



Republic of Zambia

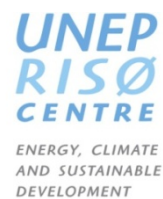
# TECHNOLOGY NEEDS ASSESSMENT FOR CLIMATE CHANGE ADAPTATION

## Draft Project Ideas Report

(Water and, Agriculture & Food Security Sectors)

April 2013

Supported by:



## Disclaimer

This document is an output of the Technology Needs Assessment project, funded by the Global Environment Facility (GEF) and implemented by the United Nations Environment Programme (UNEP) and the UNEP Risoe Centre (URC) in collaboration with the Regional Centre (from the corresponding region), for the benefit of the participating countries. The present report is the output of a fully country-led process and the views and information contained herein are a product of the National TNA team, led by the Ministry of Lands, Natural Resources and Environmental Protection.

## Foreword

Zambia started the process of a Technology Needs Assessment (TNA) for climate change adaptation with a stakeholder's meeting in September 2011. A similar process for climate change mitigation was initiated in parallel. I am glad to report that both processes have now been concluded and have resulted in the identification and prioritisation of technologies that Zambia should pursue to help our communities adapt to the hazards of climate change.

With the help of her partners, Zambia was keen to engage in the TNA process because the country has seen the reality of climate change for a number of years now. The rise in the frequency of droughts, floods and extreme temperatures, the increase in the unpredictability of rainfall during the rainy season and the increase in mean temperatures are already wrecking hazard on the livelihoods and general wellbeing of our people. What is worse is that the occurrence of such climatic hazards is projected to increase. All our development efforts and the great score we have made over the past decade risk to be reversed by climate change. Clearly we cannot continue with business as usual.

The Government of the Republic of Zambia has recognized this need for some time now and has been preparing ground for action with regards to climate change adaptation. In 2007, it produced the National Adaptation Programme of Action which identified the nature of climate change hazards that threaten Zambia, the most vulnerable sectors and areas of our country and the kind of interventions needed to help our population adapt to these risks. This was followed by the adoption of the National Climate Change Response Strategy and the Pilot Programme for Climate Resilience in 2011. Our national development plans and other national development documents since 2006 have taken climate change as a crosscutting is that should be taken into account in all our strategies and actions. A lot has already been done to respond to climate change and yet the threat remains huge that more needs to be done with even greater urgency.

In conducting the TNA process, consultation with key stakeholders was the core approach taken at every stage. Stakeholders scored and identified the sectors and technologies that needed to be given priority in devising the needed actions. They went on to identify the barriers that would hinder the diffusion of the selected technologies and specified measures required to overcome the barriers. These stakeholder representatives came from civil society, the private sector, academia and government. The determination and desire to forge our effort together is an indication of how climate change adaptation is such an important national issue and is of great concern to all who work to better the lives of our people.

The TNA process on climate change adaptation has produced four reports which should be read together as the unfolding narrative of its results:

1. Technology Needs Assessment Report This report presents the methodology used in the TNA process, how sectors and technologies were identified and prioritized. For climate change adaptation, two sectors – water and agriculture and food security sectors – received the highest scores and were consequently selected for further analysis. In each of the two sectors, three technologies were ranked highest and taken forward for barrier analysis.
2. Barrier Analysis and Enabling Framework Report It documents the barriers to technology diffusion identified by stakeholders and their root causes. Measures and the enabling framework for

technology diffusion in the respective sectors and for each technology are also detailed in this report.

3. Technology Action Plans The TAP report provides the steps and actions required to take forward the identified measures in each sector and for each technology.
4. Project Ideas Report Building on the TAP report, this report develops some specific project ideas for water and agriculture and food security. For the water sector, it is proposed to establish a Pilot Climate Change and Water Access (PCCWA) project meant to enhance access to water in Region I despite the climate change hazards the region is exposed to. For the agriculture and food security, it is proposed that a Pilot Smallholder Climate Change Resilience (PSCCR) Project be established to enhance the resilience of small farmers to climate change hazards. Both are pilot projects from which lessons should be learnt with a view to rollout to other areas, especially Region I where these hazards are increasing in prominence.

This has been a lot of work and I am pleased at its successful conclusion. I am grateful to the stakeholders who participated in the process over a period of nearly two years. I thank our partners, the United Nations Environment Programme (UNEP), the Global Environment Facility, UNEP RISO Centre and ENDA for the financial and technical support rendered to the TNA process in Zambia. I wish to also recognize the work of the Consultant, RuralNet Associates Limited, who facilitated the process and documented the outcomes from the stakeholder consultations into the reports mentioned above.

It remains for all of us to work together to ensure that the results of this intense and long process will not go to waste as has been the case in the past with other processes. The Ministry of Lands, Natural Resources and Environmental Protection has made climate change a top priority in its work. I and my colleagues will therefore work very hard to ensure that the projects identified come to fruition. We need the continued support of everyone.

Hon. Wilbur Simusa (MP)

**Minister, Lands, Natural Resources and Environmental Protection**

May 2013, Lusaka, Zambia

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## Acronyms

CFU	Conservation Farming Unit
DWA	Department of Water Affairs
FISP	Farmer Input Support Programme
GART	Golden Valley Agriculture Trust
GRZ	Government of the Republic of Zambia
HH	Household
ICRAF	Eastern province by the International Center for Research in Agro forestry
MAL	Ministry of Agriculture and Livestock
MMEWD	Ministry of Mines and Water Development
MOF	Ministry of Finance
NRWSSP	National Rural Water Supply and Sanitation Programme
NWASCO	National Water Supply and Sanitation Council
PSCCR	Pilot Smallholder Climate Change Resilience
RELO	Research Extension Liaison Officer
SAG	Sector Advisory Group
SCCI	Seed Control and Certification Institute
SNDP	Sixth National Development Plan
TAP	Technology Action Plan
TNA	Technology Needs Assessment
ZARI	Zambia Agriculture Research Institute
ZDA	Zambia Development Agency
ZEMA	Zambia Environmental Management Agency
ZNFU	Zambia National Farmers Union

# 1 Project Ideas for Water Sector

## 1.1 Brief summary of the Project Ideas for Water Sector

The TNA report highlighted the adverse effects on communities access to water for both production and domestic use of the of climate change adverse effects. Of the three agro-ecological regions, Region I and its communities were the most vulnerable to climatic hazards. To address this, a Pilot Climate Change and Water Access (PCCWA) project meant to enhance access to water has been proposed. It will ensure that beneficiaries continue to get quality water despite droughts and other water depleting effects and have their water facilities made resilient to floods. The PCCWA project will also seek to promote an enabling environment that facilitates adaptation to climate change by the affected communities.

The proposed PCCWA project will be the framework for diffusing the technologies prioritized at the TNA stage.

## 1.2 Specific Project Ideas

### 1.2.1 Introduction

The National Action Plan for Adaptation (NAPA) points out that the most vulnerable region to climate change is Region I (GRZ, 2007). Therefore, the main target groups for actions on climate change adaptation in the water sector with respect to the selected technologies are communities of Region I. Climate change has been evident in this Region. It is considered a drought-prone/risk area. At the same time, the region is increasingly becoming prone to floods. Most communities in this region face the challenge of accessing clean water for home use, crop production as well as watering their animals.

The PCCWA project will seek to address the effects of climate change in Region I. When good lessons have been learnt about the implementation of the project, it could then be rolled out to other areas such as Region II where droughts and floods are also increasing in frequency. In the main, it will install or rehabilitate small dams, boreholes/tube wells and wells built to be resilient to floods. It is suggested that the project be implemented by the Ministry of Mines, Energy and Water (MMEW) under the Department of Water and supported by the Ministry of Lands, Natural Resources and Environmental Protection (MLNREP) and the Ministry of Local Government and Housing.<sup>1</sup> The beneficiaries are the communities in Region I for whom climate change adverse effects have accentuated in the last few decades.

### 1.2.2 Objectives and Deliverables

The proposed PCCWA project is meant to enhance access to water for communities in Agro ecological Region I. The specific objectives are:

1. Communities in Agro-ecological Region I have access to quality water for both production and domestic consumption;
2. Communities in flood prone areas in Region I protect their water sources during floods; and,
3. Contribute to regulatory and institutional environment that supports adaptation to climate change.

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<sup>1</sup> This suggestion was not signed off and there is need for the MLNREP to further engage the other players for a more conclusive agreement.

The PCCWA project will target a total of 13,500 households in Region I with 1,500 households accessing water from small dams, 10,000 households accessing water from wells built to be resilient to floods and 2,000 accessing water from boreholes/tube wells.

In order to evaluate the impact of the proposed project, a number of verifiable and measurable indicators have been proposed. Listed below are some of the verifiable indicators (see the rest in the Project Matrix in Annex IIa):

1. The number of people/households accessing quality water for domestic consumption and production by 2018,
2. The number of households with access to water for production during the dry season or drought by 2018,
3. The number of people who have their water sources/utilities protected by 2018,
4. By 2018, appropriate regulatory and legal framework processes in place in the environment and natural resources sector to support efforts of climate change adaptation,
5. By 2018, manpower with better skills and experience for designing and constructing technologies is developed, and
6. By 2018, Monitoring and Evaluation systems of the Ministry of Lands, Natural Resources and Environmental protection in the project areas of Region I is strengthened.

### 1.2.3 Scope and Implementation

Three technologies were identified at TNA stage and will be diffused through the proposed Pilot Project on Climate Change and Water access as follows:

1. Rainwater harvesting through small reservoirs and micro-catchment technology to ensure easy access to a reliable source of water for drinking for human beings and livestock and agricultural production such as irrigation of crops especially during seasonal dry periods and during periods of droughts. The pilot project will install 15 small dams to target 1,500 HHs for water supply and animal watering for communities in Region I.
2. Installing boreholes/tube wells for domestic water supply to ensure access to water during droughts or prolonged dry periods. The pilot project will install 200 boreholes/tube wells to target 2,000 HHs for communities in Region I.
3. Improving the resilience of protected wells by building a concrete apron/collar on the well to ensure good quality water in situations of increased occurrence of floods. The pilot project will install/improve 10,000 wells to target 10,000 HHs who are affected by the seasonal floods that brings up the problem of access to clean water.
4. Contributing to the regulatory and institutional environment that supports adaptation to climate change by way of lobbying relevant government ministries.

#### 1.2.3.1 Rainwater harvesting – Small reservoirs and micro-catchment

##### Outputs and Verifiable Indicators

The expected output for this option of the pilot project as tabulated in Annex II below (Project Matrix) is the number of small dams constructed for given communities in Region I. The verifiable indicator for this output is the construction of 15 small dams (small reservoirs & catchments) for 1,500 households by Year 5 (2018).



## Activities

In order to achieve the expected outputs, some of the global activities that will be undertaken include the following: -

- Undertake feasibility studies of the proposed areas for the project;
- Procure contractor(s) through a tender process;
- Mobilize: (a) Community Forums (CFs) by forming new ones or use existing ones; (b) Local resources (human, materials) in the selected areas;
- Conduct Social and Environmental Impact Assessment (SEIA) studies;
- Construct 15 small dams
- Build capacities of the CFs in water and sanitation, hygiene, dam maintenance and management, project management and communication skills.
- Engage and dialogue with government on subsidies on equipment and materials for climate change adaptation
- Conduct quarterly and annual reviews and mid and final evaluations

## Timelines and Budget Requirements

The pilot project is intended to run for a period of five years from 2014 to 2018. The preliminary cost during the five year period is estimated at US\$4.8 million. There are not many projects helping to construct dams. Interest is nevertheless growing given the realization that small dams can play a vital role in enhancing the resilience of households in rural communities already adversely affected by climate change. It is suggested that this interest be explored. The African Development Bank under the African Water Facility (AWF) already in August 2012 gave Zambia a grant of €950,000 *“to support a project to help the Government of Zambia develop, test and adopt updated guidelines, which will be used as framework for programming as well as designing the financing, construction and operations of multi-purpose small dams”*.<sup>2</sup> The AfDB AWF window can thus be explored as a possible source of funds. Climate Funds Initiatives could also be explored for this purpose.

## Challenges

The following were some of the challenges identified.

- The difficulty of mobilizing all stakeholders and ensure that they fully participate in the project and remain engaged from inception to completion. To mitigate the risk, there is need to ensure ownership of the project from the start and that the project is executed timely with demonstrable results so that its benefits are clear to all.
- The challenge of ensuring optimal cost-sharing between project funders and the community so that there is local ownership and good prospects for sustainability of the project. A common approach on this is for communities to contribute labour and other local materials to the project. However, households already face labour challenges. A realistic assessment should thus be made at the beginning as to what the beneficiaries can do
- The difficulty of ensuring adequate and timely disbursement of project funds. An effective Project Implementation Unit (PIU) should be put in place to mitigate the risk.
- Procurement bottlenecks that could delay project execution. This also requires an effective PIU.

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<sup>2</sup> <http://www.afdb.org/en/news-and-events/article/african-water-facility>, 26<sup>th</sup> September, 2012

- There is no improvement takes place in the supportive environment. A component has been provided for to advocate for an enabling environment for climate change adaptation projects in the water sector.

### ***1.2.3.2 Boreholes/Tubewells for domestic water supply***

#### **Outputs**

The expected outputs for this option is the installation of boreholes for communities in Region I are to install 200 boreholes targeting 2,000 households in Region I by the year 2018. The Verifiable measurable indicator for this output is the construction of 200 boreholes for 2,000 households.

#### **Activities**

Activities for the borehole/tube wells component are similar to those in Section 1.2.3.2 above.

#### **Timelines and Budget Requirements**

This is a five year project expected to start in 2014 and end in 2018. Preliminary cost is estimated at US\$2.7 million. There are a many projects for the drilling of boreholes in Zambia carried out by the Government of the Republic of Zambia (GRZ) and non-state actors. As an example, the GRZ on 11<sup>th</sup> February 2011 invited bids for the drilling of 1,500 boreholes under the National Water Supply and Sanitation Programme (NRWSSP) executed with a UA 15 million loan from the AfDB. The boreholes were to be sited in Luapula and Northern Provinces. In view of the fact that there is an absence of projects under the water sector which have a strong focus on climate change adaptation, the drilling of boreholes/tube wells under the proposed pilot project could thus be incorporated and funded from the ongoing projects such as the NRWSSP.

#### **Challenges**

The risks and how to mitigate them are similar to initiatives under Section 1.2.3.2 above.

### ***1.2.3.3 Building a Concrete Apron/Collar on the well***

#### **Outputs**

The third component of the Pilot Climate Change and Water Access project is proposed to construct concrete apron/collars on the wells targeting households in Region I by 2018. The verifiable indicator for this output is the construction of 1,000 facilities for 10,000 households by year 5 (2018).

#### **Activities**

Activities for the borehole/tube wells component are similar to those in Section 1.2.3.2 above.

#### **Timelines and Budget Requirements**

The pilot project is envisaged to take a period of five years from 2014 to 2018. Preliminary cost for this option is estimated at US\$4 million. The source of funding is similar to that of boreholes/tube wells component of the pilot project.

### Challenges

The risks and how to mitigate them are similar to initiatives under Section 1.2.3.2 above.

#### **1.2.3.4 Contribute to regulatory and institutional environment that supports adaptation to climate change**

### Outputs and verifiable indicators

The following are the expected outputs;

- Mainstreaming of environment and climate change adaptation in government departments and key partners located in Region I; and,
- Institutional capacity of Ministry of Energy and Water Development and other key partners strengthened

The verifiable indicators for these outputs include:

- By 2018, appropriate regulatory and legal framework processes are in place in the environment and natural resources sector to support efforts of climate change adaptation are in place
- By 2018, import duty on bulk equipment for construction of technologies for climate change adaptation is removed
- By 2018, M&E systems of Ministry of Mines, Energy and Water resources in the project areas of Region I are strengthened
- By 2018, climate change resilience strategies arising from inter-ministerial meetings are implemented

### Activities

The activities listed below are the planned activities to be undertaken;

- Engage environment and climate change adaptation consultant
- Awareness raising within the government at district level to mainstream environment and climate change adaptation
- Training in environment and climate change adaptation for government departments and other key partners
- Training of district level government staff in climate change adaptation
- Training of provincial level government staff in climate change adaptation
- Training of national level government staff in climate change adaptation
- Advocating for increased budgetary allocation for climate change adaptation in the national budget
- M&E training workshop for national, provincial and district –based environmental and natural Resources officers organised
- Training of provincial and district level environment and natural resources staff on how best to disseminate information on climate change
- Inter-ministry meetings on climate change resilience held supported by the pilot project.

### Timelines and Budget Requirements

Like the other components, contributing to an enabling environment will be for five years from 2014 to 2018. The same funding sources identified for the first two components should cater for the regulatory and institutional component as well.

### Challenges

The following are some of the identified risks and possible ways of mitigating them:

- Environment and climate change issues are discussed but not integrated into policy documents. An effective PIU should be put in place that will follow through all the outputs of the component.
- Adoption of policy instruments that support environment and climate change adaption take long. It will be necessary to set realistic targets regarding what could be achieved in the time frame
- Financial resources allocated to support the regulatory and institutional framework not timely disbursed. An effective PIU will mitigate this risk.

### **1.3 Linkages to Country's sustainable development priorities**

The proposed Pilot Climate Change and Water Access project embraces and harnesses several existing strategies, plans and development priorities by the GRZ that offer to build adaptation concerns into the national sustainable development agenda. As already pointed out, improving access to water for development and domestic use have been ongoing initiatives. However, there has been very inadequate focus on climate change adaptation. The PCCWA proposed here is meant to address this inadequacy

The PCCWA embraces the NAPA whose primary goal is to communicate to the international community priority activities that addresses Zambia's urgent immediate needs for adapting to the adverse impacts of climate change. The pilot project also contributes to the objective of the National Water Policy (1994) which aims to guide development in conservation, management, demand and supply of water resources and facilitate an equitable provision of adequate quantity and quality of water for all competing groups and users at acceptable costs and ensuring security of supply under varying conditions.

### **1.4 Evaluation**

The proposed project will be evaluated to assess the following:

- Attainment of the expected project deliverables and outputs as outlined in the project.
- The impact of the proposed interventions on the target communities of Region I.
- The key lessons learnt from the project outcomes so they can be replicated to other areas within the region and other regions, II.

### **1.5 Responsibilities and Coordination**

The responsibility and coordination of the proposed project lies with the GRZ who are the custodian and key player to the successive implementation of the project elements. Tabulated below is the role that each key player would play in the proposed project.

**Table 1: Responsibilities of key project players**

Key Player	Role/Responsibility
Government (including line department)	<ul style="list-style-type: none"> <li>• Monitoring &amp; Coordination,</li> <li>• Promoting Political commitment,</li> <li>• Creating an enabling environment conducive for all players,</li> <li>• Financing of project</li> </ul>
Community (Project beneficiaries)	<ul style="list-style-type: none"> <li>• Provision of local inputs such as labour, materials</li> <li>• Project management after completion</li> </ul>
Civil Society	<ul style="list-style-type: none"> <li>• Advocacy</li> <li>• Capacity building/skills development</li> </ul>
Private Sector	<ul style="list-style-type: none"> <li>• Capacity building/skills development</li> <li>• Sources of funding</li> </ul>
Cooperating Partners	<ul style="list-style-type: none"> <li>• Sources of funding</li> <li>• Enhance accountability in resource use</li> <li>• Monitoring</li> </ul>

## 2 Project Ideas for Agriculture and Food Security Sector

### 2.1 Brief summary of the Project Ideas for Agriculture and Food Security Sector

The TNA report pointed out that agriculture is perhaps the most vulnerable sector to climate change adverse effects resulting in significant crop loss and animal deaths. The impacts on household and national food security are significant with a myriad of other negative effects such as poverty, hunger and under-nutrition and poor education outcomes. Agro-ecological Region I with its semi-arid areas is the most vulnerable. To address these concerns, the Pilot Smallholder Climate Change Resilience (PSCCR) project has been proposed. Although separate to the PCCWA discussed above, synergies could be drawn from the two projects in order to ensure maximum impact given that they will cover the same region.

The main aim of the PSCCR is to help smallholder farmers become more resilient to climate change adverse effects by helping to protect their crop yields, spread their risk widely and ensure that their enterprises are run as viable businesses. It is supposed to be the framework through which the technologies identified and selected at the TNA stage in the agriculture sector are diffused.

The proposed pilot project is aimed to enhance and improve agricultural produce and food security communities in Agro ecological Region I and thereby make them more resilient to climate change adverse impacts. Estimated cost for the PSCCR implemented over a period of five years starting in 2014 is US\$5.4 million.

### 2.2 Specific Project Ideas

#### 2.2.1 Introduction

The National Action Plan for Adaptation (NAPA) points out that the most vulnerable region to climate change is Region I (GRZ, 2007). Therefore, the main target groups for actions on climate change adaptation in the Agricultural and Food Security sector are communities of Region I. The proposed PSCCR although a separate project from the PCCWA, synergies will be drawn from the two to ensure maximum impact given that they will cover the same region. As the PSCCR shows good results, it could be rolled out to other areas especially Region II where droughts and floods are also increasing in frequency.

#### 2.2.2 Objectives

The overall objective for the proposed pilot project is thus *to increase the resilience and adaptive capacity of targeted farming households in Region I and increase food security and income. This is supposed to be achieved by promoting crops, livestock and fisheries production through higher commercialization and crop diversification.*

#### 2.2.3 Project Deliverables

The PSCCR project will have the following deliverables:

1. Enable farmers in Agro-ecological Region I achieve higher yields with less water and less chemicals while conserving soil fertility;
2. Help farmers build crop resilience to diseases, pest organisms and environmental stresses; and,

3. Enable farmers spread the risk widely by diversifying their enterprises while in the process making their farming systems more profitable
4. Promote farming as a business among the targeted farmers
5. Contribute to regulatory and institutional environment that supports adaptation to climate change

In order to evaluate the impact of the proposed project, a number of verifiable indicators have been proposed (see the rest in the Project Matrix in Annex IIb):

1. Percentage increase in average crop yield per targeted household as a result of using conservation farming;
2. Percentage increase in average income per targeted household as a result of using conservation farming;
3. Average yield per targeted household as a result of using improved and early maturing crop varieties
4. Percentage reduction in the frequency of diseases due to use of improved and early maturing varieties
5. Percentage reduction in pest infestation due to use of improved and early maturing varieties
6. Percentage increase in average household income for the targeted households involved in integrated production system
7. Percentage increase in yield of targeted commodities involved in integrated production system
8. Percentage increase in farm households adopting farming as a business
9. M&E systems of MAL in the project areas of Region I strengthened
10. Climate change resilience strategies arising from inter-ministry meetings implemented

#### **2.2.4 Scope and Implementation**

A number of interventions have been identified for the proposed Pilot Project and these include the following;

1. Conservation farming to increase resilience of farmers to drought weather conditions
2. Promotion of drought-tolerant and early maturing varieties
3. Promotion of integrated farming systems
4. Training of farmers in 'farming as a business'
5. Mainstreaming of environment and climate change adaptation in government departments and key partners located in Region I

##### **2.2.4.1 Conservation farming**

###### **Outputs and Verifiable Indicators**

The pilot project option will target 3,000 agricultural HHs in Region I who will each be assisted to acquire 100 agro-forestry seedlings to be planted on a 1 hectare plot of land over a five year period (2014-2018). They will also be trained in soil fertility improvement issues with the following expected outputs:

- Targeted farming HHs trained in appropriate soil fertility improvement practices (Lime, residual retention, crop rotation, no burning, improved furrow)
- Targeted farming HHs are planting green manure crops in their fields so as to increase soil fertility
- Targeted farming HHs are using compost manures in their fields, and

- Targeted farming HHs are producing compost manures in their fields

The Verifiable indicators for this output are as follows:

- Percentage of farming HHs using conservation farming with agro-forestry
- Percentage reduction in the application of chemical fertilizers per hectare
- Number of targeted farmers trained in appropriate soil fertility improvement practices ((Lime, residual retention, crop rotation, no burning, improved furrow)
- Percentage of targeted farming HHs planting green manure crops in their fields so as to increase soil fertility
- Percentage of targeted farming HHs using compost manures in their fields
- Percentage of targeted farming HHs producing compost manures in their field

### **Activities**

In order to achieve the expected outputs, the option plans to undertake the following activities.

- Sensitize farmers on the benefits of using conservation farming with agro-forestry
- Facilitate farmers to access a total of 300,000 agro-forestry seedlings
- Train farming HHs on how to use organic fertilizers in their crop fields
- Undertake soil diagnostics to ascertain the soil types
- Train farmers in appropriate soil fertility improvement practices (Lime, residual retention, crop rotation, no burning, improved furrow)

### **Timelines and Budget Requirements**

The pilot project is envisaged to take a period of five years from 2014 to 2018. The preliminary cost for this adaptation option over a five year period is estimated at US\$3.3 million. Conservation farming has been promoted for a number of years now with good results with funding from bilateral agencies (e.g. NORAD, Sida), multilateral agencies (World Bank, EU) and a number on non-state actors. Most of the projects have occurred in Agro-ecological Region II. The Ministry of Agriculture and Livestock Development has also integrated conservation farming in its messages. The Conservation Farming Unit (CFU) of the Zambian National Farmers Union (ZNFU) has been the central agency advocating for CF. Given all these projects, the suggestion is that climate change adaptation merits of CF be highlighted much more by promoting the practice in a region most vulnerable to the adverse effects of climate change. The CFU or another agency could thus be helped to source extra funds to expand their activities in Region I.

### **Risks and Challenges**

The only identified challenge for this option was that the labour intensity of conservation farming would constrain the adoption of the practice given the labour shortages most households in rural communities face. The high cost of hired labour compounds the challenge.

The risks identified include:

- MAL does not allocate insufficient resources to agricultural research and especially to farming systems research. This should be taken up as part of the project budget.



- The inadequate number of extension workers available persists in the project area. The project to operate only in camps where there are extension workers.
- Prices of soil fertility improving ingredients such as lime are not affordable to small scale farmers. The project to facilitate the acquisition of these ingredients and work out a mechanism for farmer contribution.

#### ***2.2.4.2 Promotion of drought tolerant and early maturing crop varieties***

##### **Outputs and Verifiable Indicators**

The project option will target 3,000 agricultural households who will each be helped to acquire drought and early maturing seed varieties of cassava and sorghum.

The Verifiable indicators for this output are as follows:

- The number of demonstrations for drought tolerant crops established
- The number of targeted farming HHs sensitized on the benefits of drought-tolerant crop varieties

##### **Activities**

In order to achieve the expected outputs, the option plans to undertake the following activities.

- Farming HHs helped to procure/source drought-tolerant crop varieties.
- Farming HHs trained in crop diversification using drought-tolerant crop varieties

##### **Timelines and Budget Requirements**

The PSCCR project is envisaged to take a period of five years from 2014 to 2018. The estimated cost is US\$1,035 to cover purchase of new seed varieties, labour time, training costs, on-farm equipment and field trips. The usual sources of agricultural projects in Zambia including the GRZ and bilateral and multilateral agencies could be approached for funding. Given the focus on climate change resilience strengthening for farmers in Zone I, Climate Funds Initiatives could be tapped as well.

##### **Challenges**

The risks and their mitigation measures were similar to those in Section 2.2.4.1

#### ***2.2.4.3 Promotion of integrated farming systems***

##### **Outputs and Verifiable Indicators**

This will target 500 agricultural households who will each be assisted to acquire fingerlings, livestock (5 goats & 10 ducks), sorghum and sugar beans and vegetable seeds sufficient for a 1.25 Ha plot of land in Region I.

The Verifiable indicators for this output are as follows:

- Number of farming HHs using integrated farming.
- Percentage increase in income of farming HHs involved in integrated farming

### **Activities**

In order to achieve the expected outputs, the option plans to undertake the following activities.

- Establish demonstration plots of integrated production systems
- Train farmers in integrated production systems
- Train farmers in growing at least 4 commodities to reduce the negative effects of climate change

### **Timelines and Budget Requirements**

The estimated capital cost of a small medium farmer who is engaged in mixed production system (farming) of fish, livestock (5 goats & 10 ducks), crops (sorghum & sugar beans), and vegetables (cabbage) on a 1.25 ha of land is US\$1,937.37.<sup>3</sup> Estimated cost for the 500 agricultural HHs for both direct and indirect cost is US\$1,114,350. Funding sources are similar to those in Section 2.2.4.2.

### **Challenges**

The risks and their mitigation measures were similar to those in Section 2.2.4.1.

#### ***2.2.4.4 Training of farmers in 'farming as a business'***

### **Outputs and Verifiable Indicators**

The expected outputs are:

- Number of agribusiness groups formed
- Number of farming HHs trained in farming as a business
- Percentage increase in incomes of farming HHs trained in farming as a business
- Targeted farming HHs sensitised on the benefits of bulking centres in promoting markets for agricultural produce
- Bulking centres established
- Farmers are trained in using mobile cell phones to access prices and market information

The verifiable indicators for this output are as follows:

- Number of agribusiness groups formed
- Number of farming HHs trained in farming as a business
- Percentage increase in the income of farming HHs involved in integrated farming
- Number of farmers sensitised on the benefits of bulking centres in promoting markets for agricultural produce
- Number of bulking centres established
- Number of farmers trained in using mobile cell phones to access prices and market availability

### **Activities**

In order to achieve the expected outputs, this component will undertake the following activities.

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<sup>3</sup> See TAP report for details.

- Mobilise community to form agribusiness groups
- District, block and camp level staff to be trained in farming as a business
- Farming HHs to be trained in farming as a business
- Establish bulking centers for agricultural produce
- Conduct sensitizations through meetings and field visits on market information
- Conduct training on the use of mobile phones to access market prices

### **Timelines and Budget Requirements**

This is a supportive component meant to enhance the viability of farming as farmers take a more business approach. Activities will be implemented for a period of five years from 2014 to 2018. Estimated cost for this component is US\$700 to cover production of materials on farming as a business, training workshops, establishment of agribusiness groups, establishment of savings groups, etc. Funding sources are similar to those specified in Section 2.2.4.2.

### **Challenges**

The challenges identified include:

- Farmers have insufficient access to the markets rendering getting information by mobile phone irrelevant. This risk should be addressed by activities of the other components intending to promote market linkages.
- Some areas continue not to have mobile phone coverage. Farmers in such areas are linked to farmers in nearby areas with mobile phone coverage who pass on market information to them.

#### ***2.2.4.5 Promotion of the mainstreaming of environment and climate change adaptation in agriculture***

### **Outputs and Verifiable Indicators**

The expected outputs are:

- Awareness raised in government officials at district level on the need to mainstream environment and climate change
- Training in environment and climate change adaptation for government departments and other key partners undertaken
- Increased budgetary allocation for climate change adaptation in the agriculture and food security sector in the national budget
- Inter-ministry meetings on climate change resilience facilitated

The verifiable indicators for this output are as follows:

- Number of developmental programmes implemented in Region I that have mainstreamed environmental and climate change adaptation.
- One environment and climate change adaptation consultant is engaged
- Number of meetings held to awareness in district officials on environment and climate change issues
- Number of trainings conducted on environment and climate change adaptation for government departments and other key partners conducted.

- Number of national, district and sub-district officials trained in climate change adaptation
- Percentage increase in budgetary allocation to climate change adaptation
- Percentage increase in budgetary allocation for environment and climate change adaptation specific to Region I

### Activities

In order to achieve the expected outputs, the option plans to undertake the following activities.

- Conduct training in climate change adaptation for key stakeholders
- Conduct awareness creation meetings on climate change mainstreaming
- Conduct training for district level government staff in climate change adaptation
- Conduct training for block level government staff in climate change adaptation
- Conduct training for camp level government staff in climate change adaptation
- Advocacy initiatives for increased budgetary allocation for climate change adaptation in the national budget
- Facilitate inter-ministry meetings on climate change resilience
- Advocacy initiatives for increased budgetary allocation for environment and climate change adaptation in Region I

### Timelines and Budget Requirements

Activities under this component will last for five years as for the rest of the pilot project. Estimated cost to cover production training materials and conducting of training in climate change adaptation mainstreaming, sensitization meetings, hiring of consultant, etc is US\$500,000. Climate Fund Initiatives can be tapped for these activities.

### Challenges

Two risks have been identified. First, is that the environment and climate change issues though discussed are not taken up in policy documents given the complex nature of policy formulation process. An effective PIU that follows up these issues would help to mitigate this risk. The second is that institutional strengthening is difficult and the results take long to see. Therefore, expected targets need to be realistically set.

## **2.3 Linkages to Country's sustainable development priorities**

Like the proposed Pilot Project on Climate Change and Water access, proposed Pilot Smallholder Climate Change Resilience (PSCCR) Project on Agriculture and Food Security embraces and harnesses several existing strategies, plans and development priorities by the Government that offer to build adaptation concerns into national sustainable development which are underway and at various stages of implementation. The project is meant to enhance agricultural productivity and improve food security communities in Agro ecological Region I.

It is in line with the SNDP vision for the agriculture sector which is "an efficient, competitive, sustainable and export-led agriculture sector that assures food security and increased income by 2030" (GRZ, 2011). This is supposed to be achieved by promoting crops, livestock and fisheries production through higher commercialization.

It also embraces the NAPA whose primary goal is to communicate to the international community priority activities that addresses Zambia's urgent immediate needs for adapting to the adverse impacts of climate change. It also contributes to the objective of the National Agricultural Policy (1995) which aims to facilitate and support the development of a sustainable and competitive agricultural sector that assures food security at national and households' levels and maximizes the sector's contribution to GNP. Sector policies and objectives include food security, contribution to industrial development, income and sustaining the resource base.

## 2.4 Evaluation

The proposed project will be evaluated to assess the following:

- Attainment of the expected project deliverables and outputs as outlined in the project above.
- The impact of the proposed interventions on the target communities of Region I.
- The key lessons learnt from the project outcomes so they can be replicated to other areas within the region and other regions.

## 2.5 Responsibilities and Coordination

The responsibility and coordination of the proposed project lies with the GRZ who are the custodian and key player to the successive implementation of the project elements. Tabulated below is the role that each key player would play in the proposed project.

**Table 2: Responsibilities of key project players**

Key Player	Role/Responsibility
Government (including line departments)	<ul style="list-style-type: none"> <li>• Monitoring &amp; Coordination,</li> <li>• Promoting Political commitment,</li> <li>• Creating an enabling environment conducive for all players,</li> <li>• Financing of project</li> </ul>
Community (Project beneficiaries)	<ul style="list-style-type: none"> <li>• Provision of local inputs such as labour, materials</li> <li>• Project management after completion</li> </ul>
Civil Society	<ul style="list-style-type: none"> <li>• Advocacy</li> <li>• Capacity building/skills development</li> </ul>
Private Sector	<ul style="list-style-type: none"> <li>• Capacity building/skills development</li> <li>• Sources of funding</li> </ul>
Cooperating Partners	<ul style="list-style-type: none"> <li>• Sources of funding</li> <li>• Enhance accountability in resource use</li> <li>• Monitoring</li> </ul>

### 3 References

1. Conservation Farming Unit, 2007: **Conservation Farming and Conservation Agriculture Handbook for HOE Farmers in Agro-Ecological Regions I & IIa - Flat Culture 2007 Edition** Conservation Farming Unit, Lusaka
2. Government of the Republic of Zambia, October 2012: **Technology Needs Assessment for Climate Change Adaptation**, RuralNet Associates Limited, Lusaka
3. Government of the Republic of Zambia, 2011: **Sixth National Development Plan, Executive Summary**, Ministry of Finance and National Planning, Lusaka
4. Government of the Republic of Zambia, December, 2012: **Barrier Analyses and Enabling Frameworks for Climate Change Adaptation**, RuralNet Associates Limited, Lusaka
5. Government of the Republic of Zambia, 2007: **Formulation of the National Adaptation Programme of Action on Climate Change, Zambia**; Ministry of Tourism, Environment and Natural Resources, Lusaka
6. International Journal of Fisheries and Aquaculture Vol. 2 (15), pp.271 – 278, 23 December 2011: Profitability analysis of small scale aquaculture enterprises in Central Uganda.
7. **ODI (2013)**: Draft report on Climate Change and Rural Livelihoods: Mapping the Zambian Landscape
8. Zambia National Farmers' Union (ZNFU): Enterprise Budgets, Lusaka, Zambia, 2011

#### **Annex I.** List of stakeholders involved and their contacts

## Annex II. Project Matrices

### A. Pilot Climate Change and Water Access Project: Logical Framework

OVERALL OBJECTIVE	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
A country where all users have access to water and sanitation and utilise them in an efficient and sustainable manner for wealth creation, improved livelihood and adapting to the effects of climate change by 2030.	1. Number of people/households accessing quality water for domestic consumption and production	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Case studies</li> <li>• End of Project Evaluation Report</li> <li>• CSO Living conditions monitoring survey report</li> <li>• Ministry of Health Database</li> <li>• Dept of Water Affairs reports</li> <li>• Ministry of Agriculture and Livestock records and reports</li> <li>• Ministry of environment and natural resources records and reports</li> </ul>	<ul style="list-style-type: none"> <li>• Political, social, environmental and economic stability</li> <li>• Climatic variability</li> </ul>
	2. Number of people who have their water sources/utilities protected		
	3. Number of households with access to water for production during the dry season or drought		
PROJECT PURPOSE	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
1. Communities in Agro-ecological Region I have access to quality water both for production and domestic consumption;	1.1. Number of people/households accessing quality water for domestic consumption and production by 2018. 1.2. Number of households with access to water for production during the dry season or drought by 2018	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Case studies</li> <li>• Midterm and final evaluations</li> <li>• Project records</li> <li>• CSO Living conditions monitoring survey report</li> <li>• Ministry of Health Database</li> <li>• Dept of Water Affairs reports</li> <li>• MAL records and reports</li> <li>• Ministry of environment and natural resources records and reports</li> </ul>	<ul style="list-style-type: none"> <li>• Political, social, environmental and economic stability</li> <li>• Active community participation</li> </ul>

<p>2. Communities in flood prone areas in Region I and II protect their water sources during floods.</p>	<p>2.1 Number of people who have their water sources/utilities protected by 2018</p>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Case studies</li> <li>• Midterm and final evaluations</li> <li>• Project records</li> <li>• CSO Living conditions monitoring survey report</li> <li>• Ministry of Health Database</li> <li>• CSO Living conditions monitoring survey report</li> <li>• Disaster management reports</li> </ul>	<ul style="list-style-type: none"> <li>• Political, social, environmental and economic stability</li> <li>• Active community participation</li> </ul>
<p>3 To contribute to regulatory and institutional environment that supports adaptation to climate change</p>	<p>3.1 By 2018, appropriate regulatory and legal framework processes in the environment and natural resources sector to support efforts of climate change adaptation</p> <p>3.2 By 2018, develop manpower with better skills and experience for designing and constructing technologies</p> <p>3.3 By 2019, promote the small and medium enterprises through the TEVET policy to stimulate entrepreneurship in the country.</p> <p>3.4 By 2019, Zero rating import duty on bulk equipment for construction of technologies for climate change adaptation</p> <p>3.5 By 2019, M&amp;E systems of Ministry of Environment and Natural resources in the project areas of Region I strengthened</p> <p>3.6 By 2019, climate change resilience strategies arising from inter-ministry meetings implemented</p>	<ul style="list-style-type: none"> <li>• Specific approved Policies and legislation</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Environment and natural resources records and reports</li> <li>• Ministry of Finance reports</li> </ul>	<ul style="list-style-type: none"> <li>• Poor development in the Zambian economy and sectoral policies</li> <li>• Government does not respond to advocacy and lobbying</li> </ul>



## RESULTS (OUTPUTS)

Purpose 1: Rainwater harvesting – Small reservoirs and micro-catchment to ensure easy access to a reliable source of water for drinking, irrigation, livestock or some other uses during seasonal dry periods and where possible during droughts			
RESULTS (OUTPUTS)	INDICATOR	MEANS OF VERIFICATION	RISKS
1. Construction of 15 dams targeting 1500 households in Agro ecological Region I by 2018 (year 5)	1.1.1. Constructing 15 small dams for 1,500 households by year 5 (2018).	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Engineer's completion report</li> <li>• Project report</li> <li>• Ministry of Health Database</li> <li>• Dept of Water Affairs reports</li> <li>• MAL records and reports</li> <li>• Ministry of environment and natural resources records and reports</li> </ul>	<ul style="list-style-type: none"> <li>• Active participation by all stakeholders (GRZ, Funders, NGOs, Community)</li> </ul>
Purpose 2. Boreholes/Tubewells for domestic water supply to ensure access to water during droughts or prolonged dry periods			
RESULTS (OUTPUTS)	INDICATOR	MEANS OF VERIFICATION	RISKS
2.1. Installation of 200 boreholes targeting 2000 households by 2018 (year 5) in Agro ecological Region I	2.1.1. Constructing 200 boreholes for 2,000 households by year 5 (2018).	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Contractor's completion report</li> <li>• Project evaluation report</li> <li>• CF's report</li> <li>• Ministry of Health Database</li> <li>• Dept of Water Affairs reports</li> <li>• MAL records and reports</li> <li>• Ministry of environment and natural resources records and reports</li> <li>• </li> </ul>	<ul style="list-style-type: none"> <li>• Local labour inputs are provided by beneficiaries</li> <li>• Active participation by all stakeholders (Govt, Donors)</li> </ul>
Purpose 3. Improving Resilience of Protected Wells and ensuring good quality water in situations of increased occurrence of floods			
RESULTS (OUTPUTS)	INDICATOR	MEANS OF VERIFICATION	RISKS

Purpose 1: Rainwater harvesting – Small reservoirs and micro-catchment to ensure easy access to a reliable source of water for drinking, irrigation, livestock or some other uses during seasonal dry periods and where possible during droughts			
3.1 Installation of 1000 improved wells with concrete apron collars targeting 10000 households by 2018 (year 5) in Agro ecological Regions I	3.2.1 Improving 1,000 wells with concrete aprons targeting 10,000 households by year 5 (2018)	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Contractor's completion report</li> <li>• Project evaluation report</li> <li>• CFs project report</li> <li>• Ministry of Health Database</li> <li>• Disaster Management reports</li> <li>• Dept of Water Affairs reports</li> </ul>	<ul style="list-style-type: none"> <li>• Local labour inputs are provided by beneficiaries</li> <li>• Active participation by all stakeholders (Govt, Donors, NGOs, Community)</li> <li>• Adequate and timely supply of inputs</li> </ul>
Purpose 4. To contribute to regulatory and institutional environment that supports adaptation to climate change			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
4.1. Mainstreaming of environment and climate change adaptation in government departments and key partners located in Region I	4.1.1 By 2018, environmental and climate change adaptation features prominently in government and developmental programmes implemented in Region I.	<ul style="list-style-type: none"> <li>• Department of Water affairs records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Environment and climate change issues are discussed but not documented in policy documents.</li> </ul>
4.2. Institutional capacity of MAL and other key partners strengthened	4.2.1 By 2018, district, provincial and national level environment, water affairs staff to be trained in climate change adaptation for water sector 4.2.2 By 2018, increased budgetary allocation for environment and climate change adaptation in drought-prone Region I as a result of advocacy work of the project 4.2.3 By 2018, increased facilitation by the ministry of environment to order to facilitate inter-linkages between departments of Ministry of environment at district, provincial and national level and facilitate for the CFs and NGOs interaction with the government 4.2.4 By 2018, increased advocacy for development of monetary and fiscal policies to reduce interest rates in the country 4.2.5 By 2018, increased access to financing for investors and households in the country 4.2.6 By 2018, increased advocacy to reduce import-duty on equipment necessary for water access construction system 4.2.7 By 2015, the M&E system of the project is established 4.2.8 By 2015, the M&E system of the project is established	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme monitoring reports</li> <li>• Partners' records and reports</li> <li>• Programme reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Limited financial resources released by government.</li> </ul>

<b>Purpose 1: Rainwater harvesting – Small reservoirs and micro-catchment to ensure easy access to a reliable source of water for drinking, irrigation, livestock or some other uses during seasonal dry periods and where possible during droughts</b>			
	4.2.9	By 2015, increased climate change strategies arising from the inter-ministry meetings with Ministry of Lands, Energy, Agriculture and Food Security.	

## ACTIVITIES

<b>Purpose 1. Rainwater harvesting – Small reservoirs and micro-catchment to ensure easy access to a reliable source of water for drinking, irrigation, livestock or some other uses during seasonal dry periods and where possible during droughts</b>			
RESULTS (OUTPUTS)	INDICATOR	MEANS OF VERIFICATION	RISKS
<p>1.1. Feasibility studies of the proposed areas;</p> <p>1.2. Procurement of Contractor(s) through tender process</p> <p>1.3. Contractor mobilizing resources (finances, equipment, personnel) and moving on site</p> <p>1.4. Mobilization of:</p> <p>(a) Community Forums (CFs – new or existing);</p> <p>(b) Local resources (human, materials) in the selected areas;</p> <p>1.5. Conducting of Social and Environmental Impact Assessment (SEIA)</p> <p>1.6. Build capacities of the CFs in water and sanitation, hygiene, Dam maintenance and management, Project management and, communication skills.</p> <p>1.7. Engaging and dialogue with Government on subsidies on equipment and materials for climate change adaptation</p> <p>1.8. Conduct Project quarterly reviews/evaluation</p>	<ul style="list-style-type: none"> <li>• Feasibility study by year 1 (2014)</li> <li>• Contractor(s) procured and mobilized on site by mid of 2014</li> <li>• CFs are mobilized including local resources by 2014</li> <li>• SEIA study by end of 2014</li> <li>• CFs have been trained and capacitated with relevant skills by 2015</li> <li>• Ministry of Environment and Natural Protection to facilitate the CFs in order to lobby NGOs to engage dialogue with government by year 2 (2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Feasibility study report</li> <li>• Signed contract</li> <li>• Project quarterly evaluation report</li> <li>• CFs reports</li> <li>• Minutes of meetings</li> <li>• SEIA study Report</li> <li>• Training report</li> <li>• Policy on subsidy for equipment climate change adaptation</li> <li>• CSO statistics</li> <li>• Ministry of environment and natural resources records and reports</li> <li>• Programme progress reports and records</li> <li>• Dept of Water Affairs reports</li> </ul>	<ul style="list-style-type: none"> <li>• Adequate and timely supply of inputs</li> <li>• Local labour inputs are provided by beneficiaries</li> <li>• Active participation of the local stakeholders especially community members</li> </ul>

Purpose 2. Boreholes/Tubewells for domestic water supply to ensure access to water during droughts or prolonged dry periods			
RESULTS (OUTPUTS)	INDICATOR	MEANS OF VERIFICATION	RISKS
<p>2.1. Feasibility studies of the proposed areas;</p> <p>2.2. Procurement of a Contractor through tender process</p> <p>2.3. Contractor mobilizing resources (finances, equipment, personnel) and moving on site</p> <p>2.4. Mobilization of:            (a) Community Forums (CFs – new or existing);            (b) Local resources (human, materials) in the selected areas;</p> <p>2.5. Capacity Building through training of the CFs in water and sanitation, hygiene, borehole maintenance and management</p> <p>2.6. Conducting of Social and Environmental Impact Assessment (SEIA)</p> <p>2.7. Engaging and dialogue with Government on subsidies on equipment and materials for climate change adaptation</p> <p>2.8. Conduct Project quarterly reviews/evaluation</p>	<ul style="list-style-type: none"> <li>• Feasibility study done by 2014</li> <li>• A contractor is procured and is on site by 2014</li> <li>• CFs are mobilized including local resources by 2014</li> <li>• CFs have been trained by 2015</li> <li>• SEIA report by 2014</li> <li>• Project quarterly evaluations starting 2014</li> <li>• Ministry of Environment and Natural Protection to facilitate the CFs in order to lobby NGOs to engage dialogue with government by year 2 (2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Signed contract</li> <li>• Project quarterly evaluation reports</li> <li>• CFs reports</li> <li>• Minutes of meetings</li> <li>• Training report</li> <li>• CSO statistics</li> <li>• Ministry of environment and natural resources records and reports</li> <li>• Programme progress reports and records</li> <li>• Dept of Water Affairs reports</li> </ul>	<ul style="list-style-type: none"> <li>• Adequate and timely supply of inputs</li> <li>• Local labour inputs are provided by beneficiaries</li> <li>• Active participation of the local stakeholders especially community members</li> </ul>
Purpose 3. Improving Resilience of Protected Wells ensuring good quality water in situations of increased occurrence of floods			
RESULTS (OUTPUTS)	INDICATOR	MEANS OF VERIFICATION	RISKS

<b>Purpose 1. Rainwater harvesting – Small reservoirs and micro-catchment to ensure easy access to a reliable source of water for drinking, irrigation, livestock or some other uses during seasonal dry periods and where possible during droughts</b>			
<p>3.1. Feasibility studies of the proposed areas;  3.2. Procurement of a Contractor through tender process  3.3. Contractor mobilizing resources (finances, equipment, personnel) and moving on site  3.4. Mobilization of:  (a) Community Forums (CFs – new or existing);  (b) Local resources (human, materials) in the selected areas  3.5. Training of the CFs in water and sanitation, hygiene, well maintenance and management, and communication skills  3.6. Engaging and dialogue with Government on subsidies on equipment and materials for climate change adaptation  3.8. Conduct Project quarterly reviews/evaluation</p>	<ul style="list-style-type: none"> <li>• Feasibility study report by 2014</li> <li>• A contractor is procured and is on site by 2014</li> <li>• CFs are mobilized including local resources by 2014</li> <li>• CFs have been trained by 2015</li> <li>• Project quarterly evaluations starting 2014</li> <li>• Ministry of Environment and Natural Protection to facilitate the CFs in order to lobby NGOs to engage dialogue with government by year 2 (2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Signed contract</li> <li>• Project quarterly evaluation reports</li> <li>• CFs reports</li> <li>• Minutes of meetings</li> <li>• Training report</li> <li>• CSO statistics</li> <li>• Disaster management records and reports</li> <li>• Programme progress reports and records</li> <li>• Dept of Water Affairs reports</li> </ul>	<ul style="list-style-type: none"> <li>• Adequate and timely supply of inputs</li> <li>• Local labour inputs are provided by beneficiaries</li> <li>• Active participation of the local stakeholders especially community members</li> </ul>
<b>Purpose 4. To contribute to regulatory and institutional environment that supports adaptation to climate change</b>			
<b>RESULTS (OUTPUTS)</b>	<b>OBJECTIVELY VERIFIABLE INDICATORS (OVIs)</b>	<b>MEANS OF VERIFICATION</b>	<b>RISKS</b>

<b>Purpose 1. Rainwater harvesting – Small reservoirs and micro-catchment to ensure easy access to a reliable source of water for drinking, irrigation, livestock or some other uses during seasonal dry periods and where possible during droughts</b>			
<p><b>4.1. Mainstreaming of environment and climate change adaptation in government departments and key partners located in Region I</b></p>	<p>4.1.1 By 2015, engagement of environment and climate change adaptation consultant</p> <p>By 2015, awareness raising on policy makers within the government at district level to mainstream environment and climate change</p> <p>4.1.2 By 2015, training in environment and climate change adaptation for government departments and other key partners</p>	<ul style="list-style-type: none"> <li>• Department of Water of Water Affairs records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Enforcement of policy instruments that support environment and climate change adaptation are likely to take long.</li> </ul>
<p><b>4.2. Institutional capacity of MEWD and other key partners strengthened</b></p>	<p>4.2.1 By 2016, training of district level government staff in climate change adaptation</p> <p>4.2.2 By 2016, training of provincial level government staff in climate change adaptation</p> <p>4.2.3 By 2016, training of national level government staff in climate change adaptation</p> <p>4.2.4 By 2016, advocating for increased budgetary allocation for climate change adaptation in the national budget</p> <p>4.2.5 By 2016, propose of increased allocation to environmental negative environmental impacts</p> <p>4.2.6 By 2016, an M&amp;E training workshop for national, provincial and district –based environmental and natural Resources officers organised</p> <p>4.2.7 By 2016, a training of provincial and district level environment and natural resources staff on how best to disseminate information on climate change</p> <p>4.2.8 By 2016, inter-ministry meetings on climate change resilience facilitated</p> <p>4.2.9 By 2016, government stakeholders identified to be part of the meeting on climate change resilience</p>	<ul style="list-style-type: none"> <li>• Ministry of environment and natural resources records and reports</li> <li>• Programme monitoring reports</li> <li>• Partners' records and reports</li> <li>• Programme reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• The financial resources allocated to build the institutional framework and that of other key partners may be insufficient.</li> </ul>

**Purpose 1.** Rainwater harvesting – Small reservoirs and micro-catchment to ensure easy access to a reliable source of water for drinking, irrigation, livestock or some other uses during seasonal dry periods and where possible during droughts

	4.2.10	By 2016, non-government stakeholders identified to be part of the meeting on climate change		
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## B. Pilot Smallholder Climate Change Resilience (PSCCR) Project: Logical Framework

OVERALL OBJECTIVE	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
<i>To increase the resilience and adaptive capacity of targeted farming households in Region I so that increased food security and income could be achieved by 2030.</i>	1. By 2018, increase in <b>annual gross income of households</b> in targeted areas by xx% from average value of xx in 2014	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Case studies</li> <li>• Programme progress records and reports</li> <li>• Programme monitoring reports</li> <li>• CSO Living conditions monitoring survey report</li> <li>• Ministry of Health Database</li> <li>• ZARI reports</li> </ul>	<ul style="list-style-type: none"> <li>• Climatic variability</li> <li>• Unstable macro-economic and policy environment</li> <li>• Fluctuations in prices</li> <li>• Unstable exchange rate regime</li> </ul>
	4. By 2018, <b>average production of crops per household</b> in targeted areas increased from xx to xx tons per hectare through improved varieties.		
	5. By 2018, xx% of households in targeted areas eat <b>3 balanced meals per day</b> as compared to xx% in 2014		
	4. By 2018, <b>decline in malnutrition rate among the under five children</b> in targeted areas from xx% in 2014 to xx% (as measured by the under-weight ratio)		



PROJECT PURPOSE	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
<b>1 To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility</b>	2.1. By 2018, xx% increase in average crop yield per targeted household as a result of using conservation farming with agro-forestry tree species 2.2. By 2018, xx% increase in average income per targeted household as a result of using conservation farming with agro-forestry tree species 2.3. By 2018, targeted households record xx% decrease in expenditure for chemical fertilizers	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Case studies</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Departmental Reports and Records</li> </ul>	<ul style="list-style-type: none"> <li>• The macro-economic environment will remain conducive to fisheries sector development</li> <li>• Farmers do not adopt conservation farming with Musangu due to its long maturity period</li> </ul>
<b>2 To help farmers build crop resilience to diseases, pest organisms and environmental stress</b>	2.1 By 2018, average yield per targeted household as a result of using improved and early maturing crop varieties  2.1 By 2018, targeted households record xx% reduction in frequency of diseases due to use of improved and early maturing varieties 2.2 By 2018, targeted households record xx% reduction in pest infestation due to use of improved and early maturing varieties	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Case studies</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• MAL records and reports</li> </ul>	<ul style="list-style-type: none"> <li>• The macro-economic and policy environment does not support to agricultural development</li> <li>• Unstable climatic conditions will prevail</li> <li>• GRZ is less committed to agricultural sector development</li> </ul>

PROJECT PURPOSE	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
<p><b>3 To enable farmers spread their risk widely by diversifying their enterprises while making their agriculture profitable in the process</b></p>	<p>3.1 By 2018, xx% increase in average household income for the targeted households involved in integrated production system</p> <p>3.2 By 2018, xx% increase in yield of targeted commodities involved in integrated production system</p> <p>3.3 By 2018, xx% increase in sales of marketed produce involved in integrated production system</p> <p>3.4 By 2018, xx% increase in targeted farming households growing at least 4 different types of crops per farming season</p>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• The macro-economic and policy environment does not support to agricultural development</li> <li>• Unstable climatic conditions will prevail</li> <li>• GRZ is less committed to agricultural sector development</li> <li>• Supportive infrastructure (roads, ICT) are poorly developed</li> <li>• SMEs have inadequate access to financing for investments</li> </ul>
<p><b>4 To promote farming as a business among the targeted farmers</b></p>	<p>4.1 By 2018, xx targeted farming households are members of agribusiness groups with an elected board</p> <p>4.2 By 2018, xx targeted farming households perceive farming as a business</p> <p>4.3 By 2018, xx% increase of income raised by selling produce from the bulking centre facility</p> <p>4.4 By 2018, xx value of marketed produce increased due to improved quality and standards</p> <p>4.5 By 2018, xx targeted farming households record improved profit margin analysis</p> <p>4.6 By 2018, xx targeted farming households practice the discipline of saving money raised from their agricultural enterprises</p> <p>4.7 By 2018, xx targeted farming households repay loans accessed from the local banks</p> <p>4.8 By 2018, xx targeted farming households invest their monies to improve their agricultural enterprises (e.g. purchase of ploughs, ox-cart etc)</p>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Enterprise baseline survey</li> <li>• Programme progress reports and records</li> <li>• Market surveys</li> <li>• ZRA reports</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• The macro-economic and policy environment does not support to agricultural development</li> <li>• Unstable climatic conditions will prevail</li> <li>• GRZ is less committed to agricultural sector development</li> <li>• Supportive infrastructure (roads, ICT) are poorly developed</li> <li>• SMEs have inadequate access to financing for investments</li> </ul>

PROJECT PURPOSE	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
5 To contribute to regulatory and institutional environment that supports adaptation to climate change	5.1 By 2018, appropriate regulatory and legal framework processes in the agricultural sector to support efforts of climate change adaptation 5.2 By 2018, district, block and camp level agricultural staff possess increased knowledge of climate change adaptation 5.3 By 2019, the office of Research and Extension Liaison Officer (RELO) re-established in the Ministry of Agriculture and Livestock by cabinet office (GRZ) in order to facilitate inter-linkages between Ministry of Agricultural and Livestock (MAL) departments at national, provincial and district level 5.4 By 2019, subsidies provided to small scale farmers involved in integrated production systems 5.5 By 2019, import duty for basic agricultural implements necessary for integrated farming reduced 5.6 By 2019, M&E systems of MAL in the project areas of Region I strengthened 5.7 By 2019, climate change resilience strategies arising from inter-ministry meetings implemented	<ul style="list-style-type: none"> <li>• Specific approved Policies and legislation</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• MAL records and reports</li> </ul>	<ul style="list-style-type: none"> <li>• Poor development in the Zambian economy and sectoral policies</li> <li>• Government does not respond to advocacy and lobbying</li> </ul>

## RESULTS (OUTPUTS)

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
1.1. Conservation farming with agro-forestry tree species promoted so to increase resilience of farmers to drought weather conditions	1.1.1. By 2018, xx% farming HHs using conservation farming with agro-forestry tree species as compared to xx% farming HHs in 2014.	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Musangu Tree takes over 10 years to fully mature</li> </ul>
	1.1.2 By 2018, xx% reduction in application of chemical fertilizers for crop farmers		

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
<b>1.2 Soil fertility improved in targeted cropping systems</b>	1.2.1 By 2018, xx% targeted farmers trained in appropriate soil fertility improvement practices ((Lime, residual retention, crop rotation, no burning, improved furrow) 1.2.2 By 2018, xx% of targeted farming HHs planting green manure crops in their fields so as to increase soil fertility 1.2.3 By 2018, xx% of targeted farming HHs using compost manures in their fields 1.2.4 By 2018, xx% of targeted farming HHs producing compost manures in their field	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• Inadequate number of extension workers available</li> <li>• land-related legislation enforced</li> <li>• Insufficient resources allocated by GRZ to land management issues</li> <li>• prices of soil fertility improving ingredients such as lime will does not remain affordable to farmers</li> </ul>
Purpose 2. To help farmers build crop resilience to diseases, pest organisms and environmental stress			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
<b>2.1.Promotion of early maturing varieties</b>	2.1.1. By 2018, xx% farming HHs using early maturing crop varieties increased as compared to xx% farming HHs in 2014. 2.2.1 By 2018, xx% increase in farming HHs trained in growing early maturing crop varieties	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• Inadequate number of extension workers available</li> <li>• land-related legislation enforced</li> <li>• Insufficient resources allocated by GRZ to land management issues</li> <li>• prices of soil fertility improving ingredients such as lime does not remain affordable to farmers</li> </ul>

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
2.2 Promotion of drought tolerant crop varieties	<p>2.2.1. By 2018, xx% increase in farming HHs using drought-tolerant crop varieties as compared to xx farming HHs in 2014.</p> <p>2.2.1 By 2018, xx% increase in farming HHs trained in crop diversification using drought-tolerant crop varieties</p>	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• Inadequate number of extension workers available</li> <li>• land-related legislation enforced</li> <li>• Insufficient resources allocated by GRZ to land management issues</li> <li>• prices of soil fertility improving ingredients such as lime will does not remain affordable to farmers</li> </ul>
Purpose 3. To enable farmers spread their risk widely by diversifying their enterprises while in the process making their agriculture profitable in the process			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
2.1 Promotion of integrated production systems	<p>2.2.1. By 2018, xx% increase in farming HHs using integrated production systems as compared to xx% farming HHs in 2014.</p> <p>2.2.2 By 2018, xx% increase in profit margins of farming HHs involved in integrated production systems as compared to xx% farming HHs in 2014</p>	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• Inadequate number of extension workers available</li> <li>• land-related legislation enforced</li> <li>• Insufficient resources allocated by GRZ to land management issues</li> <li>• prices of soil fertility improving ingredients such as lime will does not remain affordable to farmers</li> </ul>
Purpose 4. To promote farming as a business among the targeted farmers			

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
RESULTS	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
3.1. Training of farmers in 'farming as a business'	3.1.1. By 2018, xx agribusiness groups formed	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Enterprise baseline survey</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• agricultural prices not significantly affected by GRZ decisions</li> <li>• GRZ actions will not compromise competitiveness of private sector</li> <li>• political will to private sector development maintained</li> </ul>
	3.1.2. By 2018, xx farming HHs trained in farming as a business		
	3.1.3 By 2018, xx% increase in profit margins of farming HHs involved in integrated production systems as compared to xx% farming HHs in 2014		
3.2. Marketing system improved	3.2.1 By 2018, xx farming HHs sale their produce using established bulking centres		
3.3. Facilitation of Trade and competitiveness promoted	3.3.1 By 2018, acceptable user friendly grades and standards for target commodities developed	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• programme monitoring reports</li> <li>• Market surveys</li> </ul>	<ul style="list-style-type: none"> <li>• The supply side constraints (quantity, quality) will affect trade development</li> </ul>
	3.3.2 By 2018, xx% farming HHs linked to the market		
3.3 Access to market information	3.3.1. By 2018, xx% farming HHs trained on how to access market information using mobile cell phones (ZNFU initiative).	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Poor market information gives rise to Briefcase businessmen</li> <li>• Not all targeted farmers are likely to have a mobile cell phone.</li> </ul>
3.4 Functional savings and investment schemes	3.4.1 By 2018, xx% targeted farming households access bank loans through the agribusiness groups	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Bank Statements</li> </ul>	<ul style="list-style-type: none"> <li>• Poor loan recovery system by banks</li> <li>• Disunity in agribusiness groups will result in group disintegration</li> </ul>

Purpose 5. To contribute to regulatory and institutional environment that supports adaptation to climate change			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
5.1. Mainstreaming of environment and climate change adaptation in government departments and key partners located in Region I	5.1.1 By 2018, environmental and climate change adaptation features prominently in government and developmental programmes implemented in Region I.	<ul style="list-style-type: none"> <li>• DoF records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Environment and climate change issues are discussed but not documented in policy documents.</li> </ul>
5.2. Institutional capacity of MAL and other key partners strengthened	<p>5.7.1 By 2018, district, block and camp level agricultural staff possess trained in climate change adaptation for agriculture sector</p> <p>5.7.2 By 2018, increased budgetary allocation for environment and climate change adaptation in drought-prone Region I as a result of advocacy work of the project</p> <p>5.7.3 By 2018, increased advocacy for the restoration of the office of Research and Extension Liaison Officer (RELO) in order to facilitate inter-linkages between departments of MAL at district, provincial and national level</p> <p>5.7.4 By 2018, increased advocacy for provision of subsidies to small scale farmers involved in integrated production system</p> <p>5.7.5 By 2018, increased advocacy to reduce import-duty on implements necessary for integrated production system</p> <p>5.7.6 By 2015, the M&amp;E system of the project is established</p> <p>5.7.7 By 2015, the M&amp;E system of the project is established</p> <p>5.7.8 By 2015, increased climate change strategies arising from the inter-ministry meetings</p>	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme monitoring reports</li> <li>• Partners' records and reports</li> <li>• Programme reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Limited financial resources released by government.</li> </ul>

**ACTIVITIES**

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
1.1. Conservation farming with agro-forestry tree species promoted so to increase resilience of farmers to drought weather conditions	1.1.1. By 2014, xx% targeted farming sensitized on the benefits of using conservation farming with agro-forestry tree species	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Musangu Tree takes over 10 years to fully mature</li> </ul>
	1.1.2. By 2014, project distributes xx agro-forestry tree seedlings to xx% targeted farming HHs		
	1.1.3 By 2015, xx% targeted farming HHs trained on how to use organic fertilizers in their crop fields		
1.2 Soil fertility improved in targeted cropping systems	1.2.1 By 2015, soil diagnostics undertaken to ascertain the soil types 1.2.2 By 2015, xx% targeted farmers trained in appropriate soil fertility improvement practices ((Lime, residual retention, crop rotation, no burning, improved furrow) 1.2.3 By 2015, xx% targeted farmers plant Musangu trees in their fields	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL will allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• sufficient resources allocated by GRZ to land management issues</li> <li>• Prices of soil fertility improving ingredients such as lime will remain relatively expensive to farmers</li> </ul>
Purpose 2. To help farmers build crop resilience to diseases, pest organisms and environmental stress			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS



Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
2.1.Promotion of early maturing varieties	2.1.1. By 2014, project raises awareness/sensitization on the benefits of early maturing crop varieties 2.1.2 By 2014, project procures/sources early maturing crop varieties 2.1.3 By 2014, xx% targeted farming HHs trained in using early maturing crop varieties	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL will allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• sufficient resources allocated by GRZ to land management issues</li> <li>• Prices of soil fertility improving ingredients such as lime will remain relatively expensive to farmers</li> </ul>
2.2 Promotion of drought tolerant crop varieties	2.2.1. By 2015, xx demonstrations for drought tolerant crops established 2.2.2 By 2015, xx targeted farming households sensitized on the benefits of drought-tolerant crop varieties	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL will allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• sufficient resources allocated by GRZ to land management issues</li> <li>• Prices of soil fertility improving ingredients such as lime will remain relatively expensive to farmers</li> </ul>
Purpose 3. To enable farmers spread their risk widely by diversifying their enterprises while in the process making their agriculture profitable in the process			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
2.1 Promotion of integrated production systems	2.2.1. By 2015, xx demonstration plots of integrated production systems established 2.2.2 By 2015, xx% targeted farmers trained in integrated production systems 2.2.3 By 2015, xx% targeted farmers are trained in growing at least 4 commodities to reduce the negative effects of climate change	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL will allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• Insufficient resources allocated by GRZ to land management issues</li> <li>• Prices of soil fertility improving ingredients such as lime will remain relatively expensive to farmers</li> </ul>
2.2 Facilitation of market linkages for the produce of integrated production systems	2.3.1 By 2016, xx% targeted farmers exposed to profitable markets 2.3.2 By 2016, xx% targeted farming HHs trained in record keeping 2.3.3 By 2016, xx% targeted farming HHs trained in profit margin analysis	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> <li>• Baseline survey</li> <li>• CSO statistics</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL will allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• Inadequate number of extension workers available</li> <li>• Insufficient resources allocated by GRZ to land management issues</li> </ul>
Purpose 4. To promote farming as a business among the targeted farmers			
RESULTS	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS
3.1. Training of farmers in 'farming as a business'	3.1.1. By 2015, community mobilised to form agribusiness groups 3.1.2 By 2015, district, block and camp level staff trained in farming as a business 3.1.3 By 2015, xx% targeted farming HHs trained in farming as a business	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Enterprise baseline survey</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• MAL will allocate insufficient resources to agricultural research and especially to farming systems research</li> <li>• Inadequate number of extension workers available</li> <li>• Insufficient resources allocated by</li> </ul>

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
3.2. Marketing system improved	3.2.1 By 2016, sensitisations of the benefits of bulking centres in promoting markets for agricultural produce  3.2.2 By 2016, establishment of bulking centres		GRZ to land management issues
3.3. Facilitation of Trade and competitiveness promoted	3.3.1 By 2015, sensitisation of targeted farmers on how to maintain high quality standard of agricultural produce  3.3.2 By 2016, creating market linkages between producers and producers and consumers  3.3.3 By 2018, xx% farming HHs linked to the market  3.3.4 By 2015, xx% targeted farming HHs trained in price negotiations	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• Enterprise baseline survey</li> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• programme monitoring reports</li> <li>• Market surveys</li> </ul>	<ul style="list-style-type: none"> <li>• The supply side constraints (quantity, quality) will affect trade development</li> <li>• International terms of trade conducive to trade promotion nationally and internationally</li> </ul>
3.3 Access to market information	3.3.1. By 2015, farmers sensitised on market information  3.3.2 By 2015, farmers are trained in using mobile cell phones to access prices and market availability	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Farmers have insufficient access to the marks</li> <li>• Cell Phones may not always be common to targeted for farmers.</li> </ul>
3.4 Functional savings and investment schemes	3.4.1 By 2015, agribusiness groups established  3.4.2 By 2015, agribusiness groups sensitized on sources of capital for the groups  3.4.3 By 2015, agribusiness groups trained on how to write business plans/proposals to financial institutions	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Farmers have insufficient access to the marks</li> <li>• Agribusiness group members fails to write good business plans</li> </ul>
Purpose 5. To contribute to regulatory and institutional environment that supports adaptation to climate change			
RESULTS (OUTPUTS)	OBJECTIVELY VERIFIABLE INDICATORS (OVIs)	MEANS OF VERIFICATION	RISKS

Purpose 1. To enable farmers in Agro-ecological region I achieve higher yields with less water and less chemicals while conserving soil fertility			
<b>5.1. Mainstreaming of environment and climate change adaptation in government departments and key partners located in Region I</b>	5.1.1 By 2015, engagement of environment and climate change adaptation consultant  By 2015, awareness raising on policy makers within the government at district level to mainstream environment and climate change  5.1.2 By 2015, training in environment and climate change adaptation for government departments and other key partners	<ul style="list-style-type: none"> <li>• DoF records and reports</li> <li>• Programme progress reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• Enforcement of policy instruments that support environment and climate change adaptation are likely to take long.</li> </ul>
<b>5.2. Institutional capacity of MAL and other key partners strengthened</b>	5.2.1 By 2016, training of district level government staff in climate change adaptation 5.2.2 By 2016, training of block level government staff in climate change adaptation 5.2.3 By 2016, training of camp level government staff in climate change adaptation 5.2.4 By 2016, advocating for increased budgetary allocation for climate change adaptation in the national budget 5.2.5 By 2016, propose that budgetary allocation to FISP be reduced as it has negative environmental impacts 5.2.6 By 2016, an M&E training workshop for national, provincial and district –based MAL officers organised 5.2.7 By 2016, a training of provincial and district level MAL staff on how best to disseminate information on agricultural packages involving 5.2.8 By 2016, inter-ministry meetings on climate change resilience facilitated 5.2.9 By 2016, government stakeholders identified to be part of the meeting on climate change resilience 5.2.10 By 2016, non-government stakeholders identified to be part of the meeting on climate change	<ul style="list-style-type: none"> <li>• MAL records and reports</li> <li>• Programme monitoring reports</li> <li>• Partners' records and reports</li> <li>• Programme reports and records</li> <li>• Programme monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• The financial resources allocated to build the institutional framework and that of other key partners may be insufficient.</li> </ul>