- rainfed subsistence
- Sheep and goat meat
- Shee

**Choose the type of farming technology**

GLPS     Mixed Rainfed

**Choose whether we are using crop physical area or harvested area in calculations**

**MapSPAM area type**

- harvested
- physical
- harvested
- sesameseed
- small millet

**\*Not operational (leave as no)\***

**Choose the crops the project will focus on**

**Crops (MapSPAM)**

**Technology**

- all technologies

**Area type**

- harvested

**Extract totals?**

- No

**Make maps of crops**

- All livestock
- All livestock exc. low density poultry
- All livestock exc. poultry
- Bovine meat
- Bovine milk
- Pig meat
- Poultry
- Ruminants
- Sheep and goat meat
- Sheep and goat milk

**Livestock**

**Countries**      **Farming systems**      **Crops (MapSPAM)**      **Livestock**      **FAOSTAT**      **Human population**      **Climate hazards**      **Combine selections**

## Set-up: MapSPAM, crop technologies and area types explained

The screenshot shows the AICCRA EFA Tool's navigation bar at the top, with tabs for Approach, Datasets (selected), Analysis, and Annex. Below this, there are filters for Countries (Sheep and goat meat, Sheep and goat milk), Farming systems, and Crops (MapSPAM). A large yellow arrow points from the 'Crops (MapSPAM)' section to the detailed descriptions below.

**Countries   Farming systems   Crops (MapSPAM)   Livestock   FAOSTAT   Human population   Climate hazards   Combine selections**

MapSPAM datasets are used for crop value of production (VoP), Yield, Total Production and Area and can be downloaded [here](#) and methods reviewed [here](#).

**MapSPAM technology descriptions:**

- **all technologies** = all technologies together, ie complete crop or crop group.
- **irrigated** = refers to the crop area equipped with either full or partial control irrigation. Normally the crop production on the irrigated fields uses a high level of inputs si modern varieties and fertilizer as well as advanced management such as soil/water conservation measures.
- **rainfed all** = rainfed portion of crop or crop group (= all technologies - irrigated).
- **rainfed high** = rainfed-based, uses high-yield varieties and some animal traction and mechanization. It at least applies some fertilizer, chemical pest, disease or weed and most of the product is produced for the market.
- **rainfed low** = rainfed crop production which uses traditional varieties and mainly manual labor without (or with little) application of nutrients or chemicals for pest and control. Production is mostly for their own consumption.
- **rainfed subsistence** = rainfed, low-input/subsistence production was introduced to account for situations where cropland and suitable areas do not exist, but farmland present in some way.

The definition of these production systems (management levels) more or less follows FAO/IIASA's GAEZ project since SPAM uses its suitability surfaces.

**MapSPAM area type descriptions:**

- **Physical** = Physical area is measured in a hectare and represents the actual area where a crop is grown, not counting how often production was harvested from it. P is calculated for each production system and crop, and the sum of all physical areas of the four production systems constitute the total physical area for that crop. The physical areas of all crops in a pixel may not be larger than the pixel size.
- **Harvested** = Harvested area is measured in a hectare, harvested area is at least as large as physical area, but sometimes more, since it also accounts for multiple hi crop on the same plot. Like for physical area, the harvested area is calculated for each production system and the sum of all harvested areas of all production system amount to the total harvested area of the pixel. The sum of all the harvested areas of the crops in a pixel can be larger than the pixel size.

Citation: International Food Policy Research Institute, 2020, "Spatially-Disaggregated Crop Production Statistics Data in Africa South of the Sahara for 2017", <https://doi.org/10.17196/SPAMN>, Harvard DataVerse, v3

**Value of Production (VoP)   Area   Production**

SPAM's cross entropy starts with prior knowledge of where crops may be grown and to which extent. It assumes that farmers, given a choice of different crops, will grow the generate more revenue, this is where crop prices come in. SPAM uses a different price for every crop, but the same price for all countries: 2004-2006 average international used by FAO to compute Value of Production.

Download VoP [here](#).

**MapSPAM Crop Value of Production In(USD/pixel)**

bean\_vop   cassava\_vop

A callout box with an orange border contains the text: "Maps of crop VoP, Area and Production are produced reflecting your farming systems x crop x technology x area type selections". An orange arrow points from this box to the "Value of Production (VoP)" section.

## Set-up: Choose the livestock production systems the project will work with (if any)

Approach    **Datasets**    Analysis    Annex

**Core and spillover countries** Choose core countries 1st (changing core resets spillover) and always keep 1 core country selected else the script may crash

### Core countries

- Algeria    Angola    Benin    Botswana    Burkina Faso    Burundi
- Cameroon    Central African Republic    Chad    Comoros    Cote d'Ivoire
- Democratic Republic of the Congo    Djibouti    Egypt    Equatorial Guinea
- Eritrea    Ethiopia    Gabon    Gambia    Ghana    Guinea
- Guinea-Bissau    Kenya    Lesotho    Liberia    Libya    Madagascar
- Malawi    Mali    Mauritania    Mayotte    Morocco    Mozambique
- Namibia    Niger    Nigeria    Republic of the Congo    Reunion (France)
- Rwanda    Senegal    Seychelles    Sierra Leone    Somalia    Somaliland
- South Africa    South Sudan    Sudan    Tanzania    Togo    Tunisia
- Uganda    Western Sahara    Zambia    Zimbabwe    eSwatini

### Spillover countries

- Algeria    Angola    Benin    Botswana    Burkina Faso    Burundi
- Cameroon    Central African Republic    Chad    Comoros    Cote d'Ivoire
- Democratic Republic of the Congo    Djibouti    Egypt    Equatorial Guinea
- Eritrea    Ethiopia    Gabon    Gambia    Ghana    Guinea
- Guinea-Bissau    Lesotho    Liberia    Libya    Madagascar    Malawi
- Mali    Mauritania    Mayotte    Morocco    Mozambique    Namibia
- Niger    Nigeria    Republic of the Congo    Reunion (France)    Rwanda
- Senegal    Seychelles    Sierra Leone    Somalia    Somaliland
- South Africa    South Sudan    Sudan    Tanzania    Togo    Tunisia
- Uganda    Western Sahara    Zambia    Zimbabwe    eSwatini

### Farming systems

#### Classification

- Mixed Irrigated Arid    Mixed Irrigated Humid    Mixed Irrigated Temperate    Mixed Rainfed Arid    Mixed Rainfed Humid
- Mixed Rainfed Temperate    Other    Rangelands Arid    Rangelands Humid    Rangelands Temperate    Urban

GLPS

### Crops (MapSPAM)

#### Technology

all technologies

#### Area type

harvested

#### Extract totals?

No

### Choose the livestock production systems

- arabica
- other
- rice
- robusta coffee
- sesameseed
- small millet
- sorghum
- soybean
- sugarbeet
- sugarcane
- sunflower
- sweet potato
- tea
- temperate fruit
- tobacco
- tropical fruit
- vegetables
- wheat
- yams

### Livestock

- All livestock
- All livestock exc. low density poultry
- All livestock exc. poultry
- Bovine meat
- Bovine milk
- Pig meat
- Poultry
- Ruminants
- Sheep and goat meat
- Sheep and goat milk

Countries

Farming systems

Crops (MapSPAM)

Livestock

FAOSTAT

Human population

Climate hazards

Combine selections

## Set-up: View FAOSTAT data used to estimate variability in crop production

Approach    **Datasets**    Analysis    Annex

Countries   Farming systems   Crops (MapSPAM)   Livestock   **FAOSTAT**   Human population   Climate hazards   Combine selections

FAO data are used to estimate the national level variation in crop production over time. They are downloaded using the [FAOSTAT::get\\_faostat\\_bulk](#) function. Data can also be accessed from the [FAOSTAT website](#) and directly downloaded [here](#).

[Prepare data](#)    [Raw data](#)    [Coefficient of variation \(CV\)](#)    **Plot**

To interpret these data please see the meta-data section under [Crops and livestock products](#) in this [FAOSTAT website](#) and this [pdf](#). The `SpamName` field converts the FAO crop name in the `item` column to the corresponding SPAM name.

	area_code	area	item_code	item	element_code	element	year_code	year	unit	value	flag	
1	4	Algeria	486	Bananas	5419	yield	2001	2001	t/ha			
2	4	Algeria	486	Bananas	5419	yield	2002	2002	t/ha			
3	4	Algeria	486	Bananas	5419	yield	2003	2003	t/ha			
4	4	Algeria	486	Bananas	5419	yield	2004	2004	t/ha			
5	4	Algeria	486	Bananas	5419	yield	2005	2005	t/ha			
6	4	Algeria	486	Bananas	5419	yield	2006	2006	t/ha	11	Fc	b1
7	4	Algeria	486	Bananas	5419	yield	2007	2007	t/ha	11	Fc	b1
8	4	Algeria	486	Bananas	5419	yield	2008	2008	t/ha	9.2	Fc	b1
9	4	Algeria	486	Bananas	5419	yield	2009	2009	t/ha	15.182	Fc	b1
10	4	Algeria	486	Bananas	5419	yield	2010	2010	t/ha	18.917	Fc	b1

Prepare data    Raw data    Coefficient of variation (CV)    **Plot**

Countries with no fill colour indicate either a crop is not grown in this country or there is no yield information available.

**Coefficient of variation**

The CV map is useful for reality checking the CV reduction parameter used in the analysis. This value represents a reduction in CV from the adoption of a technology.

## Set-up: Set technology performance parameters for the analysis

**Plotting Parameters**

Fill palette	Text size	Plot width (px)	Adjust height	Adjust width	Legend position (factors only)	Core country border colour	Spillover c
turbo	1.2	1200	0.5	1	bottomleft	#000000	#000000

**Approach**   **Datasets**   **Analysis**   **Annex**

<b>Productivity Increments (%)</b> 1-3 values can be entered.	<b>Annual adoption rates in core areas(%)</b> 1-3 values can be entered.	<b>The % of adoption in core countries that spills to spillover countries</b>
Value 1 5	Value 2 10	Value 3 1
Value 1 1	Value 2 2	Value 3 3

**Spillover Factor**

<b>Costs</b> Annual total costs (USD/ha) or benefit-cost ratio (BCR)	<b>To estimate the value of CIS this value is subtracted from country x crop CV values</b>
<b>Cost adopters</b> 170.46	<b>Cost non-adopters</b> 221.6
<b>BCR (Ratio)</b> 1.62	<b>CV reduction</b> 5

**Duration (years)**  
The project duration in years

**Discount rate (%)**  
Discount rate used for NPV calculations

**Return start year**  
The year that returns begin after investment?

**Project cost**  
The cost of the project (million USD)  
60

**Divide USD by:** 1   **Area unit:** ha   **Divide population by:** 1   **Divide production (t) by:** 1

**Extracted data**   **Productivity increment value**   **Marginal increase in value**   **Avoided losses from reduction in CV**   **Investment indicators**

**Do not use costs with livestock, use BCR**

CIS = "Climate information services", this EFA tool was originally designed to estimate their value, but any technology that increases resistance to climate stresses and shocks can be considered

**By what % will adoption of your technology improve yields?**  
\*Enter at least one value\*  
\* Up to 3 values allowed for sensitivity analysis\*

**What is the annual % adoption rate of your technology with the core project areas?**  
\*Enter at least one value\*  
\* Up to 3 values allowed for sensitivity analysis\*

\*\*Note\*\* Defining costs does not work for livestock systems. This because cost are defined on per ha basis and the livestock areas used are for entire farming systems giving very low yields per unit area. We must use the entire farming system area because the spatial footprint of livestock production is not available for livestock (as it is from MapSPAM for crops). When using livestock, you will need to leave the costs blank and use the BCR option

**By what % does adoption of your technology spill over into your spillover countries (if any) from the core areas?**  
\*You must enter a value, this can be 0 if there is no spillover\*  
\*Typically, this will be very low (<=1%)\*

**What is the cost of the farming systems?**  
1) You can enter costs (USD/ha) for adopters and non-adopters of a technology for crops (does work for livestock use option 2).  
2) You can also enter a typical benefit-cost ratio (BCR) for your target farming system(s) which is used to estimate the costs of production (note BCR method simply scales cost with increases in production).  
\*You must enter a value\*

**How much will adoption of your technology reduce climate variability? This value is subtracted from country x crop CV values and used to estimate yield loss reductions.**  
\*You must enter a value\*  
\*Visualize country x crop CV in the Datasets/FAOSTAT/Plots tab\*

## Set-up: Set project economic parameters for the analysis

**Plotting Parameters**

Fill palette	Text size	Plot width (px)	Adjust height	Adjust width	Legend position (factors only)	Legend columns	Border width	Core country border colour	Spillover c
turbo	1.2	1200	0.5	1	bottomleft	2	2	#000000	#000000

Approach   Datasets   **Analysis**   Annex

Productivity increments (%) 1-3 values can be entered.	Annual adoption rates in core areas(%) 1-3 values can be entered.	The % of adoption in core countries that spills to spillover countries	Costs Annual total costs (USD/ha) or benefit-cost ratio (BCR)	To estimate the value of CIS this value is subtracted from country x crop CV values								
Value 1 5	Value 2 10	Value 3 1	Value 1 2	Value 2 3	Value 3 1	Spillover Factor 1	Cost adopters 170.46	Cost non-adopters 221.6	BCR (Ratio) 1.62	CV reduction 5		
The project duration in years Duration (years)			Discount rate used for NPV calculation. Discount rate (%)			The year that returns begin after investment? Return start year			The cost of the project (million USD) Project cost			
10			5			1			60			
Divide USD by:	Area unit:	Divide population by:	Divide production (t) by:									
1	ha	1	1									
Extracted data	Productivity increment value	Marginal increase in value	Avoided losses from reduction in CV	Investment indicators								

**What is the duration of your project in years?**  
\*You must enter a value\*

**What is the % discounting rate to be used in economic calculations?**  
\*You must enter a value\*

**In what year do returns begin after investment into the project?**

\*0 = same year as investment (immediate)\*  
\*1 = 1 year after investment\*  
\*2 = 2 years after investment\*

**What is the total cost of the project in million USD?**  
\*You must enter a value\*

*Note this assumes the full project cost is paid or at least ring-fenced at the start of the project.*

## Display: Set value units for display of analysis outcomes

Plotting Parameters

Fill palette	Text size	Plot width (px)	Adjust height	Adjust width	Legend position (factors only)	Legend columns	Border width	Core country border colour	Spillover c
turbo	1.2	1200	0.5	1	bottomleft	2	2	#000000	#000000

Approach   Datasets   **Analysis**   Annex

Productivity increments (%)   Annual adoption rates in core areas(%)   The % of adoption in core countries that spills to spillover countries   Costs   To estimate the value of CIS this value is  
1-3 values can be entered.   1-3 values can be entered.   Annual total costs (USD/ha) or benefit-cost ratio (BCR) subtracted from country x crop CV values

Value 1	Value 2	Value 3	Value 1	Value 2	Value 3	Spillover Factor	Cost adopters	Cost non-adopters	BCR (Ratio)	CV reduction
5	10		1	2	3	1	170.46	221.6	1.62	5

The project duration in years   Duration (years)   Discount rate used for NPV calculations   Discount rate (%)   The year that returns begin after investment?   Return start year   The cost of the project (million USD)   Project cost

10	5		1			60
----	---	--	---	--	--	----

Divide USD by:   Area unit:   Divide population by:   Divide production (t) by:

1	ha	1	1
---	----	---	---

Extracted data   Productivity increment value   Marginal increase in value   Avoided losses from reduction in CV   Investment indicators

These options adjust how values in the major output tables are presented

## Results: Display crop/livestock statistics for country x farming systems

The Extracted data tab shows values summed by farming system x country (rows) for the crops and livestock systems (cols) you have selected (Extraction tab). Core and Spillover countries are presented in separate tabs.

Values presented are total area, human population, rainfall variability, value of production, area of production, yield and price.

### AICCRA - Economic and Financial Analysis Tool (EFAT)



Each row in the extracted data tables represents a farming system within a country. Explanation of table headings: **Area.ha** = area (ha); **Hpop** = human population; **RainCV.ln** = natural log of mean rainfall CV; suffix **vop** = commodity value of production (international USD); suffix **area** = commodity area of production (km<sup>2</sup>); suffix **yield** = commodity yield (ton/ha); suffix **price** = 2005 commodity price (international USD/ton).

	Country	Farming_System	Area.ha	Hpop	RainCV.In	Bovine meat_vop	Bovine meat_area	Bovine meat_prod	bean_vop	cassava_vop	maize_vop	bean_area	cassava_area	maize_area	bean_prod
	All	All	All	All	All	All	All	All	All	All	All	A	All	All	All
1	Kenya	Rangelands Arid	39429801.735	6401885.239	3.579	10728910.185	39429801.735	5648.855	29498637.228	1548994.394	25564378.431	74615.6	1422.9	100741.501	49027.3
2	Kenya	Rangelands Humid	973035.198	215066.881	3.144	4255665.37	955952.57	2227.58	2949070.582	813887.3	4864362.053	7146.5	497.8	16987.1	4901.4
3	Kenya	Rangelands Temperate	2538173.264	802371.783	3.108	30917471.391	2538173.264	16061.462	18093076.129	16421.2	15906546.327	49250.1	10.9	69866.7	30071.1
4	Kenya	Mixed Rainfed Arid	5210448.936	3584663.205	3.316	9810554.711	5193403.352	5157.778	139676456.893	10735190.857	116906467.085	327269.1	7766.2	449417.301	232147.9

## Results: Display farming system areas

The Extracted data tab also shows the % area of different farming systems for each country and for the total core or spillover area (Farming System Areas tab).

\*Note the totals are can sum to >100% as the total national areas comes from a shapefile and the farming system areas come from a raster.

### AICCRA - Economic and Financial Analysis Tool (EFAt)



Extraction    Farming System Areas

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Country	Mixed Irrigated Arid	Mixed Irrigated Humid	Mixed Irrigated Temperate	Mixed Rainfed Arid	Mixed Rainfed Humid	Mixed Rainfed Hyperarid	Mixed Rainfed Temperate	Other	Rangelands Arid	Rangelands Humid	Rangelands Temperate	Total
All	All	All	All	All	All	All	All	All	All	All	All	All
1 Kenya	0.25	0.12	0.06	8.89	3.38		7.97	7.41	67.24	1.66	4.33	101.31
2 Tanzania	0.1		0.01	28.63	11.86	0.02	3.77	15.01	21.59	12.82	2.18	95.99
3 Total	0.16	0.04	0.03	21.06	8.61	0.01	5.38	12.1	39.11	8.54	3	98.04

Showing 1 to 3 of 3 entries

Previous 1 Next

## Results: Display farming system areas

Here you can set a productivity increment and see what the estimated value of this increment is when applied the total value of crops/livestock in the selected core and spillover countries.

Note this assumes 100% adoption as it applied to all the value of production. This tab can be used to quickly investigate the potential of working with different commodities in different countries.

The estimated direct benefits of adoption of CSA practices in the selected core countries, expressed as the increase in value (USD) of production per year per the specified percentage productivity increment in crop, meat or milk yields – that is, assuming adoption over all the crop area and all cattle in the target systems of a technology that increased production per ha or per animal by the specified percentages.

Productivity increment (%)

1

Core Spillover

This table shows the estimated direct benefits of adoption of CSA practices in the selected core countries, expressed as the increase in value of production per year per 1 % increase in crop and/or livestock yields – that is, assuming adoption over all the crop area and cattle in the target systems of a technology that increased production per ha or per animal per 1 % productivity increment. Units are international USD.

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Search:

System	Kenya	Tanzania	Total
All	All	All	All
1 Bovine meat	3378773.7	2553424.3	5932198.1
2 bean	4833625.3	7255365.5	12088990.7
3 cassava	941273.1	5955675.5	6896948.6
4 maize	5438196.5	8473660.3	13911856.8
5 Total	14591868.7	24238125.6	38829994.3

### AICCRA - Economic and Financial Analysis Tool (EFAt)

Approach Datasets Analysis Annex

Extracted data Productivity increment value Marginal increase in value Avoided losses from reduction in CV Investment indicators

## Results: Display marginal increases in production results

The Analysis/Marginal increase in value tab shows marginal increases in production values for the adoption rates and productivity increments selected. Results are displayed: 1) in totality, year by year for each country x farming system x crop/livestock commodity selected (All Data tab); 2) summed to crop/livestock commodities only (Summarized tab).

### AICCRA - Economic and Financial Analysis Tool (EFAT)

Approach Datasets Analysis Annex  
Extracted data Productivity increment value Marginal increase in value Avoided losses from reduction in CV Investment indicators

Extracted data Productivity increment value Marginal increase in value Avoided losses from reduction in CV Investment indicators

Core countries Spillover countries

**\*\*Note\*\* Livestock yields are not realistic and should not be quoted in outputs.**

non\_adopt = non-adopters; adopt = adopters

own in the annex. The productivity increments used here should be within what has been observed in many situations for the technology being assessed. Regarding adoption rates, there are not many examples of agricultural technology adoption rates > scale increases of 2% per year (see Thornton and Herrero, 2010, for example). The annual adoption rates used here refer to the total area of crop and/or number of cattle that have not yet adopted over a 10 year period. So, for example, 2% adoption rate means that 2% of the area or number of cattle that have not yet adopted over a 10 year period. For this reason, the estimates of VOP and VOP adopted are per year shown.

Proportion of area that has adopted a technology (increases with time)

Project Benefits (PB) =  $(NR_{adopted\_year_n} + NR_{non\_adopted\_year_0}) - NR_{non\_adopt\_year_0}$   
Basically PB is the change in net returns due to technology adoption over time

All	Core countries	Spillover countries	Farming_System	Country	Crop	Area.ha	Ad.Rate	Pr.Inc	Y_non_adopt	Y_adopt	Year	Price	Cost_adopt	Cost_non_adopt	Total_adoption	A_non_adopt	A_adopt	VOP_non_adopt	VOP_adopt	NR_non_adopt	NR_adopt	Project_benefits
Mixed Irrigated Arid	Kenya	maize	145201.3625	0.01		0.05	1.9796	2.0785	1	141.6732	181.7735	173.1176	0.01	14060.376	142.024	3943240.4435	41822.2471	1509141.4043	16006.0452	762.1926		
Mixed Irrigated Arid	Kenya	maize	145201.3625	0.01		0.05	1.9796	2.0785	2	141.6732	181.7735	173.1176	0.0199	13919.7722	282.6278	3903808.039	83226.2718	1494049.9903	31852.0299	1516.7633		
Mixed Irrigated Arid	Kenya	maize	145201.3625	0.01		0.05	1.9796	2.0785	3	141.6732	181.7735	173.1176	0.0297	13780.5745	421.8255	3864769.9587	124216.2562	1479109.4903	47539.5548	2263.7883		
<div style="display: flex; justify-content: space-between;"> <div style="width: 33%;"> <p><b>Adoption rate</b> Note if spillover countries are selected then adoption rates are multiplied by the Spillover Factor</p> <p>Spillover Factor: <input type="text" value="1"/></p> <p>Annual adoption rates in core areas(%) 1-3 values can be entered. Value 1   Value 2   Value 3 1   2   3</p> </div> <div style="width: 33%;"> <p><b>Productivity increment</b></p> <p>The project duration in years Duration (years): <input type="text" value="10"/></p> <p>Productivity increments (%) 1-3 values can be entered. Value 1   Value 2   Value 3 5   10   1</p> </div> <div style="width: 33%;"> <p><b>Yield</b></p> <p><b>Year of project</b></p> <p><b>Value of crop</b></p> <p><b>Cost per unit area of adopted vs non_adopted technologies.</b> When using BCR costs are calculated as: <math>Cost_{non\_adopted} = (Yield * Price) / BCR</math> <math>Cost_{adopted} \leftarrow ((1+Pr.Inc) * Yield * Price) / BCR</math></p> <p><b>Costs</b> Annual total costs (USD/ha) or benefit-cost ratio (BCR) Cost adopters   Cost non-adopters   BCR (Ratio) 170.46   221.6   1.62</p> </div> </div>																						

How to use the tool | Results | Analysis/Marginal increase in value Tab

## Results: Adjust units

### AICCRA - Economic and Financial Analysis Tool (EFAt)

Approach Datasets **Analysis** Annex

Extracted data Productivity increment value Marginal increase in value Avoided losses from reduction in CV Investment indicators

Each row in the table represents a commodity x farming system x country combination for different values of annual adoption rate and productivity increment. Explanation of table headings:  $Area.ha$  = area of commodity (ha);  $Ad.Rate$  = annual adoption rate (proportion);  $Pr.Inc$  = productivity increment (proportion);  $Y_{non\_adopt}$  = mean yield of non-adopters (t/ha);  $Y_{adopt}$  = mean yield of adopters (t/ha) as  $Y_{non\_adopt} \times (1+Pr.Inc)$ ;  $Year$  = project year;  $Price$  = 2005 commodity price (international USD/ton);  $Cost\_adopt$  = estimate of production cost per ha as  $Price \times Y_{adopt} / BCR$  of non-adopters;  $Cost\_non\_adopt$  = estimate of production cost per ha as  $Price \times Y_{non\_adopt} / BCR$  of non-adopters;  $Total\_adoption$  = total adoption of technology (proportion);  $A_{non\_adopt}$  = area of non-adopters as  $Area \times (1-Total\_adoption)$  (km<sup>2</sup>);  $A_{adopt}$  = area of adopters (km<sup>2</sup>) as  $Area \times Total\_adoption$ ;  $VOP_{non\_adopt}$  = total value of production for non-adopters (international USD) as  $A_{non\_adopt} \times Y_{non\_adopt} \times Price$ ;  $VOP_{adopt}$  = total value of production for adopters (international USD) as  $A_{adopt} \times Y_{adopt} \times Price$ ;  $NR_{non\_adopt}$  = net return for non-adopters as  $A_{non\_adopt} \times (Y_{non\_adopt} \times Price - Cost\_adopt)$ ;  $NR_{adopt}$  = net return for adopters as  $A_{non\_adopt} \times (Y_{non\_adopt} \times Price - Cost\_non\_adopt)$ ;  $Project\_benefits$  = marginal value of adoption (international USD) as  $NR_{non\_adopt} + NR_{adopt} - NR_{non\_adopt\_t0}$  where  $NR_{non\_adopt\_t0}$  is the net return of the system before any technology adoption has occurred. For more information on how  $Total\_adoption$  is calculated see the [MarginalIncc](#) function found in the [Analysis::Data prep & analysis functions tab](#).

Core countries Spillover countries

Here we modify the benefits from the previous tab for a range of adoption rates (1, 2, 3%) and productivity increments (5, 10%) at scale. Calculations are shown in the annex. The productivity increments used here should be within what has been observed in many situations for the technology being assessed. Regarding adoption rates, there are not many examples of agricultural technology adoption rates at scale in excess of 2% per year (see Thornton and Herrero, 2010, for example). The annual adoption rates used here refer to the total area of crop and/or number of cattle that have not yet adopted over a 10 year period. So, for example, 2% adoption in year 8 is not the same number as 2% adoption in year 2. For this reason, the estimates of VOP addition are not simple linear multiples of the adoption rate per year shown.

Farming_System		Country	Crop	Area.ha	Ad.Rate	Pr.Inc	Y_non Adopt	Y Adopt	Year	Price	Cost_adopt	Cost_non_adopt	Total_adoption	A_non_adopt	A_adopt	VOP_non_adopt	VOP_adopt	NR_non_adopt	NR_adopt	Project_benefits
All				All		All		All	All	All	All	All	All	All	All	All	All	All	All	
Mixed Irrigated Arid	Kenya	maize	145201.3625	0.01	0.05	1.9796	2.0785	1	141.6732	181.7735	173.1176	0.01	14060.376	142.024	3943240.4435	41822.2471	1509141.4043	16006.0452	762.1926	
Mixed Irrigated Arid	Kenya	maize	145201.3625	0.01	0.05	1.9796	2.0785	2	141.6732	181.7735	173.1176	0.0199	13919.7722	282.6278	3903808.039	83226.2718	1494049.9903	31852.0299	1516.7633	
Mixed Irrigated Arid	Kenya	maize	145201.3625	0.01	0.05	1.9796	2.0785	3	141.6732	181.7735	173.1176	0.0297	13780.5745	421.8255	3864769.9587	124216.2562	1479109.4903	47539.5548	2263.7883	

Divide USD by:  Area unit:  Divide population by:  Divide production (t) by:

Remember you can use these options to adjust the units of value, area and production

Extracted data Productivity increment value Marginal increase in value Avoided losses from reduction in CV Investment indicators

## Results: Display marginal increases in production

### AICCRA - Economic and Financial Analysis Tool (EFAt)

Approach Datasets Analysis Annex

Extracted data Productivity increment value Marginal increase in value Avoided losses from reduction in CV Investment indicators

The Summary tab simply sums the values shown in the All Data tab across all the farming systems and countries selected for the final year of the project.

Each row in the table represents a commodity x farming system x country combination for different values of annual adoption rate and productivity increment. Explanation of table headings: **Area.ha** = area of commodity (ha); **Ad.Rate** = annual adoption rate (proportion); **Pr.Inc** = productivity increment (proportion); **Y\_non\_adopt** = mean yield of non-adopters (t/ha); **Y\_adopt** = mean yield of adopters (t/ha) as  $Y_{non\_adopt} * (1+Pr.Inc) \cdot Year$ ; **Price** = 2005 commodity price (international USD/ton); **Cost\_adopt** = estimate of production cost per ha as  $Price * Y_adopt / BCR$  of non-adopters; **Cost\_non\_adopt** = estimate of production cost per ha as  $Price * Y_{non\_adopt} / BCR$  of non-adopters; **Total\_adoption** = total adoption of technology (proportion); **A\_non\_adopt** = area of non-adopters as  $Area.ha * (1-Total.adoption)$  (km<sup>2</sup>); **A\_adopt** = area of adopters (km<sup>2</sup>) as  $Area.ha * Total.adoption$ ; **VOP\_non\_adopt** = total value of production for non-adopters (international USD) as  $A_{non\_adopt} * Y_{non\_adopt} * Price$ ; **VOP\_adopt** = total value of production for adopters (international USD) as  $A_{adopt} * Y_adopt * Price$ ; **NR\_non\_adopt** = net return for non-adopters as  $A_{non\_adopt} * (Y_{non\_adopt} * Price - Cost_adopt)$ ; **NR\_adopt** = net return for adopters as  $A_{adopt} * (Y_adopt * Price - Cost_adopt)$ ; **Project\_benefits** = marginal value of adoption (international USD) as  $NR_{non\_adopt} + NR_{adopt} - NR_{non\_adopt\_t0}$  where  $NR_{non\_adopt\_t0}$  is the net return of the system before any technology adoption has occurred. For more information on how **Total\_adoption** is calculated see the [MarginalInc](#) function found in the [Analysis::Data prep & analysis functions](#) tab.

Core countries Spillover countries

Here we modify the benefits from the previous tab for a range of adoption rates (1, 2, 3%) and productivity increments (5, 10%) at scale. Calculations are shown in the annex. The productivity increments used here should be within what has been observed in many situations for the technology being assessed. Regarding adoption rates, there are not many examples of agricultural technology adoption rates at scale in excess of 2% per year (see Thornton and Herrero, 2010, for example). The annual adoption rates used here refer to the total area of crop and/or number of cattle that have not yet adopted over a 10 year period. So, for example, 2% adoption in year 8 is not the same number as 2% adoption in year 2. For this reason, the estimates of VOP addition are not simple linear multiples of the adoption rate per year shown.

All Data Summary

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Search:

	Crop	Ad.Rate	Pr.Inc	Area.ha	A_non_adopt	A_adopt	VOP_non_adopt	VOP_adopt	NR_non_adopt	NR_adopt	Project_benefits	VOP_Total
1	Bovine meat	0.01	0.05	149815702.6627	135305796.8599	14305524.0617	536497361.0946	59558569.482	205326150.5424	22794020.419	1085429.5438	596055930.5766
2	bean	0.01	0.05	149815702.6627	2167252.8827	229137.9156	1093306653.839	121372042.1195	418426003.3211	46451028.4655	2211953.7365	1214678695.9585
3	cassava	0.01	0.05	149815702.6627	959352.1363	101429.7642	623747670.9062	69244551.2147	238718244.4209	26501001.0822	1261952.4325	69299222.1209
4	maize	0.01	0.05	149815702.6627	5737650.3999	606626.6025	1258163394.7804	139673402.7076	481519323.9283	53455252.8881	2545488.2328	1397836797.488
5	Bovine meat	0.02	0.05	149815702.6627	122243341.9276	27367978.994	484703773.8039	113941836.1373	185503913.4311	43607369.3859	2076541.3993	598645609.9411
6	bean	0.02	0.05	149815702.6627	1958025.756	438365.0423	987758560.3766	232197540.2551	378031053.9713	88865725.2828	4231701.2039	1219956100.6317
7	cassava	0.02	0.05	149815702.6627	866736.0449	194045.8556	563530917.2309	132472142.5738	215672326.3476	50699215.0591	2414248.3361	696003059.8047
8	maize	0.02	0.05	149815702.6627	5183736.218	1160540.7844	1136699990.9705	267209976.708	435033329.8776	102265546.6413	4869767.9353	1403909967.6785

## Results: Display avoided losses in production from climate adaptative technologies

Approach   Datasets   **Analysis**   Annex

Annual productivity increments (%) 1-3 values can be entered.			Annual adoption rates in core areas(%) 1-3 values can be entered.			The % of adoption in core countries that spills to spillover countries		Benefit-cost ratio 1.62 for "traditional" technologies
Value 1	Value 2	Value 3	Value 1	Value 2	Value 3	Spillover Factor	BCR of non-adopters	To estimate the value subtracted from the CV
5	10		1	2	3	1	1.62	CV reduction <input type="text" value="5"/>

Extracted data   Productivity increment value   Marginal increase in value   **Avoided losses from reduction in CV**   Investment indicators

Core   Spillover

CV table   Marginal VoP inc. Non-CIS + CIS   Summary

We estimate the economic losses avoided by adoption of a technology that enhances farmers ability to resist climate stresses and shocks.

This is only implemented for crops not livestock.

We take the distribution of long-term average yields for a country x crop from FAOSTAT and modify the coefficient of variation (CV) by subtracting a fixed value from it. We then recalculate the left-hand tail of the yield distribution function (yield less than the long-term mean) using the reduced CV and calculate the % by which this reduce losses.

When deciding what CV reduction is appropriate use the **Datasets/FAOSTAT/Plot Tab** to visualize CV for your selected crops and regions.

This table is derived from the FAOSTAT data presented in the **Datasets:FAO** tab. Each row in the extracted data tables represents a crop within a country. Explanation of table headings: **N.Years** = number of years of FAO national yield data available; **Yield\_Mean** = mean FAO crop yield (t/ha); **Yield\_SD** = standard deviation of crop yield; **cv** = coefficient of variation for crop yield as  $100 * (\text{Yield\_SD} / \text{Yield\_Mean})$ ; **cvreduced** = value of CV following reduction in variability due to use of CIS; **AvoidedLossPerc** = reduction in yield losses due to climate variability from use of CIS (%). For more information on how **AvoidedLossPerc** is calculated see the **AvLoss** function in the **ERA functions.R** script.

	Country	Crop	N.Years	Yield_Mean	Yield_SD	CV	CVreduced	AvoidedLossPerc
1	Kenya	bean	20	0.553	0.121	21.811	16.811	-4.078
2	Kenya	cassava	20	11.227	2.944	26.221	21.221	-3.387
3	Kenya	maize	20	1.643	0.156	9.524	4.524	-10.87

Showing 1 to 3 of 3 entries

**Number of years of FAO Data**   **Mean yield t/ha (FAO data)**   **Standard deviation of yield t/ha (FAO data)**   **Yield CV (FAO DATA)**   **Yield CV - CV reduction**   **Avoided loss % (negative value means losses are avoided, you can ignore the minus sign)**

Approach   Datasets   **Analysis**   Annex

Countries   Farming systems   Crops (MapSPAM)   Livestock   **FAOSTAT**

Prepare data   Raw data   Coefficient of variation (CV)   **Plot**

Countries with no fill colour indicate either a crop is not grown in this country or there is no data for this country.

**Coefficient of variation**

bean\_CV

## Results: Display avoided losses in production from climate adaptative technologies

Approach   Datasets   **Analysis**   Annex

Annual productivity increments (%) 1-3 values can be entered.	Annual adoption rates in core areas(%) 1-3 values can be entered.	The % of adoption in core countries that spills to spillover countries	Benefit-cost ratio 1.62 for "traditional" technologies	To estimate the value of CIS this value is subtracted from country x crop CV values
Value 1   Value 2   Value 3	Value 1   Value 2   Value 3	Spillover Factor	BCR of non-adopters	CV reduction
5   10   1	1   2   3	1	1.62	5

Extracted data   Productivity increment value   Marginal increase in value   **Avoided losses from reduction in CV**   Investment indicators

**Core**   Spillover      **Core**   Spillover

CV table   Marginal VoP inc. Non-CIS + CIS   Summary   CV table   Marginal VoP inc. Non-CIS + CIS   **Summary**

The detailed and summary tables of costs and returns  
are the same as the previous tab (Marginal increase  
in value), but with 3 additional columns

Project_benefits	AvoidedLossPerc	VOP_CIS	VOP_both
All	All		A
9254.643	10.87	4545.989	46368.237
18416.739	10.87	9046.519	92272.791
27487.215	10.87	13502.043	137718.299

Avoided loss %
Value of avoided loss in adopted areas.
Value of production in adopted areas (from productivity increment) + value of avoided loss in adopted areas

## Results: Display investment indicators (BCR/IRR/NPV)

Approach Datasets Analysis Annex

Extracted data Productivity increment value Marginal increase in value Avoided losses from reduction in CV Investment indicators

The information presented in the previous tabs illustrates estimated changes in the value of production of different commodities for different production increments in CIS and CIS technologies at the farm level, so that cash flows can be calculated on changes in net profits or gross margins per ha or per animal.

Each row in the Indicator tab shows the Net Present Value (NPV), Internal Rate of Return (IRR) and Benefit-Cost Ratio (BCR) for the selected ranges of adoption rates that the marginal VOP additions each year from non-CIS and CIS adoption are adjusted by a factor of to account for the increased costs of implementation at 1

**Choose Crops**

bean  cassava  maize  Bovine meat

**Indicators** Indicators Cashflow

The Choose Crops/Livestock checkboxes determine which systems contribute to the calculation of the economic indicators (the same project parameters are applied across all selection combinations).

The discount rate used in NPV calculations is 5% and the project cost is 60 million USD.

Calculated only considering core countries

Ad.Rate	Pr.Inc	CISinc	Periods	StartPeriod	Implied_Adoption	Avoided_loss_mean	NPV	IRR	BCR
All	All	All	All	All	All	All	All	All	All
1	0.01	0.05	No	11	1	9.562	6.679	86476042.99	21.925
2	0.02	0.05	No	11	1	18.293	6.679	222151015.028	38.783
3	0.03	0.05	No	11	1	26.258	6.679	350333082.223	51.445

Annual adoption rate	Productivity increment	Is a reduction in CV included in the calculations?	Total years of experiment (includes 0 so this is always one greater than the years specified)	The starting year of returns	Total adoption (%) at the end of the experiment	Average avoided crop losses (%) across all crops and countries	Net Present Value	Internal Rate of Return (%)	Benefit Cost Ratio
10	1								

The Analysis/Investment indicators/Indicators tab shows the final results of the economic and financial analysis summarized across all the crops, countries and farming systems. Rows in the table represent the combinations of adoption rates and productivity increments specified. Results are shown with or without a reduction in yield CV (CISinc column).

Two tables are shown: 1) considering core countries only; 2) considering core + spillover countries.

Cost and discount rate are used in economic calculations

The cost of the project (million USD)  
Project cost  
60

Discount rate used for NPV calculations (%)  
Discount rate (%)  
5

## Results: Display investment indicators (BCR/IRR/NPV)

### AICCRA - Economic and Financial Analysis Tool (EFAt)

Approach   Datasets   **Analysis**   Annex

Extracted data   Productivity increment value   Marginal increase in value   Avoided losses from reduction in CV   Investment indicators

The information presented in the previous tabs illustrates estimated changes in the value of production of different commodities for different production increments and CIS technologies at the farm level, so that cash flows can be calculated on changes in net profits or grow margins per ha or per animal.

Each row in the Indicator tab shows the Net Present Value (NPV), Internal Rate of Return (IRR) and Benefit-Cost Ratio (BCR) for the selected ranges of adoption that the marginal VOP additions each year from non-CIS and CIS adoption are adjusted by a factor of to account for the increased costs of implementation at t

**Choose Crops**

bean    cassava    maize    Bovine meat

Indicators   **Cashflow**

Core only   Core + Spillover

Copy   CSV   Excel   PDF   Print   Show 10 entries

Farming_System	Country	Crop	Ad.Rate	Pr.Inc	Year	Total_adoption	AvoidedLossPerc	CISInc	Cashflow	
All	All	All	All	All	All	All	All	All	All	
1	Mixed Irrigated Arid	Kenya	bean	0.01	0.05	1	0.01	4.092	No	-3784.368
2	Mixed Irrigated Arid	Kenya	bean	0.01	0.05	2	0.02	4.092	No	-7530.892
3	Mixed Irrigated Arid	Kenya	bean	0.01	0.05	3	0.03	4.092	No	-11239.952
4	Mixed Irrigated Arid	Kenya	bean	0.01	0.05	4	0.039	4.092	No	-14911.92

Adoption rate

Productivity increment

Year of project

Proportion of farming system that has adopted a technology

Avoided crop losses (%)

Is a reduction in CV included in the calculations?

Cashflow is the change in net returns due to technology adoption (i.e., project implementation) over time

# We need your feedback!

Please let us know of any bugs or issues you find or any improvements/expansions that you require at the email address below.

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Accelerating the Impact of CGIAR  
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