MINISTRY OF WATER, IRRIGATION ENERGY
ABBAY BASIN AUTHORITY
TANA SUB BASIN ORGANIZATION

Irrigation practices and challenges
in
Tana Sub basin

NSF-PIRE KICK OFF CONFERENCE
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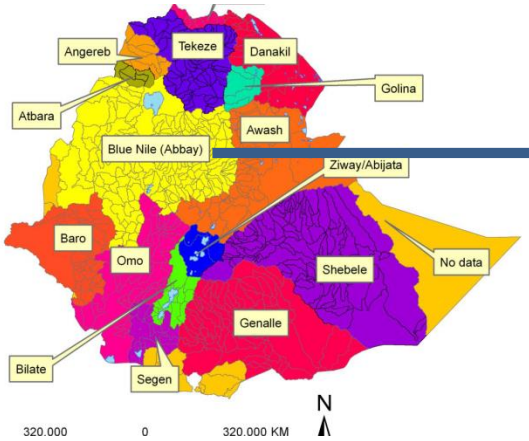
Presentation outlines

- Introduction
- Overview of Tana Sub Basin, Blue Nile Basin
- Irrigation practices in Tana Sub Basin
- Challenges of irrigation
- Opportunities of irrigation
- Expectations from this project
- conclusion

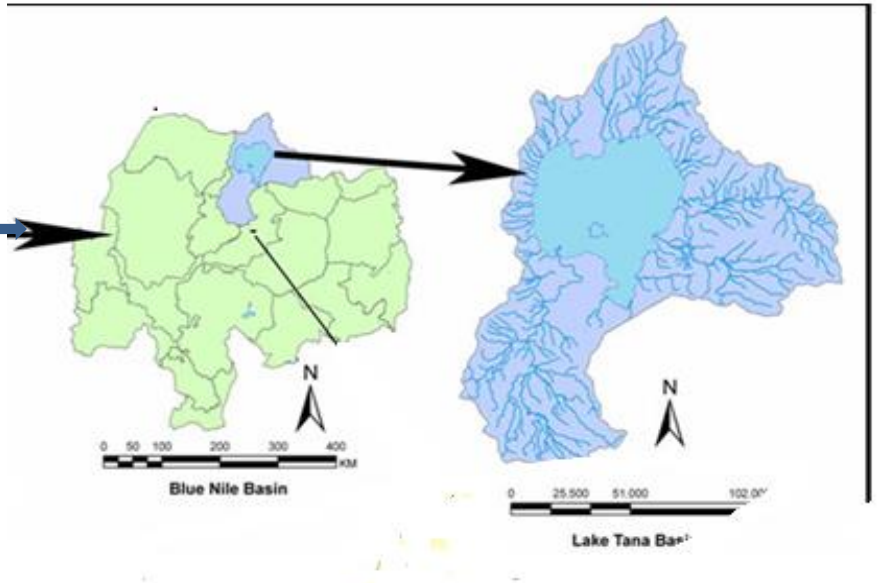
1.Introduction

- Government, donors and NGOs are investing in developing irrigation systems, especially on small-scale irrigations in Tana sub Basin. This sub basin is also one growth corridor areas in the country. But has challenges which hinders growth is this sector. If the water potentials of the sub basin is efficiently used for irrigation as well as for other sectors , it will have contribution for the sub basin and for the nation. This project with its scientific knowledge, will have its contributions to address the challenges faced in the sector.

1.Overview Of Tana sub basin



12 River Basins of Ethiopia



Abay River Basin

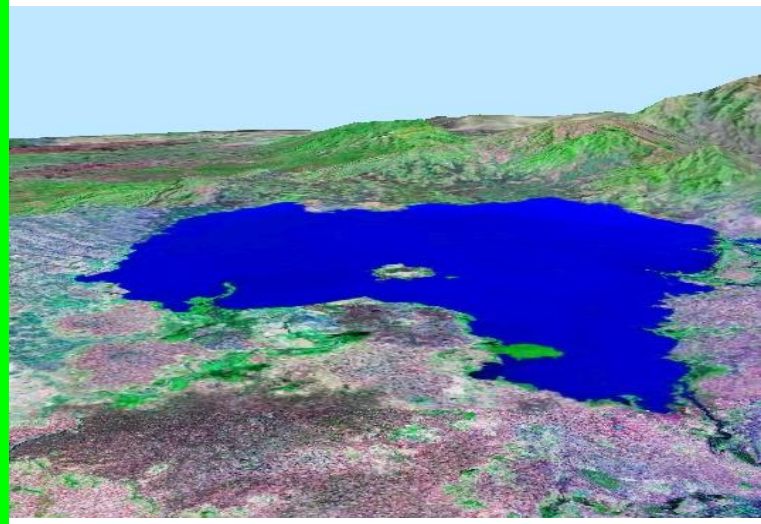
Tana Sub Basin

- Ethiopia is divided into 12 river basins, among these Abay Basin is one
- Abay River Basin is divided in to 16 sub basins, Tana sub basin is one

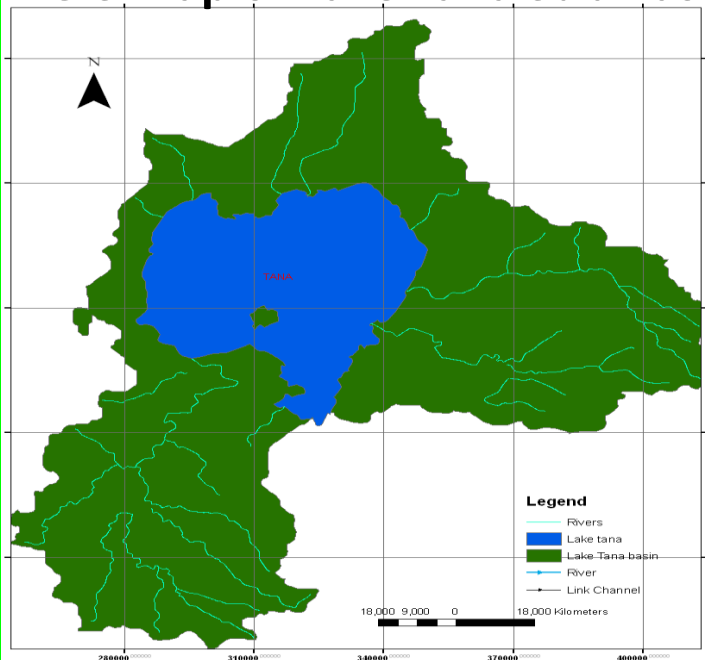
Over view of Tana sub basin---

- **Has Lake and land part(Total area at outlet is 15,321 km^2)**
  - **Land part area about 12,165 km^2 (80%)**
  - **Lake part area about 3156 km^2 (20%)**
- **One of 16 sub basins of Abay Basin**
- **Altitude 1786-4000 masl**
- **Mean annual inflow is 4,986 Mm^3y^{-1}**
  - **Lake fed by more than 60 rivers**
  - **but 93% from**
    - **Gilgel Abbay,**
    - **Ribb,**
    - **Gumara and**
    - **Megech**
- Mean annual outflow is 3,753 Mm^3y^{-1}
- Population 3.7 million

3 D View of Lake Tana Sub Basin



GIS map of Lake Tana Sub Basin



Irrigation practices in Tana Sub Basin

Current irrigation activities expressed based on schemes in the sub basin

Irrigation scheme	Cultivated area in ha	Percent of share
Modern River Diversion	6986.95	5.66
Traditional River Diversion	43651.54	35.36
Modern Spring Diversion	71.5	0.05
Traditional Spring Diversion	13101.72	10.62
Motor Pump	40954.3	33.18
Pedal Pump	183.34	0.15
Rope Pump	171.85	0.14
Pond	103.54	0.08
Hand Dug Well	12802.85	10.37
Can Irrigation	3666.74	2.97
Drip Irrigation	9.83	0.01

Future large scale irrigation plan in the sub basin

1. Koga dam irrigation (current)=7000ha
2. Rib Dam(under construction)=19925ha
3. Megech dam (under construction)=16,660ha
4. Meguch serba pump irrigation(under construction)=5254ha
5. Megech robit pump irrigation (under construction)=6532ha
6. Gumara Dam (under detail design)=13776ha
7. Jema Dam (under detail design)=7786ha
8. Gilgel Abay Dam(under detail design)=11508ha
9. Nw,NE&SW Tana, pump irrigation(under prefeasibility)=17,327ha

Total 105,768ha

Challenges of irrigation

- These challenges can be explained as technical constraints and knowledge gaps as
  1. inadequate awareness of irrigation water management as in irrigation scheduling techniques, water saving irrigation technologies, water measurement techniques, operation and maintenance of irrigation facilities,
  2. inadequate knowledge on improved and diversified irrigation agronomic practices,
  3. shortage of basic technical knowledge on irrigation pumps, drip irrigation system, sprinkler irrigations, surface and spate irrigation methods
  4. scheme based approach rather than area/catchments based approach for the development of SSI Schemes,
  5. inadequate baseline data and information on the development of water resources,

Challenges of irrigation-----

6. lack of experience in design, construction and supervision of quality irrigation projects,
7. low productivity of existing irrigation schemes,
8. inadequate community involvement and consultation in scheme planning, construction and implementation of irrigation development,
9. Poor economic background of users for irrigation infrastructure development, to access irrigation technologies and agricultural inputs, where the price increment is not affordable to farmers.

10. Access to infrastructure

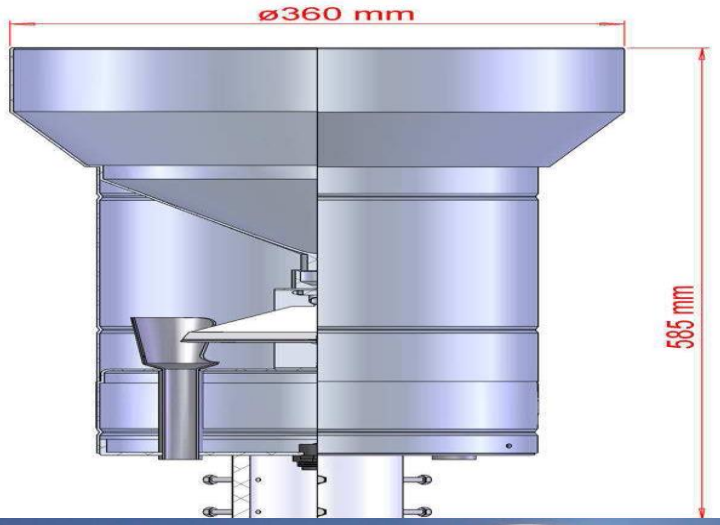
- **Smallholders have no reliable and year round access to basic infrastructure including**
  - rural roads,
  - transport,
  - communication,
  - storage facilities,
  - markets

Opportunities irrigation

- **The basic opportunistic considerations regarding irrigation developments in TaSB are**
  1. **emphasis and priorities are given to irrigation in the growth and transformation plan of the country,**
  2. **indigenous knowledge and introduction of promising household water harvesting and micro- irrigation technologies,**
  3. **Government's strong political commitment and encouragement to private sector and public enterprises involvement in irrigation development,**
  4. **abundant water resources, climate and land suitability,**
  5. **availability of inexpensive labor,**
  6. **availability of suitable lands for irrigation developments**

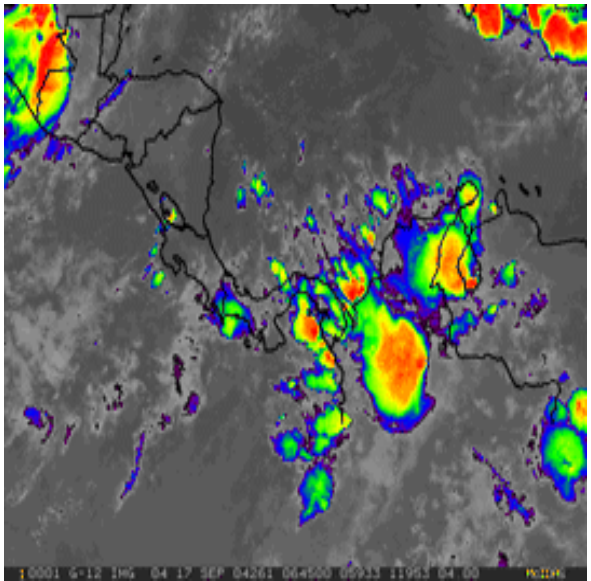
7. Establishment of modern hydrologica and basin information system

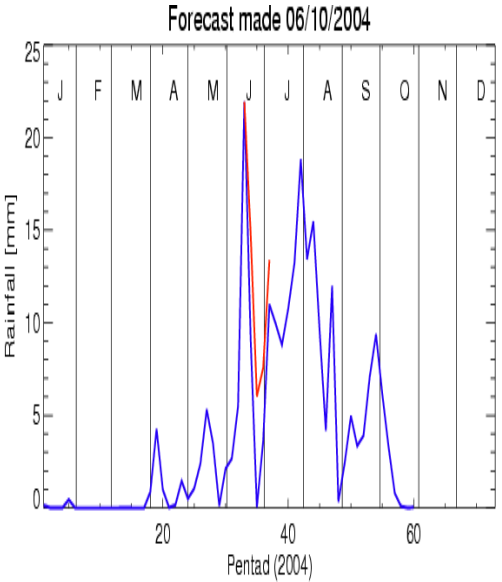
- Surface Hydrological monitoring system
- Meteorological monitoring system
- Ground water monitoring system
- Flood early warning monitoring system
- Water quality monitoring system
- Ecological monitoring system

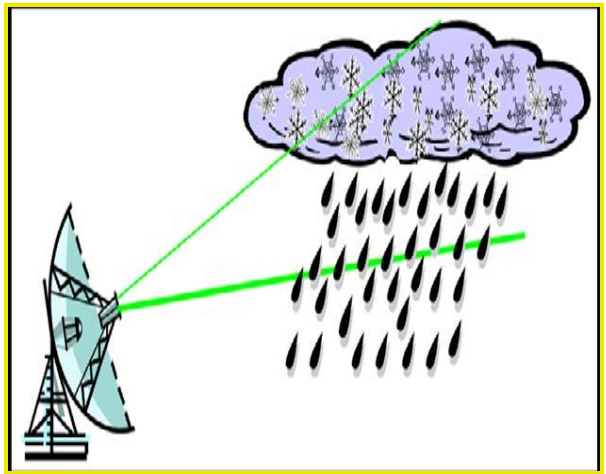


8. Weather radar system established

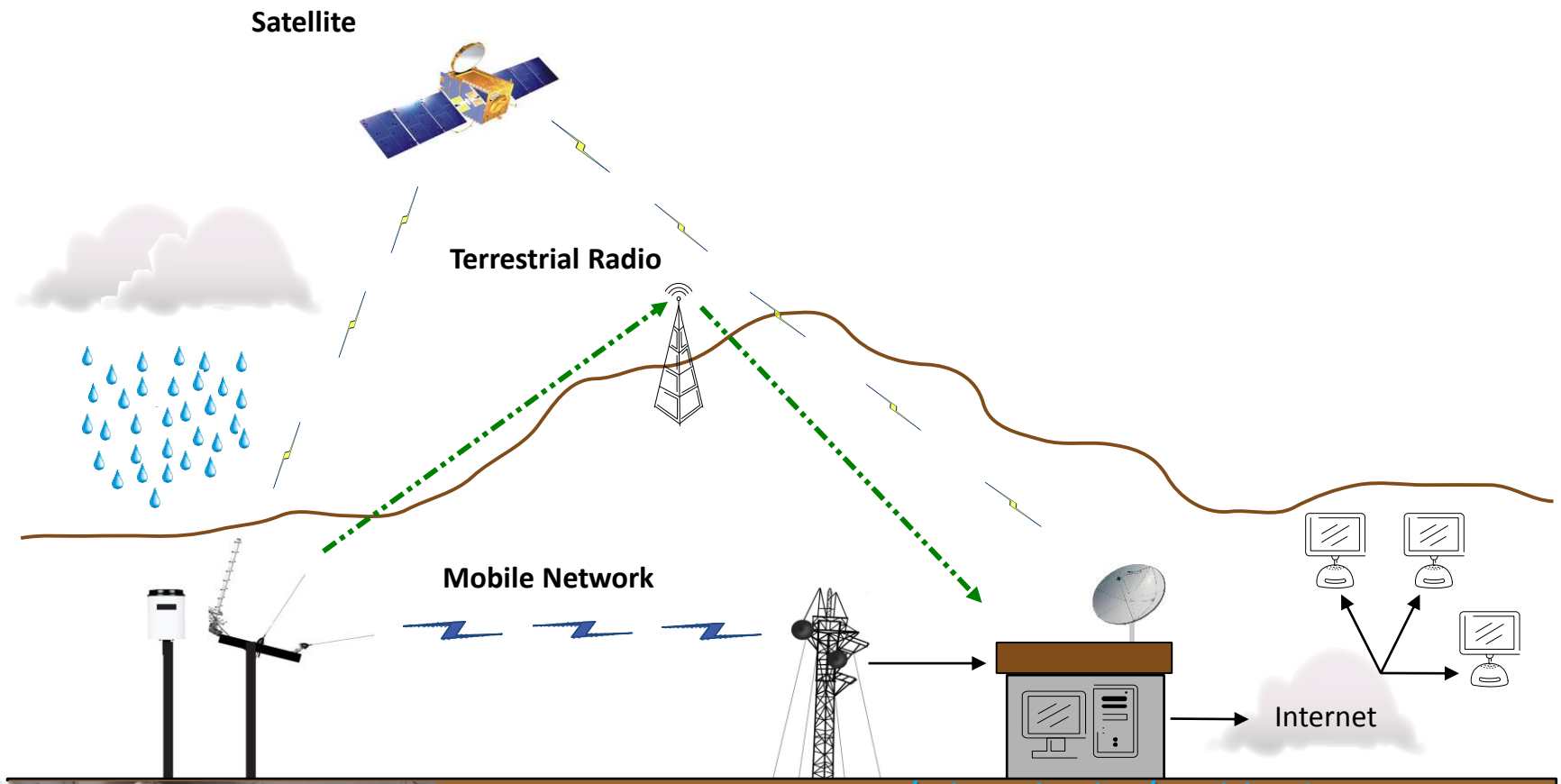
- Weather, hydrological, and flood forecasting tools &systems establishment







Illustrative Options for Real-time Telemetry



Forecast/ Dissemination/ Decision Support Center/ Operational Control Room/ Water Center

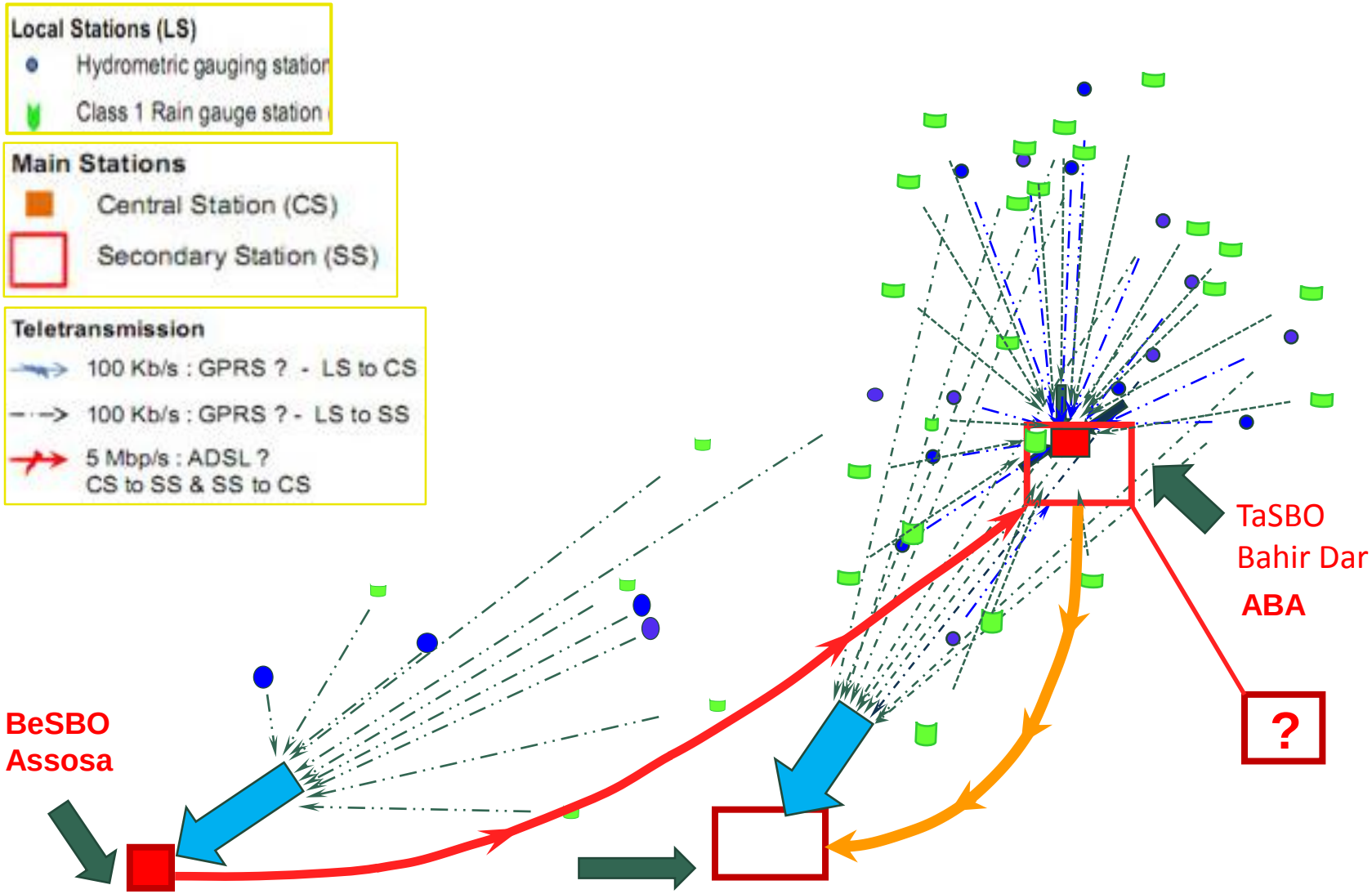
Automatic Collection & Real-time Transmission

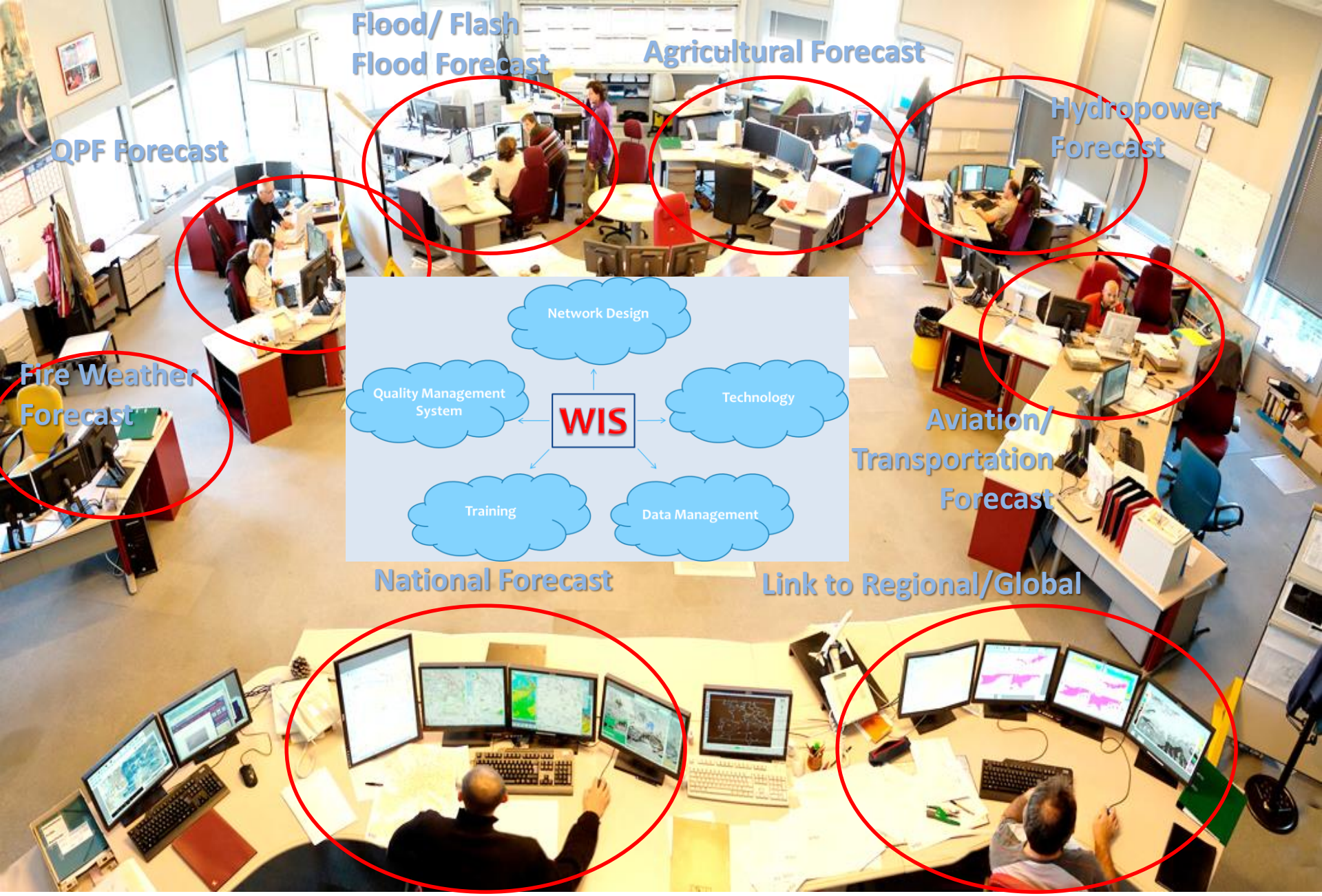
(e.g. GSM/GPRS, Terrestrial Radio, Satellite Radio, Meteorburst, broadband, etc. or combination possibly with local data logger storage backup)

9. Establishment of Basin authorities for integrated water mgt with multisystem **New building for ABA/TaSBO**

- Multidimensional videoconference system
- Research facilities
- Laboratory facilities
- Hydrological/Basin information system facilities

HIS/BIS communication network





Illustrative Ideal National Hydromet Service Forecast Center

Expectations from this project

- Assessments of how do farmers manage irrigated agriculture
- Assessment of the contribution of irrigated agriculture to household income and sub basin, country?
- What are the problems encountered by the irrigation systems?
- Development of different models including;
  - Simulation models(planning and real time water allocation models)
  - Multicriteria analysis models(trade off analysis)
  - Optimization models(maximize total benefit)
- others

conclusion

- To reduce environmental, and socioeconomic impacts, an integrated approach of water resource management is crucial
- efficient irrigation system is the main components for water management

Fig 2 Schematic Presentation of the Cumulative Impact of Ongoing and Planned Activities on Lake Tana & its Environment

Degraded watershed

Upper catchment degradation results in erosion and downstream siltation

Proposed & ongoing irrigation Dams

Domestic Water supply requirement 0.0537 BCM

Dams alter downstream flow and hamper the up & downstream movement of fish

Proposed irrigation fields

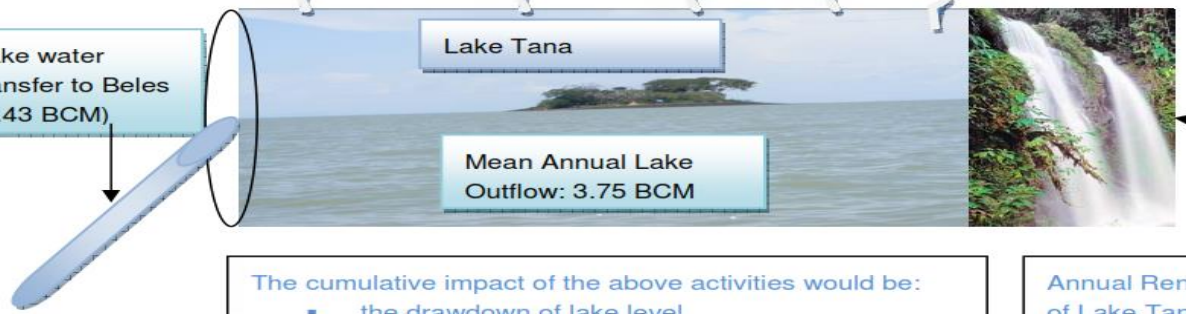
Net irrigation requirement 0.5 BCM

Irrigated agriculture will consume water that usually flows to the lake and the return (drainage) will be more polluted with agro-chemicals

Wetlands around Lake Tana

Flood plains and wetlands will no longer be flooded which eventually reduces ground water recharge, the productivity of recession agriculture and biodiversity. It also lacks flittering ability of pollutants and other ecological function

Lake water transfer to Beles (2.43 BCM)



Release from the lake for the fall & ecological use (0.89 BCM)

The cumulative impact of the above activities would be:

- the drawdown of lake level,
- pollution of lake water by agro-chemicals,
- shrinkage of wetland,
- distraction of biodiversity,
- reduction in fish and other aquatic life
- siltation of lake and reservoirs

Annual Renewable Water of Lake Tana = 3.75 BCM

Annual Water Demand = 3.87 BCM

Annual Water Demand > Annual supply

THANK YOU FOR ATTENTION !!!