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Evaluation of Agricultural Research Directorates of EIAR for Mainstreaming Climate Change Adaptation and Mitigation into Research Projects

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Abstract
Agriculture, the mainstay of Ethiopia's economy, is heavily dependent on mother nature and low-input, small-scale and subsistence-oriented agriculture which is under pressure from continued land and forest degradation. Climate change adds another layer of complexity to existing development challenges. Climate change is a constraint to development, and sustainable development is a key to capacities for mitigation and adaptation. Developing countries Ethiopia included, are uniquely vulnerable to and experiencing the effects of climate change. In this respect, agriculture is at the nexus of these challenges that need to be addressed and must undergo a significant transformation to achieve food security and responding to climate change to make sustainable development a reality in Ethiopia. Responsible evaluation and monitoring are mandatory to awaken, refocus and reengage relevant climate change adaptation and mitigation development actors including agricultural research system of the country. Thus, this study was conducted with targeted objectives to evaluate Research Directorates of EIAR for Mainstreaming Climate Change Adaptation and Mitigation into Research Projects. Case study approach with predefined indicators was employed each part of the project was reviewed and categorized as nonrelated, slightly/indirectly related, related, more related and most related to climate change adaptation and mitigation mainstreaming research project. The study shows that EIAR is assuming a none 'Climate-proofing' institution under its stature and contemporary situations-contrary to standard minimal expectations and responsibilities, of all evaluated projects, more than 80% were none or slightly related to climate change adaptation and mitigation mainstreaming: did not consider climate risks or mitigation options into projects.
Keywords: EIAR, Climate change, SLM, adaptation, mitigation, mainstreaming, evaluation

1. Introduction

1.1 Background

Climate change is an environmental change and fundamentally a human issue that is not a distant threat looming on the horizon, rather it is already with us and arguably the greatest challenge of our time. Its impacts- from rising temperatures to glacial melt, rising sea levels, drought, floods, and severe weather - due to the observed increase in anthropogenic greenhouse gas concentrations in the atmosphere threaten global economic stability and food security, and will increasingly affect the basic elements of human wellbeing, disproportionately the world's poor people in developing countries (OECD, 2009; WRI, 2011).

Accordingly, climate change adds another layer of complexity to existing development challenges, such as high levels of poverty and inequality, rapid population growth, land degradation, underdeveloped markets, poor infrastructure and service provision, and weak governance systems in developing countries. It will also exacerbate the existing vulnerabilities to land degradation, floods and drought and will challenge farmers and other communities to make changes to production systems and protect natural assets (Levine et al., 2011). Agriculture, forestry, fisheries, water resource, human health, nature conservation, energy and infrastructure are the key climate sensitive sectors (OECD, 2009). In this context, poor people are especially vulnerable to climate change because of their heavy reliance on these climate-sensitive sectors, their tendency to be located geographically in more exposed or marginal areas such as flood plains, and their limited asset base. Poverty therefore increases exposure while also limiting the ability to cope and adapt to climate change impacts (Huxtable and Yen, 2009). In this regard, Sub-Saharan Africa is uniquely vulnerable to climate change because it already suffers from high temperatures, less predictable precipitation and substantially greater environmental stresses than other continents (Woodfine, 2009).

Of Sub-Saharan Africa countries, Ethiopia provides a good example on how climate change and variability influence a developing country's economy (USAID, 2007). The GDP of Ethiopia rises or falls about a year behind changes in average rainfall. With rain-fed agriculture accounting for half of GDP and 80% of jobs, the Ethiopian economy is thus, sensitive to climate change and variability, particularly variations in rainfall (USAID, 2007; Osman-Elasha, 2009).

Nevertheless, though developing countries, especially Sub-Saharan Africa and Ethiopia in general are uniquely vulnerable to and experiencing the effects of climate change, they contributed world's lowest anthropogenic greenhouse gas concentrations- buildup (Osman-Elasha, 2009; Federal Democratic Republic of Ethiopia, 2011). For instance, Ethiopia's current contribution to the global increase in GHG emissions since the industrial revolution has been practically negligible. Even after years of rapid economic expansion, today's per capita emissions of less than two tone CO2e are modest as compared to the more than 10 t per capita on average in the EU and more than 20t per capita in the US and Australia (Federal Democratic Republic of Ethiopia, 2011).

Because of this global nature of the causes and consequences, climate change is currently becoming the forefront of debates and discourses globally for international collective action, an efficient, effective and equitable policy response and the United Nations Framework Convention on Climate Change (UNFCCC) identifies two policy responses to address climate change: mitigation of climate change by reducing greenhouse gases (GHGs) in the atmosphere and enhancing carbon sinks, and adaptation to the impacts of climate change. Climate change mitigation is an anthropogenic intervention to reduce the sources or enhance the sinks of GHGs such as carbon dioxide, methane and nitrous oxide. Therefore, mitigation actions are expected to delay and reduce damages caused by the change, while providing environmental and socio-economic benefits. Furthermore, adaptation is any adjustment in natural or human systems in response to actual or expected climate change, aimed at moderating harm or exploiting beneficial opportunities (OECD, 2009; Somorin et. al, 2012).

Indeed, currently strategies for climate change mitigation and adaptation, and sustainable development: "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs" have many common elements so that applying them together creates synergies (Osman-Elasha, 2009). The link between climate change and sustainable development stems from the fact that climate change is a constraint to development, and sustainable development is a key to capacities for mitigation and adaptation (Osman-Elasha, 2009).

1.2 Justification

Agriculture, the mainstay of Ethiopia's economy, is heavily dependent on mother nature and about 85% of the population relies on low-input, small-scale and subsistence-oriented agriculture for their livelihoods, which is under pressure from continued land and forest degradation that explained by high rate of deforestation, soil erosion and salinity. Changing patterns and intensities of rainfall and increasing temperatures will have consequences for all Ethiopians, but especially for the more than 70 million poor people whose survival depends on rain fed agriculture (Levine et al., 2011). Reasons for Ethiopia's vulnerability are manifold. Of these, geographical location and topography; and increasing population growth accelerate vulnerability to the impacts of climate change. One of the reasons for this pronounced vulnerability is the extremely low level of water and related natural resources management, either in the form of watershed management or investment in water infrastructure (Levine et al., 2011).

In this respect, agriculture, (intended in the FAO sense of 'agriculture, forestry and fisheries') is at the nexus of the challenges that need to be addressed to make sustainable development a reality in Ethiopia (FAO, 2012). This is because, on one way, agriculture is an important source of greenhouse gases (GHGs). On the other hand, agriculture is essential for a green economy and there can be no green economy without agriculture. As stated in the outcome document of the Rio+20 conference the "green economy in the context of sustainable development and poverty eradication will enhance our ability to manage natural resources sustainably and with lower negative environmental impacts, increase resource use efficiency and reduce waste." This implies that agriculture is essential for climate change mitigation and adaptation, and sustainable development (FAO, 2012).

Therefore, agriculture in Ethiopia must undergo a significant transformation in order to meet the related challenges of achieving food security and responding to climate change (FAO, 2010). According to FAO (2010), transforming smallholder systems is not only important for food security but also for poverty reduction, as well as for aggregate growth and structural change. The role of agriculture on human and physical environment has to crosses beyond seed-food-feed triangle: contributes to the development as an economic activity, as a livelihood and as a provider of environmental services, making the sector a unique instrument for development. It has to be climate-smart agriculture (CSA) that contributes to the goals of making sustainable development concrete that address simultaneously three intertwined challenges: ensuring food security through increased productivity and income, adapting to climate change and contributing to climate change mitigation (Woodfine, 2009).

Addressing these challenges will require radical changes in our food systems, at the same time, adopting appropriate practices, developing enabling policies and institutions and mobilizing needed finances at every scale from the farm level to the global level. It has to be more efficient in resource use (use less land, water, inputs to produce more food sustainably) and become more resilient to changes and shocks (FAO, 2012). Indeed, the Government of the Federal Democratic Republic of Ethiopia has initiated the Climate-Resilient Green Economy (CRGE) to protect the country from the adverse effects of climate change and to build a green economy that will help realize the ambition five-year Growth and Transformation Plan (GTP) (Federal

Democratic Republic of Ethiopia, 2011).

It appears therefore that in Ethiopia achieving the needed levels of growth, but on a lower emissions trajectory while enhancing adaptation capacity will require a concerted effort to maximize synergies and minimize tradeoffs between productivity and climate change adaptation and mitigation. It entails to adopt CSA that addresses the challenges of building synergies between the related objectives of climate change mitigation, adaptation and productivity and income increase, and minimizing their potential negative trade-offs (FAO, 2012).

More specifically, it is a matter of adopting and implementing sustainable land management (SLM) strategies and practices that can enable our farmers and communities to become more resilient to climate change by increasing food production for food security, conserving soil and water, and managing and restoring forest resources (Woodfine, 2009).

In this regard, mainstreaming or 'integrating' climate change adaptation and mitigation into key climate-agriculture institutions has formed and will form the most important entry point in strengthening climate change adaptation and mitigation research for development (R4D), transfer and impact to increase the sustainability and impact of interventions in sectors such as water, agriculture, livelihoods and health in Ethiopia. It helps to reduce risks posed by climate change to project activities, stakeholders, and results, sometimes referred to as 'climate-proofing'; ensure that project or program activities maximize their contribution to adaptive capacity of target populations; and guarantee REDD+- reducing emissions from deforestation and forest degradation, conserving and enhancing carbon stocks (forest and woodland) and sustainable management of forests (Huxtable and Yen, 2009). In a broader sense, it will help to realize sustainable land management and hence climate smart agriculture in Ethiopia.

In this respect, EIAR, as one of the key government organs concerned with climate-agriculture has initiated a project "Making Ethiopian Agriculture Climate Resilient: Towards Networking and Coordination to mainstream Climate Change Adaptation (CCA) into food security and sustainable development in Ethiopia" with the financial support of Rockefeller Foundation (RF). Thus, this study was designed to evaluate Agricultural Research Directorates of EIAR for Mainstreaming Climate Change Adaptation and Mitigation into Research Projects with the following objectives.

Objectives

- To generate baseline information for mainstreaming for climate change adaptation and mitigation issues into further agricultural research projects,
- To familiarize and enhance further integration of climate change adaptation and mitigation mainstreaming efforts into national agricultural research system (NARS),
- To demonstrate project level climate change adaptation and mitigation mainstreaming.

Research Questions

1. How many of the government funded research projects are directly or indirectly related to climate change adaptation and mitigation?
2. Have agricultural research directorates of EIAR started mainstreaming climate change adaptation and mitigation into the ongoing and new research projects?

2. Methodology

2.1 Research Design

Case study approach was employed for the exploration of climate change adaptation and mitigation mainstreaming status of EIAR research directorates. Starting from discussion with all research directorates of EIAR, all ongoing research projects of EIAR were collected from respective directorates and evaluated based on predefined indicators (Table 1).

2.2. Data Collection

2.2.1 Setting indicators/ variables to be used

Primary Indicators were identified by the team. Accordingly, all on going government funded EIAR research projects were categorized into different parts as an indicator and each part given value or grade, starting from project title, content, objectives, methodology (data to be collected, tools and statistical properties used to analyze the data and level of detail of interpretation with respect to climate). Accordingly, each encountered part was categorized as non-related, slightly/indirectly related, related, more related and most related to climate change adaptation and mitigation mainstreaming research project (Table 1).

2.2.2 Evaluation of the projects

Then, all government funded EIAR 2017/18 ongoing research projects were collected and evaluated for their sufficient factorizing of climate issues in accordance with predefined indicators. Projects were evaluated whether they were designed in different way than the conventional approach (business as usual) or mainstream climate change adaptation and mitigation into the agricultural system. Accordingly, each part of the project was reviewed and categorized as nonrelated, slightly/indirectly related, related, more related and

most related to climate change adaptation and mitigation mainstreaming research project. Finally, the aggregate value or grade was used to report the whole status of the project.

2.3 Analysis and presentation of data

Qualitative or descriptive analyses was employed to analyze and present the data collected through methods stated in the previous section.

3. Results and Discussion

3.1 Results

3.1.1 EIAR 2017/18 ongoing projects

Of 166 Government funded 2016/17 ongoing EIAR research projects, 126 were evaluated in general (Figure 1). Five research directorates (Crop, Livestock, Land and Water, Forestry and Agricultural Mechanization research directorate) and three research coordination (Agricultural Economics, Research extension &Farmers linkage; Biometrics, Climate and Geospatial; and Pastoral, Agro- pastoral & Emerging Regions Research & Capacity building research coordination) were evaluated for their factorizing of climate change issues into their research project unlike to the business as usual. From crop research process directorate: 46 projects out of 62; livestock: 15 out of 27; soil and water: eight out of 10; forestry: 16 out of 24; agricultural mechanization: five out of seven; agricultural economics, research extension &farmers linkage research coordination: three out of three; Biometrics, Climate and Geospatial : four out of four; and pastoral, agro- pastoral & emerging regions research & capacity building: 29 out of 29 projects were evaluated (Figure 1).

3.1.2 Climate change mainstreaming status of EIAR government funded projects At EIAR level

A total of 126 government funded EIAR 2017/8 ongoing research projects were evaluated and out of these, 80 (63%) were none related to climate change mainstreaming, 25 (20%) were slightly related, four (3%) were related, 12 (10%) were more related, and five (4%) were most related or were climate change adaptation and mitigation mainstreaming research projects (Figure 2).

3.1.2 At research directorate/coordination and case team level

From a total of 46 evaluated projects of crop research process directorate, 26 (57%) were none related or designed as a business as usual, 12 (26%) were slightly related, two (4%) were related, and six (13%) were more related or were climate change adaptation and mitigation mainstreaming research projects (Figure 3 & Table 2).

From climate change related projects, one was from cereal and the other was horticultural research case team; and from more related projects of this directorate, two were from cereal, two from horticultural and two from AMB (Aromatic, Medicinal and Bioenergy) research case team (Table 2). Under this directorate, projects from PPB (Plant protection and biotechnology) research case team were not evaluated totally due to lack of cooperation, while one extra project was evaluated from AMB (Aromatic, Medicinal and Bioenergy), research case team as compared to number of projects indicated in EIAR project and center code- 2017/8 excel planning document.

Under livestock research process directorate, of 15 evaluated projects, 12 (80%) were none related or designed as a business as usual, two (13%) were slightly related, one (7%) was categorized as the most related or was climate change adaptation and mitigation mainstreaming research project (Figure 3 & Table 2). This the most climate change related project was from fishery research case team. Projects under ruminant research case team of this directorate were not evaluated totally due to lack of cooperation, while one extra project was evaluated from fishery research case team (Table 2).

With regard to soil and water research process directorate, of eight evaluated projects, 7 (87.5%) were none related, and only one (12.5%) was categorized as related to climate change adaptation and mitigation mainstreaming research project form management of problematic soils research case team (Figure 3 & Table 2). From forestry research process directorate, of 16 evaluated projects, five (31%) were none related or designed as a business as usual, four (25%) were slightly related, four (25%) were more related, and three (19%) were categorized as the most related or was climate change adaptation and mitigation mainstreaming research project (Figure 3 & Table 2). From more climate change related projects, two were non-timber forest products, one was from plantation and agroforestry, and one was from natural forest research case team. Of the most climate change related projects, two were from plantation and agroforestry, and one was from natural forest research case team (Table 2). As to agricultural mechanization research process directorate, of five evaluated projects, three (60%) were none related or designed as a business as usual, one (20%) was slightly related, and one (20%) was categorized as climate change related research project (Figure 3 & Table 2).

Of three evaluated agricultural economics, research extension & farmers linkage research coordination projects, one (33.3%) was none related, one (33.3%) was categorized as slightly climate related, and one (33.3%) was more climate change adaptation and mitigation mainstreaming related research project (Figure 3 & Table 2). From Biometrics, Climate and Geospatial Research coordination, of four evaluated projects, one (25%) was none related or designed as a business as usual, one (25%) was slightly related, one (25%) was more related, and one (25%) was categorized as the most climate change adaptation and mitigation mainstreaming related research

project (Figure 3 & Table 2). As to pastoral, agro- pastoral & emerging regions research & capacity building research coordination, of 29 evaluated projects, 25 (86%) were none related or designed as a business as usual, and four (14%) were slightly related to climate change mainstream research project (Figure 3 & Table 2).

3.2 Discussion

3.2.1 Methodological aspect

The assessment of the relevance of a particular project to climate change or whether a project is climate change adaptation and mitigation mainstreaming project or not is the most challenging at this infant stage. This is because of the high degree of scientific uncertainty concerning the decision to set indicators to be used for evaluation (Huxtable and Yen, 2009; OECD, 2009). Choice about sampling design or unit of analysis, and indicators depends on the specific question to be answered and up to the investigator. However, sampling method and indicators designed based on discussion by team of researchers may yield best base line information in evaluation of climate change mainstreaming status of the project. In the current study, therefore, it was relevant to adopt case study approach and above-mentioned indicators (see Table 1).

3.2.2.1 Climate change mainstreaming status of EIAR government funded projects At EIAR level

Of all evaluated projects, more than 80% were none or slightly related to climate change adaptation and mitigation mainstreaming: did not consider climate risks or mitigation options into projects (Figure 2). In era of climate change, this may be hinder the achievement the goal of the Ethiopian Institute of Agricultural Research: increasing agricultural productivity, conservation and sustainable management of natural resources and environment; providing strong leadership in coordinating the Ethiopian Agricultural Research System via influencing agricultural policy development.

This result concurs with the finding of (Levine et al., 2011), that state climate change adaptation and mitigation aspects are being missed by development actors (including agricultural research system of the country) because they do not 'see it'. Furthermore, the study by Levine et al. (2011), state that the existing climate change adaptation approach was reactive rather than proactive: no cases of farmers, communities or local leaders reporting making changes, technical or social, because of long- or even medium-term predictions, except by extrapolating past and existing trends (e.g. land pressure for grazing, price trends).This suggests the need to enhance climate change mainstreaming into EIAR projects following project cycle (Figure 4), and support the development as well as climate change adaptation and mitigation efforts of the country, may be via training or other means of capacity building.

3.2.2.2 At research directorate/coordination and case team level

Similar to the higher level, from a total of 46 evaluated projects of crop research process directorate, more than 80 % of projects were none related and slightly related to climate change mainstreaming or in general designed as a business as usual. This clearly shows the need to paradigm shift to follow new research and developments for increased food security while climate risk reduction.

Crop research projects should be designed in a proactive way: considering long- or even medium-term climate change predictions and focus on dealing with technology generation on improved crop varieties or types (early-maturing, drought resistant, etc.), planting date, crop rotation, use of cover crops, appropriate use of fertilizer and manure and other crop management aspects in integrated approach to contribute to climate smart agriculture via sustainable land management in similar way suggested by Woodfine (2009), and IFPRI (2011).

This holds true for livestock research process directorate, whose more than 90% projects were none related and slightly related to climate change adaptation and mitigation mainstreaming research project. However, there is one project that was categorized as the most related or was climate change adaptation and mitigation mainstreaming research project from fishery research case team (Figure 3 & Table 2), indicating that there is a possibility of integrating climate change. Thus, in order to deal with climate issues, in this research directorate research projects may be designed to enhance diversify, change, or supplement livestock feeds, destocking, rotational grazing and improved breeds and species to contribute to climate smart agriculture via sustainable land management in accordance with Woodfine (2009), and IFPRI (2011).

Similarly, more than 85% of evaluated projects of soil and water research process directorate were none related to climate change while there was one project form management of problematic soils research case team related to climate change adaptation and mitigation (Figure 3 & Table 2). This suggests less effort has been made to mainstream climate change into projects. Thus, in order to deal with climate issues in soil and water research directorate, projects may be designed to generate technologies that enhance soil and nutrient management, water harvesting and use, and conservation agriculture, and contribute to climate smart agriculture via sustainable land management stated in Woodfine (2009), and IFPRI (2011).

In forestry research process directorate, almost more than 45 % the projects were related to climate change adaptation mainstreaming while, 31% were none related (Figure 3 & Table 2), indicating the potential contribution of forestry for climate change adaptation and mitigation. As to agricultural mechanization research process directorate, of five evaluated projects, three (60%) were none related or designed as a business as usual,

one (20%) was slightly related, and one (20%) was categorized as climate change related research project (Figure 3 & Table 2). This result seems to support and contribute to the fact that forests are crucial for rural development, access to water, agricultural productivity, energy, soil conservation, and flood control. Forests are also home to at least 80 per cent of terrestrial biodiversity, and are a major carbon sink for regulating global climate (UN-DESA, 2009). For agricultural mechanization research process directorate, results show that about 80% of are none related and slightly related to climate change research project (Figure 3 & Table 2), suggesting may be less contribution of the directorate for climate change adaptation and mitigation.

The results also show that the percentage of both more and most climate change mainstreaming related projects are equal in agricultural economics, research extension & farmers and linkage Biometrics, Climate and Geospatial Research coordination respectively (Figure 3 & Table 2), suggesting may be more realization and integration of climate risk and mitigation options in these research coordination's. As to pastoral, agro- pastoral & emerging regions research & capacity building research coordination, however, results show that almost all projects are none related and slightly related to climate change mainstream research project (Figure 3 & Table 2). This may also need paradigm shift to reduce vulnerability and enhance adaptive capacity and mitigation potential in these areas.

4. Conclusion and Recommendation

4.1 Conclusion

Ethiopian Institute of Agricultural Research is one of the key government institutions concerned with increasing agricultural productivity, conservation and sustainable management of natural resources and environment; providing strong leadership in coordinating the Ethiopian Agricultural Research System via influencing agricultural policy development.

Therefore, EIAR should be in a position to enhance climate-smart agriculture (CSA) that contributes to the goals of making sustainable development concrete that address simultaneously three intertwined challenges: ensuring food security through increased productivity and income, adapting to climate change and contributing to climate change mitigation. Indeed, contribute to Climate-Resilient Green Economy (CRGE) strategy to realize the ambition five-year Growth and Transformation Plan (GTP). In this regard, mainstreaming climate change adaptation and mitigation into agricultural research projects is indispensable. However, the empirical results of this study show that almost more than 80% of the EIAR government funded research projects are none or slightly related to climate change adaptation and mitigation mainstreaming, suggesting that they are designed as a business as usual.

The study revealed the need to transform agricultural research system and enhance climate change adaptation and mitigation mainstreaming into EIAR projects following project cycle may be through training or other means of capacity building, to ensure that research interventions will support the development as well as climate change adaptation and mitigation needs of the country.

The study also proved that agricultural economics, research extension & farmers and linkage Biometrics, Climate and Geospatial Research coordination, all research directorates and coordination are almost none related or slightly related to climate change adaptation and mitigation mainstreaming, implying the need for further action.

The overall conclusion of the study is that EIAR i.e. its research directorates and coordination do not fully recognize the inter-linkages between agricultural productivity, climate change adaptation, and GHG mitigation; and, in so doing, EIAR can be considered as none 'Climate-proofing' institution if the current situations are not changed.

4.2 Recommendation/ the way forward

From the findings of this study, the following activities are recommended:

1. There should be re-examining of the roles of each EIAR research directorates and coordination and transforming them to enhance 'Climate-proofing' agricultural research and development intervention.
2. In this regard, capacity building on climate change adaptation and mitigation mainstreaming could be crucial for all EIAR research directorates and coordination in general.
3. Further investigation on the push factors against a full engagement in climate change adaptation and mitigation research by EIAR research directorates and coordination and adjusting project activities and approaches to address these climate risks and almost adoption of mitigation options.

4.3 Major challenges/limitations

The finding can illuminate and may be used as an entry for detailed analysis of climate change mainstreaming status of EIAR government funded ongoing projects. However, some technical and methodological limitations might affect the findings of the study. These include:

1. Some research directors did not have the project documents at their data set or ware not willing to give

the project documents to evaluating team e.g., crop, livestock, and land and water research directorates,

2. Sampling method and indicators designed based on discussion by team of researchers might not representative,

Table 5 Criteria/indicators to be used to evaluate ongoing research projects of EIAR

No.	Indicators	Justification of indicators	Category (0-4)
1	Project title and proposal content and its activities	If the title and project content does not include climate change elements, then it is not related to climate change adaptation and mitigation mainstreaming research project	[0]= non related
		If the project content or at least the title does include climate change elements, then it is slightly/indirectly related to climate change adaptation and mitigation mainstreaming research project	[1]= Slightly or indirectly related
2	Project objectives	If the project objectives contain climate change elements, then it is directly related to climate change adaptation and mitigation mainstreaming research project assuming that the objectives will be achieved.	[2]= Related
3	Project methodology		
	Data to be collected	If data to be collected include climate variables –temperature, rainfall, radiation, carbon stock etc. then, it is more directly related to climate change adaptation and mitigation mainstreaming research	[3]= More related
	Datelines of tools and statistical properties used to analyze data	If tools like DSSAT, APSIM etc. and statistical properties like modeling, correlation, regression etc. specified to be used for climate change data analysis, then it is more directly related to climate change adaptation and mitigation mainstreaming research	[3]= More related
	The likelihood of result interpretation with respect to climate risk management	If there is indicated sign of result interpretation with respect to climate document, then it is more directly related to climate change adaptation and mitigation mainstreaming research project	[3]= More related
4	Totally deal with climate and climate risks	If the project proposal title, background, objectives, methodology completely contain climate or climate change issues, then it is the most related to climate change adaptation and mitigation mainstreaming research project	[4]= Most related

Table 6. Summarized evaluated EIAR government funded ongoing projects by research directorate/coordination and case team and their climate change adaptation/mitigation mainstreaming status

Research Directorate/coordinator	Research Case Team	Total projects	Evaluated projects	%	Evaluation result by category				
					NR	SR	R	MoreR	MostR
Crop Research Process Directorate	Cereal	14	11	78.6	4	4	1	2	0
	POF (Pulse, Oil Crops and fiber)	15	10	67	7	3	0	0	0
	Horticulture (Root Crops, Vegetables and Fruits)	9	9	100	5	1	1	2	0
	CTS (Coffee, Tea, and Spices)	8	8	100	6	2	0	0	0
	AMB (Aromatic, Medicinal and Bioenergy)	7	8	114	4	2	0	2	0
	PPB (Plant Protection and Biotechnology	9	0	0	0	0	0	0	0
	Sub total	**62**	**46**	**74**	**26**	**12**	**2**	**6**	**0**
Livestock Research Process Directorate	Ruminant	13	0	0	0	0	0	0	0
	Poultry	4	4	100	4	0	0	0	0
	Fishery	8	9	113	6	2	0	0	1
	Apiculture and Sericulture	2	2	100	2	0	0	0	0
	Sub total	**27**	**15**	**56**	**12**	**2**	**0**	**0**	**1**
Land and Water Research Process Directorate	Management of problematic soils	3	3	100	2	0	1	0	0
	Integrated soil fertility management & crop productivity improvement	3	2	67	2	0	0	0	0
	Irrigation, drainage & water harvesting	2	1	50	1	0	0	0	0
	Integrated watershed management	2	2	100	2	0	0	0	0
	Sub total	10	8	80	7	0	1	0	0
Forestry Research Process Directorate	Plantation and agroforestry	8	6	75	2	1	0	1	2
	Wood utilization	7	2	29	2	0	0	0	0
	Non-timber forest products	5	5	100	1	2	0	2	0
	Natural forest	4	3	75	0	1	0	1	1
	Sub total	24	16	67	5	4	0	4	3
AMRPD	Agricultural Mechanization Research Process Directorate	7	5	71	3	1	1	0	0
AERE&FLC	Agricultural Economics, Research extension &Farmers linkage	3	3	100	1	1	0	1	0
BGARC	Biometrics, Climate and Geospatial	4	4	100	1	1	0	1	1
PA&ERRCC	Pastoral, Agro- pastoral & Emerging Regions Research & Capacity building Coordination	29	29	100	25	4	0	0	0
Total		166	126	76	80	25	4	12	5

Note: NR= None Related, SR= Slightly Related, R= Related, MoreR= More Related and MostR= Most Related;
*= one extra project was evaluated under respective case team

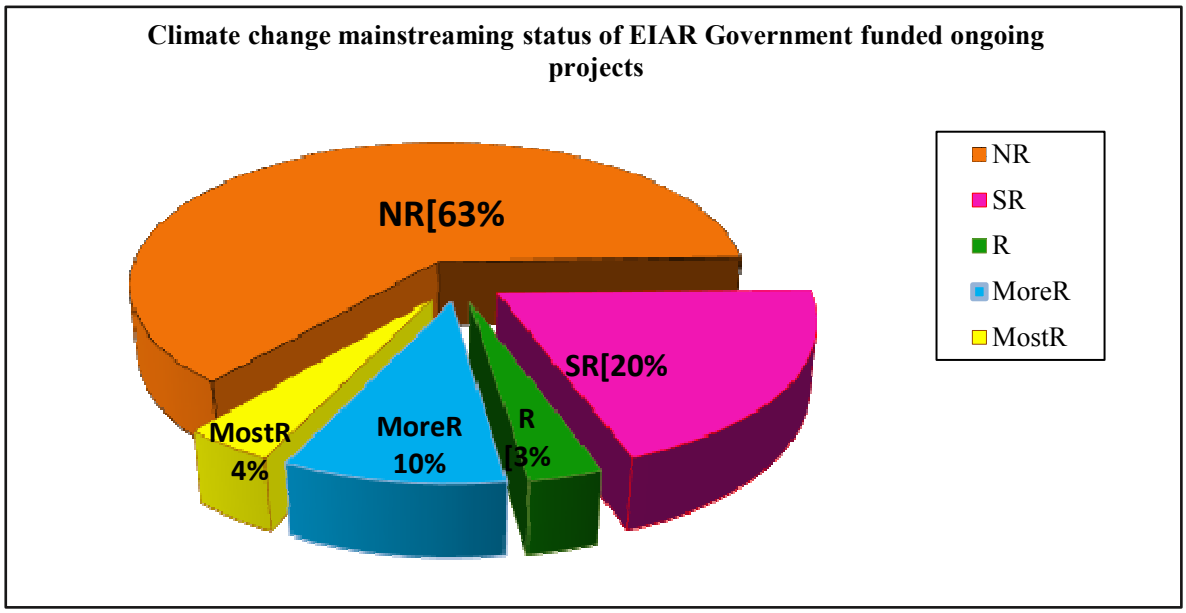
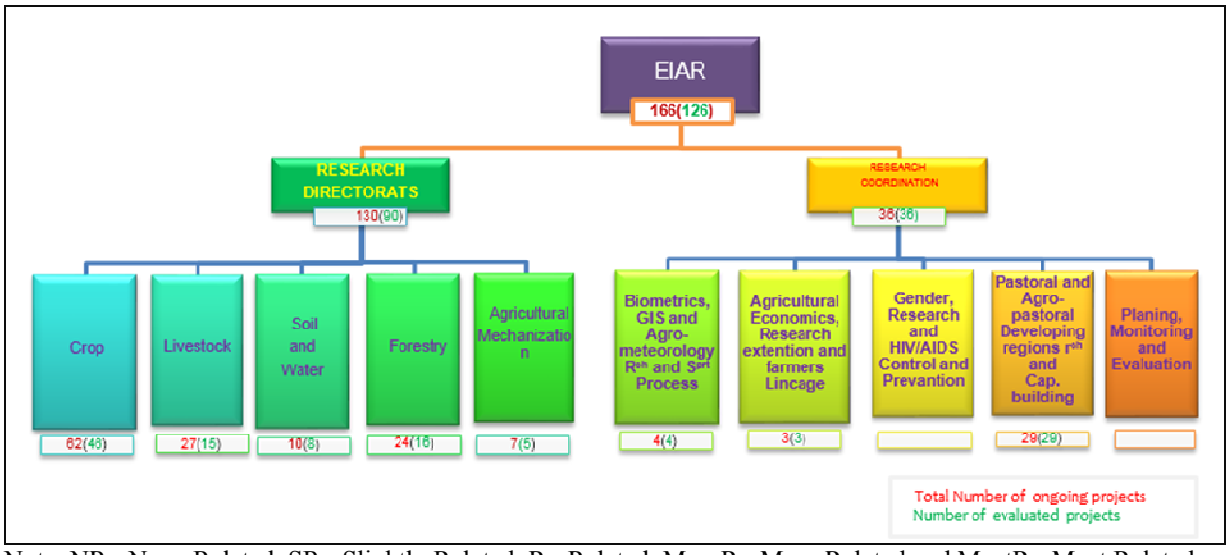


Figure 1. Total and evaluated number of EIAR Government funded 2017/8 ongoing research projects by research directorates and coordinators. Source: EIAR project and center code- 2017/8 excel planning document.



Note: NR= None Related, SR= Slightly Related, R= Related, MoreR= More Related and MostR= Most Related

Figure 2. Climate change adaptation/mitigation mainstreaming relevance status of EIAR government funded 2017/8 ongoing research.

Note: NR= None Related, SR= Slightly Related, R= Related, MoreR= More Related and MostR= Most Related

Figure 3. Climate change adaptation/mitigation mainstreaming status of EIAR government funded ongoing projects by sector or research directorates/coordination.

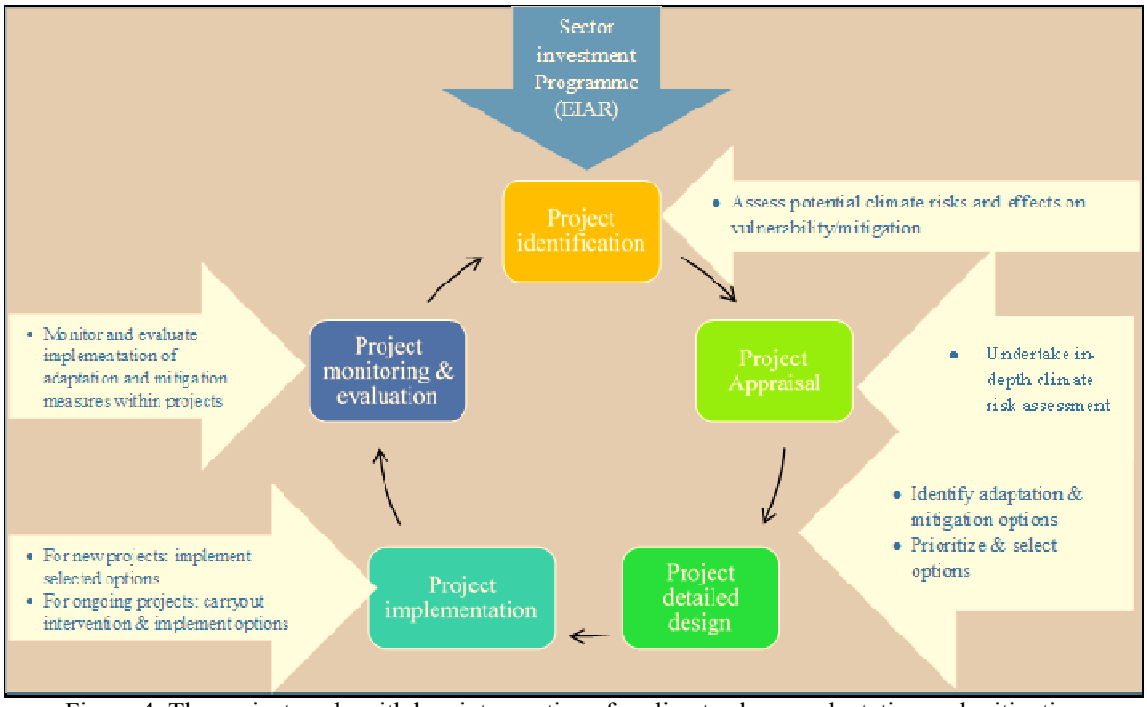


Figure 4. The project cycle with key interventions for climate change adaptation and mitigation
Source: Adopted from OECD (2009).

References

FAO, 2010. *"Climate-Smart" Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation*. Food and Agriculture Organization of the United Nations Rome, Italy.

FAO, 2012. Greening the economy with climate-smart agriculture. *Background Paper for the Second Global Conference on Agriculture, Food Security and Climate Change*, Hanoi, Vietnam, 3-7 September 2012. Food and Agriculture Organization of the United Nations Rome, Italy.

Federal Democratic Republic of Ethiopia, 2011. *Ethiopia's Climate-Resilient Green Economy: Green economy strategy,* Addis Ababa, Ethiopia.

Huxtable J. and Yen N. T., 2009. Mainstreaming Climate Change Adaptation: A Practitioner's Handbook, first edition. CARE International in Vietnam. [Online] Available: www.ngocentre.org.vn/?q+node/5457.

IFPRI, 2011. Discussion Paper 01098: Agricultural Management for Climate Change Adaptation, Greenhouse Gas Mitigation, and Agricultural Productivity. Insights from Kenya. Environment and Production Technology Division. International Food Policy Research Institute, Washington, DC 20006-1002 USA. *www.ifpri.org.*

Levine S., Ludi E., and Jones L., 2011. Rethinking support for adaptive capacity to climate change-The role of development interventions. Findings from Mozambique, Uganda and Ethiopia. *A report for the Africa Climate Change Resilience Alliance*. Overseas Development Institute (ODI), London.

OECD, 2009. Policy guidance on integrating climate change adaptation into development co-operation. *Development Assistance Committee (DAC) and Environment policy Committee (EPOC)*, Paris.

Osman-Elasha B., 2009. Climate change impacts, adaptation and links to sustainable development in Africa. *Unasylva- Adapting to climate change. No. 231/232 Vol. 60, 2009/1-2*. Food and Agriculture Organization of the United Nations. Rome, Italy.

Somorin O. A., Brown H. Carolyn P., J. Visseren-Hamakers I.J., Sonwa D.J., Arts B., Nkemd. J., 2012. The Congo Basin forests in a changing climate: Policy discourses on adaptation and mitigation (REDD+). *Global Environmental Change 22, 288–298.*

The United Nations Global Compact, United Nations Environment Program (UNEP), Oxfam, and World Resources Institute (WRI), 2011. Adapting for a Green Economy: Companies, Communities and Climate Change. *A Caring for Climate Report.*

UN-DESA, 2009. Forests: the Green and REDD of Climate Change. *UN-DESA Policy Brief No. 16.* United Nations Forum on Forests, Department of Economic and Social Affairs, Rm. DC1-1248, United Nations, New York, NY 10017, U.S.A. [Online] Available: http://www.un.org/esa/policy

USAID- from American people, 2007. Adapting to climate variability and change- *a guidance manual for development planning.* U.S. Agency for International Development, 1300 Pennsylvania Avenue, NW

Washington, DC. www.usaid.gov.

Woodfine A., 2009. Using sustainable land management practices to adapt to and mitigate climate change in Sub-Saharan Africa, *resource guide version 1.0.* Regional Sustainable Land management. WWW.TERRAFRICA.ORG.