Agriculture and Renewable energy management in Urban and Peri-Urban of Addis Ababa

Nov 2011

Ethiopia

content

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1. introduction

- Ethio has 73.9 mill of popul
- 9 Regional States and 2 Administration City Councils.
- It is one of the countries which are **on transition / developing** / process,
- it has huge hydraulic potential, and has options to diversify energy power mix (solar,wind, biomass, natural gas, coal).
- but still with great problem of energy supply

Introd Cont…

energy sectors splits to

- traditional energy i.e. fire wood, bio-gas, organic residue
- Modern energy exclusively to petroleum production& electricity,
- 90% of the total national energy comes from traditional biomass fuel
- 10% energy consumption comes from Non biomass fuel i.e 8% petroleum, 2% electricity This implys that the population need more biomass for energy use,

Introd Cont…

- Agriculture, is the most important economic sector contributing highest part of the country's GDP,
- earning 85% foreign currency
- 83% of the popu. is employed on agric. sector,
- It has a number of vegetation /crops/ spps and livestock.
- Ethio. is 1st in livestock popul in Afri and 10th in the world.

Introd Cont…

- Due to the above reasons, the government was forced to formulate policy, law and regulations that can lead to develop and utilize the resources sustainably. Some of the directions are:-

1. **Basic Directions of Agriculture**

- **Building Human Resources**
- **Proper Land Use**
- **Preparation of Agricultural Packages**
- **Creating Market-lead Agricultural**
- **Improving the Finance System**
- **Encouraging Private Investors**

Introd Cont…

- **Expanding Rural Infrastructures**
- **Strengthening Non-agricultural Rural Development**

2. Energy-directions are

- Expansion of hydroelectric power /small scale to large scale,
- natural gas and oil development,
- agro-forestry and forest development,

Introd Cont…

- promote energy saving, supply and utilization efficiency, development.

so that Supply and utilization should not affect the natural balance and environment,

- each sector has to get alternative energy source,
- energy development has to corporate with Agriculture and environment development.

Introd Cont…

The Dev't &Transformation Strategies of the federal gov't is:-

- Agriculture lead Industrialization (pillar)
- Poverty reduction
- Scaling up best practices
  - BPR/BSC (balanced score card)
- Climate change Adaptation and mitigation program
- Bring up the economy to the middle economic developed countries

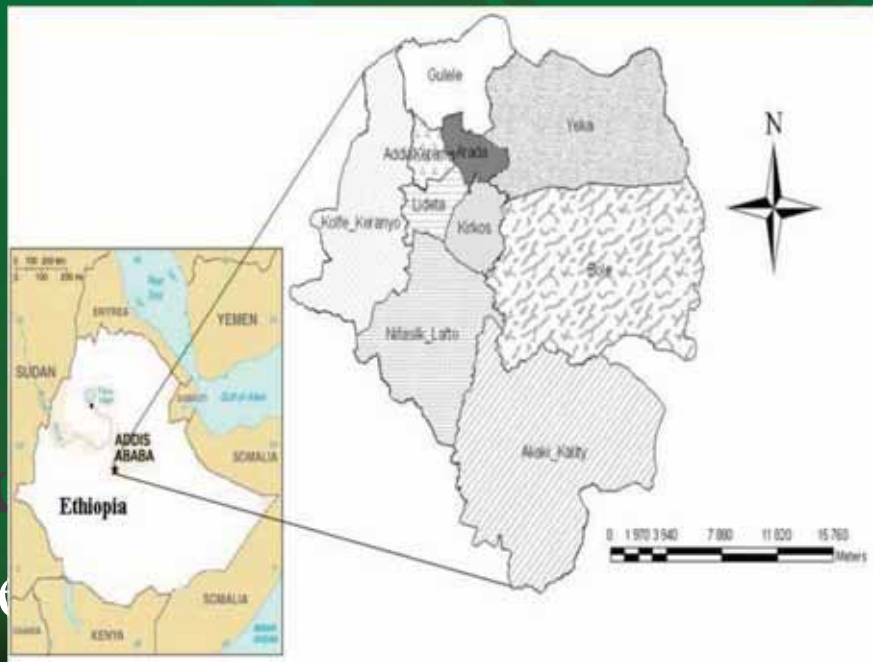
Introd Cont…

- The Policy and strategies
- Federal environmental policy
- Federal Conservation Strategy
- Federal agricultural policy
- Environmental Impact Assessment proclamation
- Federal Energy policy
- Solid waste management proclamation
- Related Environmental regulations

Introd Cont…

Addis Ababa city

- Was established in 1886/7, as a capital city
- is still CC of Federal government of Ethiopia
- & is continental, international, institutional centre, industrial ,cultural as well as political centre
- area of about 54000ha
- Has 10 sub-cities and 116 woreda (the lowest adm unit)/ distric
- Large number of Industrie



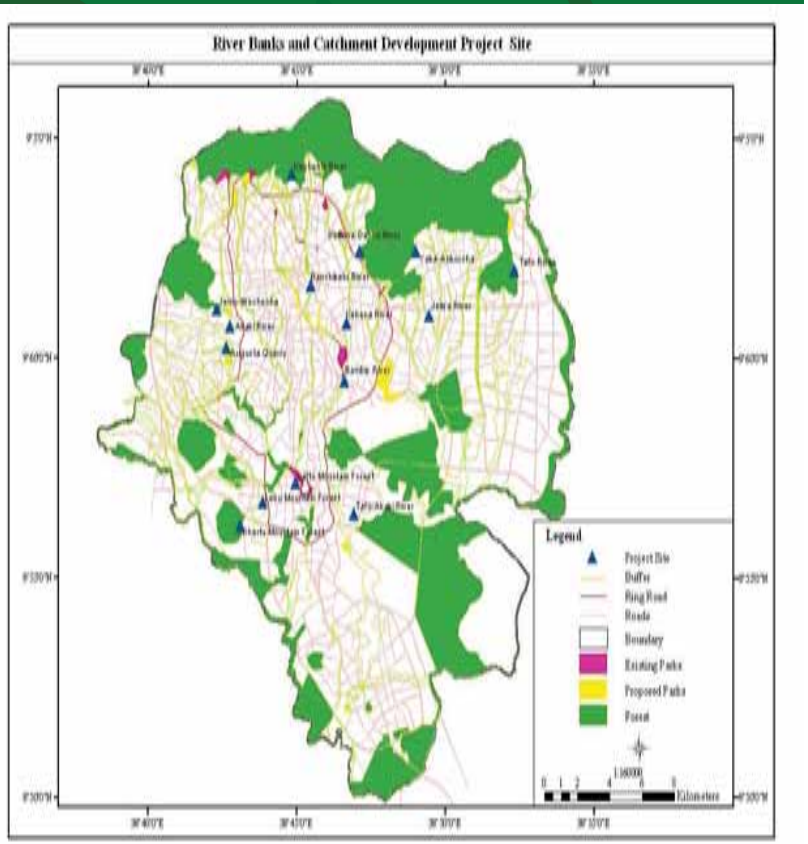
introd cont…

- about 22,000ha /41% of total area/
- including forest trees, green spaces

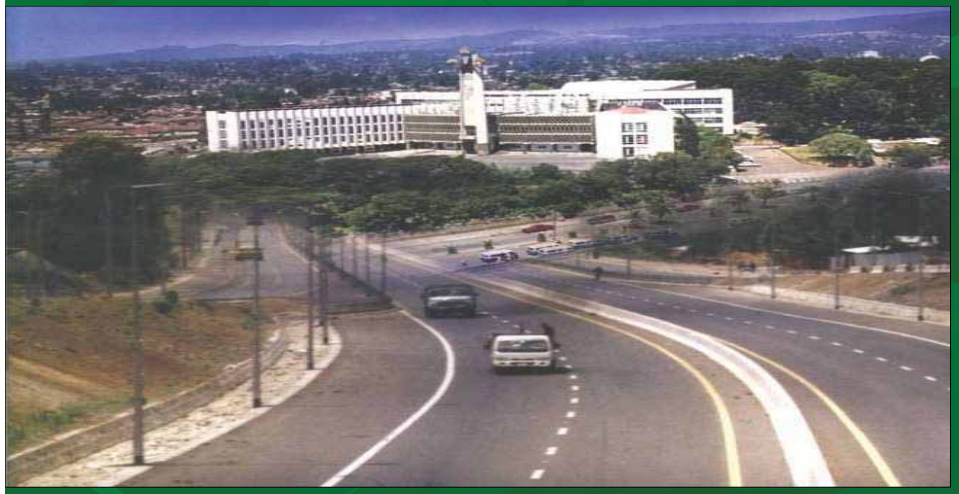
Topography :-

- situated at central high land
- at an elevation 2000-3100m asl.
- Undulated land form
- Its periphery surrounded

by slopy chain of mountain.



VISION to see the Urban & peri urban city to be pollution free, clean and green, have natural balance, comfortable & enjoyable Addis Ababa



2. Current situation of Addis Ababa

2.1 Climate

- Mean Annual temp 16^0 C rainfall 1200mm
- the sun shining every day through out the year. & is called 13 month of sunshine.

2.2 Population

- 2.8mil, growth rate 3.79%.
- Thus rapid growth of pop has negative impacts on natural resource /biodiversity/ utilization associated with climate change.

Current situ ….

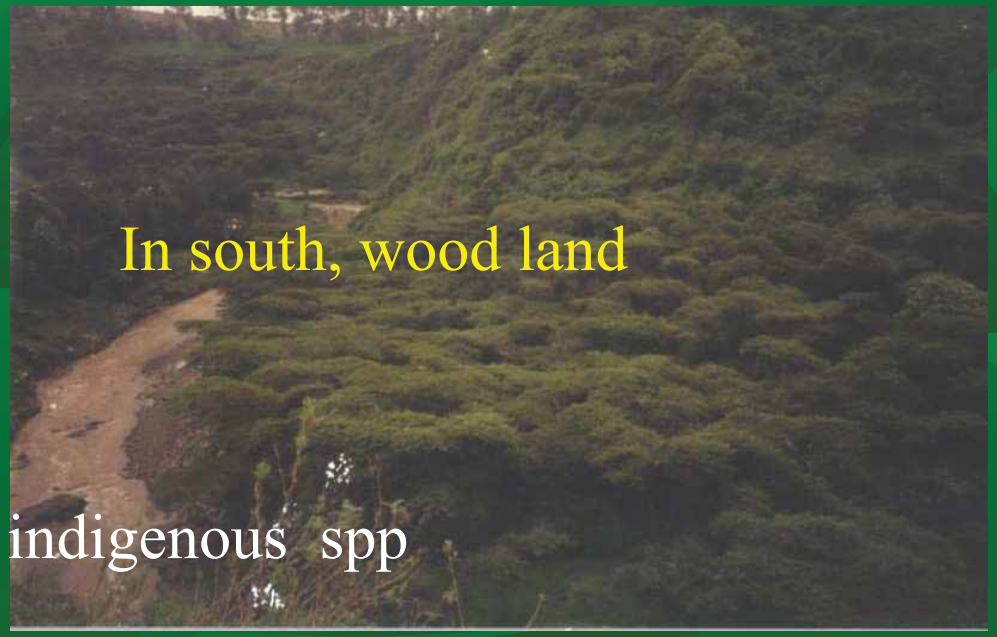
2.3 Vegetation cover

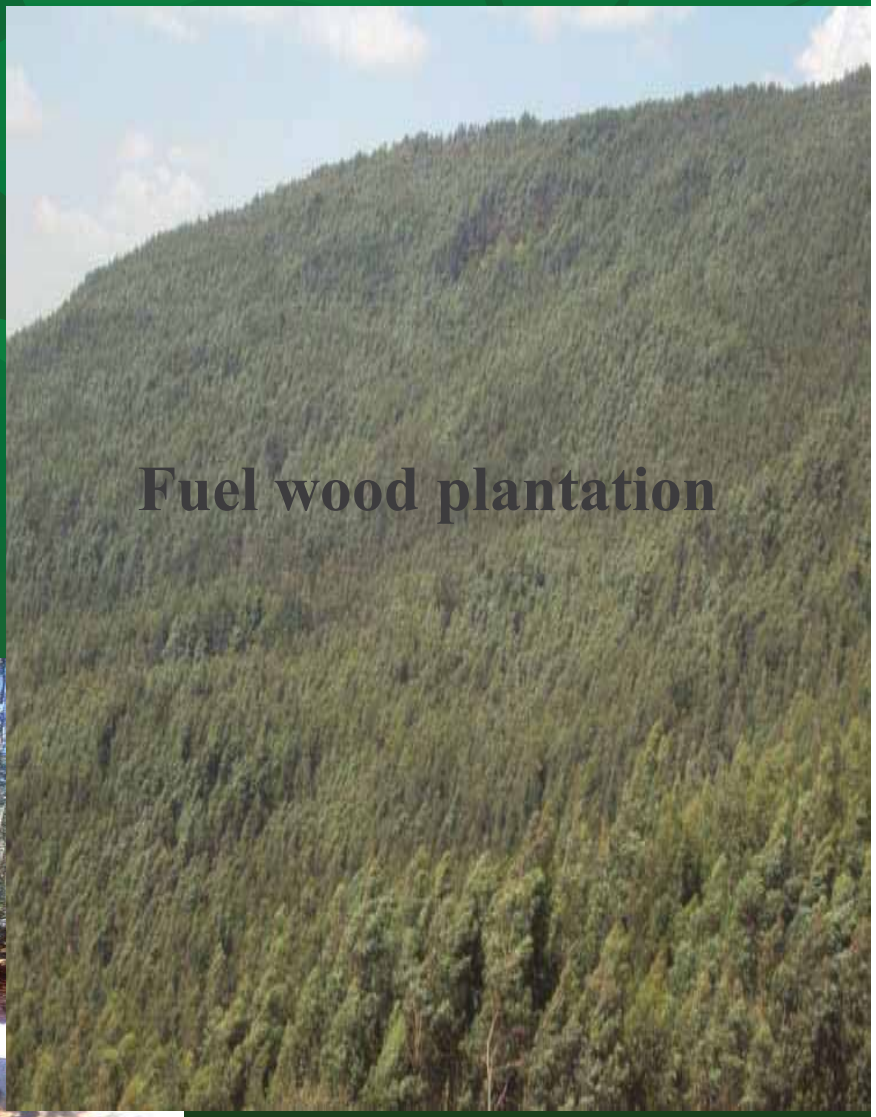
- 9900ha covered by vegetation dominantly by the exotic Euc. Tree sp.
- **12,500 ha** is expected to be covered with indegen. forests spp.
- The remaining **9300 ha** for urban agriculture & **200 ha** woodland spps.
- Due to the topographic feature and the climatic conditions, the city has rare but diverse endemic trees, shrubs and herb species.

Current situ….

- The natural vegetation has been cleared for Settlement due to fast population growt.
- like *Juniperus procera, Hagenia abyssinica, Olea europaea* etc. are indicators, that was once an evergreen montane forest area with glades of crop and grazing lands.

Current situ Cont…





Current situ Cont…

2.4 Wild animals

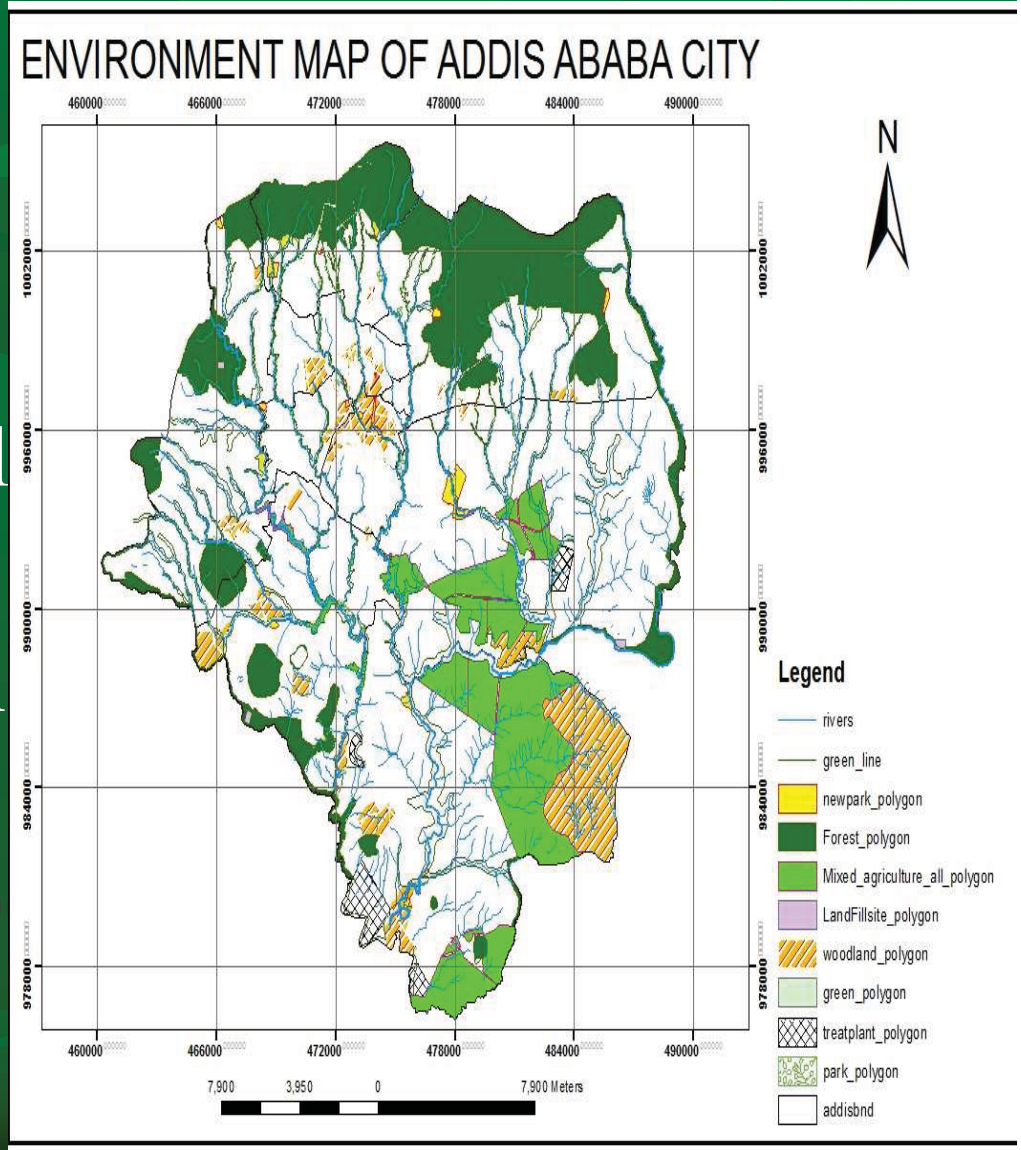
- habitats for a no. of species,
- No. of birds and animals.
- 18 spps of mammals like **Anner**/*Felis serval*, ***Q*ebero**/*Canis aureus*, **Zenejero**/*Papio anvbis* ,
- *30 spp of Birds some a*re *r*arely found & are parts of the biodiversity of the city. / **Dakeye**/*Anas platryhynchos*, ***Q*oqe**/ *Francolinus dappertion*,

Current situ Cont…

2.5 Drainages

net like drainages start from mount /Entoto/

- 11 annual and seasonal stream drained to 2 main rivers, the outlet Akaki river
- river buff area is ≈ 400 ha.



Current situ Cont…

- Most upper stream are clean seasonal water,
- the lower streams drain permanently, but highly polluted by flood,
- legal and illegal settelers at River buffer,
- Most river buffers are used for Agriculture, Mining, Industries
- this all causes the rivers to be dead water.

Current situ Cont…

2.6. Agriculture

- is one of component of U and Peri-U ecosystem, that practices mainly for income generating, and food security.
- is lead by urban agriculture units under the trade and industry bureaus.
- PUA is viewed as a vehicle for empowerment
- There are mixed farming, such as Horticulture; cereal crops; livestock /animal husbandry/

Cont…

- PUA self-reliance, as an income generator and is important for sustainable use and management of natural resources.
- provides meaningful contributions towards household food security
- 14% of urban area covered by agriculture land,
- Southern part of the city is intensively cultivated cropland

Current situ Cont…

- **2.7 Energy**
- There is progress in modern energy sources utilization (electricity, gas and kerosene) ,
- 95% of people rely on electricity for lighting,
- 48% HH relied totally on 1or 2 of these fuels for cooking,
- 30 % use some modern energy but also traditional energy sources (wood, charcoal or dung),
- 22% of urban dwellers depend on traditional fuels using traditional stoves, that can exposes women & children to highly indoor air pollution

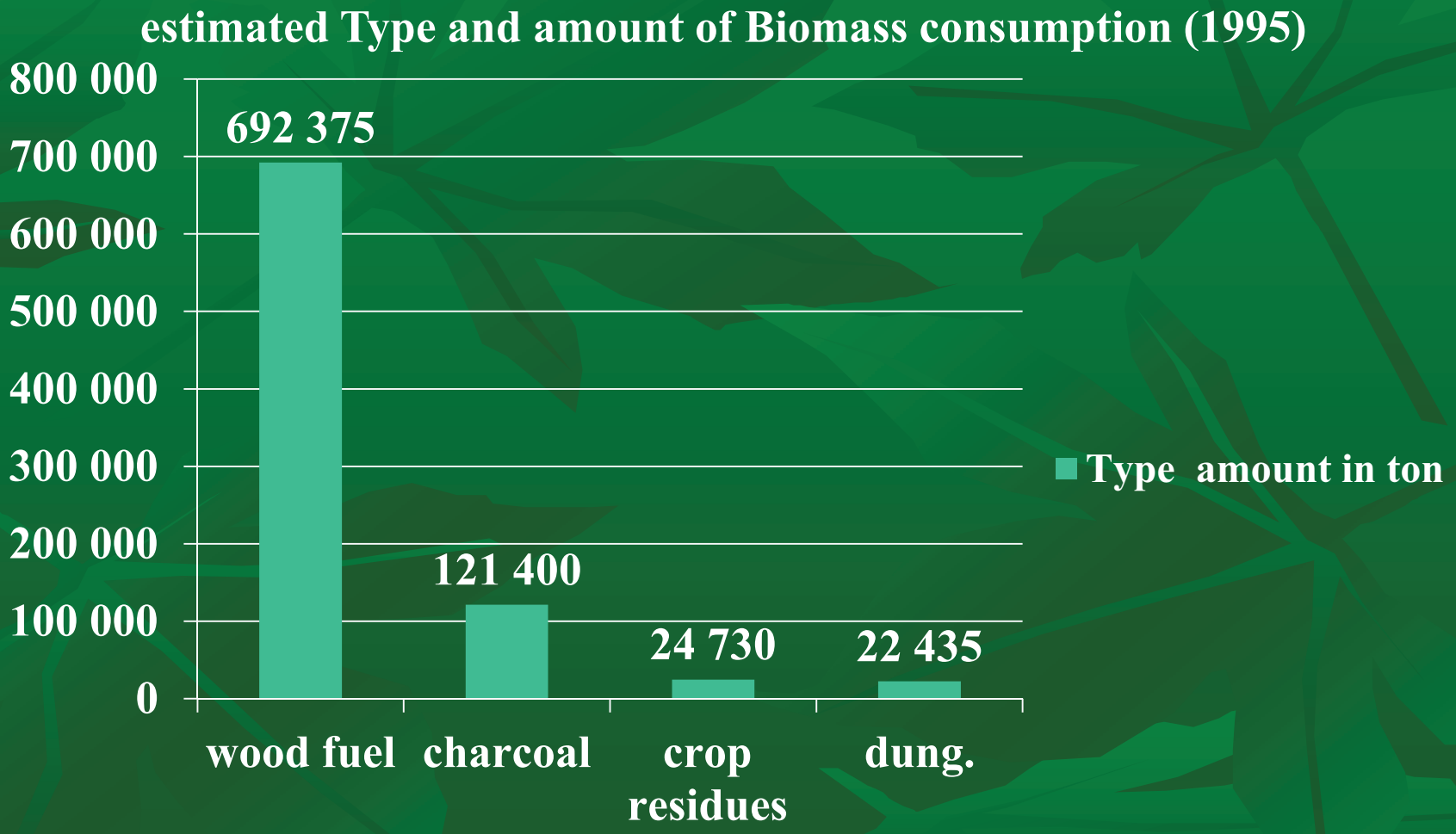
Current situ Cont…

- very high biomass energy consumption such as fuel wood, Charcoal, Dung cake, kerosene,
- Renewable & alternative energy were not practiced since last few yrs /solar, biogas, wind, bio-fuel/
- Supply doesn't satisfy the growing needs
- Thus the energy price ↑
- Wasting Considerable amount of energy
- The effect ---negative impact on forest wood,

Current situ Cont…

- consumption of fuel wood 80% , charcoal 14%, crop residue & dung 3% each
- consumption of fuel wood is equivalent to about 97,400 ha of eucalyptus,
- Wood brought from surrounding areas/25kms/,
- charcoal brought from far distant /Rift Valley 200 kms away/.
- smoke / cooking fire causes a major health problem
- Neg. impact on the national economy & env't
- To have adequate & efficient energy, modern technologies are important

Current situ Cont…



Current situ Cont…

2.8 Waste management

- 20 % of households have flash toilet
- 59% with shared pit toilet facilities,
- The remaining population have no sanitation facilities,
- Most of the housing units have no sewerage services,
- There are more than 2200 industries (leather, textile ..)
- Most of them are old and are extremely inefficient,
- 45% of their discharge causes air, water pollution,

Current situ Cont…

- All those activities generate huge amounts of diff. types of wastes adversely affect the physical environment of the metropolitan city.
- Estimated solid waste generated 2,297 m^3/ day.
- 65% is being collected properly,
- 10% recycled (5% composted 5% recycled)
- 25% damped on open spaces due to insufficient collection& lack of public awareness.
- This all increased public health hazard

Current situ Cont…

Urban Development

- The City Dev't Plan policy is designed in the area of hinterland linkage, centrality, market hierarchy, strategic investment areas, manufacturing industries, road network, transportation, Social and municipal services, housing, historical structures and sites, and environment.

strategies emphasized are in the area of

- enhancing the National and International image of Addis Ababa,

Cont…

- promote and improve services and facilities to attract international organizations.
- promote integrated regional planning between Addis Ababa and the hinterland,
- protect the environment through conservation of natural resources,
- strengthen transport linkages and mobility,
- identify strategic areas for investments and unlock barrier of redevelopment.

3. Urban and peri-UrbanAgriculture (UPUA) and renewable Energy source

3.1UPUA is the most important practices of cultivating, processing and distributing food items in or around urban,& peri urban areas. It practices mainly for income generating, and food producing

Agricultural farming includes Horticulture, sericulture, agro-forestry, and animal husbandry. but aquaculture is not yet experienced, just it is on promotion.

UPUA &ER Cont…

3.2 Energy

- **Energy** is one of the important economic sector for any nation in social and economic development, improve the productivity , and then standard of life .
- It is necessary and decisive for **daily life**, for **agriculture, industry, social** services.
- Energy is obtained from **fuel wood, coal, oil, electric, sun, wind, animal dung.**

UPUA &ER Cont…

To Implement UA & energy Both Resources requires:-

- **Integration** in urban development
- **Waste and River** water management
- Water **conservation** and **efficient** utilization
- **Integrating** in **health and environment** policy and legal procedures
- **Recycling Organic** Wastes from UPUA and change to energy, and the residue of energy to agricultural production.

UPUA &ER Cont…

- **Promotion** /capacity building/:-
  - On **sustainable** Land Mg't, On risk reduction
  - health & environmental risks mg't
  - people needs training and advisory services.
- research service,
- Women empowerment actions
- Supporting unemployed youth through UA & energy management,
- HIV/AIDs mitigation,

4. Effort of the UPU Government

4.1 formulating policies and implementation strategies

- The govt' adopted strategies & formulating policies for sustainable economic development,
- which recognize the importance of Agriculture and energy in line with environment protection and the need for its proper management:-

Effort Cont…

a. Implementation Strategy of UPU Agriculture

It was Formulated in 2010 to

- Be safe and sustainable,
- Be efficient and pluralistic delivery of UA support,
- Be health and environmental risks free,
- enhancing legal framework and awareness on UPUA

Effort Cont…

b. Energy policy that focused on:-

Energy development, supply & general policy actions .to ensure

- expansion of Fuel wood plantation
- Change Cultural energy, to Improved energy
- Develop hydroelectric power
- Develop alternative energy /Wind, solar, coal, geothermal etc/
- Develop natural gas, and oil

Effort cont…

- Minimize the gap b/n Demand and supply in house hold energy,
- alternative energy For agricultural development,
- energy to supply Industry , according to their demand /energy type/
- Protect the local natural balance from pollution
- Capacity building of science and technology /research and study/ on forest resource degradation, environment, climatic change, and renewable/improved /energy development etc/

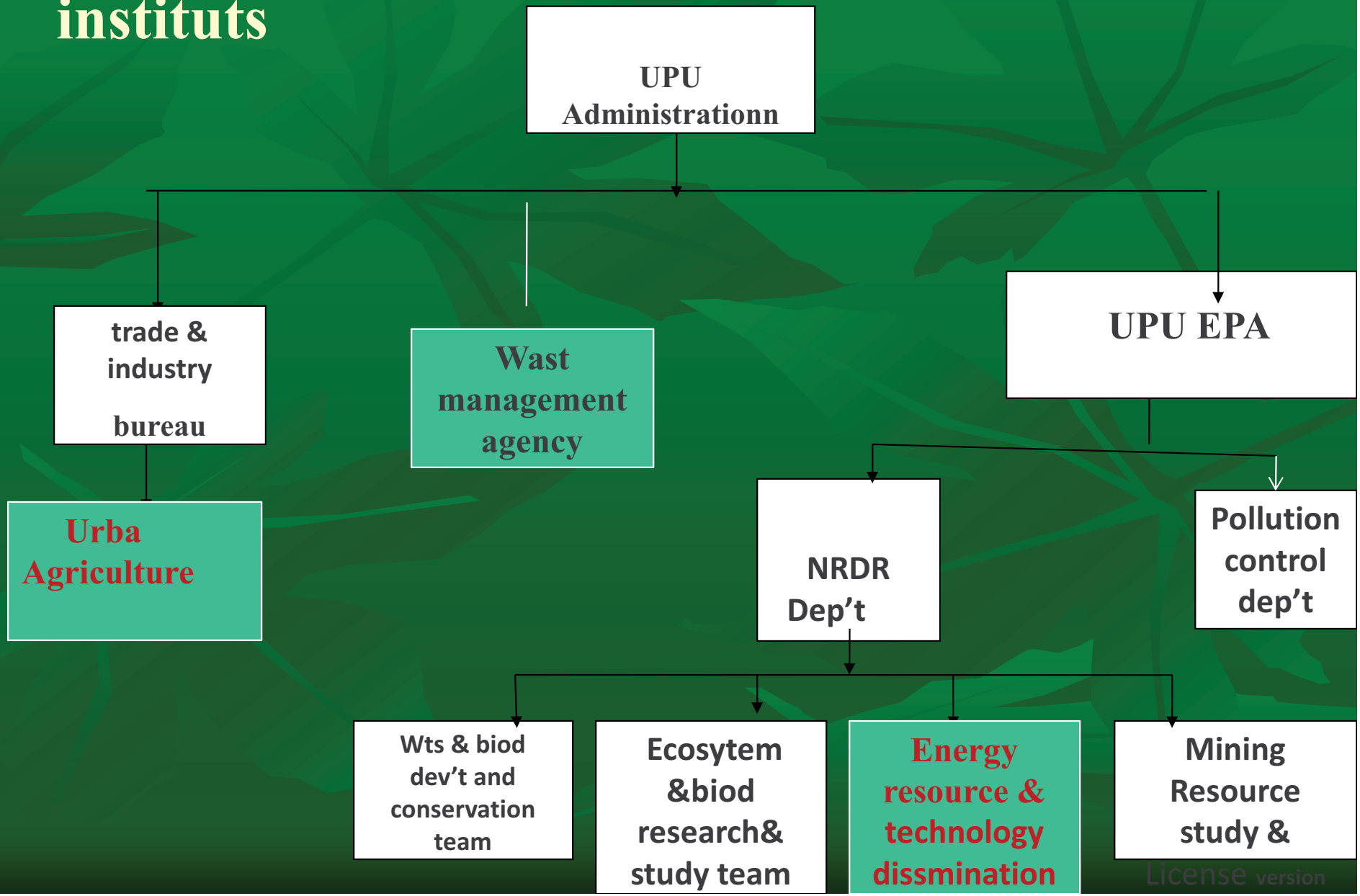
Effort Cont…

- ***4.2*** **established appropriate Institutions to perform the constitution & the policy concepts,**

At federal level

- Ministry of Agriculture and Rural Development (MOARD)
- Environmental protection Authority (EPA)
- Institute of Biodiversity Conservation (IBC)
- Ministry of Mining and energy/ water& energy source WESA/
- Regional Environmental Agencies (REA)

At urban level, Structure of UPUA and ER instituts



5. Public Participation

5.1 Awareness creation

awareness on issues related to U& PU agriculture and renewable energy policies and strategies

- Events, TV broadcasts
- FM radios
- Printed Medias etc.

5.2 training Fuel saving and Renewable Energy Source /improved stoves

- Recycling /compost preparation, change to energy etc

helped in motivating people to participate in UPUA, & Ren.energy, greening, prot'n impr't of urban ecology

5.3 Participate in UPU ecosystem & biod mg't to biomas

Public part cont…

- Training and public awareness creation programs

planting
Indegineus spp

tree planting program

6. Achievement in last three yrs

6.1. UPU agriculture unit

- it has extension workers that provide technical aid & assists SME, corporations, associations, individual producers,
- According to Master plan Agric area 7309 ha, Currently 10333.7 ha
- >12 productive land /sites in 6 sub-cities

PUA exercised Mixed farming

such as Hortic; cereal crops; bee keeping and animal hasbanbry. /poultry,dairy farm.fattening program

Activiti cont…

The PUA farming system is diverse.

- There are small scale crop-livestock systems with recycling of organic inputs,
- There are also large scale farms where private investors are dealing with vegetables, poultry and dairy in and around the capital city.
- About 50,627 populations are engaged in agricultural activities
- **Most poor households living in the city practice everywhere,**

Activiti cont…

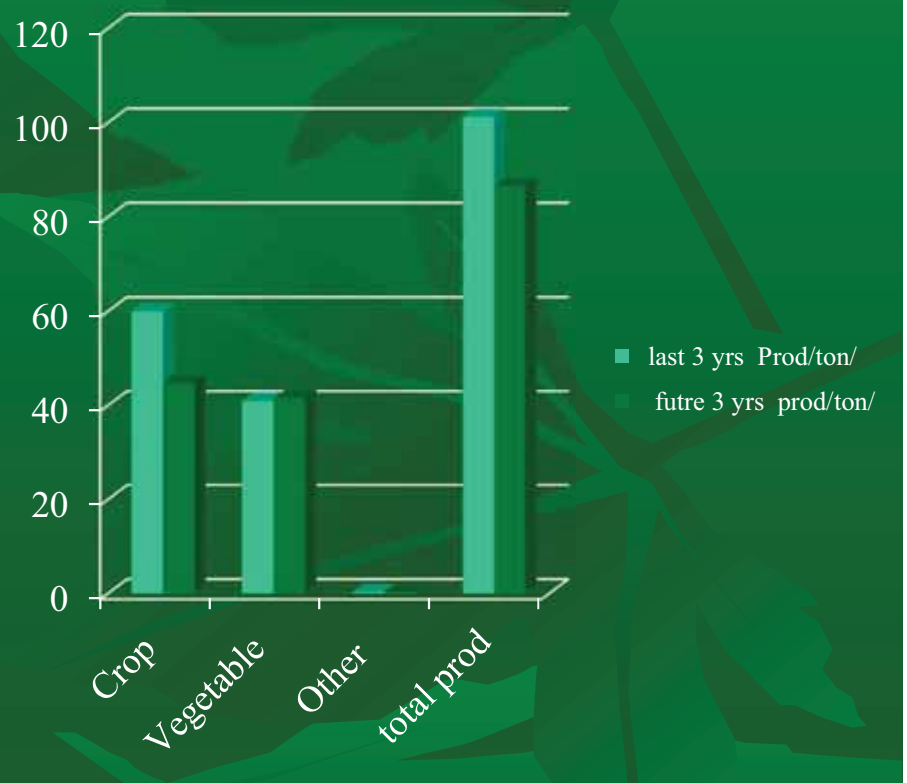
- The number of people engaged in horticultural activities are estimated to about 800.

Agri-Production of 2008/9 -11 and futre 3 yrs

- **Total production** 101189.8 ton, future prod will be 86520ton
- Current crop prod area 60200, future 44700ton
- horticulture 41160 ton, future 41820ton
- Future Production plan decreases, because 3024.7 ha. Will be used for an expansion according to master plan of the city.

Agri- production in 2008/9 t0 2010/11/ and2011/12 t0 2013/14

Type of production	Area in ha	last 3 yrs Prod/000 ton	futre3 yrs prod /000ton
Crop	9805.7	60	44.7
Vegetable	428	40.86	41.5
Other horticultural products		0.3	0.32
total	10333.7	101.2	86.52



Crop farm

Apple farm

Cont..

river buffr

vegetable farm

Recycling of Agri waste/composting


drip irrigation

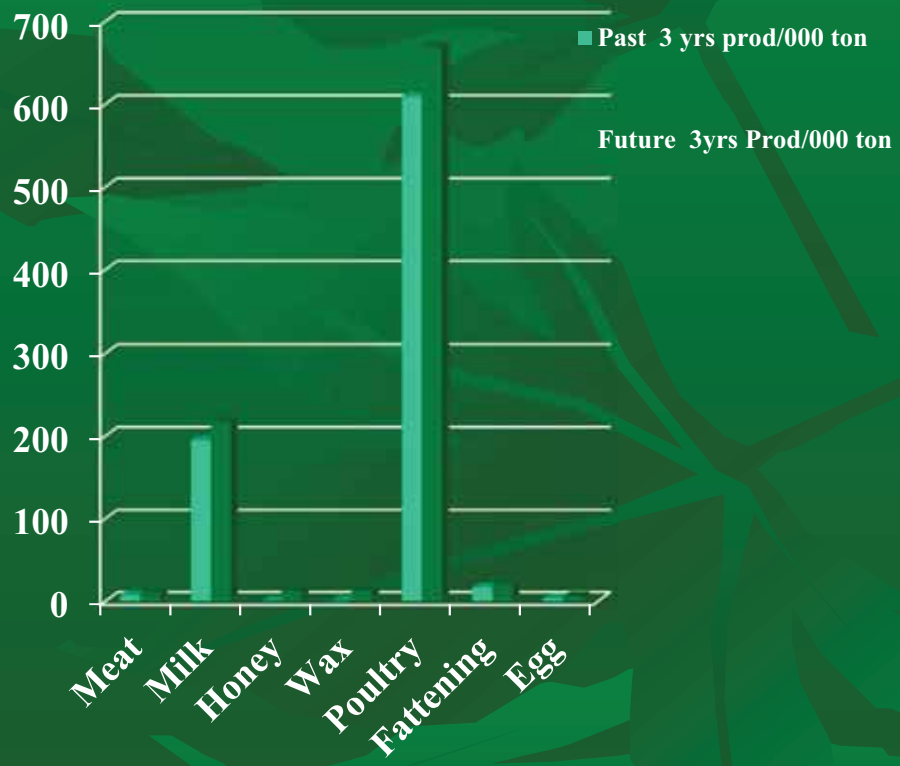
Activiti cont…

Livestock products of 3 last and future years are:-

- from 811 dairy farm 195000 ton of milk, future will be **217200** ton of milk.
- Poultry /from 484 Poultry farm **609700** ton &**future will be 668900** ton poultry
- Egg 3150 ton **future will be 66**ton **5270** ton
- Haney /from 4231bee hives/120 **future will be 13140** ton
- Fattening /from154 farm/ **16690** **future will be 20620 ton** **/sheep,goat & bulls /live stocks**
- Meat production 7150 ton **future will be 9960** ton

2008/9-10/11 & 2011/12-2014/15 livestock

No	Type	Past 3 yrs prod/000 ton	Future 3yrs Prod/000 ton
	Livestock		
1	Meat	7.15	9.96
2	Milk	195	217.2
3	Honey	0.12	13.14
4	Wax	0.12	13.14
5	Poultry	609.7	668.9
6	Fattening	16.69	20.62
7	Egg	3.15	5.27



livestock farm

Fattening program at HH

Poultry farming

achiev Cont…

6.2. Energy source tech.expan. version

- It has models of diff renewable & alternative energy resources such as improve stove (lakech,tekekel, mert, biogas) ,solar power, wind at office and some schools, and some institutions for training &awareness creation.
- There is Public participati on biogas plants construction by Private, organizations, small scale enterprises also participate on and preparing some improved stoves.

Achiev cont…

UPU Renewable energy Source manag't /RES/

- Research and studies was carried out by university, water & energy sector, EPA etc
- Research results of ethanol from sugar factory, Jatropha curcas, caster crop, Palm tree, vegetable residues , and diff. type of stoves etc.
- Promotion, on Renewable /energy stoves is carried out
- Demonstration centre was established
- Training has given & disseminate to individuals, associations, small scale enterprises, institutions etc.

Solar energy

Achiev Cont…

- 46 biogas plant at schools,public organizatios
- 276000 Proto / Improved stoves/ such as beehive, lakech, Tekekle etc/ distributed in UPU areas
- 6000 ethanol, stove / Distribution to condominium houses
- Live demonstration of coock stove for 20000 people has been carried out

Improved stoves

Meret stove

Rocket stove

Bee hive cacke machin

Bee hive cacke

Bee hive stove

Biogas

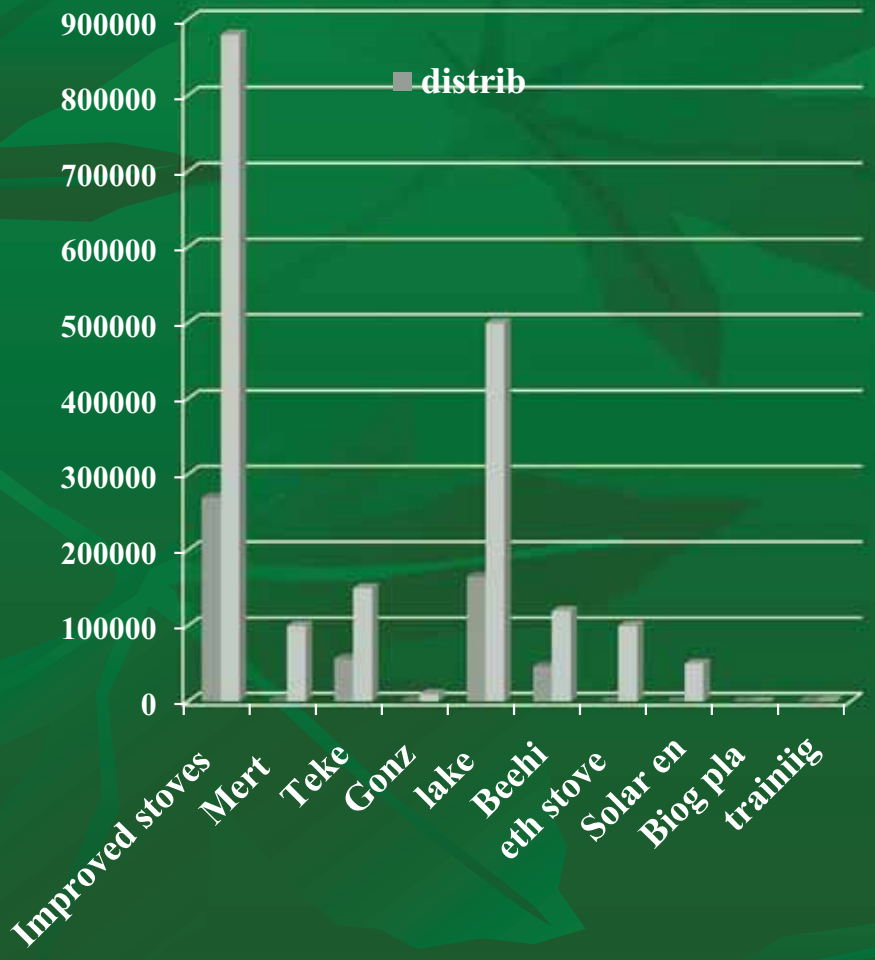
Achiev'ts of UPU **RenewableEnergy Source**

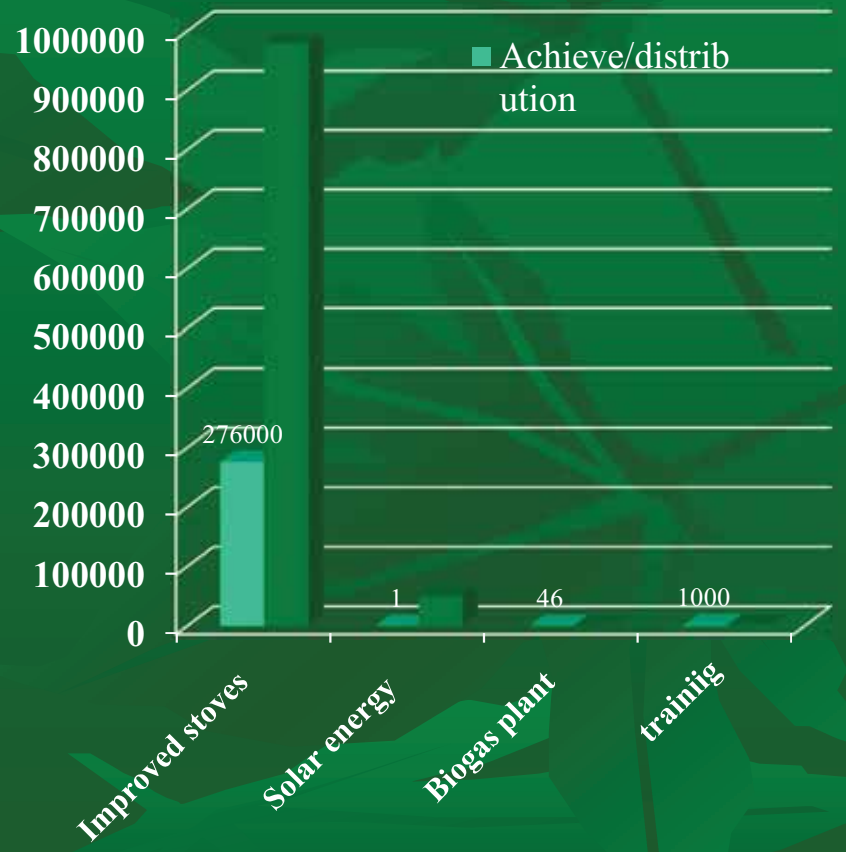
no	activities	unit	Achieve/distribution	future plan	remark
1	**Improved stoves**	**no**	**276000**	**980000**	245000/month
1.1	Meret	no	780	100000	
1.2	Tekekle /rokete	no	57000	150000	
1.3	Gonzie		720	10000	
1.4	lakech	no	165000	500000	
1.5	Beehive/Mirchaye	no	46500	120000	efficient& high demand
2	**ethanol stove**	**no**	**6000**	**100000**	1 at model
3	**Solar energy**	**no**	**1**	**50000**	At office model
4	**Biogas plant**	**no**	**46**	**100**	6 model at office
5	**trainiig**	**no**	**1000**	**1500**	

Cont..

6	Awareness creation	N0	35000	150000	
7	Research and study	no	4	4	2 Improved stoves ,1solid wast to eng, 1assesmant of energ needs&util
8	promotion	no			100000peo aware of &125
8.1	exhivition		30	40	60000people visited ,80000 is planned
8.2	permananent demonestrati centre establishing	no	1	1	20000 people visited & 25000 planed
8.3	public live coocking stove demonst	no	20000	200000	10 days package 20000people participated

DISTRIBUTION OF Renewable Energy STOVES





Efferts of the federal energy sector

Biofuel

- 11 million of *Jatropha curcas* SL were Planted in 3 regions for Bio-fuel /ethanol
- 11 mil. liter of etha nol fuel /5-10% mix/
- **720000 litter** ethanol**distributed** to HH & refugee camp
- focused on Promotion, establishing demonstration centre
- 2664263 improved stoves distributed

federal Renewable Energy source manag't

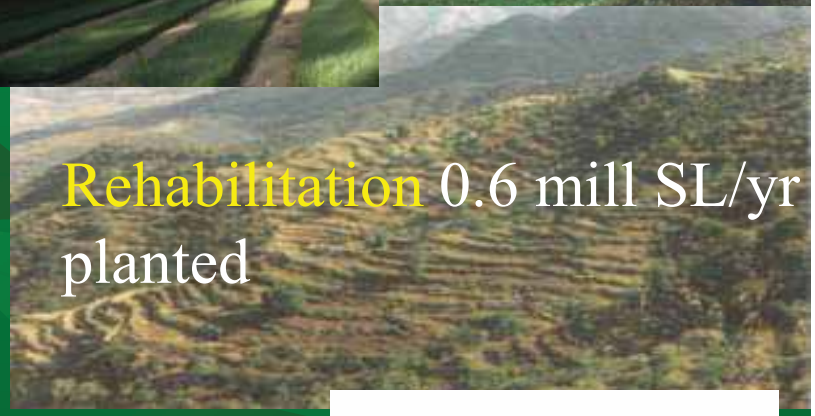
no	activities	unit	achievement	distribution	remark
1	Improved stoves	no	2664263	2664263	
1.1	Miret	no	998669	998669	
1.2	Closed stove	no	1402337	1402337	
1.3	Gonzie		139181	139181	
1.4	Daily cocker	no	11143	11143	
1.5	tekekel		2862	2862	
1.6	opesi	no	110071	110071	
2	**Bio-fuel**				
2.1	ethanol stoves	no	-	imported	Produced in2 sugar factory
2.2	ethanol fuel	liter	11 mil	720000 to HH	Produced in2

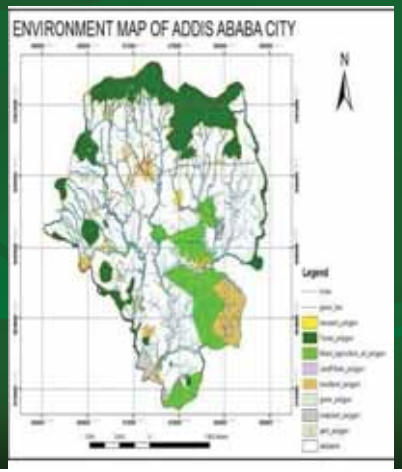
Achievements on UPUA &RE mg't

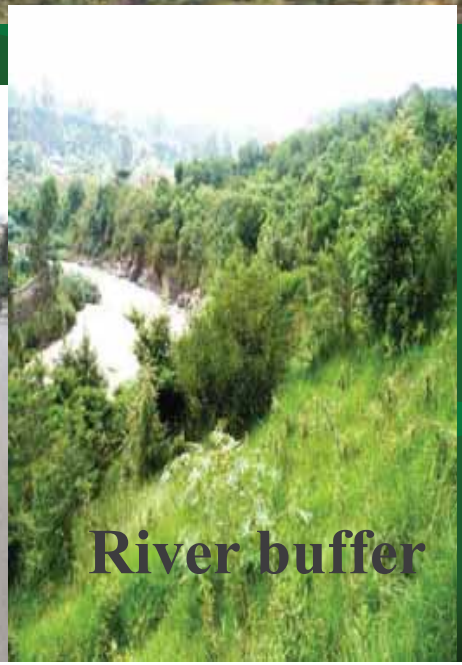
6.3 green dev't

- Rehabilitation& development
- River buffer Rehabilitation

•planting trees along the road, river buffer carried out to increase biomass, climate regulation,







7. Challenges

1. Urbanization and their impacts have the potential to disrupt the urban and peri urban ecological functions, if not checked every steps. Gap b/n production & demand

- Environmental degradation is one of the major challenges that affect urban eco-system that can affect to sustainable the food security & energy utilization.

challe cont…

2. solid and liquid waste management practices dumped on open spaces especially, drainage channels, rivers and valleys, diffic. to collect
3. Illegal settlements practices in areas allocated for green area /along the edge of river banks, upper catchment, abandoned quarry sites /i.e the agri. Land

- Climate changes Are some of the major challenges that have affected the ecology of our city.

challe cont…

4. Lack of capacity
   - Training on different topics
   - Experience sharing tours
   - lack of Technology and techniques
   - Low Level of awareness
   - Financial resources to enhance and realize the considered plans

8. Conclusion

The Addis Ababa City Government gives a better emphasis to:-

- all internal & external factors influencing the life and activities of urban ecosystem.
- Agriculture & renewable energy of the city in line with the National 5 years Growth and Transformation Plan,
- give more focus to solve the urban peri- urban challenges together with the public, national, international and other partners involved in the sector.

Let us work together

to

Improve the metropolis cities

/clean, green and safe to live

in/