Flood-based farming in Tigray: Status, Potential and investment perspective

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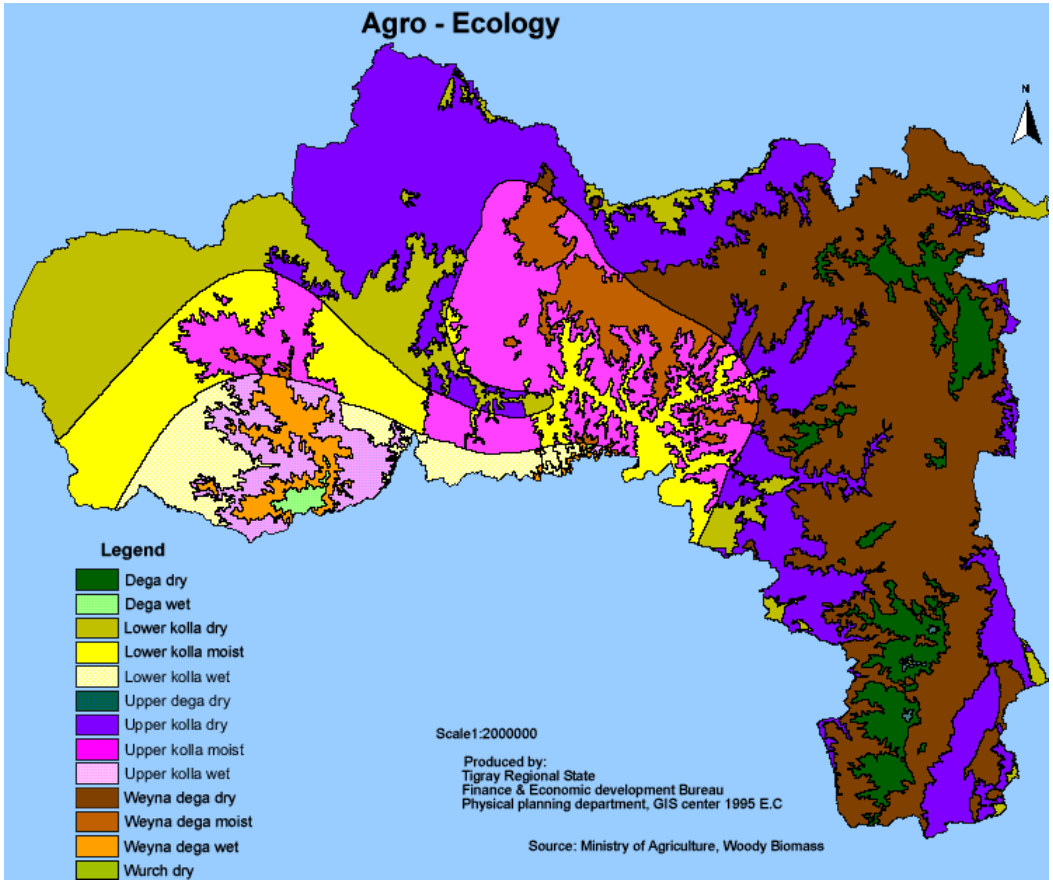
INTRODUCTION

Tigray region has :

- Area of 41,409.95 Km^2
- Total arable land is estimated as 1.3million ha and out of this 907,070ha is owned by farmers
- Population of 4,316,988 with the proportion of 2,126,465 men and 2,190,523 women.
- Rural inhabitants number 3,472,948 or 80.45 %

Source: CSA 2008



- Agriculture is almost entirely dependent on rainfall that is both seasonal and highly variable from year to year

INTRODUCTION … con'd

- The inhabitants of the areas have struggled for years with drought, and serious water-related challenges to agricultural productivity.

- Soil is severely eroded, with little or no topsoil in many areas.

- Therefore the regional government together with the people must seek a solution to maintain their livelihood condition. Accordingly, floods are becoming the only source of livelihood. Then finally yet importantly a notion flood based farming has come in to being.

INTRODUCTION … con'd

What is Flood-based farming?

The use of: often unpredictable and occasional destructive water supply

From: Impermanent and seasonal, semi perennial and even perennial rivers

Through:

- Spate irrigation – direct diversion of flashy floods
- Flood inundation and recession: rivers overflow their embankment and flood huge adjacent areas
- Flood spreading weir
- Flood harvesting Dams

For multiple use: Crop, rangeland and agro-forest production, domestic and livestock water supply, recharging Groundwater *(Spate irrigation network presentation by Embaye, 2013)*

FLOOD BASED FARMING-STATUS where we are?

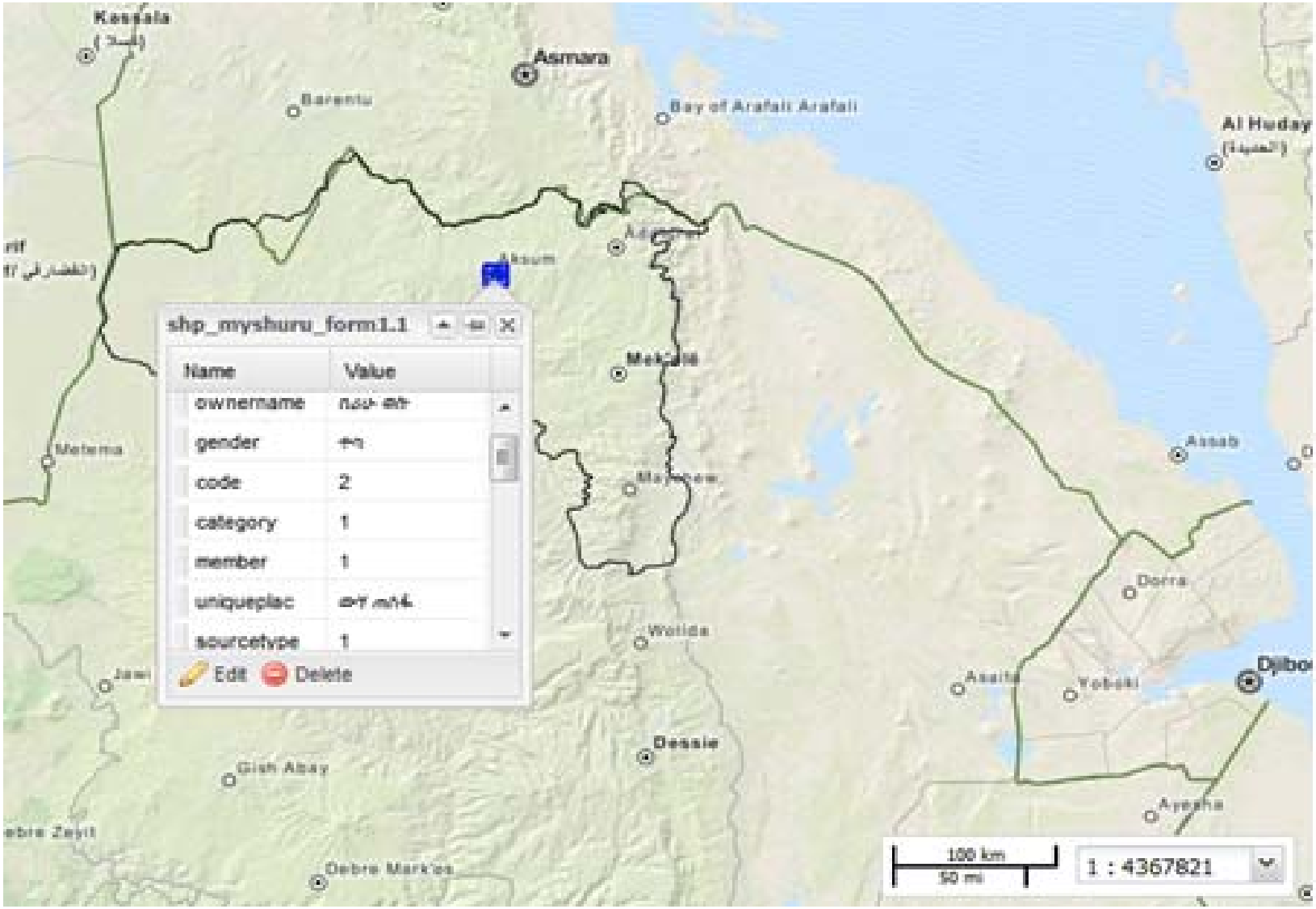
- The regional government has planned a development strategy, which focused on expansion of this irrigation development infrastructure by utilizing the land and water resources of the region efficiently under the concept of Flood based Farming systems .

- Thus, this concept will help to utilize the flood amount that comes from those mountains as maximum as possible in order to sustain the livelihood of the inhabitance the region rather than its devastating nature.

STATUS, sofar

Structure type	Quantity
Individual pond	14362
Community pond	611
Spate modern with traditional	382
Diversion	2802
Check dam	3039
Spring dev‘t	12340
Traditional diversion	2330
Shallow well	189
Deep well	213
Dam	82
Lift irrigation	209
Series of ponds	230
underground Tanker	1527
Tankers	40

- 121,106 irrigation structures for full time irrigation
- 115,517 structures for supplementary irrigation are developed so far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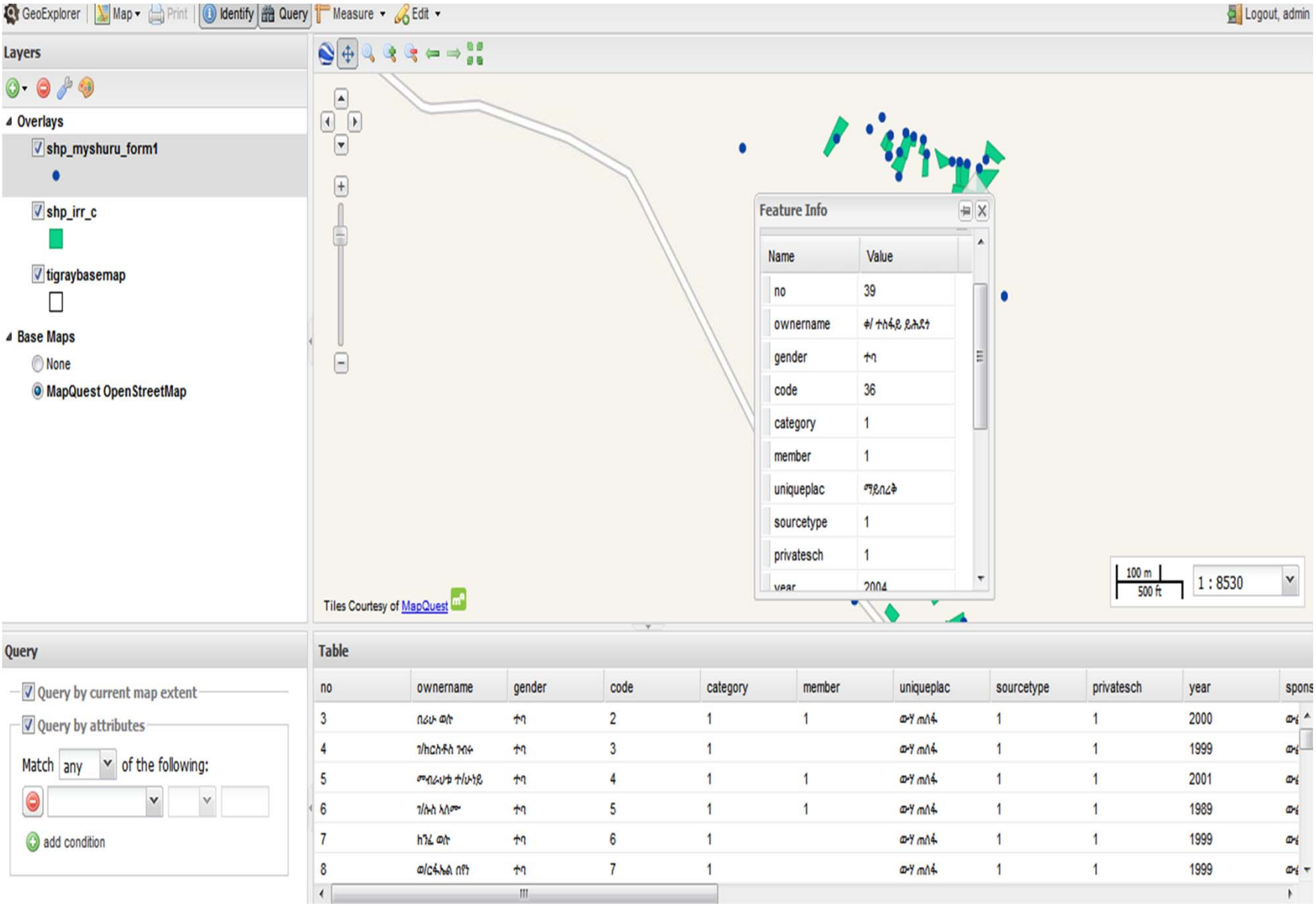
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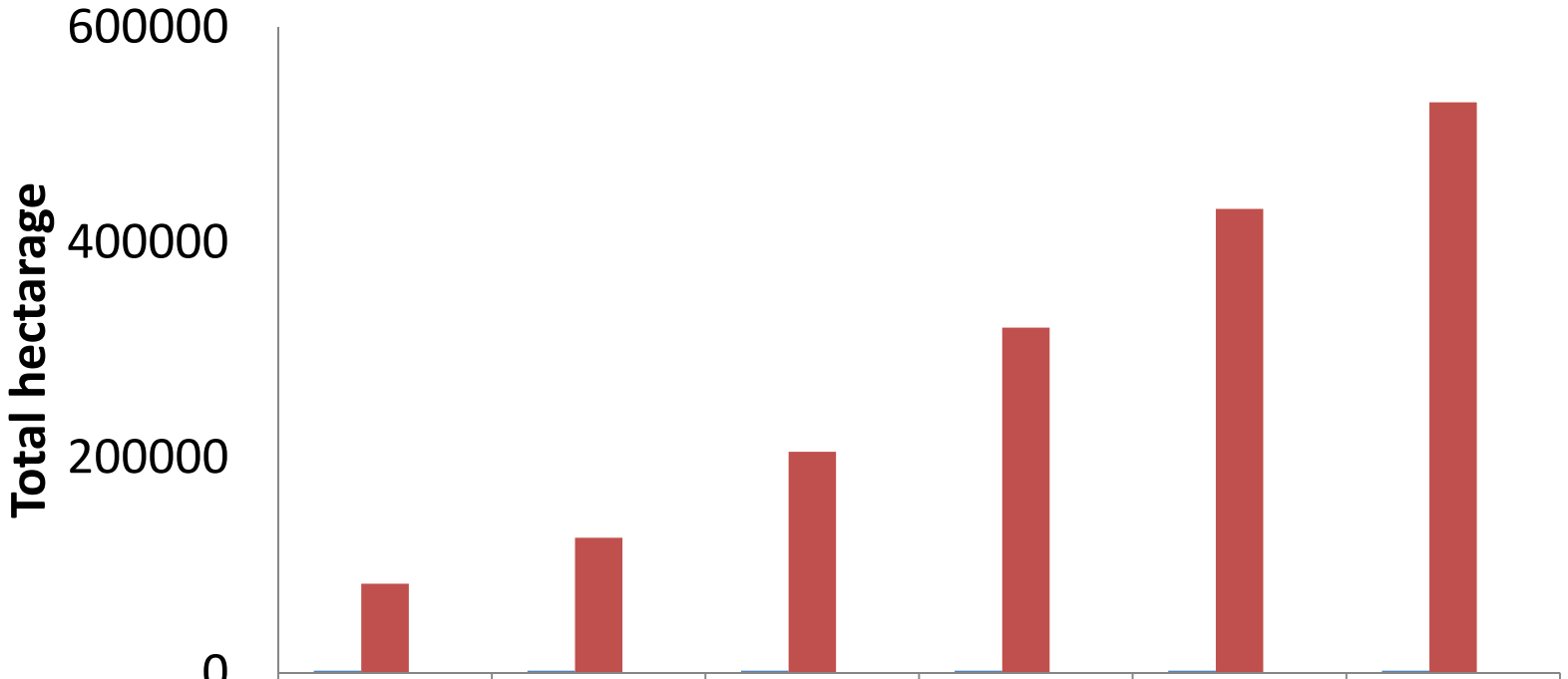
STATUS, sofar

Irrigation Development



	2002	2003	2004	2005	2006	2007
Year	2002	2003	2004	2005	2006	2007
Hectar	82893	125558	205427	320929	431206	530281
GTP-1	9,21%	13,95%	22,83%	35,67%	47,92%	58,93%

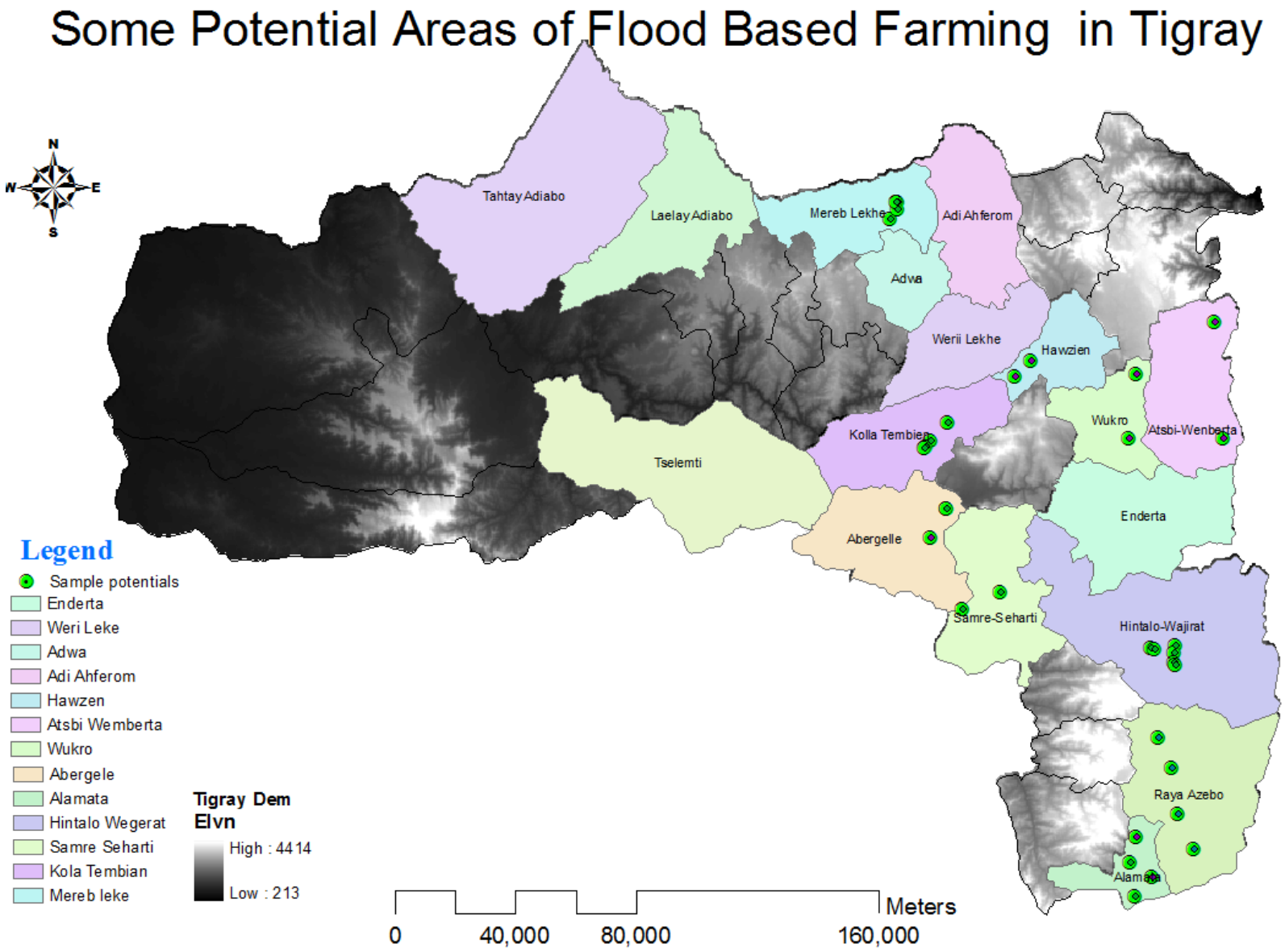

12:18

Series of underground tankers at Kola Tembian Wereda

Communal ponds at Enderta Wereda

check dam in Ahferom Wereda

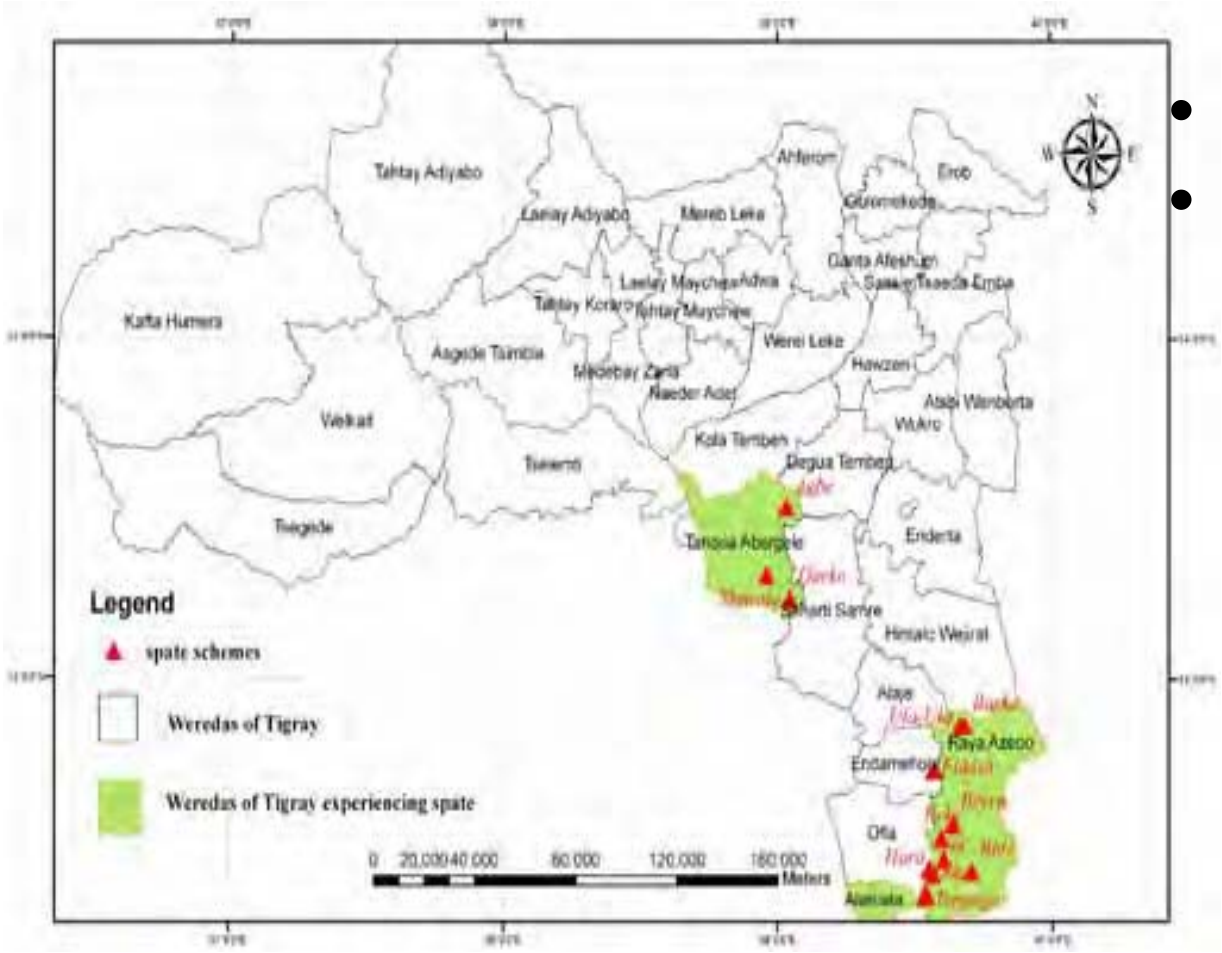
FLOOD BASED FARMING -PONTENTIAL



FLOOD BASED FARMING PONTENTIAL

S/N	Name of the wereda	Watershed Area (Km^2)	Rainfall (mm)	Potential Flood (10^6m^3)	Potential Command (ha)	Estimated Command (ha)
1	Mereb leke	2000	578	346.80	24771	30,000
2	H/Wegerat	3500	600	630.00	45000	50,000
3	Abergele	3500	550	577.50	41250	25,000
4	S/ Samre	3000	658	592.20	42300	25,000
5	R/Alamata	3700	765	849.15	60653	35,000
6	Raya Azebo	3000	550	495.00	35357	80,000
7	Enderta	2000	590	354.00	25285	50,000
8	K/Tembian	2000	958	574.80	41057	30,000
9	D/Tembian	1500	750	337.50	24107	15,000
10	A/Ahferom	2000	700	420.00	30000	20,000
11	Adwa	2000	775	465.00	33214	30,000
12	Hawzen	2000	600	360.00	25714	40,000
13	T/ Adyabo	4000	800	960.00	68571	100,000
14	L/Adyabo	2000	900	540.00	38571	40,000
15	Tselemti	4000	1200	1440.00	102857.1	100,000
16	Wukro	1800	600	324.00	23142.86	25,000
Total				9265.95	661853.6	695,000

SPATE IRRGATION- PONTENTIAL



Tigray regional state: location and boundaries of its 34 woredas (Embaye, 2012)

- Potential:80,000 ha
- Annual rainfall:
  - ✓ highlands around 800 mm but that of
  - ✓ lowlands is less than 350 mm.

Spate irrigation Practices in Tigray

- In the region there are more than 20 modernized schemes which are started from 1998
- The main objectives of modernization were:
  - ❖ To increase the command area that could be irrigated per unit of water thereby increasing the productivity of water.
  - ❖ To sustain spate irrigation usage as many years as possible.
  - ❖ To reduce the cutting of trees thereby reducing the negative environmental impact
- But, the modernization is not effective as it was anticipated for so many technical and socioeconomic reasons

Characteristics of Spate Irrigation

- Floods are unpredictable in
  - ✓Occurrence
  - ✓Frequency and
  - ✓Magnitude

- Flood stays for short period of time (mostly in hours)
- High sediment concentrations

Design Improvements

- ✓Open off takes
- ✓Siphons and pipes avoided
- ✓Flexible diversion angles

FLOOD BASED FARMING - INVESTMENT

River diversion

S.no	Scheme name	Construction Cost	Irrigation capacity	Cost/ha
1	Hiyana	2,638,860.09	25	105,554.40
2	Mahdigo	1,927,945.50	25	77,117.82
3	Membahbah	964,913.07	16.4	58,836.16
4	Ruba-Kebabo	1,818,057.53	25	72,722.30
5	Diblo	4,086,037.50	35	116,743.93
6	Mai-shewash	6,334,609.43	50	126,692.19
7	GerebHidaro	7,166,139.84	80	89,576.75
8	Ayni-Mendedo	3,932,112.73	34	115,650.37
Average		**3,608,584.46**	**36.3**	**95,361.74**

Source- IFAD_PASSIDP Tigray Coordination Office

Cost Indication

Dam

S.no	Scheme name	Cost (Birr)	Command area (ha)	Cost per ha
1	Serenta	205,000,000.00	450	455,555.56
2	Seysa	170,000,000.00	450	377,777.78
3	Hangoda	120,000,000.00	400	300,000.00
4	MihtsabAzmati	440,000,000.00	2000	220,000.00
5	Dora	300,000,000	300	1,000,000
6	Grindeho	260,000,000	400	650,000
7	Kaza	1,867,000,456	10,000	186,700
Average			1833	461,323

Spate

S.no	Scheme Name	Cost (Birr)	Command area (ha)	Cost per ha
1	Oda	11,552,121.84	420	23,809.52
2	Mersa	10,789,486.49	430	23,255.81
Average		11,170,804.17	425	26,284.25

Source- Tigray Bureau of Water Resources

Summary

	Flood based farming				Low Flow Diversion
	Spate	Community Ponds	Dam	Wells	
Average Investment cost Birr per ha	26,284	30,000	463,323	45,000	95,362 Birr
Number of cultivation per year	once	once	Two-three	Two	Two-three
Reliability	Less	High	High	High	High
Potential sites availability	Exist (very high)	Exist (very high)	Exist (high)	Exist (medium)	Almost explored (finished)

Conclusions and Recommendations

Conclusions:

- Flood base farming is a complex way of farming system in which farmers need to understand

- Therefore, we can learn :
  - ✓ How to live with floods?
  - ✓ How to transform flood from source destruction to source of livelihood?
  - ✓ How we make the flood management cost effective?
- So far, there are a lot of records of indigenous knowledge in some weredas of Tigray in understanding the behavior, importance and benefits of flood based farming. This needs to spread out all over the region

Recommendation

- Development and implementation of integrated packages
- Water balance studies for the entire watershed, soil erosion and sediment load.
- Formulation and implementation of effective measures to mitigate sedimentation problems
- Design and construction of appropriate, low-cost diversion/off-take structures
- Command area development and management

Capacity building

- Woreda and regional level staff need training on:
  - ✓ Flood-based irrigation design, improvement and development
  - ✓ Construction procedures and supervision
  - ✓ Sustainability of schemes Operation and maintenance
  - ✓ Agronomic practices
- At community and farmer level
  - ✓ Sustainability of schemes Operation and maintenance
  - ✓ Trainings on establishing and running cooperatives or water user associations.
  - ✓ Farmer to farmer knowledge sharing and exchange
  - ✓ Practical skills for enhancing livestock productivity


Thank You!