

## Annex 1: Structured survey questionnaire for household heads



**Addis Ababa University**  
**College of Development Studies**  
**Centre for Rural Development**

**Title: FARMING UNDER UNCERTAINTY: Livelihood Strategies, Vulnerability of Smallholder Farmers and their Adaptation measures to Climate Change in Woleka Sub Basin: North Central Ethiopia**

### Introduction

This questionnaire is designed to collect primary data on socioeconomics, ecological, and development related information from household heads, conservation and management problems of natural resources, present and prospect livelihood options of households, variability and trend of rainfall and temperature, climate change perceptions and coping strategies, and the extent of vulnerability of the farming system. Therefore, you are kindly requested to give your response freely and accurately to the success of the study.

**Dear Respondent:** This questionnaire has solely a research purpose. It is believed that it will assist the community, the government and non-government organizations in designing mechanisms to enhance the capacity of smallholder farmers to climate variability and change as well as to ensure sustainable natural resource management. I confirm you that all data will be treated confidentially and only aggregate and average information will be published. Therefore, I kindly request the cooperation of respondents in providing accurate and reliable information considering the importance of the study. Do you agree to participate in this interview?

**Direction:** for the closed ended questions, write the number of your choice on the space provided; for Likert scale and questions given in Tables, put "✓" mark as per your choice, and for open ended questions provide your answer on the space provided. For multiple choice questions, you can provide more than one response (if necessary). For points which require ranking, rank the first three or five, based on the instruction, based on their degree of importance/severity. Lastly, I thank you for your time and cooperation

### I. General Information

Zone: **South Wollo Administrative Zone (ANRS)**                      **Woreda:** \_\_\_\_\_  
 Kebele: \_\_\_\_\_ Village (Mender or kot): \_\_\_\_\_ Household Code: \_\_\_\_\_  
 Name of Enumerator \_\_\_\_\_ Date \_\_\_\_\_ Signature \_\_\_\_\_

No	Question (Issue)
1	Local Agroecological Categorization of the Village: 1. Dega 2. Woinadega 3. Kolla
2	What is the major (dominant) cropping season? 1. Meher 2. Belg 3. both meher and belg
3	Based on agroecology and type of cropping season, which one best describes your locality? 1. Dega/belg 2. Dega/meher 3. woinadega/meher 4. Kolla/meher 5. kolla/belg

### II. Demographic Characteristics

No	Question (Issue)																									
4	Type of household head. 1 Male headed 2. Female headed																									
5	Age of the household head in years:																									
6	Marital status of the household head: 1. Never married 2. Currently Live in union 3. divorced 4. widowed																									
7	Religion type of the household head: 1. Orthodox 2. Muslim 3. Others																									
8	Total household size based on age and sex category (include all members in living together)																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>code</th> <th>Age</th> <th>Male</th> <th>Female</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>HHSIZE14</td> <td>Below 14 years</td> <td></td> <td></td> <td></td> </tr> <tr> <td>HHSIZE15-65</td> <td>15-65 years</td> <td></td> <td></td> <td></td> </tr> <tr> <td>HHSIZE65+</td> <td>Above 65 years</td> <td></td> <td></td> <td></td> </tr> <tr> <td>TTHHSIZE</td> <td>Total</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	code	Age	Male	Female	Total	HHSIZE14	Below 14 years				HHSIZE15-65	15-65 years				HHSIZE65+	Above 65 years				TTHHSIZE	Total			
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9	Educational status of the Husband; 1. Unable to write and read 2. Write and/or read (non-formal education)																									

10	3. Literate (formal education) If the husband has formal education, the maximum class level completed is.....						
11	Educational status of the wife: 1. Unable to write and read 2. Write and/or read (non-formal education) 3. Literate (formal education)						
12	If the husband has formal education, the maximum class level completed is.....						
13	Number of children in the household in their educational status, if any (both sexes)						
	<table border="1"> <thead> <tr> <th>Level</th> <th>Total Number of children</th> </tr> </thead> <tbody> <tr> <td>Primary (1-8)</td> <td></td> </tr> <tr> <td>Secondary (9-12) and above</td> <td></td> </tr> </tbody> </table>	Level	Total Number of children	Primary (1-8)		Secondary (9-12) and above	
Level	Total Number of children						
Primary (1-8)							
Secondary (9-12) and above							
14	Based on the Kebelle productive safety net program wealth grouping criteria, your family classification is under: 1. Poor 2. Medium 3. Rich						

### III. Assets

Natural capital/assets (Land, Livestock, bee colony and related)						
No	Question (Issue)					
15	Do you have your own cultivable land? 1 = yes 0 = otherwise					
16	If 'yes' the total size in 'gemed' is ..... (write the number in the space provided)					
	Cultivated land	homestead	Woodlot	Irrigated land	Grazing land	Total
17	Do you have a land holding/ownership certificate? 1 = yes 0 = otherwise					
18	If 'yes' does it encourages you to invest in terms of soil conservation like terracing, application of organic fertilizer, planting trees, agroforestry etc) better than before? 1. Yes 0 = otherwise					
19	How do you evaluate the fertility of your majority of farm land? 1. Not fertile 2. Medium 3. Fertile					
20	Have you rented or share cropped of your farm land to other farmers for the last five years? 1. Yes 0. No					
21	If you have rented or sharecropped your land to other farmers, what was/were the major reason(s) to do so? Mention the first <b>THREE</b> factors. 1. Labor constraint 2. Lack of Traction animal 3. Plenty of land 4. Engaged in other activities 5. Financial constraint to buy inputs 6. Lack of seed 7. other					
22	What type of fertilizer are you using to increase the fertility of your farm land more frequently? 0 = not applied 1. Organic (manure/compost) 2. Inorganic 3. Both organic and inorganic equally					
23	Total amount of fertilizer in kilograms used during the last summer/Belg season was.....?					
24	If you are not using inorganic fertilizer, what is/are the major reasons? Mention the first <b>THREE</b> critical problems. 1. Financial constraint 2. Organic one yields more 3. Inorganic fertilizer needs more water 4. The land needs no fertilizer 5. Lack of timely access 6. other					
25	Have you used improved seed? 1. Yes 0. No					
26	Have you used insecticide/pesticide/herbicide? 1. Yes 0. No					
27	Hereunder are possible problems related to crop production. Rate out the ones which are critical for you based on: 1. Not encountered at all 2. Encountered in limited extent 3. Encountered in medium extent 4. Encounter most frequently					
	Problem	1	2	3	4	
	Shortage of land					
	Declining soil fertility/Soil erosion					
	Unreliable and unpredictable rainfall/drought					
	Labor scarcity					
	Modern input constraint/high price (selected seeds, fertilizer, insecticides)					
	Flooding/waterlogging					
	Increased crop pests and disease					
	Lack of traction animal					
	Frost/Snow hail					
	Weak extension service					
	Attacked by wild animals					
	Other					
28	Total crop production in the previous harvesting season in Quintals					
	Meher	Belg	Irrigation	Total		

29	Livestock ownership (put the total number based on the classification)										
	Number	Chicken	goat	sheep	Donkey	Horse	mule	cow	Ox		
30	Major Feeding modality of domestic animals: 1. Free grazing 2. Cut and carry (zero grazing) 3. other										
31	What is/are the source of fodder for your domestic animals? Mention the <b>THREE</b> commonly used ones in their rank. 1. own private grazing land 2. communal grazing land 3. Cut and carry form enclosure 4. crop residue/straw/hay 5. buying fodder 6. Range land 7. other (specify)										
32	Was the pasture of last year sufficient for feeding your animals? 1=yes; 0=No										
33	If not sufficient, what did you do to feed your animals? 1. Migration of animals 2. Purchasing of feed/pasture or strew 3. Liquidation of some animals 4. Nothing 5. Other mention										
34	Hereunder are possible problems related to animal husbandery. Rate out the ones which are critaical for you based on: 1. Not encountered at all 2. Encounterd in limited extent 3. Ecnoutoured in medium extent 4. Encounter most frequently										
							1	2	3	4	
	Shortage of forage										
	Scarcity of grazing land										
	Water scarcity										
	Animal disease										
	Market problem										
	Lack of veterinary service										
	Attack from wild animals (predators)										
	other (specify)										
35	Do you have beehive of your own? 1. Yes 0 = otherwise										
36	If "yes", the number of bee colony and yearly based production of honey in kilograms										
	Type	Number	Annual Production in kg								
	Traditional										
	transition										
	Modern										
	Total										
37	Annual average income from honey and related products in Ethiopian birr										
38	Do you have irrigation land? 1=yes 2. Formerly yes, but currently not implemented 0=not at all (both formerly and currently)										
39	What are your major sources of water used for irrigation purpose? Mention the first <b>THREE</b> sources based on their importance. 1. Rainwater harvesting 2. Diverting a stream/river 3. Digging well/ground water 4. Nearby spring 5. Small dam 6. Motor pumping 7. Other (specify).....										
40	How do you evaluate the volume of water used for irrigation through time? 1. increased 2. No change 3. Decreased										
41	What are the major types of crops/fruits/vegetables cultivated using irrigation? Mention the first <b>THREE</b> in their level of importance. 1. Onion 2. Potato 3. Cabbage 4. Maize 5. Tomato 6. Red peppers 7. Cereals 8. Fruits (orange/lemon/Banana) 9. Chat/Gesho/ 10. Other										
42	Are you using most of the products from irrigation for home consumption or for market? 1. Mainly for home consumption purpose 2. Mainly for market 3. Both										
43	Average annual income earned from selling products from irrigation in ETB.....										
44	If you do not have irrigation land what is/are the constraints not to apply irrigation? Mention the first <b>THREE</b> based on their degree of influence. 1. Water scarcity 2. Shortage of labor 3. Shortage of land 4. Knowhow problem 5. Lack of market for the products 6. Others										
45	What is your <b>MAJOR</b> source of water for home consumption? 1. Open well 2. Stream/river 3. Pond/Lake 4. Protected well 5. Modern tap 6. Other specify										
46	Average time taken to fetch water for home consumption (one way round) in hours?										
47	How do you evaluate the volume of water used for home consumption through time? 1. increased 2. No change 3. Decreased										
48	What is your <b>MAJOR</b> source of water for domestic animals? 1. Open well 2. Stream/river 3. Pond/Lake 4. Protected well 5. Modern tap										
49	Average time taken to get drinking water for domestic animals (one way round)?										
50	How do you evaluate the volume of water used for domestic animals through time? 1. increased 2. No change 3. Decreased										

51	Have you heard any conflict among community members due to water resources (for home consumption, irrigation, domestic animals)? 1. Yes 0=otherwise
52	What is/are the MAJOR sources of energy used for cooking in the household? Rank the first <b>THREE</b> based on their degree of contribution. 1. Wood 2. Dung 3. Charcoal 4. Crop residue 5. Shrubs/leaves 6. Kerosene/natural gas 7. Biogas/solar energy
53	What is the MAJOR source of wood for home consumption? 1. Own plantation wood lot/homestead 2. Community/ <i>Kebelle</i> forest 3. Government controlled forest 4. Market 5. Naturally grown trees in the farm land 6. Other
54	Do you think that firewood becomes scarcer than 30 years back? 1. Yes 2 =otherwise
55	Average time taken to collect firewood per week.....
56	Are you using energy efficient stove? 1. Yes 0 = other wise
57	If 'no' what is/are your reason(s)? Mention the first <b>THREE</b> reasons. 1. Lack of access (affordability) 2. Financial constraint 3. Lack of knowledge/information 4. Not suitable for cooking 5. Not suitable for additional services like heating and lighting 6.other(specify)
58	Is there any family member <b>injured</b> due to flooding, thunderstorm, landslide/avalanches, malaria, hunger, frost/coldness) for the last 30 years? 1. Yes 0= otherwise
59	Is there any domestic animal <b>died</b> due to flooding, thunderstorm, landslide/avalanches, drought, snow hail) for the last 30 years? 1. Yes 0= otherwise
60	Is there any domestic animal <b>injured</b> due to flooding, thunderstorm, landslide/ avalanches, malaria, snow hail, frost) for the last 30 years? 1. Yes 0= otherwise

#### Human Capital (health, education, knowledge, information, skill)

No	CODE	Question (Issue)																											
61.		Have you got training on any of the following issue (Put “✓” mark on the appropriate space																											
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62		Are there any family members who have got vocational training? 1. Yes 0=otherwise																											
63		Do you have your own radio (operating currently)? 1. Yes 0=otherwise																											
64		Do you have your own mobile phone? 1. Yes 0=otherwise																											
65		Frequency of contacts with development agents for the last one year? 1. None or Once 2. 2-4 times 3. 5-7 times 4. More than 8 times																											
66		Frequency of contacts with <i>Kebelle</i> health extension workers for the last one year? 1. None or Once 2. 2-4 times 3. 5-7 times 4. More than 8 times																											
67		Average time to the nearest FTC centre (one way round) in hours is...																											
68		Average time to the nearest health centre (one way round) in hours is																											
69		Average time to the nearest veterinary service (one way round) in hours is																											
70		Is there any family member who has health problem (get sick very often) including the disabled (Malaria, Tuberculosis, Cholera, HIV/AIDS, handicapped etc) or other communicable diseases? 1=Yes 0= otherwise																											
71		Is there any family member who had missed work or school due to illness for more than five days in the past six months? 1=Yes 0= otherwise																											
72		Do any members of the household require daily care because of age, physical or mental conditions, illness or disability? 1. Yes 0. Otherwise																											
73		Do have the capacity to pay for medication for your own and your family in times of health problem? 1. Yes 0. Otherwise																											
74		Have you completed all the rural health extension packages properly? 1. Yes 0. No																											
<b>Physical capital (infrastructure, technologies, tools)</b>																													
No	Question (Issue)																												
75	Average time to reach the nearest all weather road (one way round) in hours is.....																												

76	Average time to reach the nearest major market centre (one way round) in hours is.....
77	Average time to reach the nearest communication centre(one way round) in hours is
78	Average time to reach the nearest school (one way round) in hours is.....
79	Type of house (main) 1. Wood/stone wall with grass thatched roof 2. Wood wall/stone with corrugated iron roof 3. Other specify
80	Do you have a separate house for human beings and domestic animals? 1. Yes 0 = otherwise

**Economic/Financial capital (credit/saving, remittance, pension)**

No	Question (Issue)
81	Do you have access to micro finance institutions/formal bank for credit and saving? 1. Yes 0 = otherwise
82	Do you have a saving account either in microfinance, cooperatives or formal bank? 1. Yes 0. Not at all
83	How much money do you have in your saving account (if any) in ETB?
84	If you do not have any saving account, mention the first TWO reasons 1. Lack of thrust 2. Have no extra money to be saved 3. Have no awareness on saving 4. Absence of the institution 5. Other
85	Did you borrow money from any of the following sources for the last one year? 1. Yes 0=otherwise
86	If 'yes' which one(s). Mention the first <b>THREE</b> based on their volume of money borrowed? 1. Relatives 2. Neighbors and friends (not relative) 3. Farmers' association/cooperatives 4. Microfinance institution 5. Commercial bank 6. Credit and saving association 7. Individual money lenders ( <i>Arataabedari</i> ) 8. Religious institutions 9. Government office 10. NGOs 11. others
87	For what purpose have you spent the money? Identify <b>THREE</b> purposes based on their volume of money invested. 1. Purchasing food and other consumable items (consumption smoothing) 2. Education and health fee 3. Purchasing agricultural inputs 4. Buying domestic animals 5. Running own business 6. For different ceremonies (wedding, <i>Tezkare, Mewlid</i> ) 7. Non consumable items like cloth, tools
88	Is there any family member working outside the village (aboard and/or domestic) and send remittance at least once in a year? 1. Yes 0 = otherwise

**Social capital ( networks, r/ships, participation, bylaws etc)**

No	Question (Issue)																					
89	Have you received any kind of support and help from neighbor/relatives for the last six months? (labor, finance, material in kind, in times of accident, etc) 1. Yes 0. Otherwise																					
90	Have you given any kind of support and help to neighbor/relatives for the last six months? (labor, finance, material in kind, accident, etc) 1. Yes 0. Otherwise																					
91	Did you have support/assistance from the local government ( <i>Kebelle</i> or woreda level) for the last 12 months? 1. Yes 0. Otherwise																					
92	Is there any family member who is a member of any producers/ farmers cooperatives association? 1. Yes 0. Other wise																					
93	Is there any family member who is affiliated with community based organizations (Idir, Mahiber, association etc) 1. Yes 0 = otherwise																					
94	Type of responsibility of the household head in the community/ <i>Kebelle</i> (multiple response possible, if any) 1. Religious leader 2. Community development work coordinator 3. One to five arrangement leader 4. <i>Kebelle</i> administrator 5. Idir leader6. Member of parent-teacher union 7. Other																					
95	Do you have bylaws (written or/and unwritten) articulated by the local community and enforced if not discharged? 1. Yes 0=otherwise																					
96.	If "yes" the bylaws are on: (put ✓ mark whenever necessary)																					
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97. Have you ever actively participated in watershed delination and implementation? 1. Yes 2. Not at all

98. Have you ever participated in identification of feasible climate change adaptation strategies? 1.yes 2.no

**IV. Livelihoods (types, diversification, opportunities and challenges)**

No	Issue
99	What is/are the <b>Principal</b> source (s) of livelihood (s) for the household? (Mention the first <b>FIVE</b> based on their level

	of contribution) 1. Crop production 2. Animal husbandry 3. Mixed farming 4. Petty trading 5. Selling fuel wood and charcoal 6. Apiculture 7. Handcrafts/blacksmith/carpentry/waving/tanning/jewelry and welding/pottery 8. Wage laborer 9. Salaried work 10. Other																				
100	Do you have any source of income rather than crop production and animal husbandry? 1=yes; 0 = otherwise																				
101	Type(s) of non/off-farm source(s) of income? Rank them according to their contribution. 1. Trade 2. Handcrafts/blacksmith/carpentry/waving/tanning/jewelry and welding/pottery 3. Selling fuel wood 4. Daily labor 5. Other																				
101.1	Average annual income from non/off-farm activities in Ethiopian birr....																				
101.2	Which critical problem hinders you to engage in non-farm economic activities? Rank the first three problems? 1. Shortage of money 2. Lack of know-how 3. Market problem 4. No training or support 5. other																				
101.3	What was the source of seed money to start non-farm activities? 1. Own saving or selling other assets 2. borrowing from microfinance institutions 3. support from relatives and friends 4. Borrowing from money lenders 5. others																				
102. What proportion of your household income comes from the following sources (put ✓ mark)																					
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103	What is your major source of food? 1. Own production 2. Food aid 3. Buying from market 4. Borrowing from relatives/ friends 5. Other																				
104	How many, on average, crops do you cultivate in one harvesting season?																				
105	What are the major types of crops cultivated in <i>Meher</i> season? (Mention the <b>THREE</b> most important). 1. Wheat 2. Barely 3. Teff 4. Maize 5. Sorghum 6. Selale 7. Leguminous (any type) 8. Oil crops (any type)																				
106	What are the major types of crops cultivated in <i>Belg</i> season? (mention the <b>THREE</b> most important) 1. Wheat 2. Barely 3. Teff 4. Maize 5. Sorghum 6. Selale 7. Leguminous (any type) 8. Oil crops (any type)																				
107. Total production of crops from the last harvesting season in Quintals:																					
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108	Is there any change in productivity of the cultivated land for the last 30 years? 1. Increased 2. No change 3. Decreased																				
109	What are the reasons for the increment of your cultivated land productivity, if any? Rank them according to their contribution. 1. Increased soil fertility 2. Strong extension service (improved seed supply, agrochemical use, organic fertilizer) 3. Suitable weather conditions (rainfall/temperature) 4. Timely preparation of land 5. Soil and water conservation practices 6. Other, please specify																				
110	What are the reasons for the decrease of your cultivated land productivity? Mention the first <b>Three</b> decisive factors. 1. Land degradation 2. Lack of timely input supply 3. Lack of traction animal 4. Rainfall variability/Drought 5. Pests and Crop diseases 6. Labor scarcity (timely ploughing, weeding, harvesting) 7. Other, please specify																				
111	Duration in months with food sufficiency through own production? 1. Excess of the requirement 2. Sufficient but not excess 3. Covers 9-11 months 4. Covers 6-8months 5. Covers 3-5months																				
112	For how many months does your family be in food deficit?.....months																				
113	How do you fill the gap of food deficit? (mention the first <b>THREE</b> mechanisms in their order of importance) 1. Buying by selling other assets or money earned from non/off farm sources 2. Food aid/safety net 3. Borrowing from relatives/neighbor 4. Migrating for wage labor seasonally 5. Mortgaging the land 6. others (specify)																				
114	Have you ever encountered crop failure (partial or total) for the last five years? 1. Yes 0 = other wise																				
115	If "yes", what was (were) the major reason (s)? Mention the first <b>THREE</b> ones based on their extent of severity. 1. Water shortage (rainfall failure) 2. Flooding/heavy rain 3. Pests and diseases 4. Water logging 5. Land slide 6. Snow hail 7. Frost																				
116	How many times do your family members get food per day on average? 1. Once 2. Two times 3. Three times 4. more than three times																				
117	Have you ever applied reduction of meal type and quality in times of food shortage? 1. Yes 0=otherwise																				
118	Do you have received food aid from the government for the last five years? 1. Yes 0 = otherwise																				
119	Do you have financial capacity to fill out food deficit (if any) from market by your own? 1. Yes 0. Other wise																				
<b>V. Vulnerability, Perception and Manifestation to climate variability and Change</b>																					
<b>No</b>	<b>Issue</b>																				
120	Do you observe any climate variability in terms of rainfall and temperature for the last 30 years? 1. Yes 0. No change observed																				

121	Do you think that climate variability/change in terms of rainfall and temperature is a problem for smallholder farmers? 1=yes 0=otherwise		
122	What do you think is the cause for climate variability? 1. I do not know 2. Human action (deforestation, overgrazing) 3. Natural process 4. God's reaction for our wrong doings 5. other		
123	Have you ever got any early warning on rainfall pattern (amount and timing) and natural hazards (pest, climate induced disease and flooding)? 1. Yes 0. Otherwise		
124	Do you think climate variability and change can be adapted? 1. Yes 0= otherwise		
125	How do you evaluate the trend of rainfall amount in your locality for the last 20-30 years? 1. No change 2. Increasing 3. decreasing		
126	Which rainy season demonstrates more variability/inconsistency? 1. Kiremt 2. Belg 3. Both		
127	Which of the following rainfall related phenomena are observed in your locality? Put '✓' mark for each		
	Rain fall pattern	Yes	No
	Onset late		
	ends up/cessation/ early		
	No problem on timing but on its amount and distribution		
	Onsets early		
	terminates late		
	Difficult to predict the onset and cessation time		
	Unusual prolonged dry days during summer/belg seasons		
	Rainfall erratic and short in duration		
	Increasing tendency of extreme events like flooding, heavy showers		
128	How do you evaluate the trend of temperature amount in your locality for the last 20-30 years? 1. No change 2. Increasing 3. decreasing		
129	Do you have information on climate variability/change (its cause, impact and adaptation strategies)? 1. Yes 0=otherwise		
130	If 'yes' what is your source of information. Mention the first <b>THREE</b> ones. 1. Radio 2. DAs/government officials 3. Training 4. Friends 5. Printed media 6. others		
131.	A list of climate variability/change indicators/manifestations are given below. Identify by putting "✓" mark the ones that you have experienced in your locality. [1= Yes, observed; 0 = not observed]		
	Indicators/manifestations of climate variability/change	1	0
	Prevalence of human and animals diseases that has not been seen before (like malaria)		
	Frequency of occurrence of drought and floods		
	The emergence of new species of wild animals and plant (Habitat shift)		
	Changes of clothing style of the communities		
	Reduction of rivers in volume through time		
	Change of domestic animals type		
	Change of crop type		
	Irregular pattern of rainfall through time		
	Drying up of swampy areas/ponds/springs/streams		

### VI. Impacts, Coping mechanisms and Adaptation strategies to Climate Variability and Change

No	Issue			
132.	Below are <b>actual impacts</b> of climate variability and change on the livelihoods of small-scale farmers. Put "✓" mark on the issue that affects your livelihood practically based on the scale given. [0=has no effect 1. Has a moderate effect 2. Has a sever effect]			
	Impact/effect of climate variability/change	0	1	2
	Reduction in crop yield and increase yield spoilage			
	Reduction the productivity of animals (milk, meat, wool etc)			
	Increase the degree of poverty (more people in need of food aid)			
	Increase the incidences of disease and death of humans			
	Increase the incidences of disease and death of animals			
	Force to travel for search of water due to drying up/reduction of nearby sources			
	Ceased irrigation practices due to scarcity of water			
	Confusion over planting dates due to unpredictable nature of rainfall			
	Breaking down the social networking of helping the disadvantaged ones			
	Infestation of new types of insects and weeds			
	Increases production cost (high fertilizer, more labor, more water, more money for insecticide/pesticide/herbicide, veterinary service for animals, health burden)			
	Increases the incidence of high temperature induced wild fire			

Ignites conflict over resources (grazing land, water for irrigation/domestic use)			
Reduction in forest coverage due to encroachment for search of farm land, grazing and others			
Disappearance of indigenous trees			

133. Below are adaptation strategies to climate variability and change to be implemented as categorized into different groups. Put “✓” on the appropriate degree of your implementation for each case. [0 = not implemented at all; 1= implemented in small extent (up to 25%) 2= implemented most of the time (25-75%) and 3=implemented regularly (more than 75%)]

	Options			
Land/water Management Related adaptation strategies	0	1	2	3
Terracing on the slope land (stone/bund)				
Planting trees (agroforestry)/ Planting along the contour				
Mulching technology				
Cut and carry method (Zero grazing/area closure)				
Water diversion				
Using energy efficient stoves (to reduce pressure on forests)				
Livelihood related adaptation strategies	0	1	2	3
Portfolio diversification (petty trading, wage laborer, farming, animal husbandry, bee hiving, irrigation )				
Non-farm Livelihood diversification (carpentry/wavering/ blacksmith/tanning/tailor/local liquor brewers)				
On-farm diversification (mixed farming/bee farming/ crop diversification/animal fattening/ cash crop production)				
Agricultural practice related strategies	0	1	2	3
Changing sowing and harvesting time (changing farming calendar)				
Application of organic fertilizer/compost				
Application of inorganic fertilizer				
Application of herbicides/insecticides				
Using irrigation (water harvesting/ground water/river diversion)				
Planting in rows				
Draining of Vertisols ( <i>mantafef</i> ) – cut-off drain				
Reducing the number of domestic animals (to improved one)				
Crop variety related adaptation strategies	0	1	2	3
Using improved seeds				
Growing drought resistant crop (crops using residual moisture) varieties				
Switching to short maturing crop varieties				
Multiple cropping/Intercropping/crop diversification				
Crop rotation, conservation tillage				
Technology related adaptation strategies	0	1	2	3
Selected seeds and fertilizer				
Irrigation(water diversion/harvesting/pumping/groundwater)				
Improved species of domestic animals				
Pesticide/herbicide/insecticide				

134. The following actions are reactive coping measures to be taken by smallholder farmers in response to climate variability and change. Put “✓” mark on the actions you have implemented.

Reactive Coping Measures (short term)	Yes	No
Seasonal migration to urban/other rural areas for casual work		
Selling of fire wood or/and charcoal		
Food aid/safety net program		
Engaging with non-farm activities (petty trading, wage laborer, others)		
Cultivating(expanding) to grazing and forest land		
Borrowing from relatives/neighbors		
Taking loan from money lenders		
Selling assets or/and live stocks to buy food		
Depending on remittance		
Reducing consumption (quantity and quality)		

135. From the lists given below, select the one which is widely used as adaptation strategy by the household? (select only one category and put ‘✓’ mark under the options column)

No	Category	Description
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1	Technology-related adaptations	New crop and animal varieties, improved stove, irrigation, water harvesting
2	Agriculture related adaptations	Change of cropping calendar, agroforestry, land augmenting, crop diversification
3	Non-agriculture related adaptation	Petty trading, wage labor, migration, handcraft and related

136. From the lists given below, select the one which is widely used as adaptation strategy by the household? (select only one category and put '✓' mark under the options column)

No	Category	Option
1	Land augmentation (application of fertilizer, organic fertilizer etc)	
2	Land management practices (terracing, check dam )	
3	Irrigation and water harvesting	
4	Changing cropping calendar and crop varieties	
5	Livelihood diversification	
0	Doing nothing (business as usual)	

### VII. Natural Resource Management

No	Issue
137	How do you evaluate the forest coverage in your locality through as compared with the coverage some 20-30 years back? 1. No change 2. Increasing 3. Decreasing
138	If decreased, what do you think is/are the major cause(s)? Mention the first <b>THREE</b> critical causes. 1. Population pressure 2. Conversion into farm land 3. Conversion into grazing land 4. Expansion of settlement 5. Wild fire 6. Other
139	How reduction in forest coverage affects your way of life? Mention the first <b>THREE</b> cases based on their degree. 1. Reduction in water amount/flow 2. Springs dried up 3. Increased runoff/soil erosion 4. Shortage of wood (fuel and construction) 5. Temperature increases 6. Rainfall decreased 7. others
140	Do you think climate variability and change has impact on forest resources? 1. Yes 0 = otherwise
141	If 'yes' which one(s) of the following is/are caused by climate variability and change on forest resources? Mention the first <b>THREE</b> causes. 1. Occurrences of fire 2. Encroachment for search of forage/grazing land 3. Encroachment for search of farm land 4. Encroachment for search of edible fruits 5. Encroachment for search of water for domestic animals 6. others
142	Which of the following soil management practices are implemented more by you? Identify the first <b>THREE</b> based on their degree of implementation. 1. Check dame 2. Stone Bund 3. Soil Bund 4. Trench 5. Cut-off drain 6. Agroforestry
143	Do you think watershed management has benefits? 1. Yes 0 = otherwise
144	If 'yes' how it benefits? Rank them based on their benefits. 1. Reduced runoff speed 2. Increases the water volume of rivers and springs 3. For apiculture 4. Could be source of forage 5. Protects soil erosion 6. other
145	How do you evaluate the successfulness, benefits and continuity of working together in watershed management in campaigns? 1. It is successful and should be continued 2. Not successful, needs rethinking 3. Has no benefit except wastage of time and energy so should not be continued

146. Following are lists of climate variability/change coping/adaptation strategies. Possible Hindering factors not to apply each strategy are also listed on the right side. Please select the **THREE** most important factors which become a barrier for you not apply in their degree of impact. (use numbers)

Coping/ adaptation Strategy	Hindering factors			Possible factors
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	
Terracing on the slope land (stone/bund)				1. Land scarcity 2. labor constraint 3. lack of awareness about climate change 4. lack of awareness about adaptation strategies 5. financial constraint 6. access problem 7. Lack of inputs markets (fertilizer, selected seeds, insecticides, herbicides etc) 8. weak extension service 9. poor output market access 10. poor infrastructure (road) 11. insecure property right 12. shortage of water 13. others
Planting trees (agroforestry)/ along the contour				
Mulching technology				
Water diversion				
Cut and curry or zero grazing				
Non-farm Livelihood diversification (carpentry/ wavering/ blacksmith/ tanning/tailor/ local liquor brewers)				
Changing sowing and harvesting time (changing farming calendar)				
Application of organic fertilizer/compost				
Application of inorganic fertilizer				
Application of herbicides/insecticides				
Using irrigation (water harvesting/ground water/river diversion)				
Planting in rows				
Using improved seeds				
Growing drought resistant crop (using residual moisture) varieties				
Switching to short maturing crop varieties				
Multiple cropping/Intercropping/crop diversification				
Crop rotation, conservation tillage				

Annex 2: Issues for Key-informant interview, in-depth interview and FGD

**Leading Questions**

- What are the prominent livelihoods of the people in your locality (now and 30 years back)
- How do you explain the agricultural potential, crop productivity, soil fertility, in your locality (now and 30 years back)
- Constraints for the farming practices at present. Is there any crop type the farmers switched off or less frequently used than 20-30 years ago? That means, do the farmers now cultivate similar type of crop with the ones cultivated by your father or forefather? Why? Do the domestic animals you are rearing now the same as (in type, size, productivity etc) the animals which were reared by your father and forefathers?
- Do you know what climate variability means? Is the pattern of rainfall and temperature in your locality changing through time? If so, what do you think is the reason behind?
- What differences in the weather and climate situation do you noted compared with 20-30 years back? How do you describe the rainfall and temperature pattern in your surrounding in terms of rainfall onset and cessation, amount, seasonal distribution, temperature pattern? In which season (*Belg* or *Meher*) do you experienced more variability of rainfall? Do you have indigenous way of forecasting/ predicating the weather condition, occurrences of droughts, heavy rainfall and the like? What are the manifestations/indicators of climate variability/change?
- What kind of impacts does climate change have on farming systems, cropping calendar, crop type, animal husbandry, water resources, forest cover, land management, health of human and animals, social cohesion (conflict, migration, social bond) and on the livelihood of the farmers
- What coping measure or/and adaptive strategies do farmers apply with the adverse impacts of climate variability/change at local level? **Opportunities to overcome/adapt climate variability/change**
- Observed change in the forest coverage in your locality? and contributing factors?
- How do you evaluate the availability of water (both for home consumption, domestic animals and irrigation) through time...increasing or decreasing? Why? How do you evaluate the fertility of the land and its productivity through time?
- is there any watershed management practiced recently in your locality? How is its effectiveness? Do farmers participate in the planning and implementation voluntarily?
- How watershed management in the upper lands benefits the low landers?
- Supports from local government and NGOs to strength individual farmers' adaptive capacity to climate change