Pesticide Risk Reduction Programme – Ethiopia

Inventory of agro-environmental characteristics and existing environmental standards in Ethiopia

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joint collaborative programme on pesticide registration and post-registration

MoA

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Towards a sustainable use of pesticides in Africa

Goal

- to gather information on the geographical distribution of agro-environmental data, pesticide use and current environmental standards.

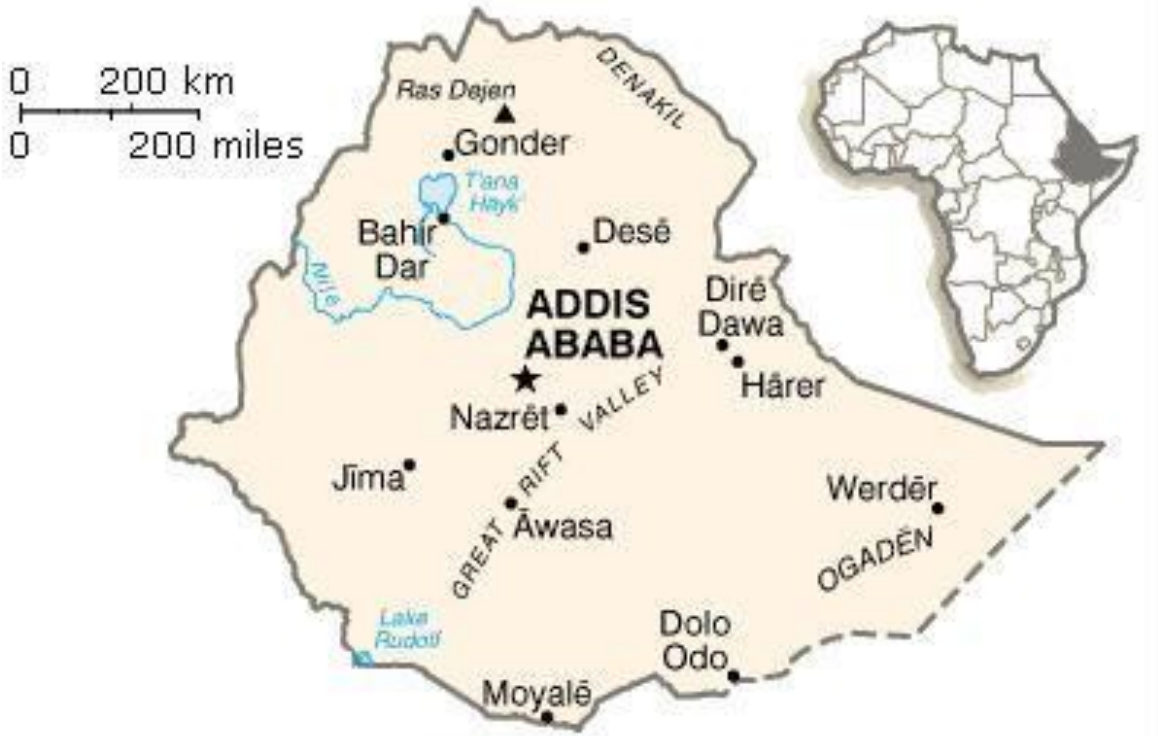
- to support the selection of relevant environmental protection goals (e.g. groundwater, soil, surface waters, birds, bees) and enable the development of a risk assessment methodology for each of them.

Contents

1. Introduction

- The Federal Democratic Republic of Ethiopia
- The country covers 1,112,000 square kilometres (472,000 sq. miles) , roughly 5X the size of the UK.
- with high central plateau (1,800 to 3,000 meters) (6,000 ft.-10,000 ft.) above sea level, with some mountains reaching 4,620 meters (15,158 ft.).
- the Great Rift Valley, splits the plateau diagonally.
- A number of rivers cross the plateau–notably the Blue Nile starts from the biggest lake in the country.

1. Introduction

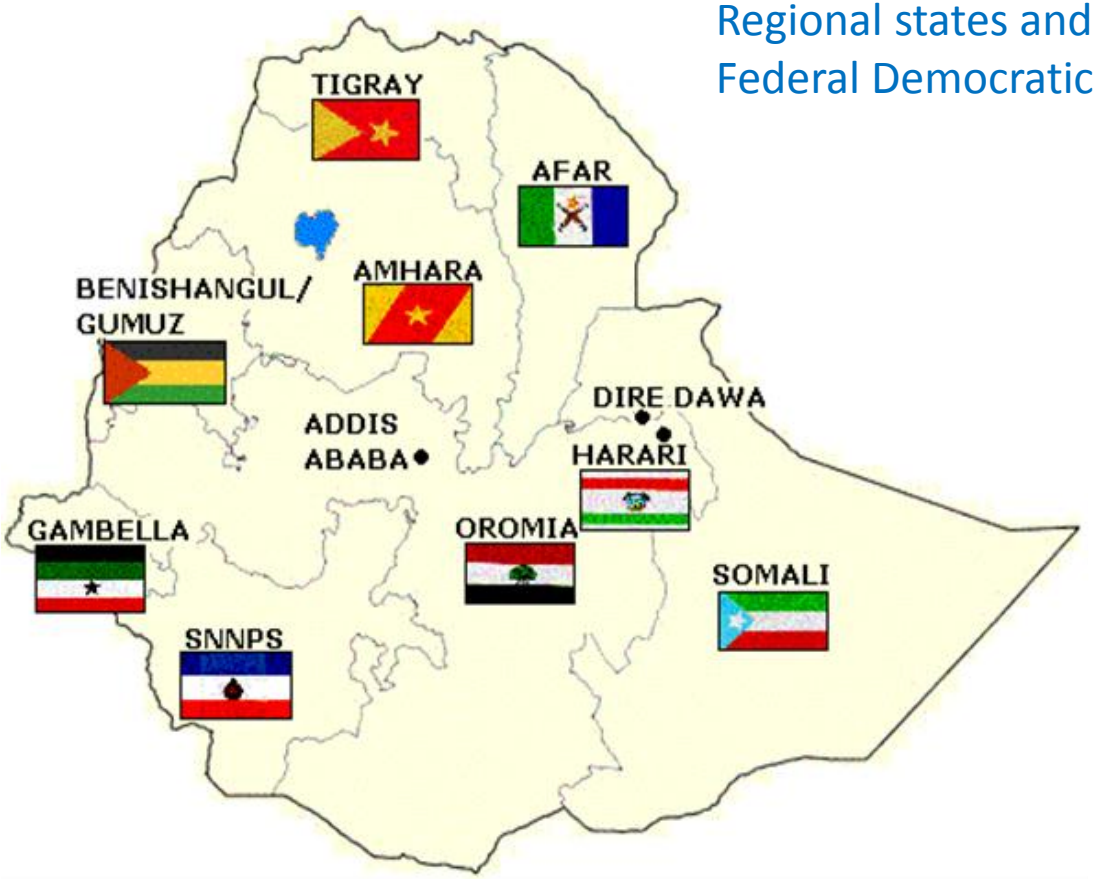


1. Introduction

- With 9 regional governments : Afar, Amhara, Benishangul/Gumuz, Gambella, Harari, Oromiya, Southern Nations Nationalities and Peoples', Somali and Tigray; and two chartered cities: Addis Ababa and Dire-Dawa.

- All the regional governments and the chartered cities have got administrative divisions by zone, woreda, and kebele, the zone level division represents the biggest in the hierarchy with in the region.

1. Introduction



Regional states and chartered cities of the Federal Democratic Republic of Ethiopia

2. Bio physical characteristics

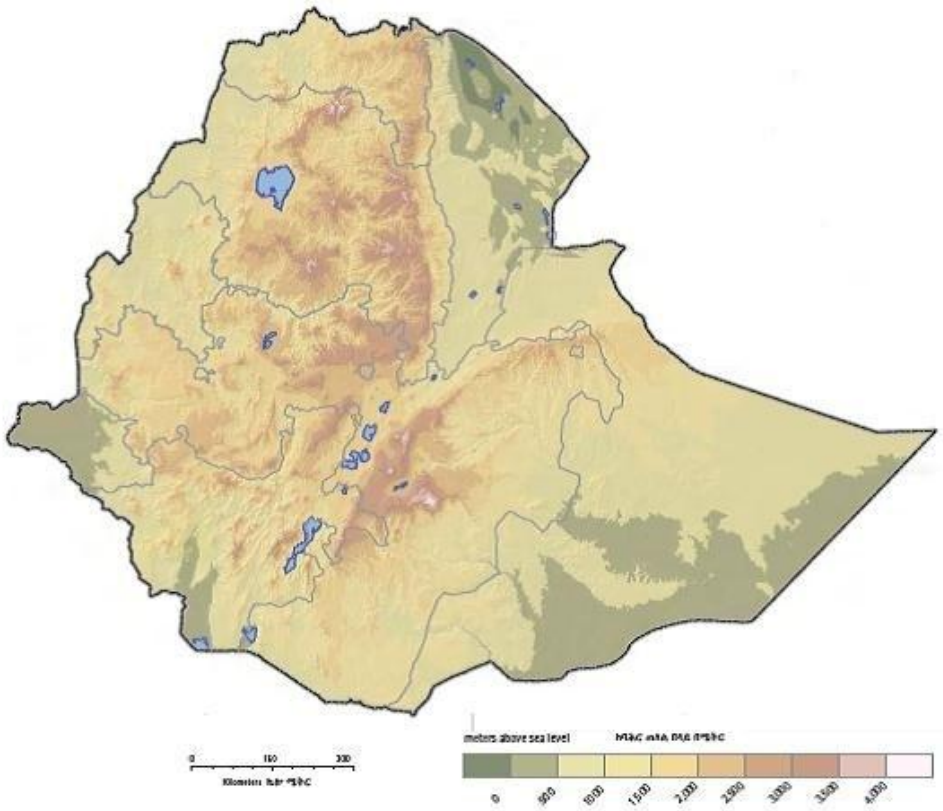
Elevation

- Elevation ranges from 110 meters below sea level in the Danakil Depression to 4,620 m.a.s.l. at Ethiopia's highest mountain, Ras Dashen.

- Addis Ababa is located at approximately 2,300 m.a.s.l. (AERE,2006).

2. Bio physical characteristics

Elevation in Ethiopia (Source: AERE, 2006)



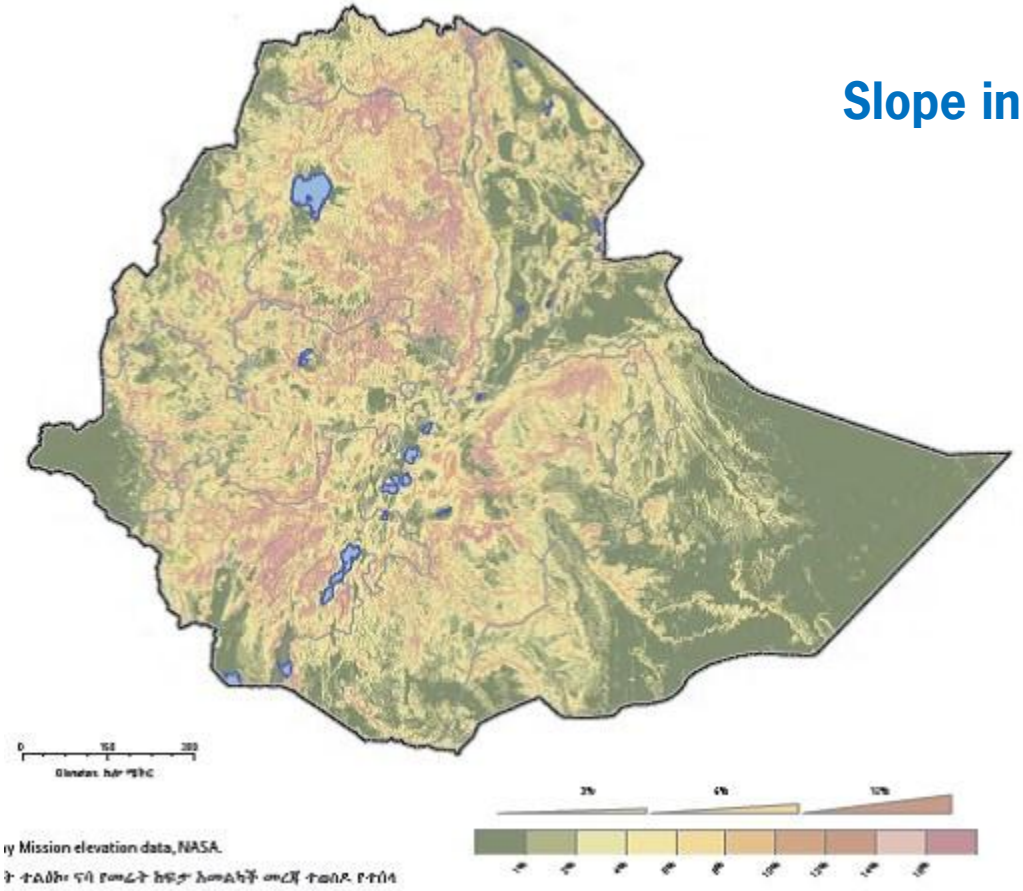
Data source: Shuttle Radar Topographic Mission, NASA.

2. Bio physical characteristics

Slope

- Ethiopia is characterized as a mountainous country with steep terrain.

2. Bio physical characteristics



Slope in Ethiopia (Source: AERE, 2006)

2. Bio physical characteristics

Traditional and modern classification of agro ecological zones.

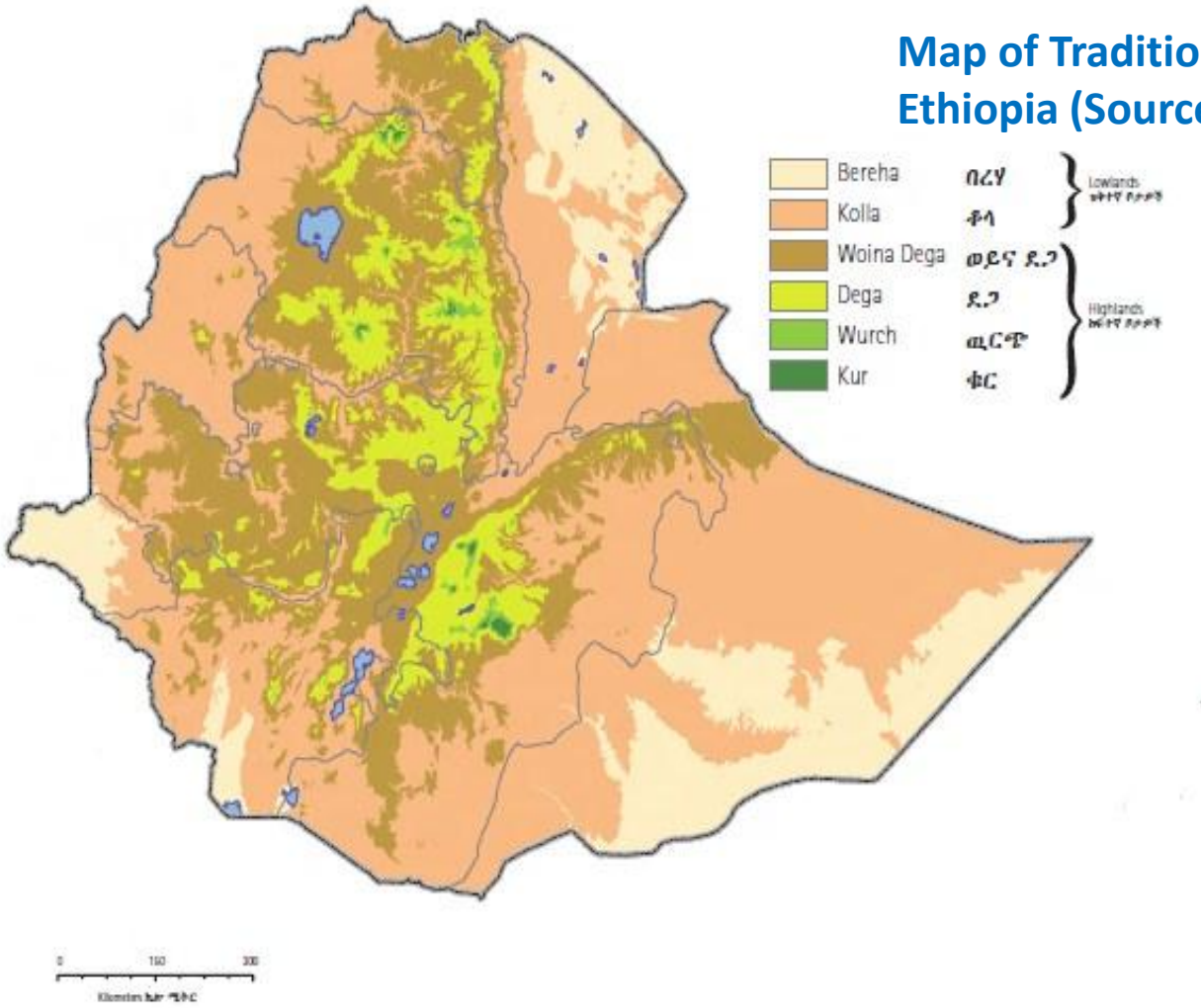
- 6 traditional agro ecological zones
- Elevation is the basis for classification

2. Bio physical characteristics

Summary of the description of the traditional agro ecological zones in Ethiopia.

Traditional agro ecological zone	Description
Bereha	Refers to hot lowlands of less than 500 meters above sea level. In the arid east, Bereha crop production is very limited. In the humid west, mixed root crops and maize are grown.
Kolla	Refers to lowlands between 500 and 1,500 meters. Predominant crops here are sorghum, finger millet, sesame, cowpeas, and groundnuts.
Woina Dega	Refers to highlands between 1,500 and 2,300 meters. Predominant crops here are wheat, teff, barley, maize, sorghum, and chickpeas.
Dega	Refers to highlands between 2,300 and 3,200 meters. Predominant crops here are barley, wheat, oilseeds, and pulses.
Wurch	Refers to highlands between 3,200 and 3,700 meters. Barley is common here.
Kur	Refers to highland areas above 3,700 meters. These areas are primarily used for grazing animals.

2. Bio physical characteristics

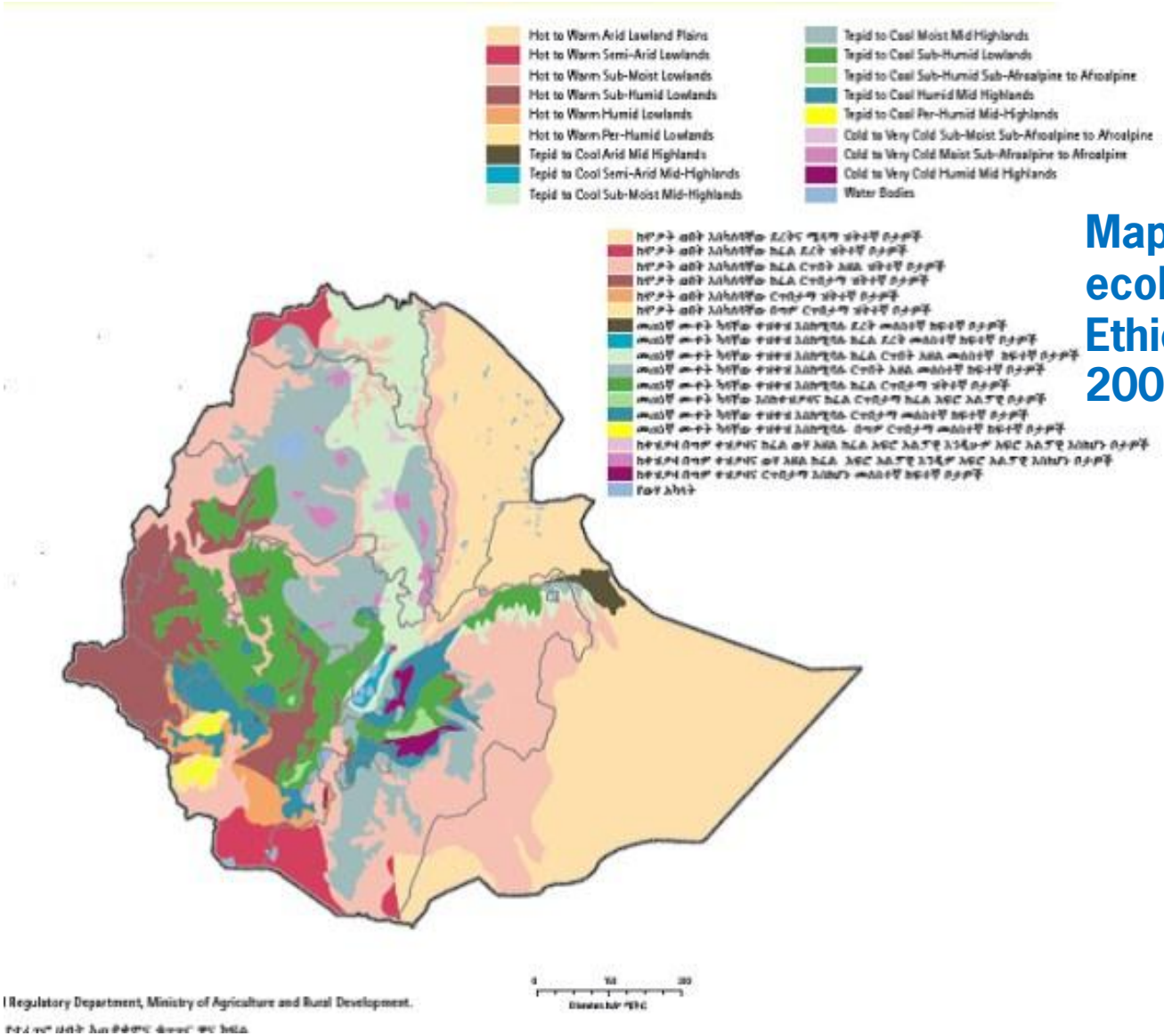


Map of Traditional agro-ecological zones in Ethiopia (Source: AERE, 2006)

2. Bio physical characteristics

- 18 modern agro ecological zones (MoA)
- Basis of classification =Temperature and moisture regimes

2. Bio physical characteristics



Map of modern agro ecological zones in Ethiopia (Source: AERE, 2006)

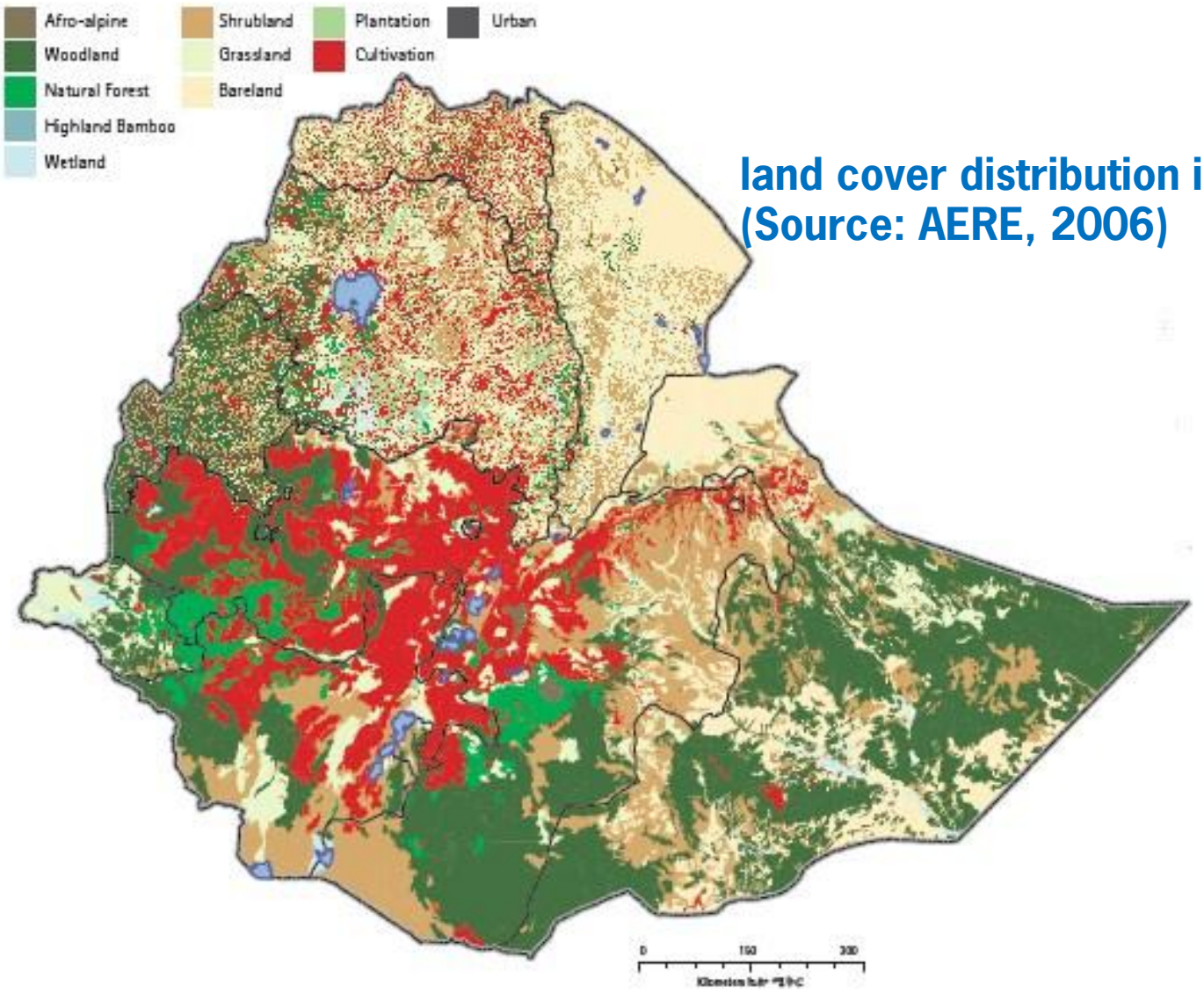
2. Bio physical characteristics

Land cover

- most of the natural forest that once covered much of the temperate highlands is now seriously reduced, converted to agriculture and grazing land.

- At the year 2006, only 21 percent of the country is classified as cultivated. This figure is expected to rise by this time owing to the vast intensification of agricultural investment in the country (AERE, 2006).

2. Bio physical characteristics



land cover distribution in Ethiopia (Source: AERE, 2006)

2. Bio physical characteristics

Major Soil Types

- According to AERE (2006)

- Leptosols (29.8 percent of total land area) mostly found in the north, are very shallow (< 30 cm), and have somewhat limited agricultural potential

- Nitosols (12.5 percent) that are mostly found in the west and are deep, well-drained soils. Despite low pH and low levels of phosphorus, they have relatively good agricultural potential.

- Vertisols (10 percent) have wider distribution. They are heavy, black clay soils that are difficult to work; and have poor drainage.

-

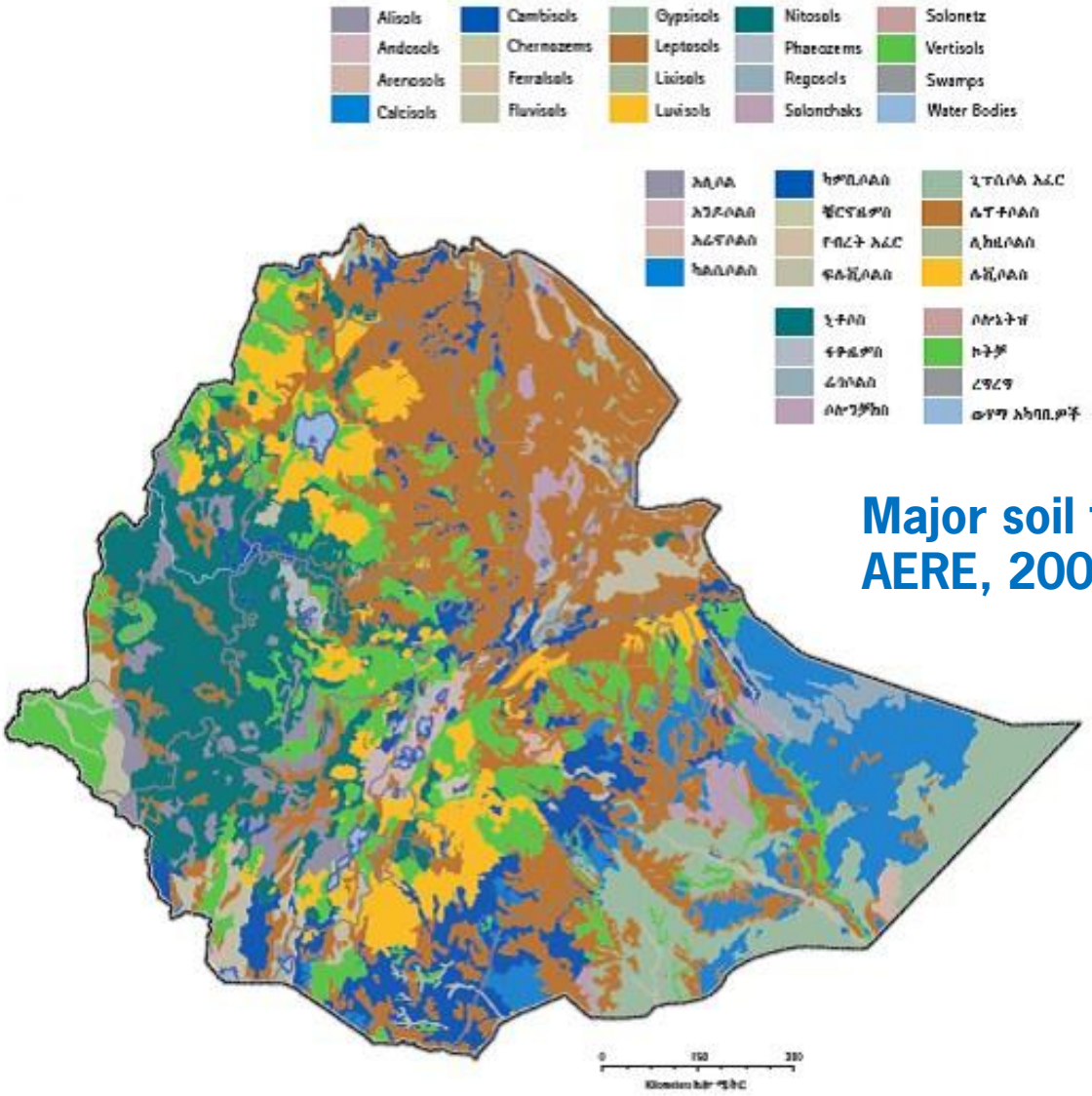
2. Bio physical characteristics

Other soils including

- Cambisols (9.4 percent)
- Calcisols (9.3 percent)
- Luvisols (7.8 percent)
- Gypsisols (7.6 percent)

❑**Description (Annex 4)**

2. Bio physical characteristics



Major soil types in Ethiopia (Source: AERE, 2004)

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2. Bio physical characteristics

Soil organic matter content

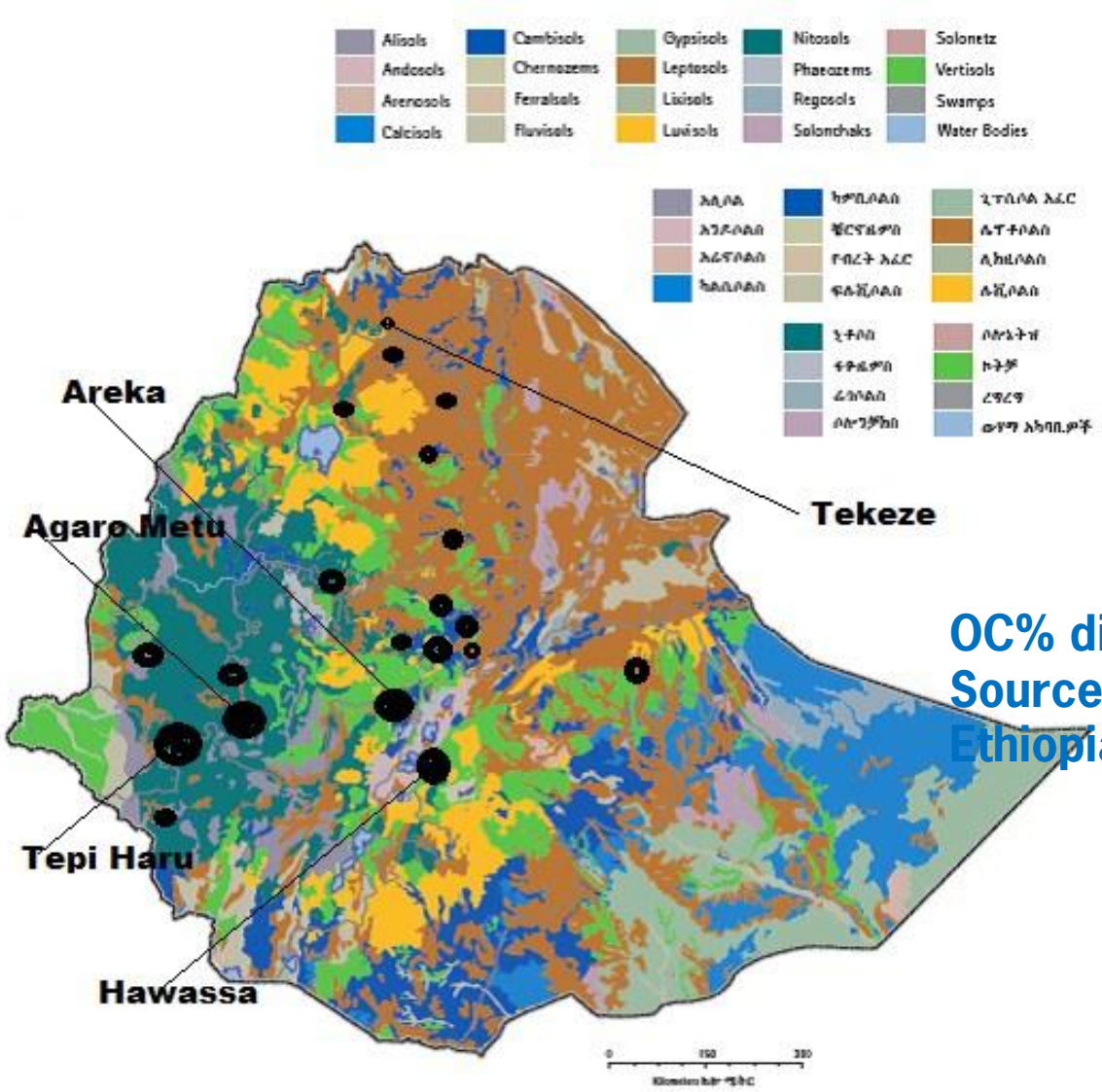
- OC% Data taken from National Soil lab Ethiopia
- Samples taken from of some river basins and agricultural research canters
- Tepi Haru, Agaro metu, Arega and Hawassa areas seem to be with the highest OC% value for the top soil.
- Tekeze is the lowest

2. Bio physical characteristics

Top Soil OC%				
Location	Code	Average	Maximum	Minimum
Tekeze	TKZ	0.53	1.3	0
Omo river	OR	0.55	0.82	0.14
Abay river phase 1	ARP1	2.25	7.38	0
Abay river phase 2	ARP2	2.61	7.1	0.2
Adet/Debre Tabor	Ad	1.71	4.47	0.92
Alamata	Al	1.13	1.47	0.78
Areka	Ar	3.09	5.76	0.73
Assosa	As	2.56	5.5	0.1
Hwassa	Ha	3.29	11.6	1.4
Debrezeit	DZ	1.05	1.8	0.7
Debre Berhan	DB	2.28	6.8	0.6
Enewari	En	0.67	0.67	0.42
Jijiga	Ji	1.83	2.12	1.52
Agaro Mettu	AM	3.56	5.91	1.86
Kulumsa	Ku	1.5	2.95	0.15
Mekelle	Me	1.2	1.79	0.6
Melkasa	Ml	1.63	3.75	0.5
Pawe	Pa	2.4	2.8	1.7
Sekota	Se	0.81	1.08	0.44
Sinana	Si	2.56	4.19	1.99
Tepi Haru	TH	3.88	5.98	1
Wendogenet	WG	2.94	4.2	1.8

Average OC% values for the top soil in sampled river basins and research centres across the country (Data source: National Soil Lab Ethiopia, 2011).

2. Bio physical characteristics



OC% distribution of samples (Data Source: National Soil Laboratory Ethiopia)

2. Bio physical characteristics

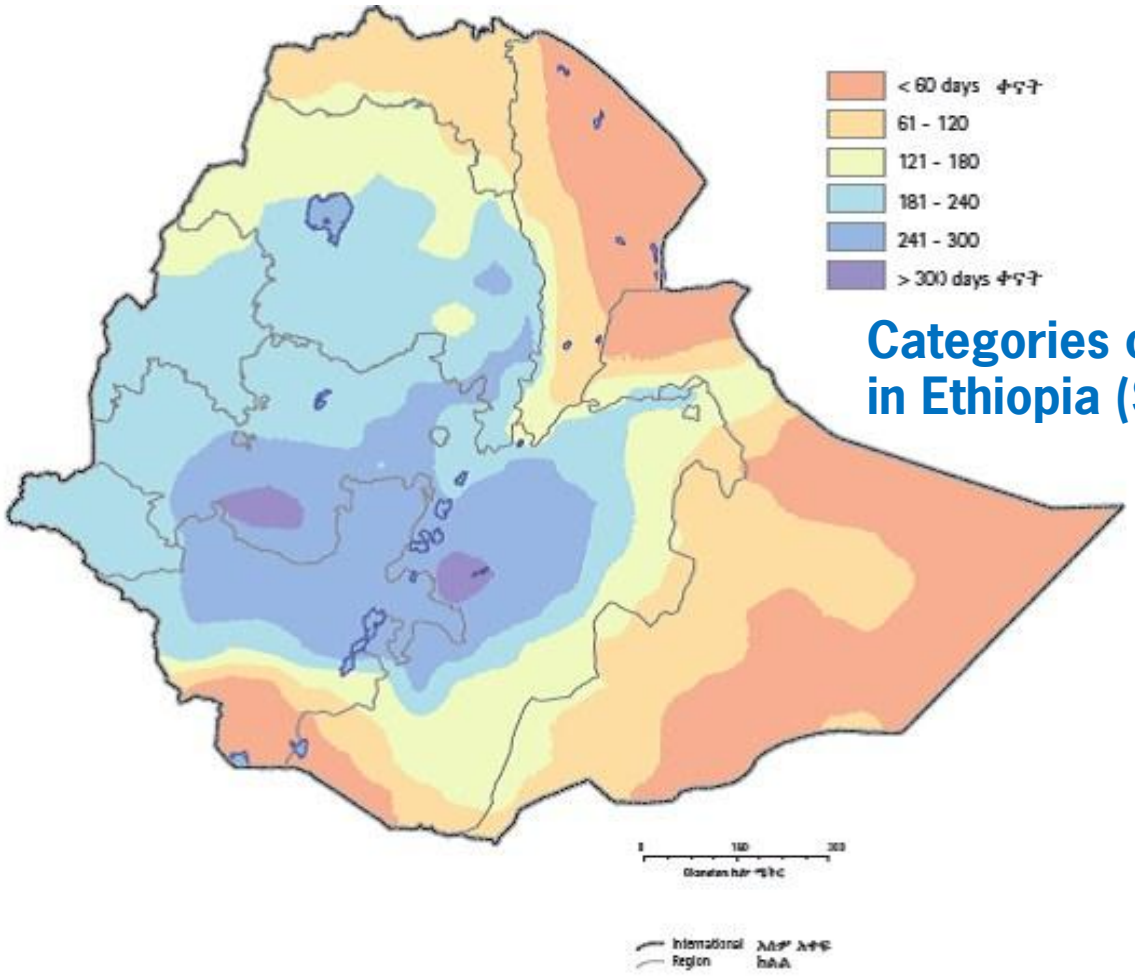
Length of growing period

- The cumulative time in a normal year when moisture conditions are adequate for plant growth generally refers to The length of growing period (LGP).

- Thus a longer LGP generally indicates higher agricultural potential.

- central highlands including the Rift Valley are the places with the highest value of LGP (>300) followed by the western and eastern and north eastern regions surrounding the centre (241-300).

2. Bio physical characteristics



Categories of length of growing periods in Ethiopia (Source AERE, 2006)

3. Meteorological data

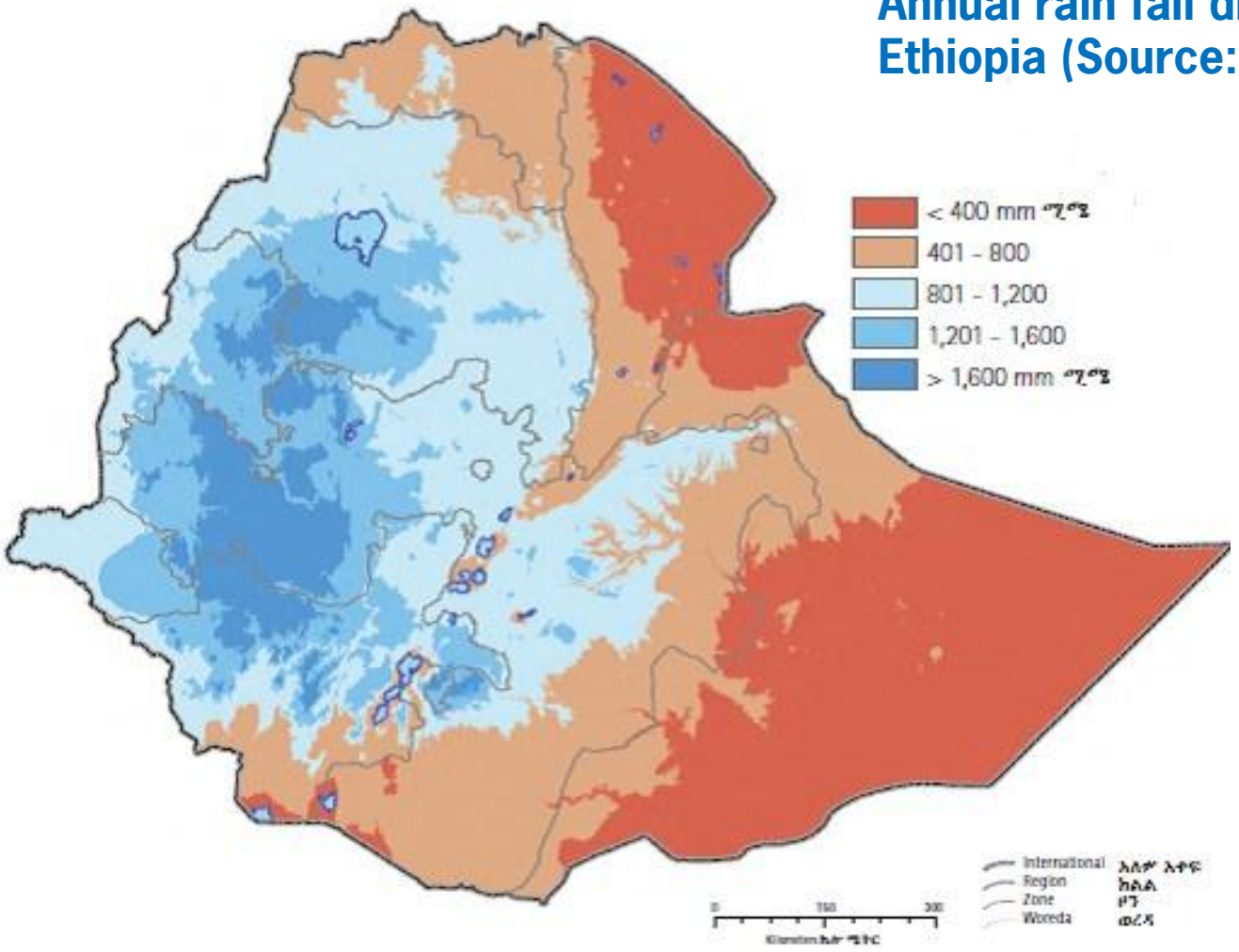
Annual Rain Fall

- The western highlands have particularly high rainfall, averaging more than 1,200 millimetres annually in many areas.

- Rainfall is lower with loss of elevation, especially toward the east. Most of the eastern lowland areas of Afar and Somali are unsuitable for crop production because of lack of rainfall.

3. Meteorological data

Annual rain fall distribution of Ethiopia (Source: AERE, 2006)



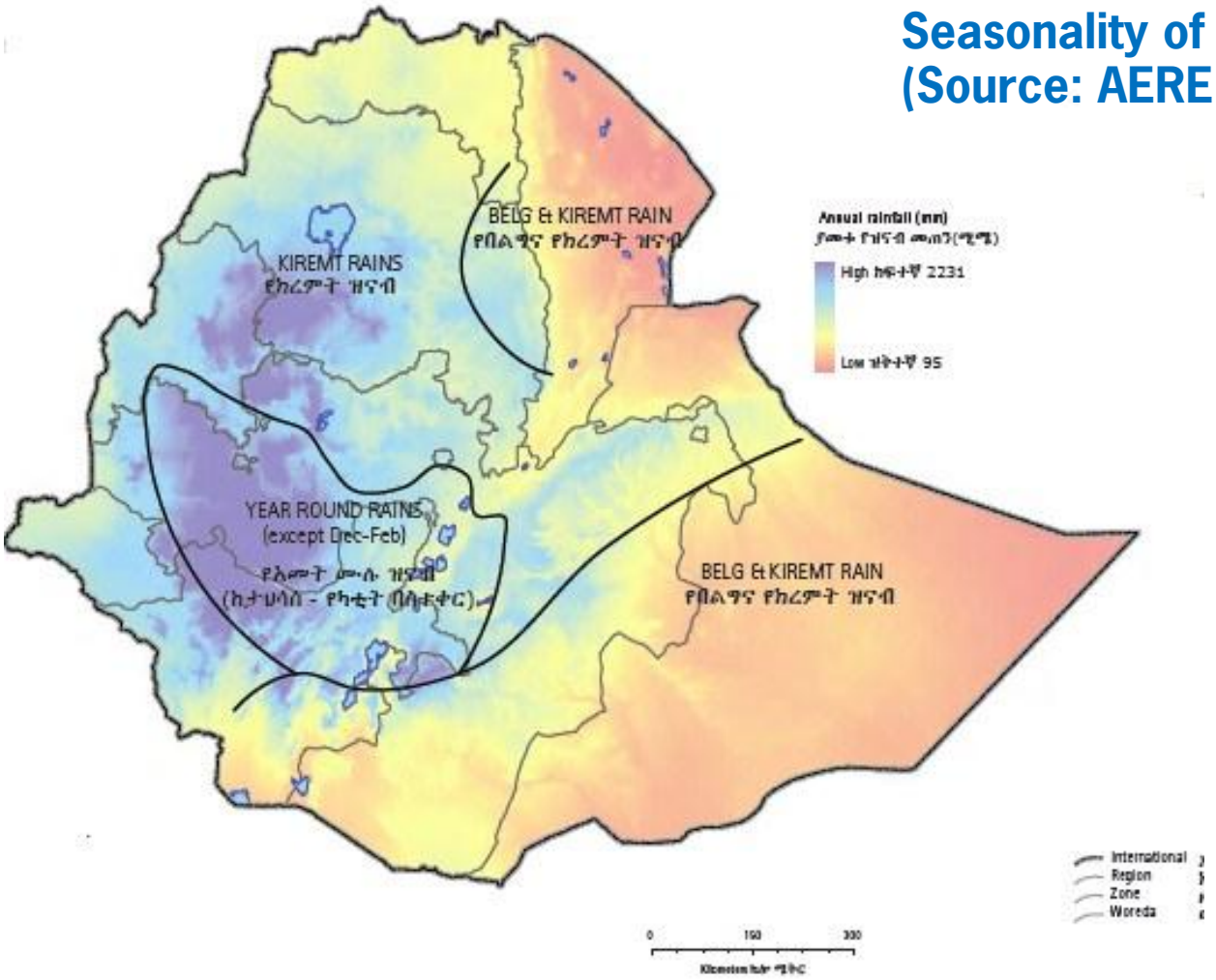
3. Meteorological data

Seasonality of rainfall

- Long rain=Kiremt=June-September
- Short rain=Belg=March-May

3. Meteorological data

Seasonality of rainfall in Ethiopia (Source: AERE, 2006



3. Meteorological data

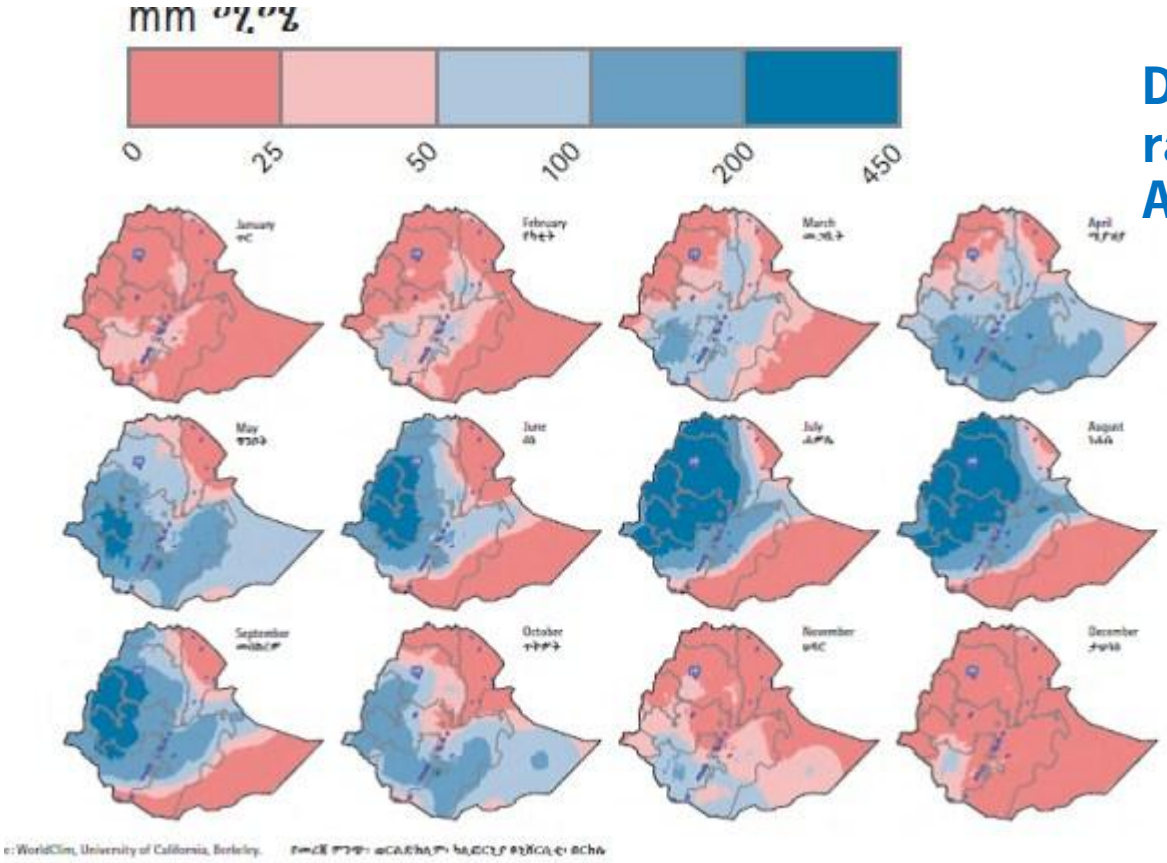
Mean monthly rainfall

- Rainfall varies throughout the country, not only spatially but also temporally.

- Some parts of the western highlands experience rainfall for most of the year

- Most of the rest of the country experiences rainfall within either the main rainy season (Kiremt, roughly July through Sept) or possibly also the short rains (Belg, roughly March through May).

3. Meteorological data



Distribution of Mean monthly rain fall in Ethiopia (Source: AERE, 2006)

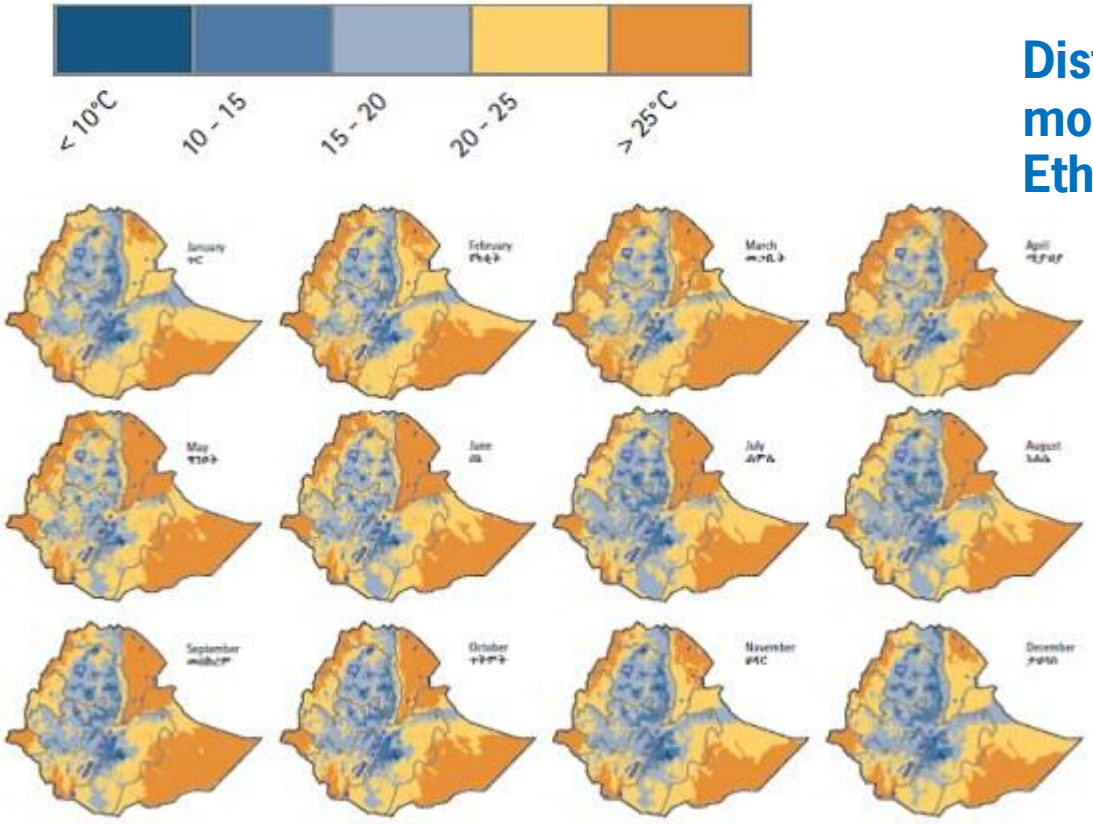
3. Meteorological data

Mean monthly temperature

- Variation in temperature is driven mostly by elevation.

- The upper parts of Rift Valley + the west and east lowlands got a mean maximum monthly temperature of $>25^0$c almost throughout the year while some places in the central highlands are with an average temperature of $<10^0$c (Source: AERE, 2006).

3. Meteorological data



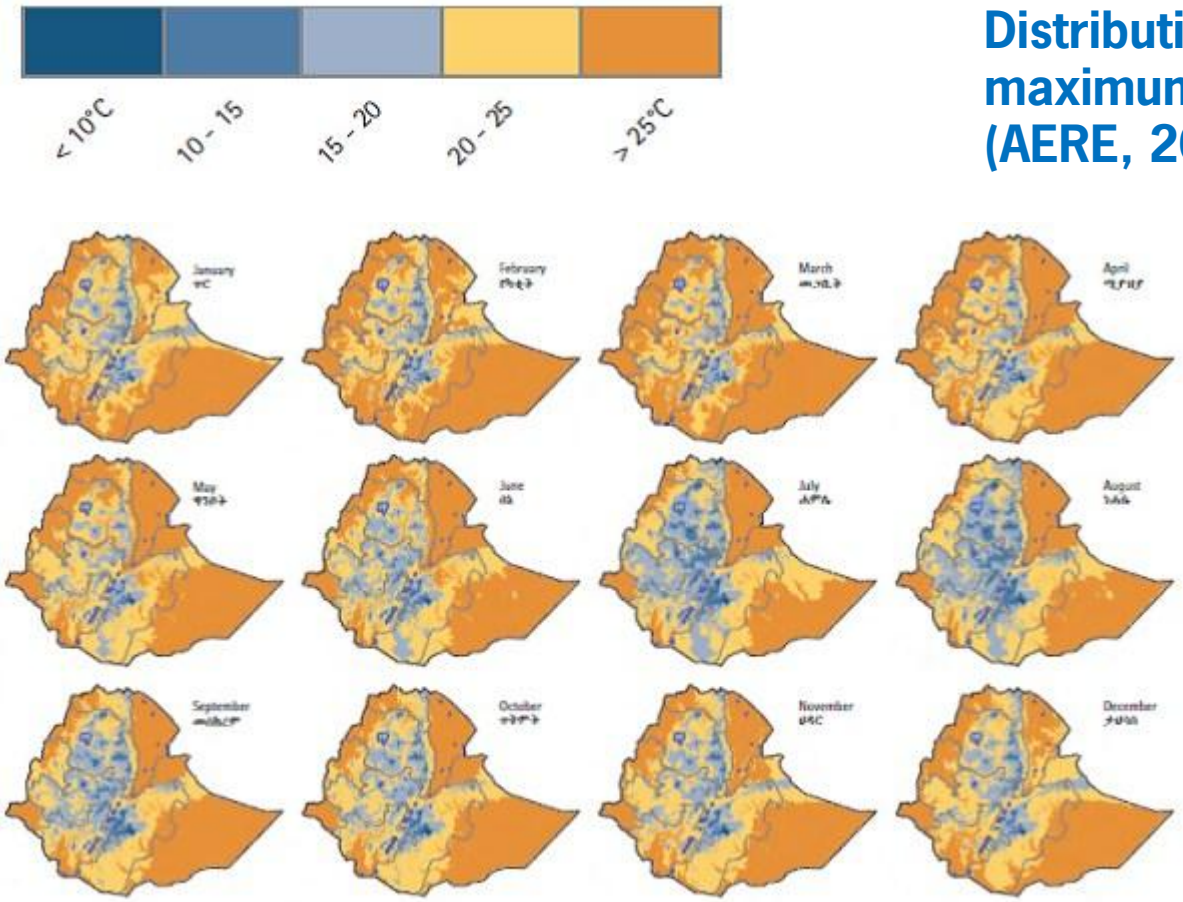
Distribution of mean monthly temperature in Ethiopia (AERE, 2006).

3. Meteorological data

Mean monthly maximum temperature

- As with the maps of average temperature, there is relatively little variation between months for any particular location (the Afar lowlands show the most variation). Maximum temperatures are most constraining for crop production in the lowlands, where very high temperatures adversely affect the physiological functioning of many plants.

3. Meteorological data



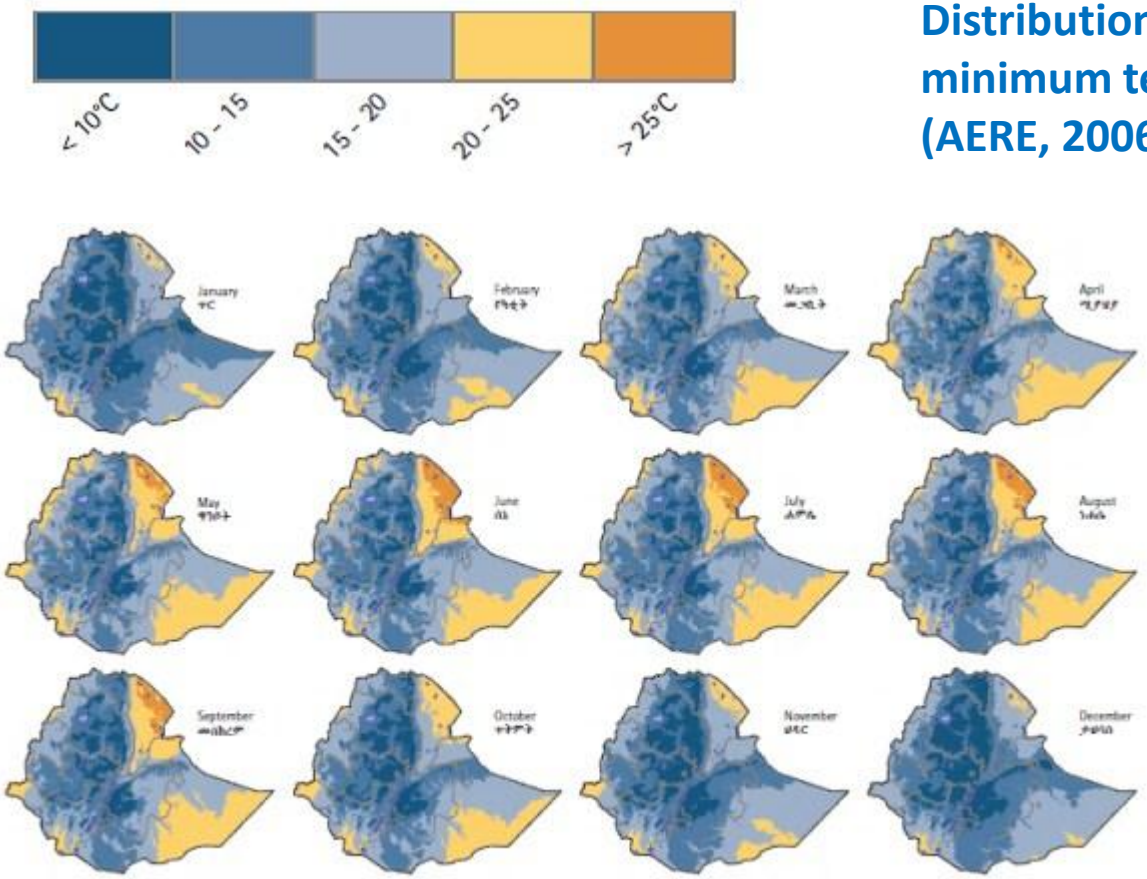
Distribution of mean monthly maximum temperature in Ethiopia (AERE, 2006).

3. Meteorological data

Mean monthly minimum temperature

- Like the previous maps, there is relatively little variation between months for any particular location (again, the most variation can be seen in the Afar lowlands). Minimum daily temperatures are probably most limiting for crop production in the cooler highlands, where frost may curb crop development.

3. Meteorological data



Distribution of mean monthly minimum temperature in Ethiopia (AERE, 2006).

3. Meteorological data

- The National Meteorological Agency of Ethiopia (NMA) with 17 synoptic stations
- These synoptic stations with most of the readily available data, but stations are major cities of the regions and far away from the major agricultural activity
- the data should be from areas where much agricultural activity close to water bodies, especially the areas of the central Rift Valley of Ethiopia
- team sorted out some 21 sites; some synoptic stations are included
- daily rain fall and temperature = readily available data in digital form.
- The data for evapotranspiration and air pressure is not available
- Data for wind speed and sunshine duration is in form of hard copy (paper form). The NMA requests retrieval costs for these data.

3. Meteorological data

No	Station	Agricultural Activity	Remark
1	Zeway	Horticultural crops (flower farms)	Lake Ziway present
2	Meki	Horticultural crops	Lake Ziway, Koka reservoirer, river Awash, present
3	Awassa (synoptic)	Horticultural crops	Lake Hawassa present
4	Arba Minch (synoptic)	Cotton/banana/ horticultural crops	Lake Abaya, Chamo present
5	Arsi Negele	Cereals (wheat)	Close to Lake Shalla and Abjata
6	Koka	Horticultural crops	Koka reservoir
7	Debre Zeit (synoptic)	Horticultural crops (many flower farms)	Lake Hora, Bishoftu, Bobogaya present
8	Lekemt (synoptic)	Cofee/maize	
9	Jimma(synoptic)	Cofee/maize	Gilgel gibe reservoir present, Gibe river present
10	Melka sedi	Cotton	River awash
11	Dupti	Sugar Cane	River Awash/ reservoir
12	Mert Jeju	Horticultural crops including citrus	River Awash
13	Melkasa	Horticultural crops including citrus	River Awash
14	Sinana	Wheat barley	
15	Yirga chefe	Coffee	
16	Gonder (Synoptic)	Sesame, cereals	
17	Bale Robe (synoptic)	Wheat	
18	Alamata	Sorghum, teff, some horticultural crops	
19	Shere endasilasse	Cereals, sorghum	
20	Bahir Dar (synoptic)	Cereals	Lake Tana
21	Showa robit	Sorghum, teff, some horticultural crops	

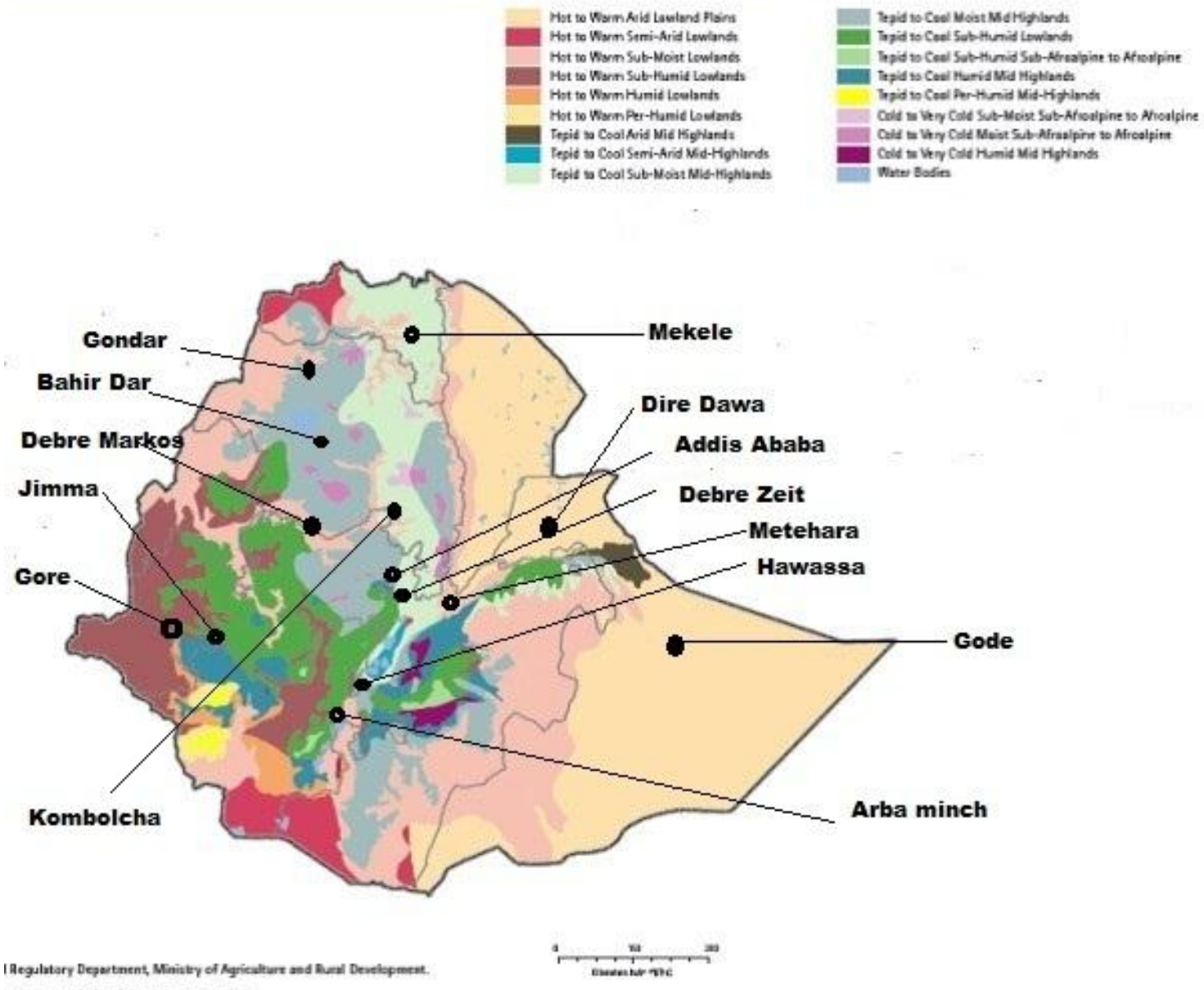
Selected stations including some of the synoptic stations proposed by the PRRP team

3. Meteorological data

No	Station	Agricultural Activity	Remark
1	Addis Ababa	Horticultural crops (flower farms) in the periphery	
2	Arba minch	Horticultural crops/banana	Lake Abaya, Chamo present
3	Awassa	Horticultural crops	Lake Hawassa present
4	Bahir Dar	Cereals	Lake Tana
5	Kombolcha	Cereals (wheat)	
6	Debre Markos	Teff/ wheat	
7	Debre Zeit	Horticultural crops (many flower farms)	Lake Hora, Bishoftu, Bobogaya present
8	Dire Dawa		
9	Gode		
10	Gondar	Sesame	
11	Gore		
12	Jimma	Cofee/maize	Gilgel gibe reservoir present, Gibe river present
13	Mekele		
14	Metehra	Sugar cane/horticultural crops	River Awash
15	Negele Borena		
16	Nekemt	Coffee	
17	Bale Robe	Wheat	

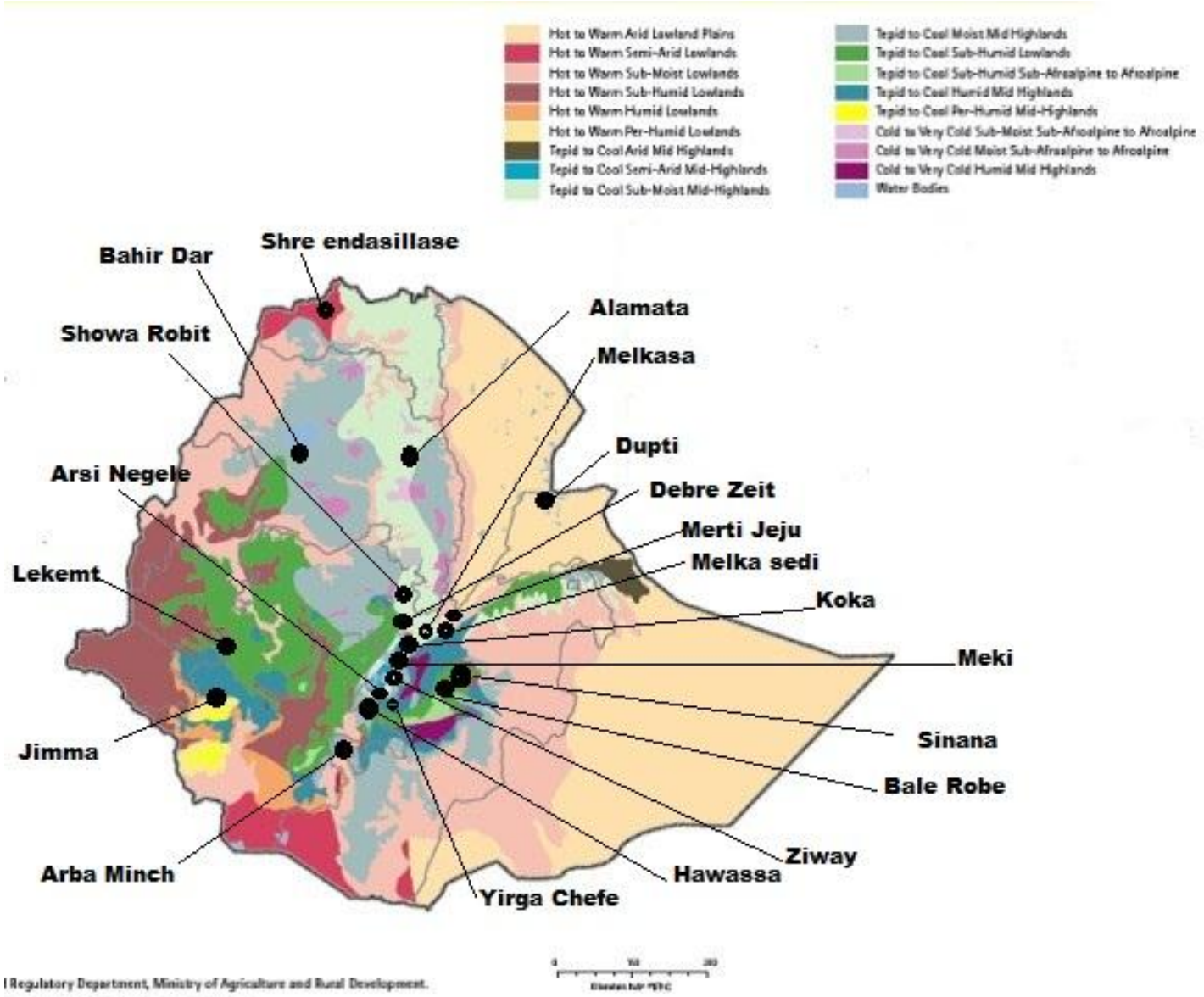
17 Synoptic stations throughout the country proposed by NMA (National Meteorological Agency)

3. Meteorological data



Distribution of the 17 NMA synoptic stations across the modern agro ecological zones

3. Meteorological data



Distribution of the 21 station proposed by the team across the modern agro ecological zones

3. Meteorological data

Item	Unit cost	Total cost	Remark
RF	4.50x20x17	1530	
Max To	6.18x20x17	2101.2	
Min To	6.18x20x17	2101.2	
Rani intensity	51.4x20x17	17523.6	
Wind speed	45.86x20x17	1559.4	Data available only in the form of hard copy
Sunshine duration	40.79x20x17	13686.6	Data available only in the form of hard copy
Service Charge	80	80	
Total		52797=2100€	1€=25 Eth birr

Retrieval cost for 17 synoptic stations (NMA)

3. Meteorological data

Item	Unit cost	Total cost	Remark
RF	4.50x20x21	1890	
Max To	6.18x20x21	2595.6	
Min To	6.18x20x21	2595.6	
Rani intensity	51.4x20x21	21646.8	
Wind speed	45.86x20x21	19261.2	Data available only in the form of hard copy
Sunshine duration	40.79x20x21	17131.8	Data available only in the form of hard copy
Service Charge	80	80	
Total		65201=2608.04€	1€=25 Eth birr

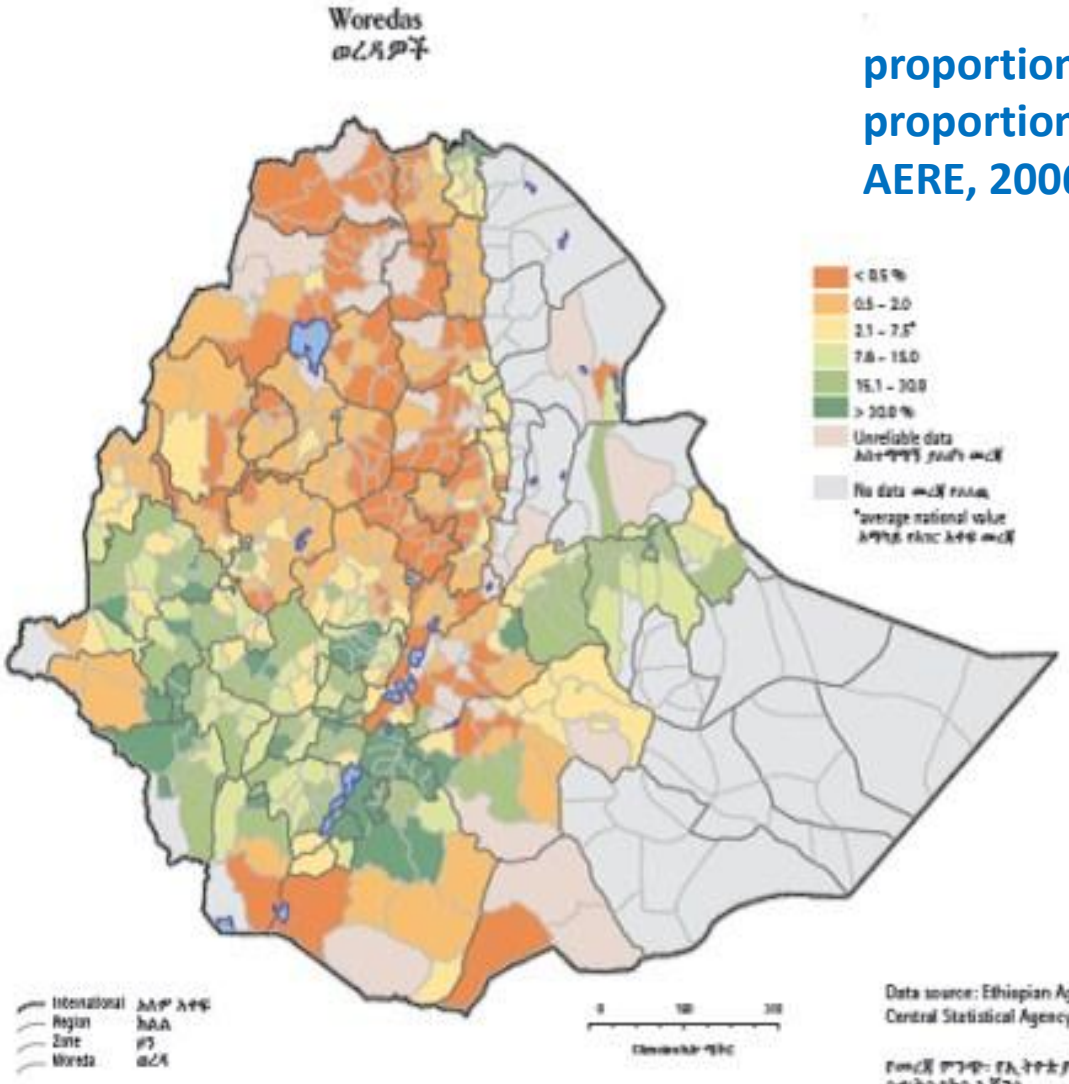
Retrieval cost for 21 proposed sites (Team)

4. Crop production

permanent vs temporary crops coverage

- 7.5 percent is dedicated to permanent crops.
- Major cash crops, such as coffee and chat (Catha edulis), as well as tree crops, such as enset (Ensete ventricosum), bananas, oranges, mangos, papayas, and avocados.
- Greatest proportion in the S. and W. highlands, the S. Rift Valley, and the E. highlands (AERE, 2006).
- The authors of this report believe that there are considerable changes in this regard by the year 2011 following the intensification of large-scale agricultural production through investment promotion in the country.

4. Crop production



proportion of permanent crop area as a proportion of total cropped area (Source: AERE, 2006).

4. Crop production

The crops which judged to be with the highest pesticide use in Ethiopia are teff, maize, wheat and cotton. All the four belong to the temporary crops out of which the three are cereals

- Of the total cropped area in Ethiopia, 92.5 percent is dedicated to temporary crops.
- cereals 80 %
- Pulses 13%.
- Oilseeds < 5 percent of the temporary crop areas, while vegetables and root crops account for only 1 and 3 percent, respectively.

4. Crop production

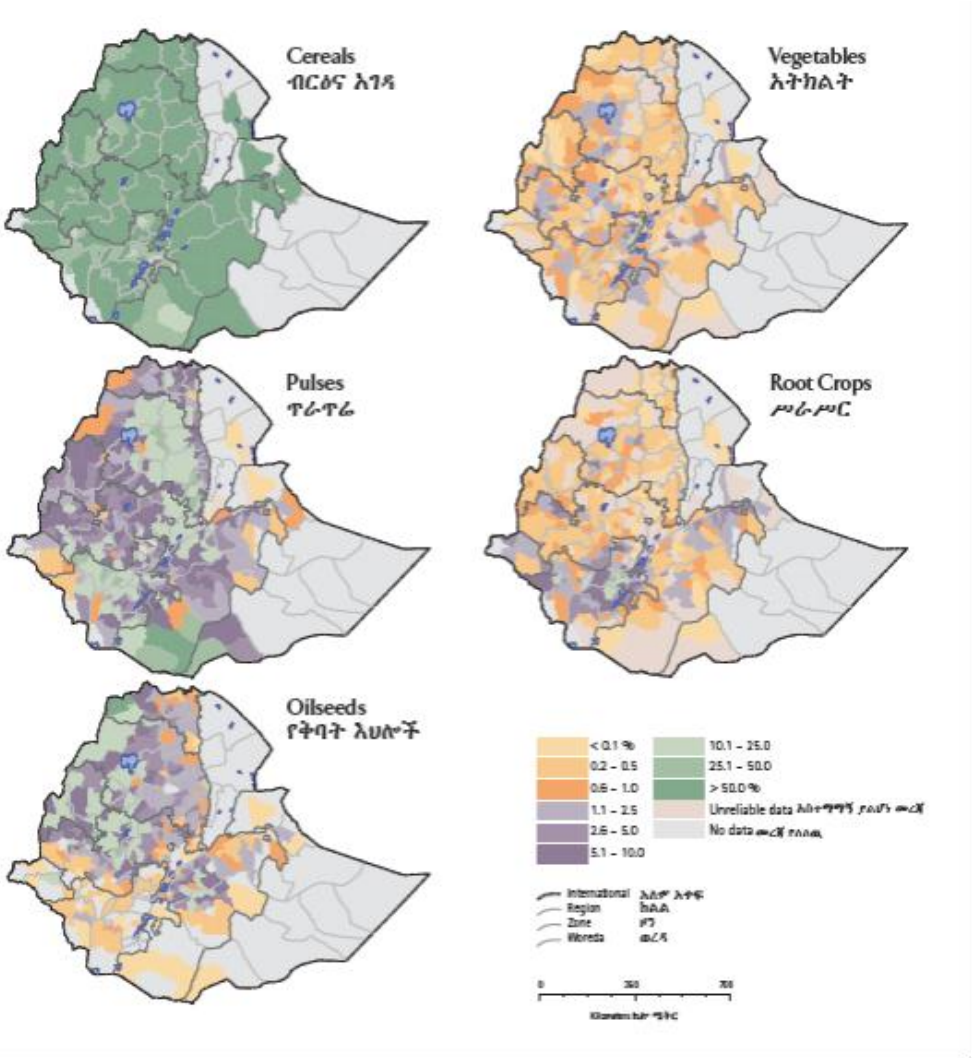
- In addition to this horticulture and floriculture at commercial farms have an intensive pesticide use. The four main locations with flower cultivalton are (i) Lake Ziway, (ii) Lake Bishoftu (Debre Zeit), (iii) Sebeta area and (iv) Menagesha-Holeta area.

- Controversial to put the exact pesticide application status of coffee in Ethiopia

- Small-scale coffee farmers are known for low input production of coffee often referred as organic.

- (Ethiopian Agricultural Research Institute) EIAR categorized commercial coffee as a fungicide and insecticide rarely used and a herbicide and fertilizer often used crop.

4. Crop production



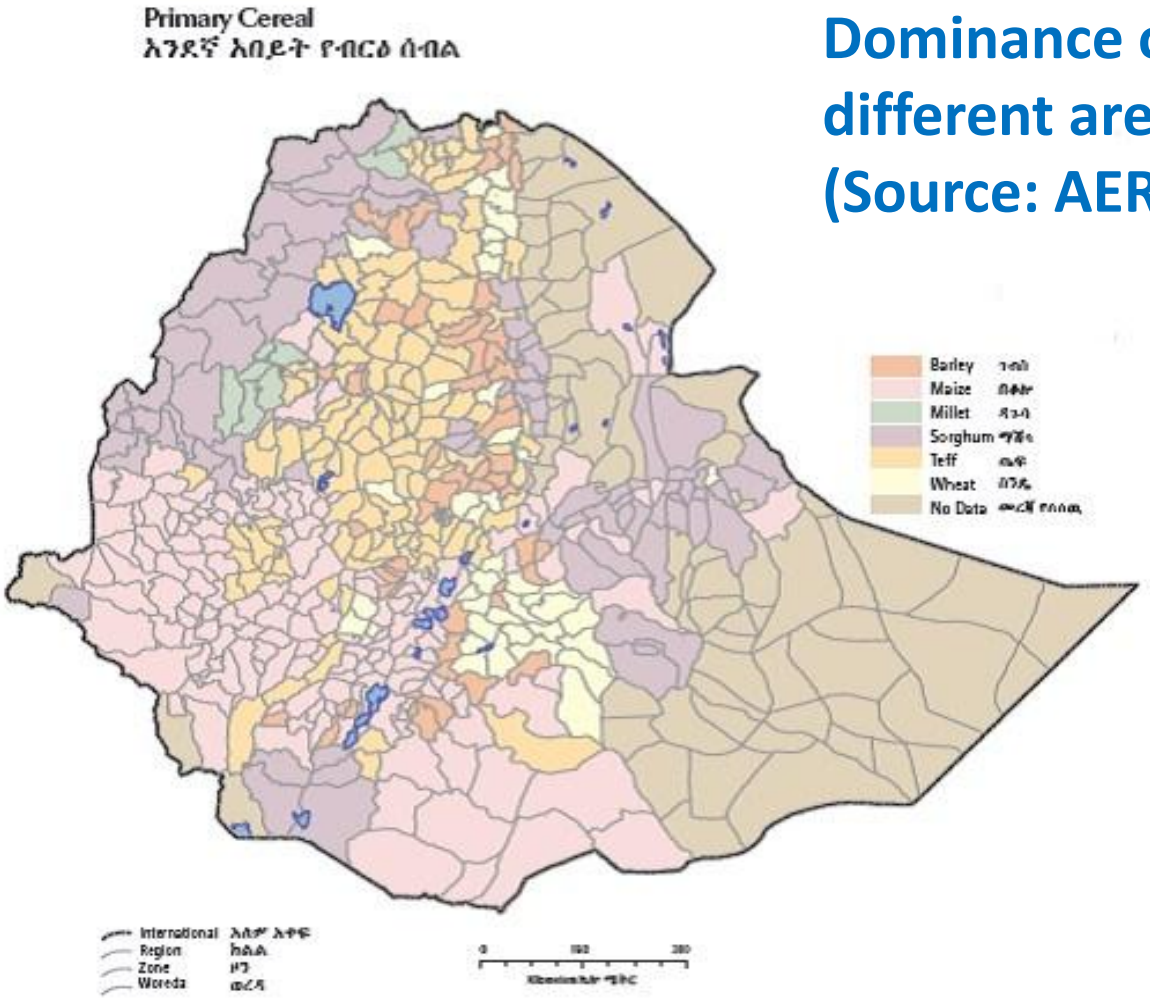
Proportion of temporary crops cropped area in Ethiopia (Source: AERE, 2006)

4. Crop production

Dominant cereals

- Cereals, mainstay of agricultural production in the highlands; they are also produced in lowland areas.
- Different cereals in different areas, /climatic and cultural contexts./
- Teff predominant in the central and northern highlands, where it is both endemic, having adapted to local climatic conditions, and is also the preferred food grain.
- Barley tends to dominate in cooler areas.
- Wheat production is concentrated in the Arsi-Bale highlands of eastern Oromia.
- Maize and sorghum are produced over a wider range of climates and elevations than other cereals.

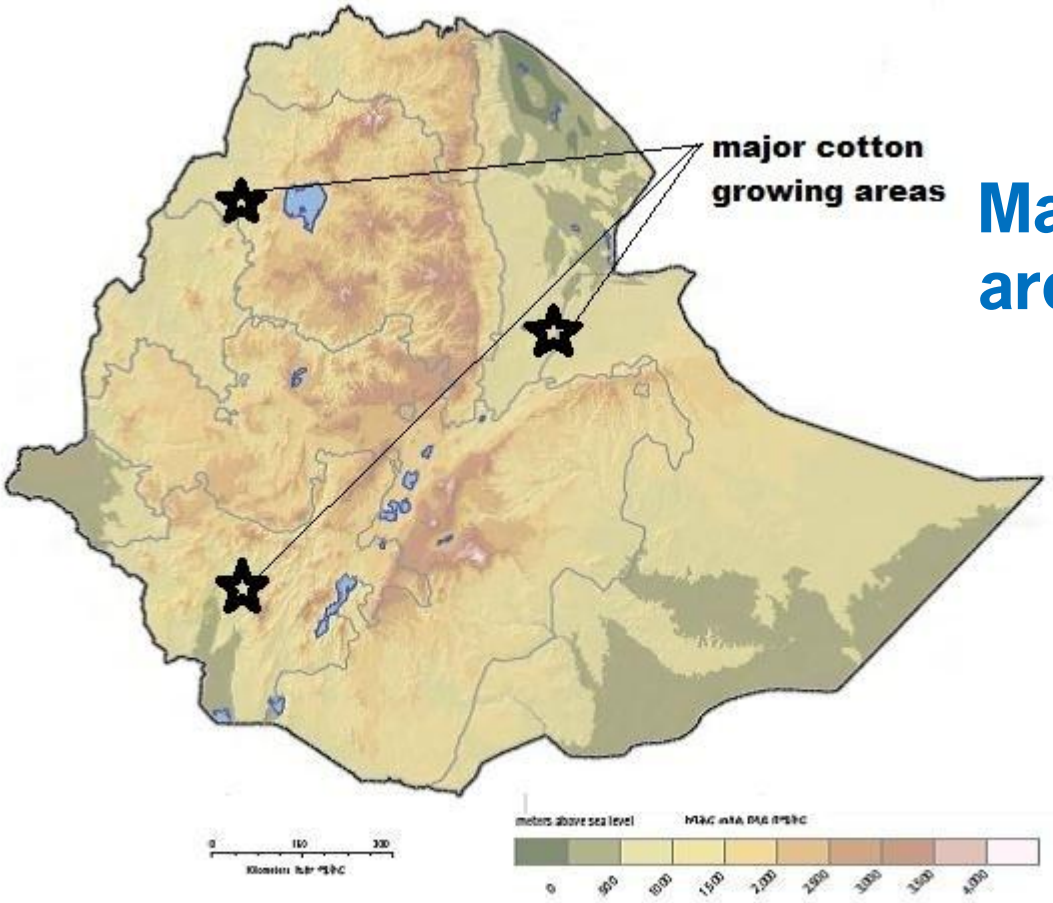
4. Crop production



Data source: Ethiopian Agricultural Sample Enumeration 2001/02, Central Statistical Agency.

Dominance of various cereals in different areas of Ethiopia (Source: AERE,2006)

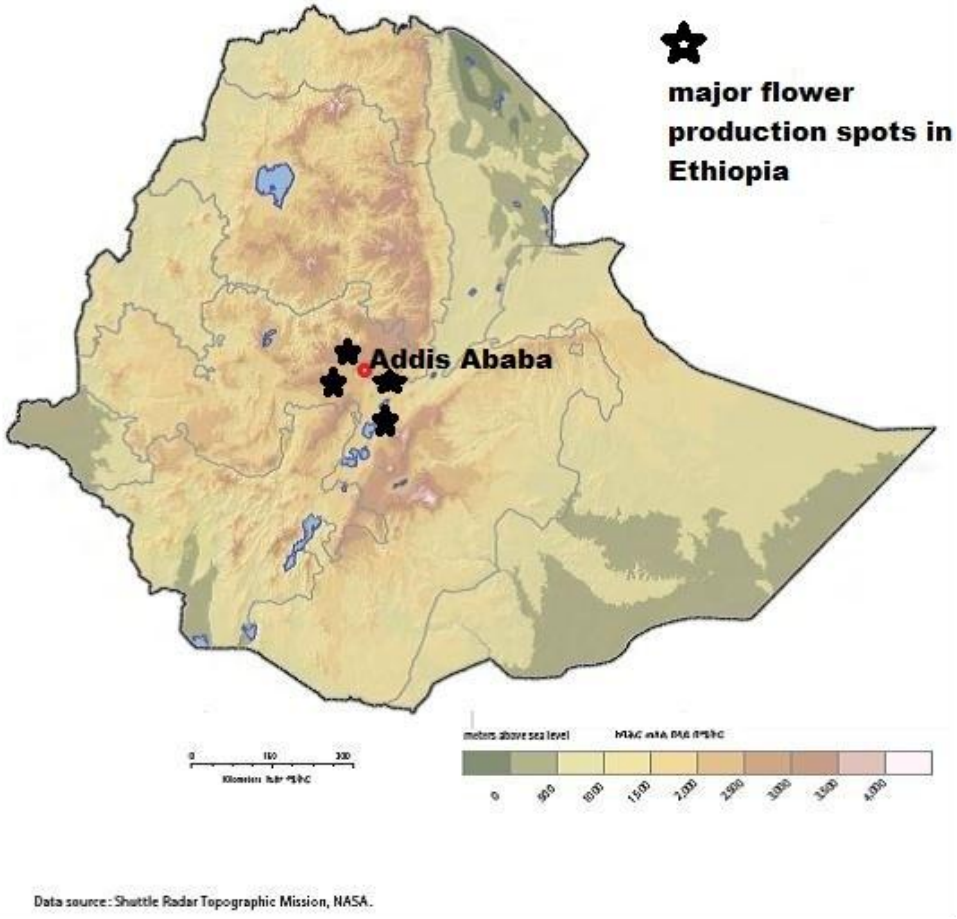
4. Crop production



Major cotton growing areas in Ethiopia

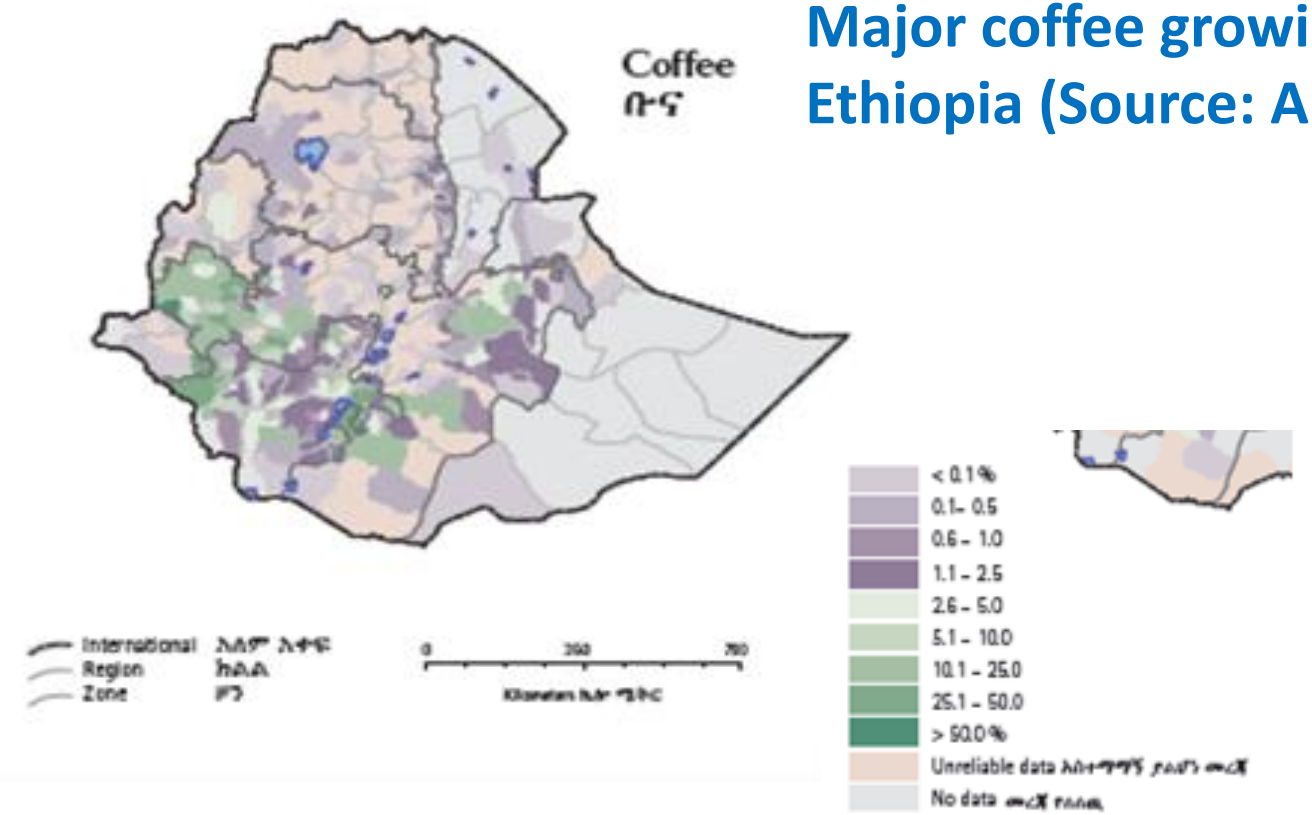
Data source: Shuttle Radar Topographic Mission, NASA.

4. Crop production



Major flower producing areas in Ethiopia

4. Crop production



Major coffee growing areas in Ethiopia (Source: AERE, 2006)

5. Other farming characteristics

Agricultural intensification and possible pesticide risk

- Ethiopia is with an immense agricultural potential
- Crop has the soils and climate required for the production of a variety of food crops.
- The four crops which are judged to be with the highest pesticide use in Ethiopia are teff, maize, wheat and cotton. All four belong to the temporary crops out of which three are cereals

5. Other farming characteristics

Potential areas for farming in Ethiopia (Source: Ethiopia Investment Guide, 2010)

No.	Type of farming	Area (ha)	Region
1	Rice	280,000	SNNP, Oromiya, Amhara, Benshangul Gumuz, and Somali
2	Maize	1,400,000	SNNP, Oromiya, Amhara, Benshangul Gumuz, Gambella and Somali
3	Horticultur	763,300	SNNP, Oromiya, Amhara and Dire Dawa
4	Coffee	426,000	SNNP, Oromiya, Amhara and Gambella
5	Tea	150,000	SNNP, Oromiya, Amhara and Gambella
6	Cotton	3,000,810	Tigray, SNNP, Oromiya, Amhara, Benshangul Gumuz, Gambella, Afar and Somali
7	Oil crops	1,601,323	Tigray, SNNP, Oromiya, Amhara, Benshangul Gumuz, Gambella, Afar and Somali
8	Puls	1,601,323	Tigray, SNNP, Oromiya, Amhara, and Benshangul Gumuz
9	Rubber	3,274,469	SNNP and Gambella
10	Palm oil	200,000	SNNP, Oromiya and Gambella
	Total	11,545,902	

SOURCE: MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

5. Other farming characteristics

- Agricultural intensification is underway in the country
- As one can expect, the rate of use of pesticides in the country will increase in connection with this huge agro investment activity.
- The water bodies found in the eastern and western lowlands are at greater risk of future pesticide application, since most projects are believed to be concentrated in these areas.

5. Other farming characteristics

- Surface waters found in the Rift Valley are also believed to be at increased rate of pesticide risk for the fact that recent developments in horticultural crops production brought about increased use of pesticides in this area.

- environmental safety precautions in connection with intensified agriculture need to be implemented to mitigate the negative impact of pesticides.

6. Presence of groundwater and surface water and their use

- Ethiopia = the water tower of Africa,

- The country is with plenty of rivers (~96 rivers),
- Nile (locally called Abay) originating from lake Tana and the river Awash are among the popular

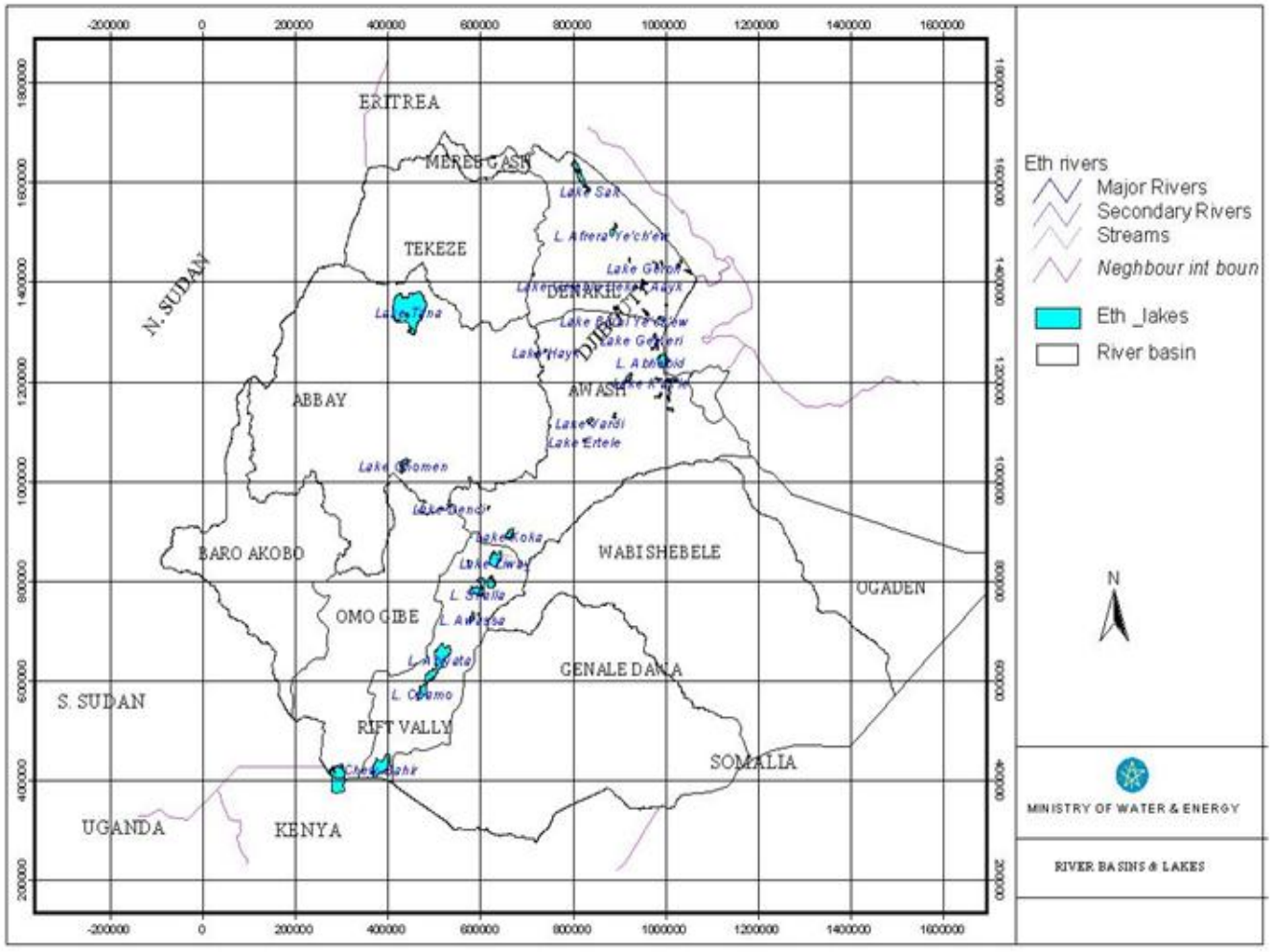
- Ethiopia has 11 fresh and 9 saline lakes, 4 crater lakes and over 12 major swamps or wetlands. Majority of the lakes are found in the Rift Valley Basin.

- the total surface area of these natural and artificial lakes in Ethiopia is about 7,500 km2.

6. Presence of groundwater and surface water and their use

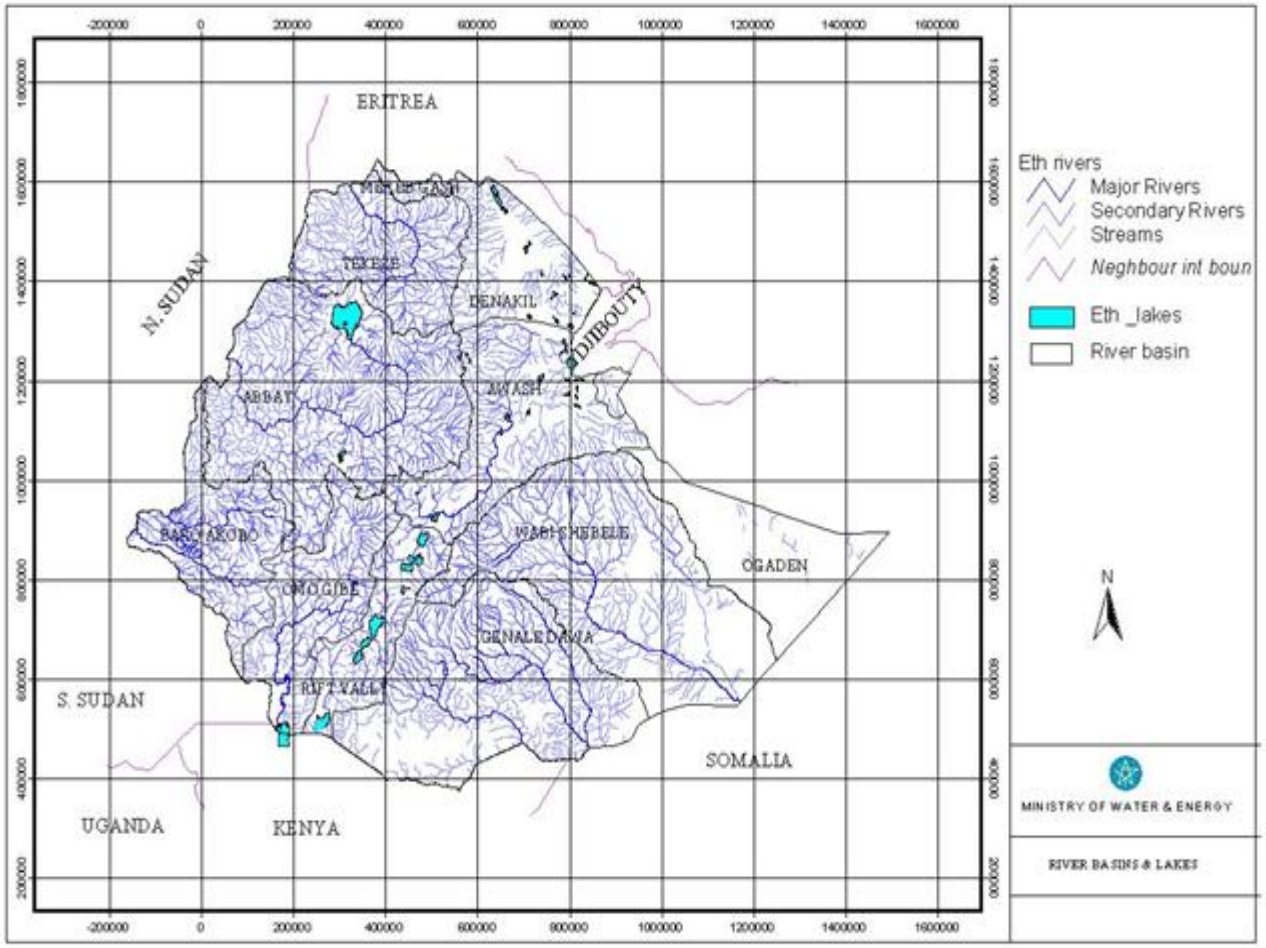
- The majority of Ethiopian lakes are rich in fish.
- Most of the lakes except Ziway, Tana, Langano, Abbaya and Chamo have no surface water outlets, i.e., they are endhoric.
- Lakes Shala and Abiyata have high concentrations of chemicals and Abiyata is currently exploited for production of soda ash (Seleshi et al., 2007).
- As compared to surface water resources, Ethiopia has lower ground water potential.
- However, by many countries' standard the total exploitable groundwater potential is high. potential ~ 2.6 BMC (Billion Metric Cube) annually rechargeable resource (Seleshi *etal.*, 2007).

6. Presence of groundwater and surface water and their use



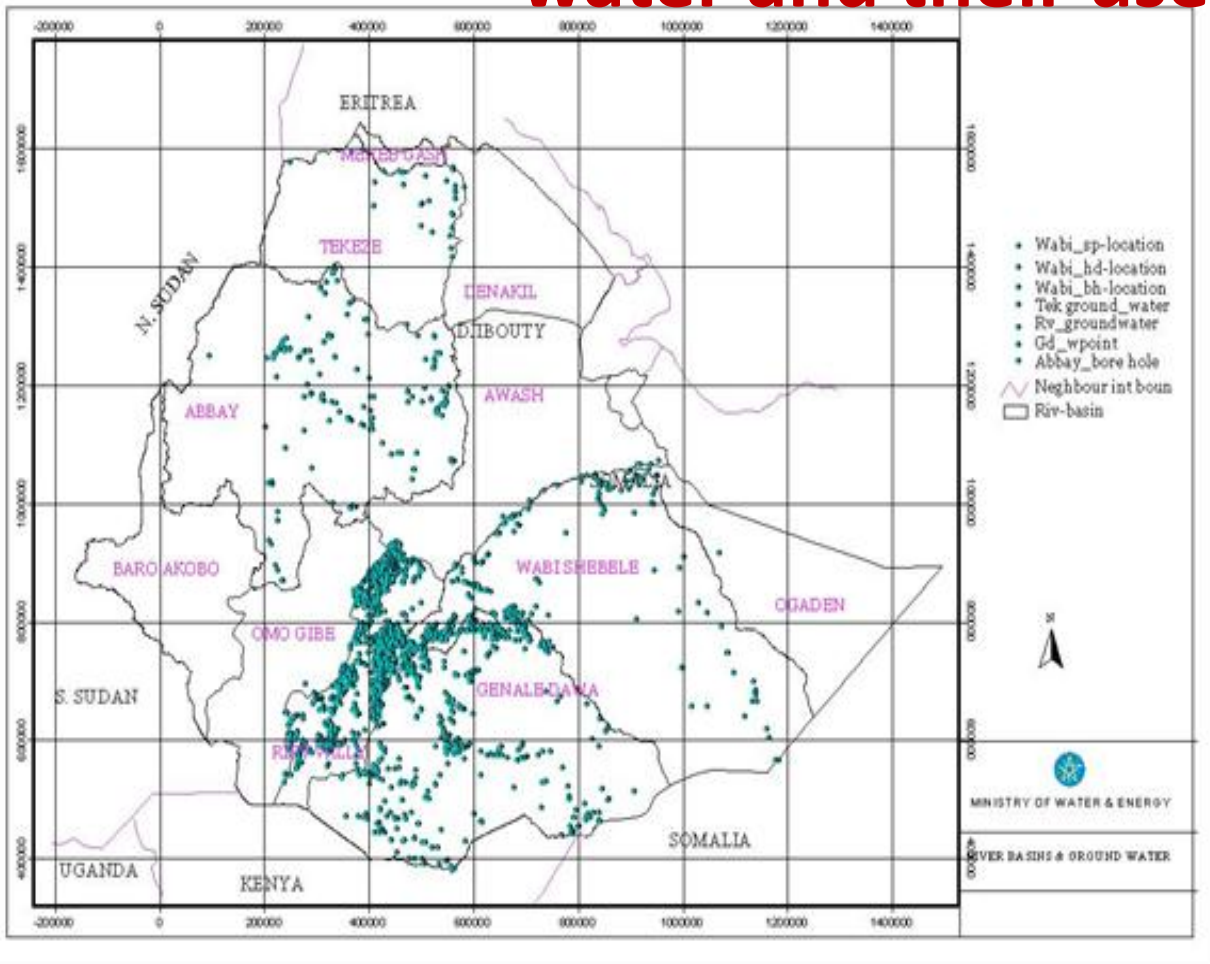
Major river basins and natural lakes in Ethiopia (Source: Ministry of Water and Energy)

6. Presence of groundwater and surface water and their use



Major rivers and the tributary system along the river basins in Ethiopia (Source: Ministry of Water and Energy)

6. Presence of groundwater and surface water and their use

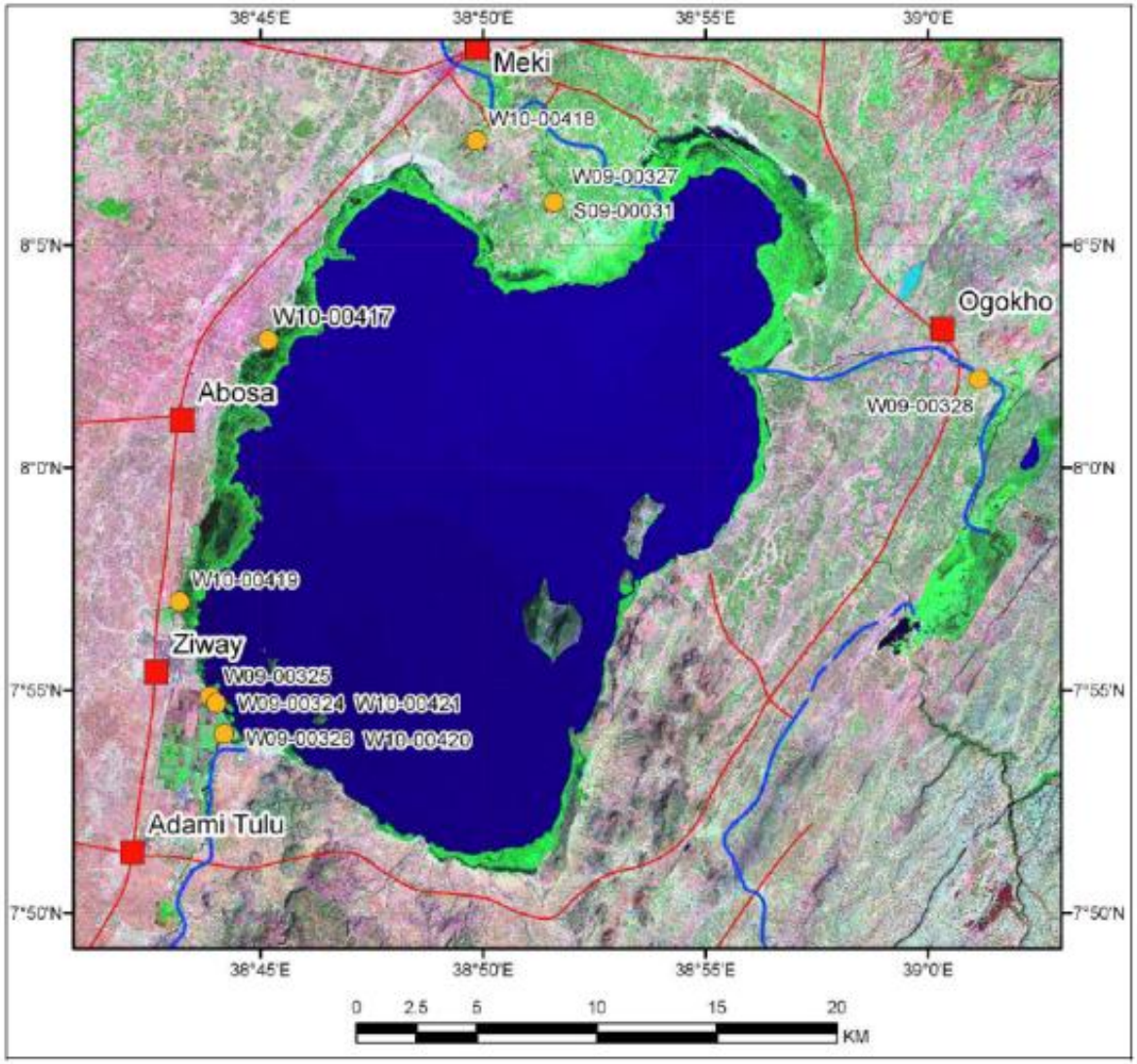


Distribution of ground water wells in Ethiopia (Source: Ministry if Water and Energy)

6. Presence of groundwater and surface water and their use

- According to Jansen and Harmsen (2011), the availability and quality of surface water resources in the Central Rift Valley are increasingly threatened through the intensified use of land and water resources. They studied the situation around lake Ziway, irrigated agriculture by smallholders has largely expanded and large-scale agro enterprises. One of the main concerns is the increased use of pesticides and the impacts of pesticide residues on the aquatic environment and on human health.

6. Presence of groundwater and surface water and their use



Lake Ziway and proximity to sampling site by Jansen and Harmsen (2011)

7. Use of pesticides in agriculture, impact on the environment

- Pesticides have increased agricultural production and improved public health

- Considering the absence of effective controlling mechanisms in pesticides imports and their increased and inappropriate use in Ethiopia, an assessment of the impact on human health and the ecosystem is warranted (Taddese and Asferachew, 2008).

7. Use of pesticides in agriculture, impact on the environment

- The impacts of pesticides in Ethiopia are likely to be aggravated by the limited knowledge among users on toxicological and chemical properties of these substances.

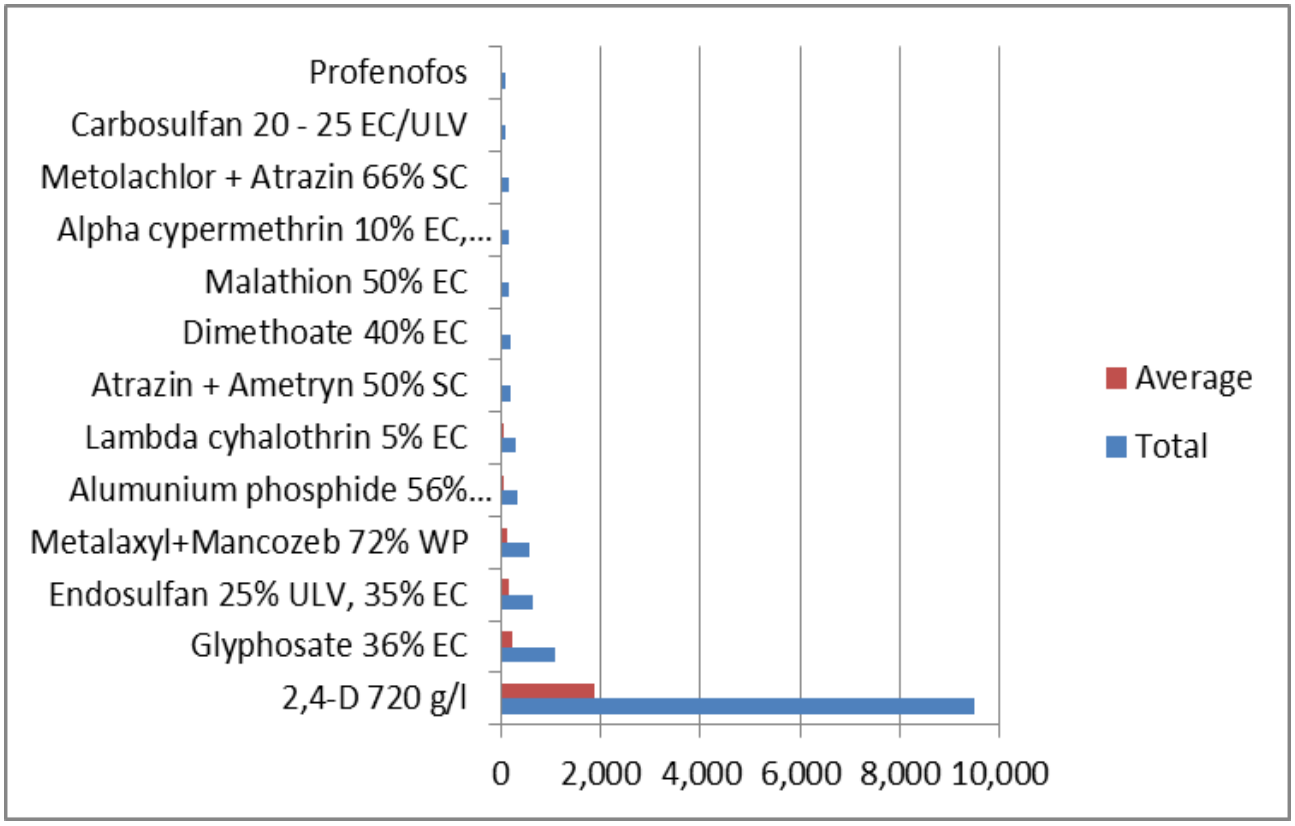
- labels on pesticide containers were in a language which cannot be understood or missing. Little is known about the long term and indirect effects of pesticides on rural and urban communities as well as on local and national food production systems (Taddese and Asferachew, 2008).

7. Use of pesticides in agriculture, impact on the environment

- The awareness of farmers regarding application of pesticides is referred as one of the poorest in Africa (Colin and Tingle, 2008; Taddese and Asferachew, 2008

- Note 2-4D is the most imported pesticide b/n the years 2006-10 followed by Glyphosate and Endosulfan

7. Use of pesticides in agriculture, impact on the environment

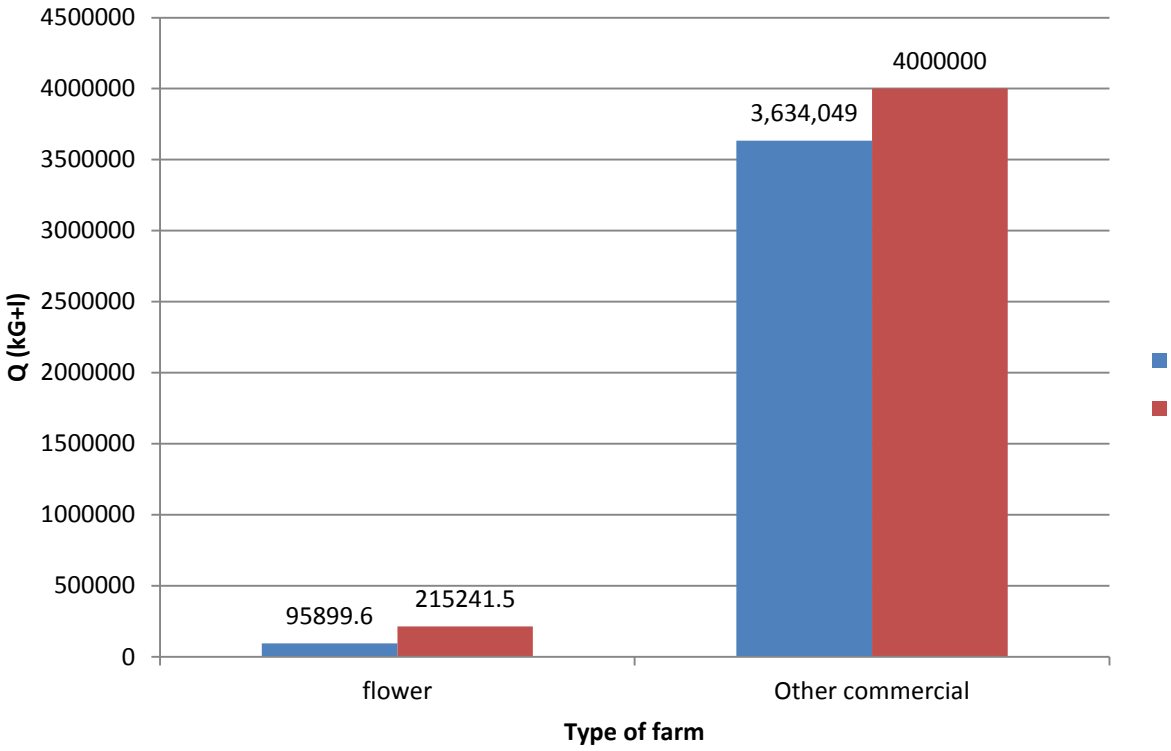


Major pesticides imported between the years 2006-2010 in Ethiopia (Tonnes) (Source: APHRD)

7. Use of pesticides in agriculture, impact on the environment

- According to a data information from APHRD about 4,000,000 Q (Kg+L) of pesticide is imported for other commercial farms in Ethiopia in the year 2010 and about 215,241.5 Q(Kg +L) of pesticide has been imported for flower purposes only in the same year, this figure shows a significant increase for both parameters from what has been in the year 2009 (Annex 5).

7. Use of pesticides in agriculture, impact on the environment



Comparison of amount of pesticides imported for other commercial and flower farming Q (Kg+l) purposes in the year 2009/10 in Ethiopia (Source APHRD)

7. Use of pesticides in agriculture, impact on the environment

- Random checking made to evaluate the status of some of the active ingredients under use for flower farms in Ethiopia revealed the majority of the active ingredients are registered by most or all of the EU member states, Approval for this pesticides is also extended to Australia and USA; while two are excluded from registration under the EU even if some member stats still approve the use of one. Three active ingredients couldn't be found under the FOOTPRINT data base (Annex 7).

7. Use of pesticides in agriculture, impact on the environment

Registration status in the EU countries of some of the pesticides under use for flower farms in Ethiopia (Data source: APHRD, http://sitem.herts.ac.uk/aeru/iupac/640.htm)

Pesticide trade name	Active ingradient	Type of pesticide	Date of Introduction	Registration status in EU	Number of member states Approved for use
BIOMECTINE	Abamectin	Insecticide/Miticide	1985	Annex 1	Approved for use in most EU member states also registered in Australia and USA
APPLAUD	Buprofezin	Insecticide	1984	Annex 1	Only in Poland
BAVESTIN DF	Carbendazim 50 sc	Fungicide	1974	Annex 1	Approved for use in most EU member states also registered in Australia and USA
DECIS 2.5 EC	Deltamethrine	Insecticide	1984	Annex 1	Approved in all EU countries also registered in USA and Australia
VERTIA	Fenamidone 44.4	Fungicide	2001	Annex 1	Approved for use in most EU member states
BIOFILM	Glycel Ethers	Insecticde	-	-	-
NISSURON 10 EC	Hexythiazox	Acricide	1985	Annex 1	Approved for use in most EU member states
GAUCHO FS 350	Imidacloprid	Insecticde	1991	Annex 1	Approved in all EU countries
ARDENT	Kresoxim methyl	Fungicide	1998	Annex1	Approved for use in al but one EU member states also registered in Australia and USA
MATCH	Lufenuron	Insecticde	1990	Annex 1	Approved by half the EU member countries. Also registerd in Australia
METHAMORE	Metham Sodium	Fungicide	1960	Excluded from Annex 1 (re-submitted)	Approved by half the EU member states, Also registered in USA and Australia
ZEEMGUARD	Neem oil	Insecticde	-	-	-
AMINO GOLD	Organosilicone	Insecticde /Fungicide	-	-	-
DAYNON	Propamocarb	Fungicide	1967	Excluded for annex 1	No EU member state approved
IMPULSE 500 EC	Spiroxamine	Fungicide		Annex 1(Re-Review)	Approved in most EU member states, Also registered in Australia
TOPNATE 50 SC	Thiophanate-methyl	Fungicide	1971	Annex 1	Approved for use in most EU member states also registered in Australia and USA

7. Use of pesticides in agriculture, impact on the environment

First approximate inventory of Protection goals presence, problems associated with pesticides and possible examples

#	Protection Goals	Presence of expected problems with pesticide use (Yes/NO)	Possible Examples of these
1	groundwater (general, or used for drinking water)	Yes	Ethiopian people may use ground water as a source of drinking water, areas near commercial farms (flower farms) all over the country are expected to be at risk of contamination
2	surface water (used for drinking water)	Yes	Surface water is the major source of drinking water in Ethiopia, major rivers like Awash (with tributaries), Abay(with tributaries), Gibe, Tekeze and Wabishebele are at different risk of contamination depending on the extent of agricultural activity along their course, with Awash being at greater risk of contamination owing to its extensive involvement for various Agricultural purposes. Some lakes present in the Rift valley area are also expected to be at greater risk
3	aquatic ecosystem (or only specific aquatic organisms, e.g. fish because of fish consumption)	Yes	Aquatic ecosystem found in the rift valley are expected to be at Greater risk, Fish species along the course of awash river and lake Ziway for example are at greater risk in association with the large and small scale agricultural activity in the area
4	Birds	Yes	Arial pesticide application for quila control is expected to have an impact on non-target endemic bird species the country
5	Bees	Yes	The northern part of the country with an intensified apiculture activity are expected to be at higher risks
6	non-target arthropods or soil organisms	Yes	All non-target arthropods or soil organisms found throughout the country where pesticide application is prevalent are at higher risk of exposure

8. Environmental and water quality standards, relevant for pesticide registration

- Giving attention for the protection of the environment and non-target organisms by the Ethiopian government started with the article presented on the proclamation No. 1/1995 (Proclamation of the Constitution of the Federal Democratic Republic of Ethiopia).

- In which article 44 of this proclamation talks about environmental rights 'all persons have the right to a clean and healthy environment and all persons who have been displaced or whose livelihoods have been adversely affected as a result of State programmes have the right to commensurate monetary or alternative means of compensation, including relocation with adequate State assistance.'

8. Environmental and water quality standards, relevant for pesticide registration

- After this binding constitutional proclamation other proclamations and standards became active to ensure the effectiveness of this binding rule, among them proclamation No. 300/2002, the Environmental Pollution Control Proclamation , and Standards for Industrial Pollution and the Environmental Policy of Ethiopia worth to mention.

8. Environmental and water quality standards, relevant for pesticide registration

- Part two of The Standards of Industrial Pollution explains the standards for the specified industrial sectors, in which the specific standard for the pesticide manufacturing placed the limit values for discharge to water as given below in the table (Source: EPA).

8. Environmental and water quality standards, relevant for pesticide registration

limit values for discharges to water by pesticide manufacturing (Source:EPA)

Parameter	Limit Value
Temperature	40 °C
pH	6 – 9
BOD_5 at 20?C	90% removal or 50 mg/l, whichever is less
COD	75% removal or 200 mg/l, whichever is less
Total phosphorus (as P)	90% removal or 5 mg/l, whichever is less
Total nitrogen (as N)	90% removal or 30 mg/l, whichever is less
Suspended solids	20 mg/l
Oils, fats, and greases	15 mg/l
Chromium (as total Cr)	1 mg/l
Chromium (as Cr VI)	0.1 mg/l
Phenols	1 mg/l
Copper (as Cu)	1 mg/l
Mercury (as Hg)	0.01 mg/l
Active ingredient (each)	0.05 mg/l

8. Environmental and water quality standards, relevant for pesticide registration

limit values for discharges to water by pesticide formulation (Source: EPA)

Parameter	Limit Value
Temperature	40 °C
pH	6 – 9
COD	75% removal or 250 mg/l, whichever is less
Total phosphorus (as P)	90% removal or 5 mg/l, whichever is less
Total nitrogen (as N)	90% removal or 30 mg/l, whichever is less
Suspended solids	30 mg/l
Oils, fats, and greases	15 mg/l
AOX	2 mg/l
Organochlorines	**0.1 mg/l**
Nitroorganics	**0.1 mg/l**
Pyrethroids	**0.1 mg/l**
Phenoxy compounds	**0.1 mg/l**
Active ingredient	**0.05 mg/l**
Arsenic (as As)	0.2 mg/l
Chromium (as total Cr)	1 mg/l
Chromium (as Cr VI)	0.1 mg/l
Phenols	1mg/l
Copper (as Cu)	2 mg/l
Mercury (as Hg)	0.01 mg/l

Amesege'nallo‘, thank you!