Communication and Dissemination of Community based Flood Information System in Bangladesh

Ahmadul Hassan

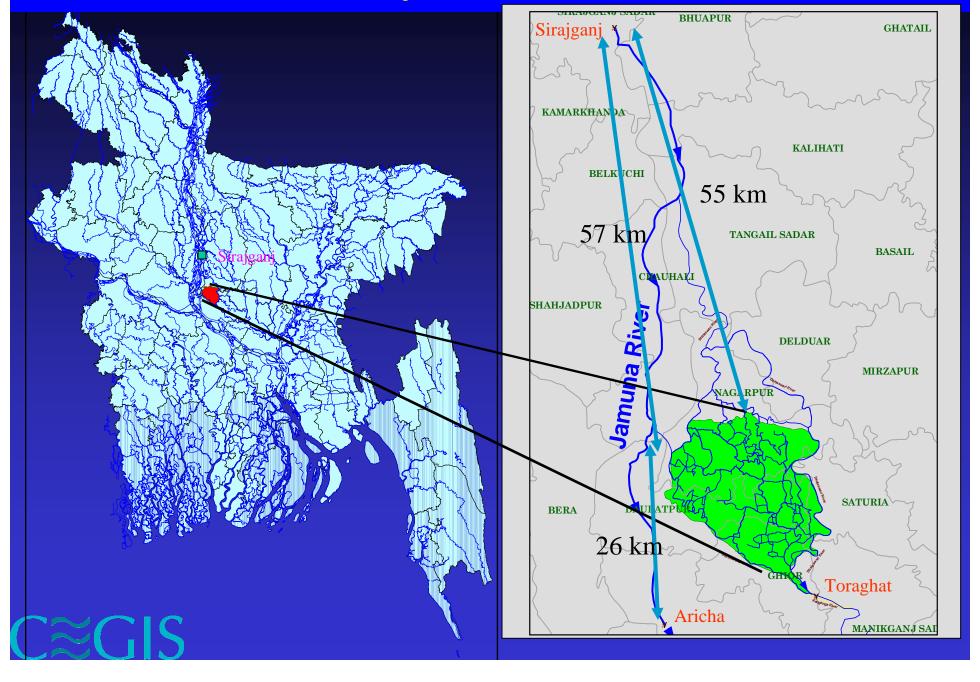


Objective of CFIS

Dissemination of Flood Level information to the community with a lead time before the flood occurs



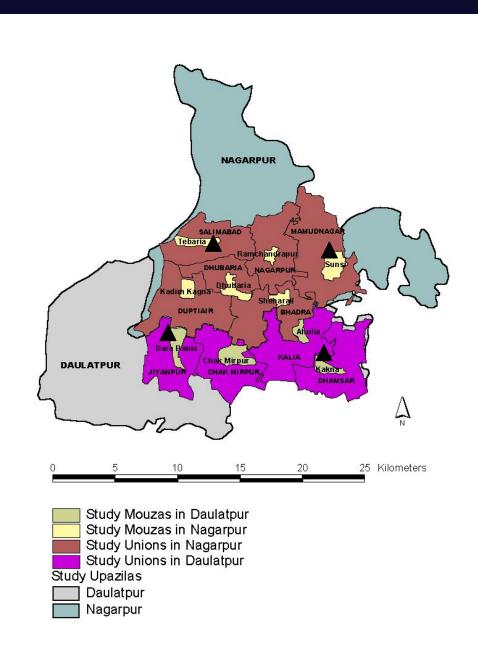
Project Location



Information and Dissemination

COMMUNITY

- Information mechanism directly to the community level
- Flag and BillboardNetwork
- Improves lead time
- Requires little or no literacy
- Field tested:
 - Calibration
 - Local Operators
 - Capacity Building

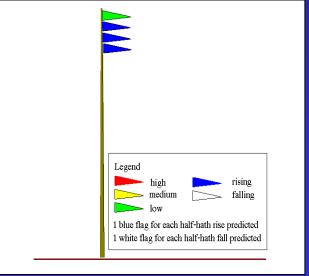


Need: Format of Information Dissemination

COMMUNITY

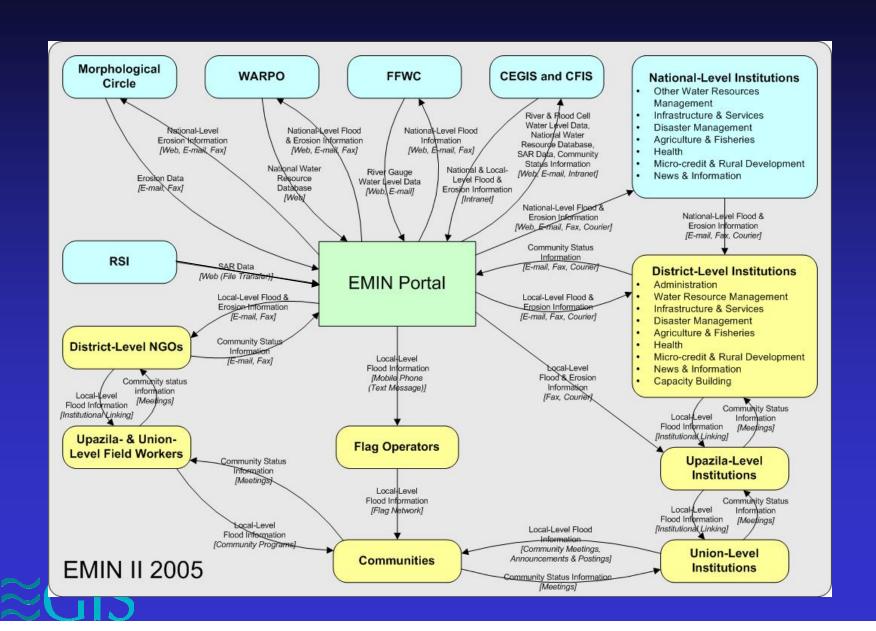
- Billboard Network:
 - Predicted flood extent on high-resolution image of community
 - Predicted trend and relative water level rise
- Flag Network:
 - Predicted water level rise when close to or above danger level







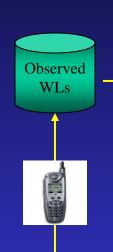
Information Network Portal



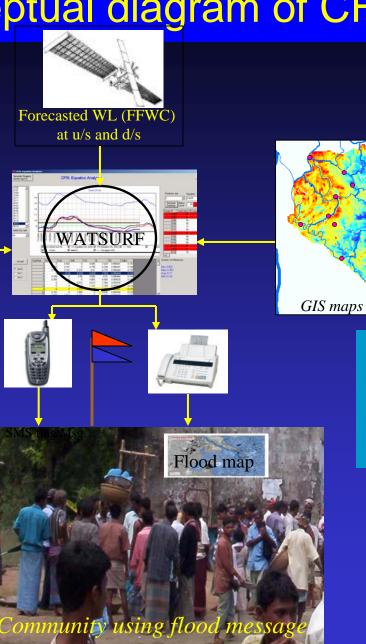
Conceptual diagram of CFIS



- GIS Riv Networks
- FFWC WLs



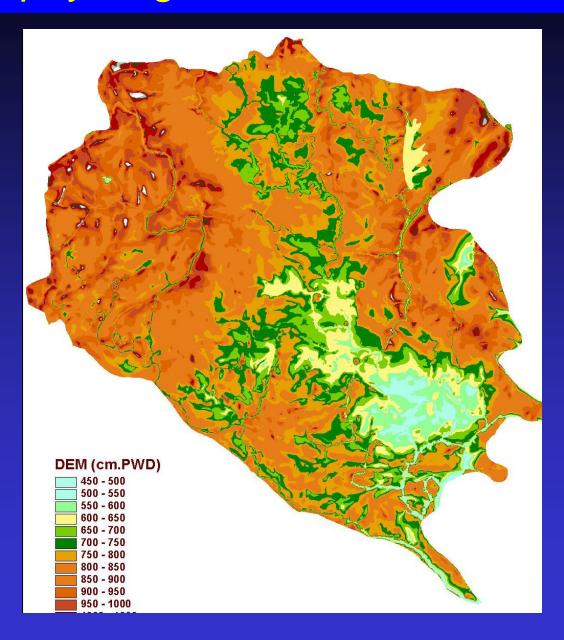




Output:

- WL change after 48 hr in terms of 'Bighat'
- inundation maps

Topography: Digital Elevation Model (DEM)





Development of CFIS tool: WL Measurement

- In 2003 17 gauges
- In 2004 18 gauges

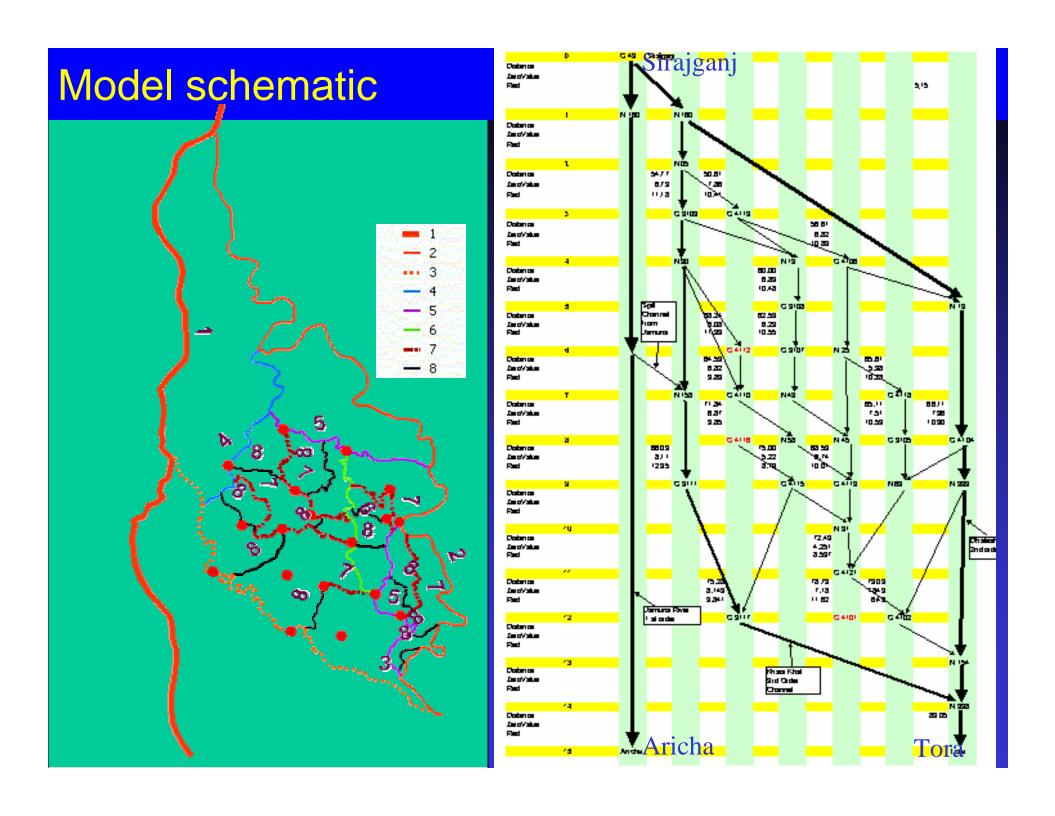
Key water level gauges

Gauge 49: Sirajganj

Gauge 50.5: Aricha

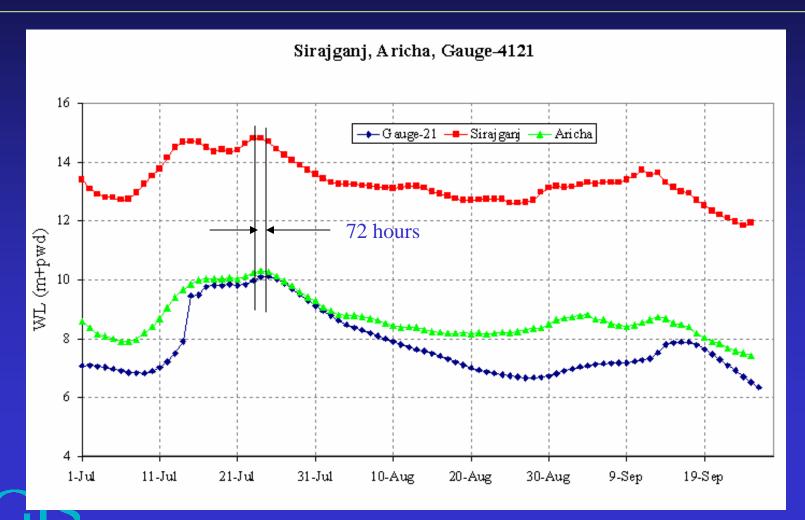






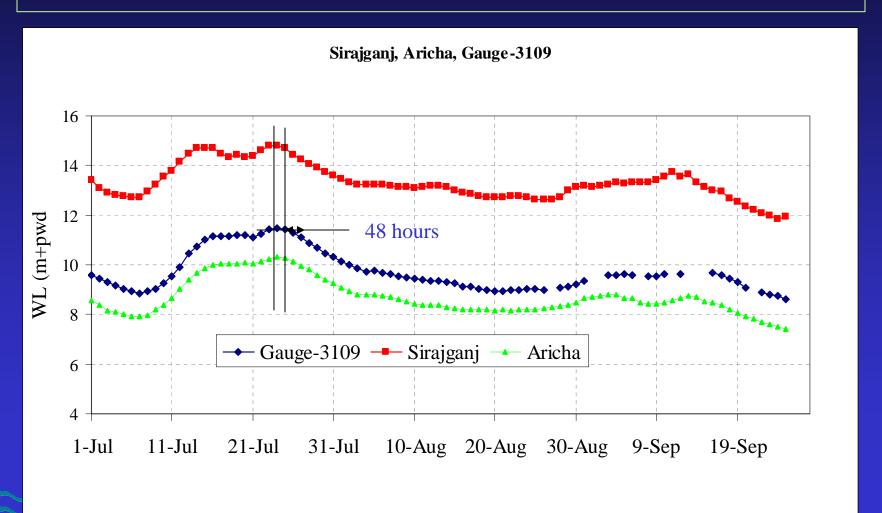
Development of Relationships

The lag-time for Sirajganj to reach each individual gauge is estimated by studying the hydrographs before the equation is derived.



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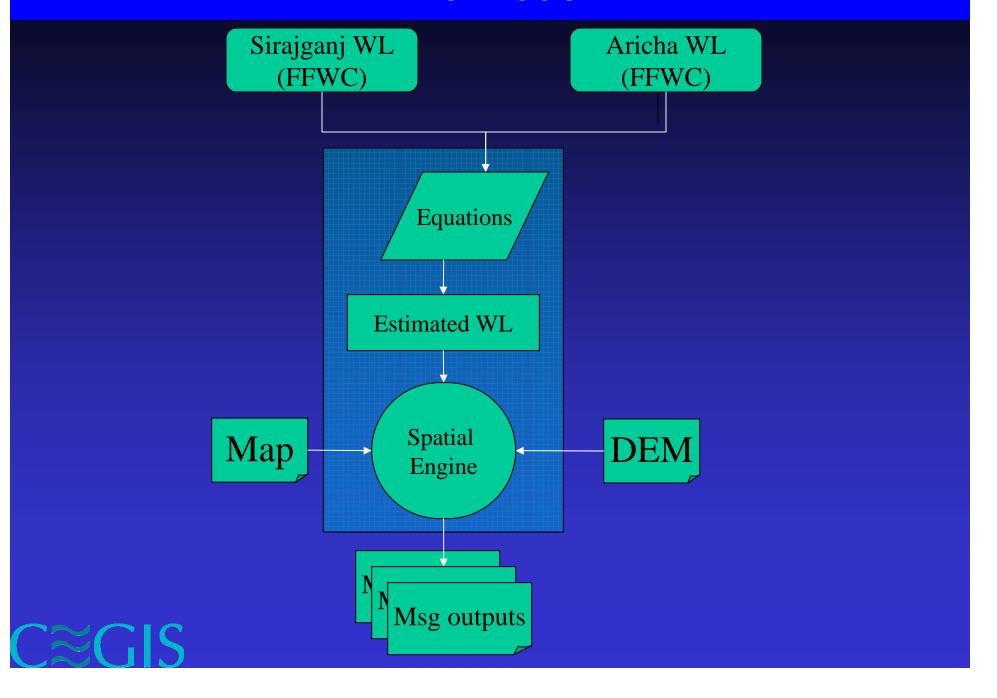
Development of Relationships

WL at any gauge in the study area is function of water level at Sirajganj (considering the lag time) and Aricha

15 Equations have been developed for each Gauge



The Model



Community flood risk level

No Color **Below Normal** Flood **Normal Flood** Green Yellow Moderate Flood Severe Flood Red



Flood levels are being marked on concrete pillar



Community Flood Message

Water level change	Flag	Description	
Today flood status	Top flag: No flag, Green, Yellow, Red	No flag – the water level at gauge is at below the Normal Flood level Green – the water level at gauge is within the Normal Flood range Yellow – the water level at gauge is within the Moderate Flood range Red – the water level at gauge is above the Moderate Flood range	
Water level after 48 hr	Except the topmost flag	No Flag - WL change < 1 bghat (22 cm) White Flag - decrease of WL Blue Flag - increase of WL	





Local Level Product List

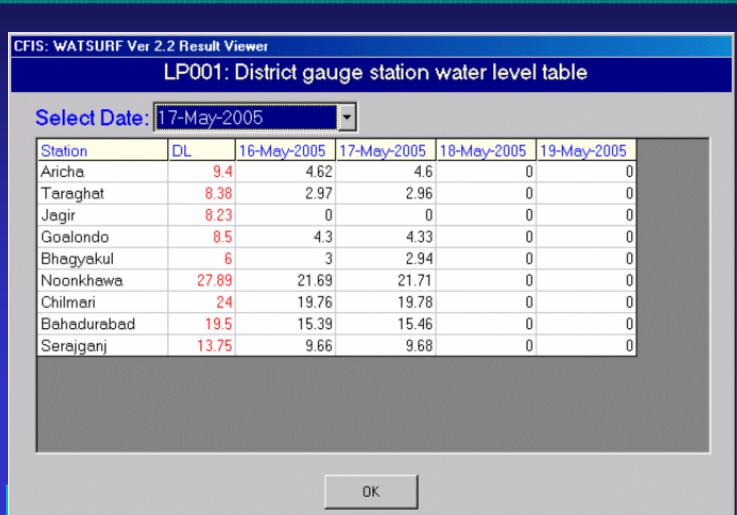
Six types of flood forecasting products from tool WATSURF for dissemination through its network

- 1. District level gauge water levels
- 2. Upazila gauge station water level map
- 3. Upazila gauge station water level table
- 4. Mouza water level forecast table
- 5. Community water level change forecast flag signal



Local Level Product – 1 (District)

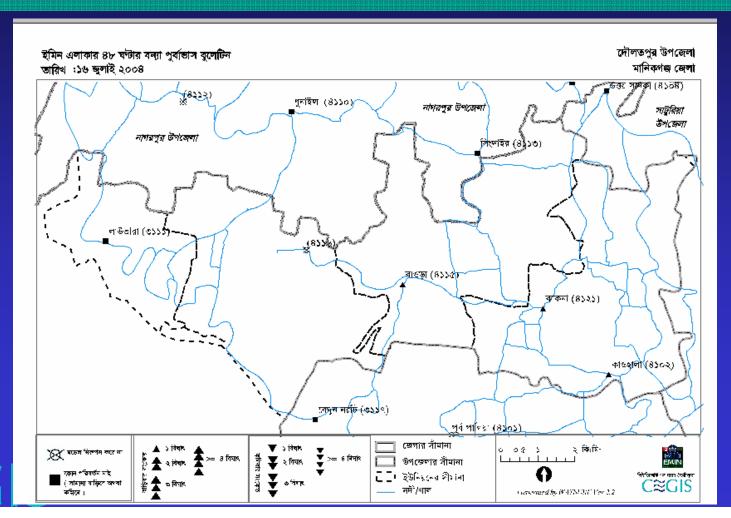
This product represent flood situation at district level as predicted by FFWC at and around the Tangail and Manikganj





Local Level Product – 2 (Upazila)

Water level changes in gauges at Upazila level in the form of symbols representing rise/fall in local units. The maps are faxed to the DC and UNO offices



Local Level Product – 3 (Upazila)

The water level changes in next 48 hrs in Tabular form are faxed to Upazila HQ

ইমিন গেজ স্টেশন ভিত্তিক বর্তমান ও আগামী ৪৮ ঘণ্টার বন্যা পুর্বভাষ

উপজেলা: দৌলতপুর

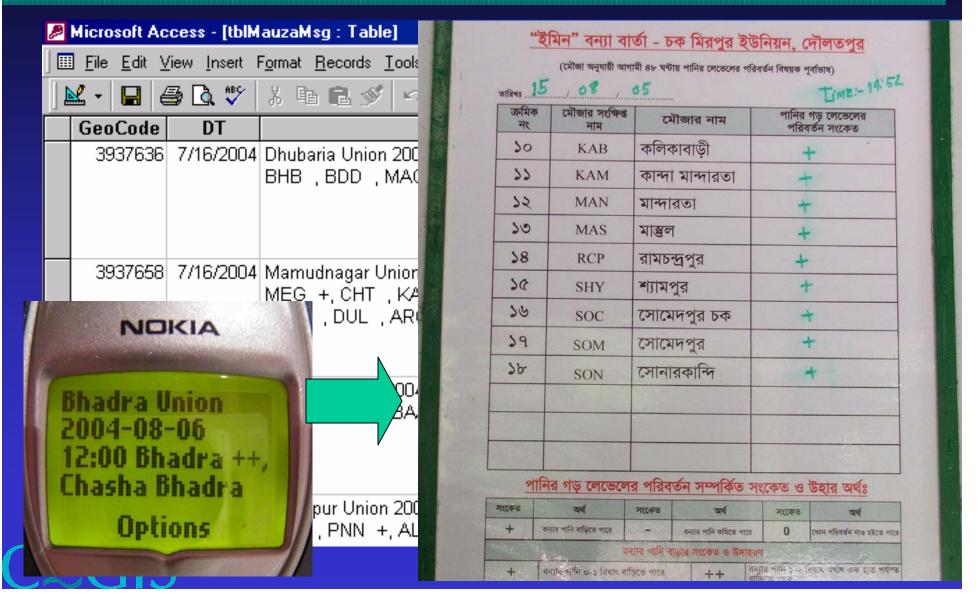
তারিখ: ১৬ জুলাই ২০০৪

গেজ	গেজের অবস্থান	বর্তমান পানির	৪৮ ঘশ্টা পর	পরিবর্তন	
নং		লৈভেল	পানির লেভেল		
		(m+PWD)	(m+PWD)	পরিমান	পরিবর্তন
				(cm)	
8\$0\$	কাওহালা, ধামস্বর	৯.৪৮	৯.৮২	9 8	বাড়িবে
٥٢٢٥	লাউতারা, জিয়নপুর	\$0.09	\$0.0€	-7	কমিবে
8770	সিংদাইর, ভাদরা	৯.৯৪	১০.২৬	2	বাড়িবে
8776	বাওড়া, কলিয়া	৯.৪৩	৯.৭৬	9	বাড়িবে
8545	কাকনা, ধামস্বর	৯.৭১	১০.০৬	9 8	বাড়িবে



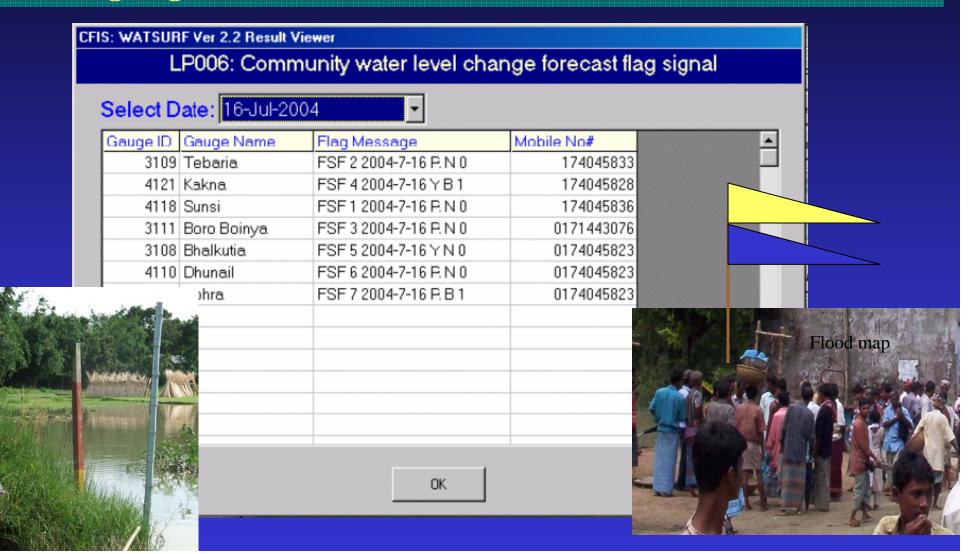
Local Level Product – 4 (Union)

Flood message for all Mouzas within the targeted Union through SMS, and subsequently displayed on bulletin board



Local Level Product – 5 (Mauza/Community)

Flood message for flag site/Mouza through SMS for hoisting warning flags.

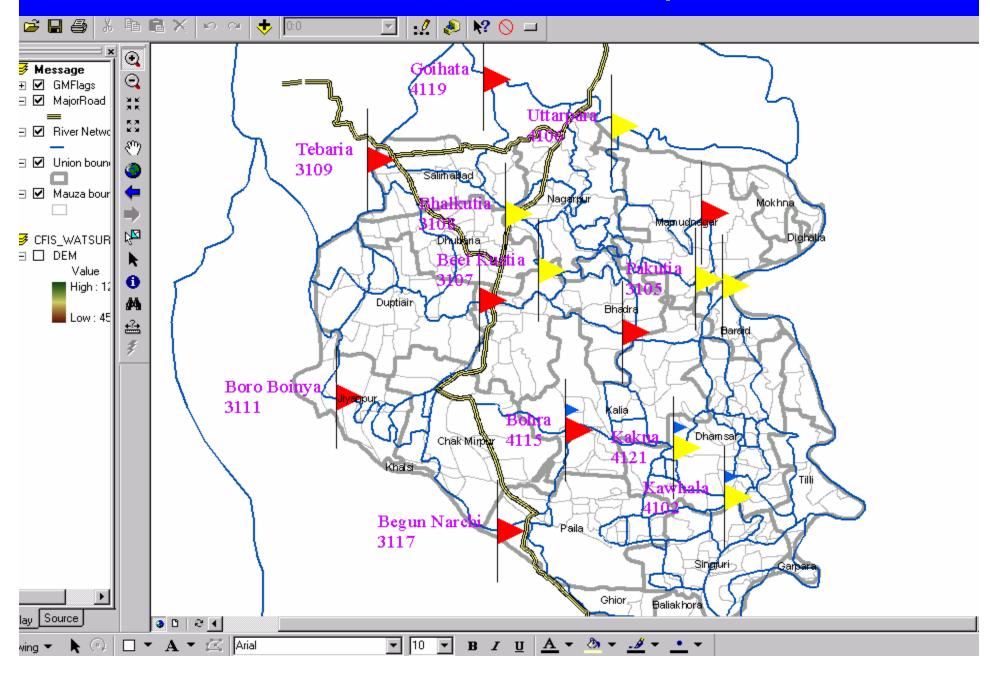


Other Products

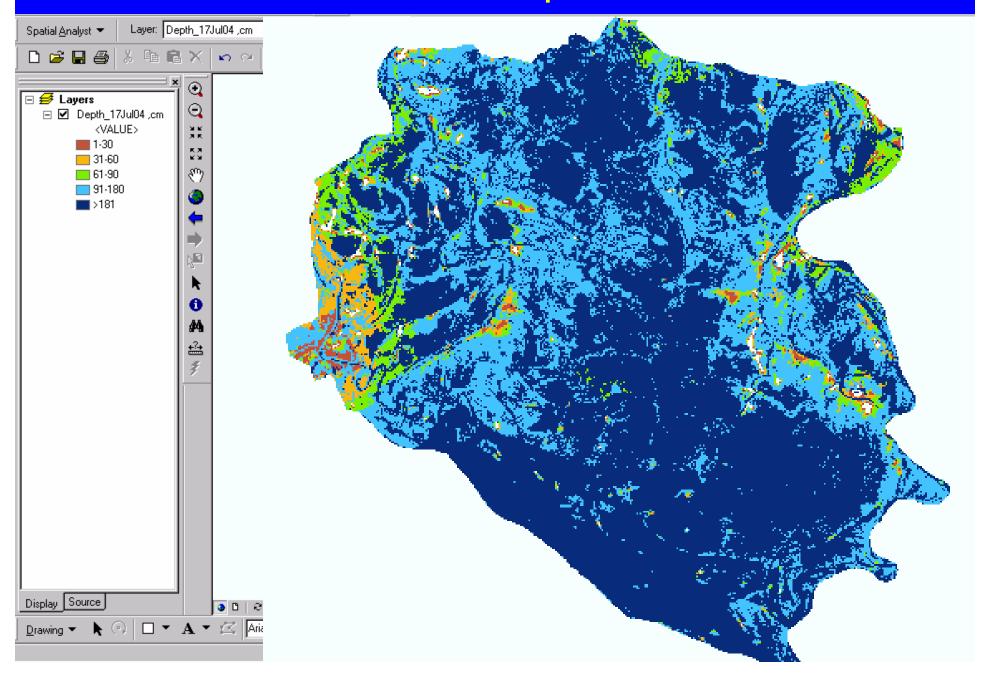
- Flag maps using WATSURF
- •Flood Extent using RADARSAT Image
- Monsoon Land Use mapping



Other WATSURF Outputs

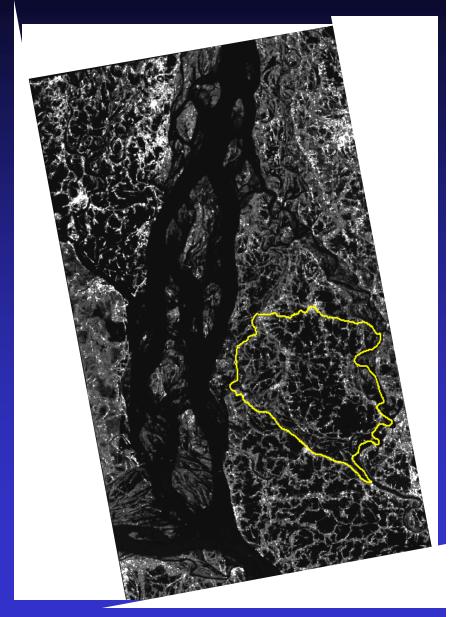


Other outputs

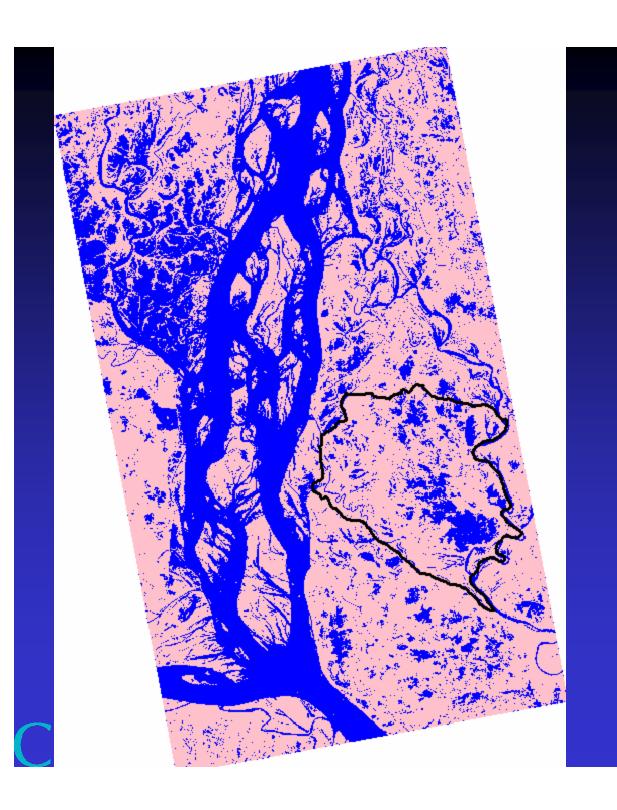


Open Water flooding - Extent

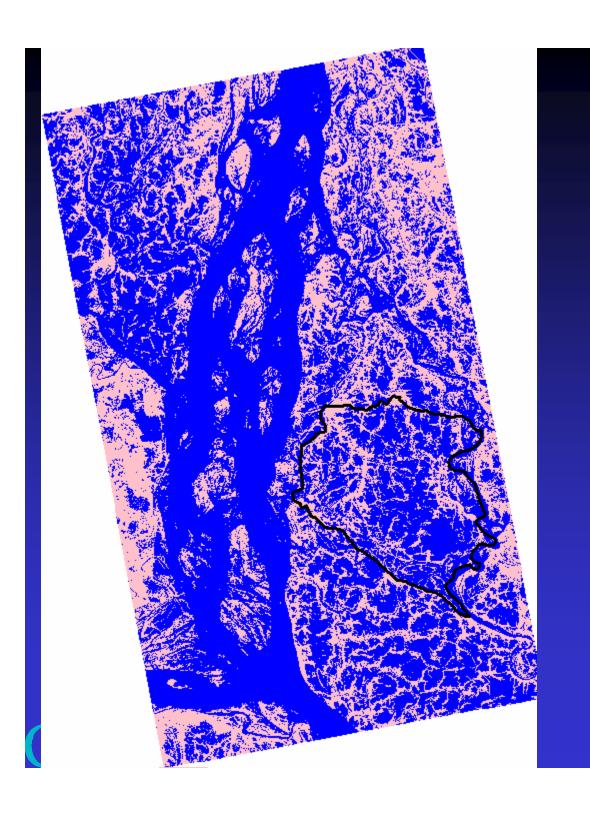
RADARSAT Fine Beam images were used to identify open water extent



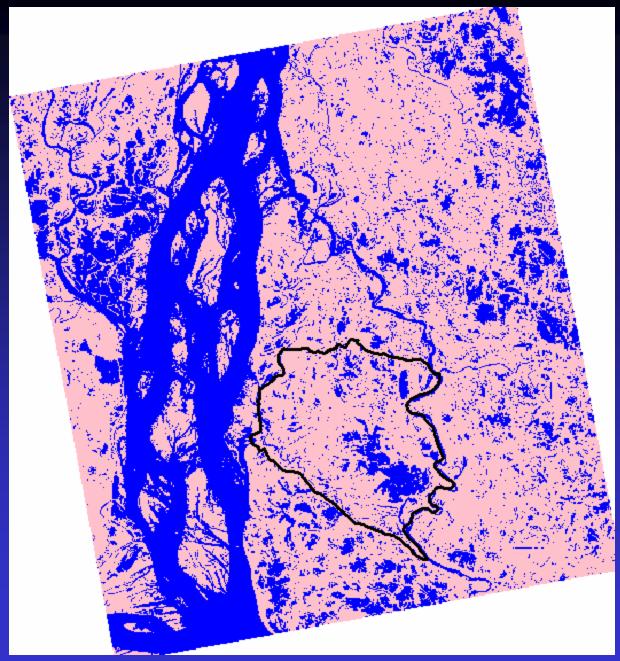




09 July 2004

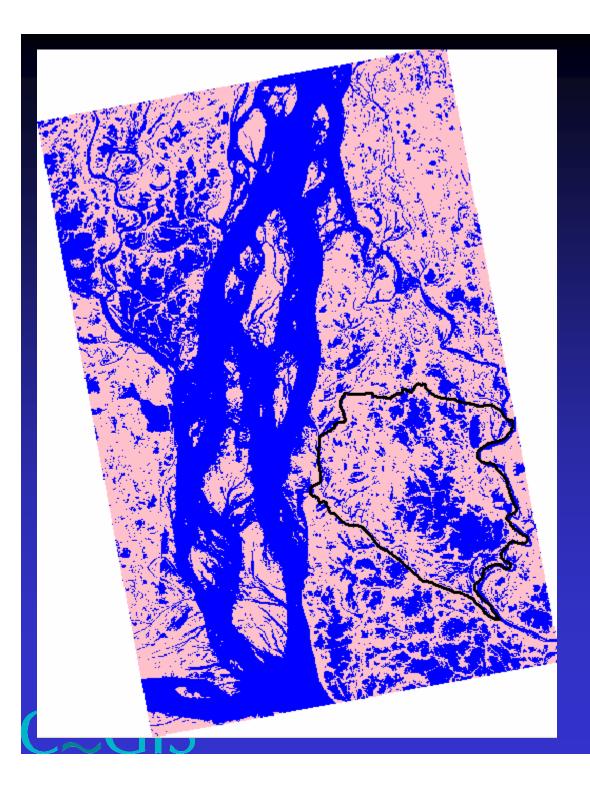


02 August 2004



26 August 2004

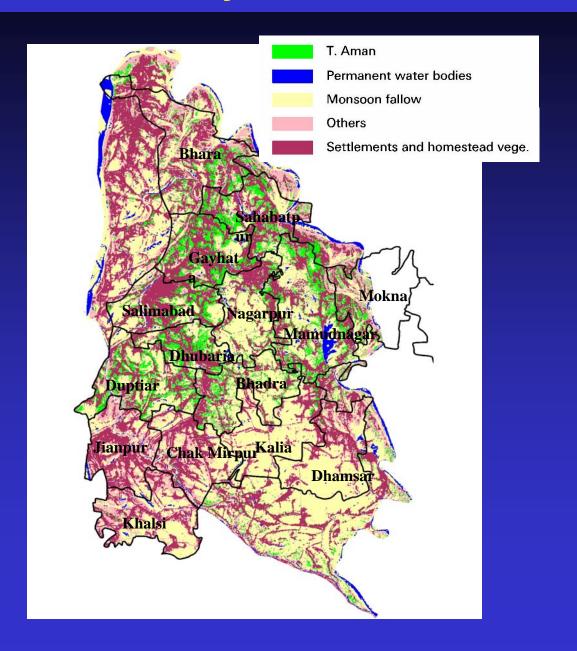




19 September 2004

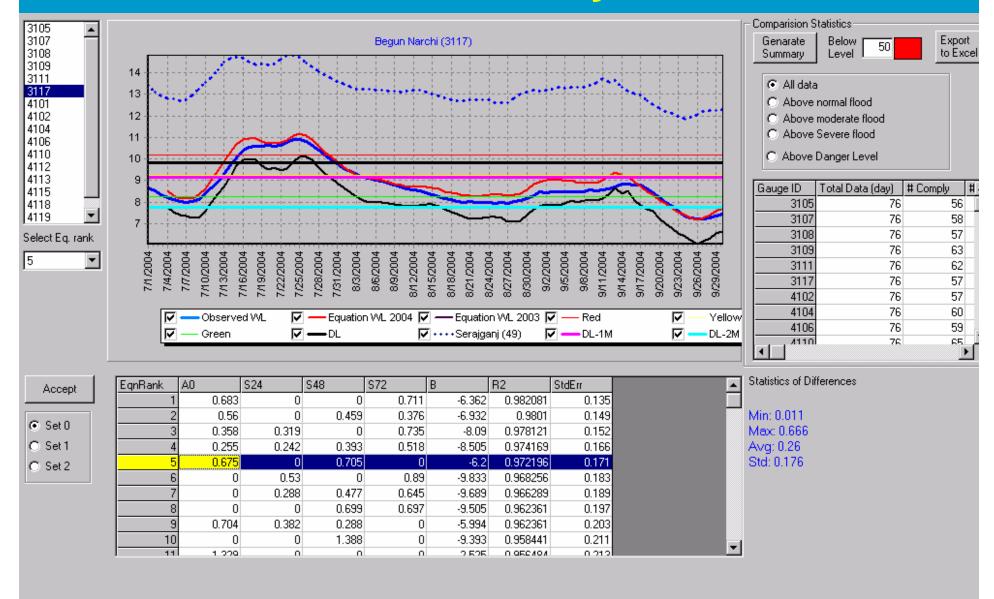
Presentation Layout

RADARSAT
Fine Beam
images were
used for Aman
rice mapping

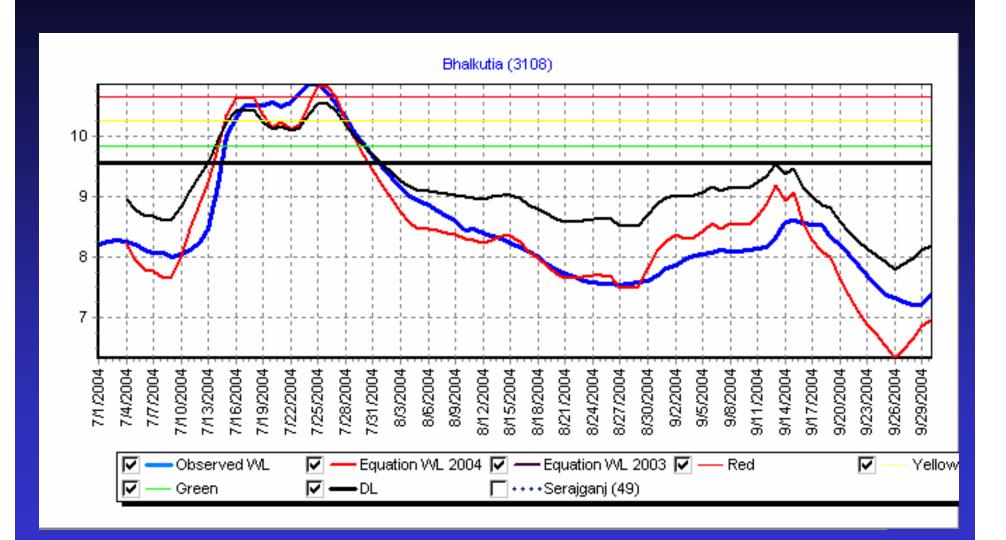




Result Analysis

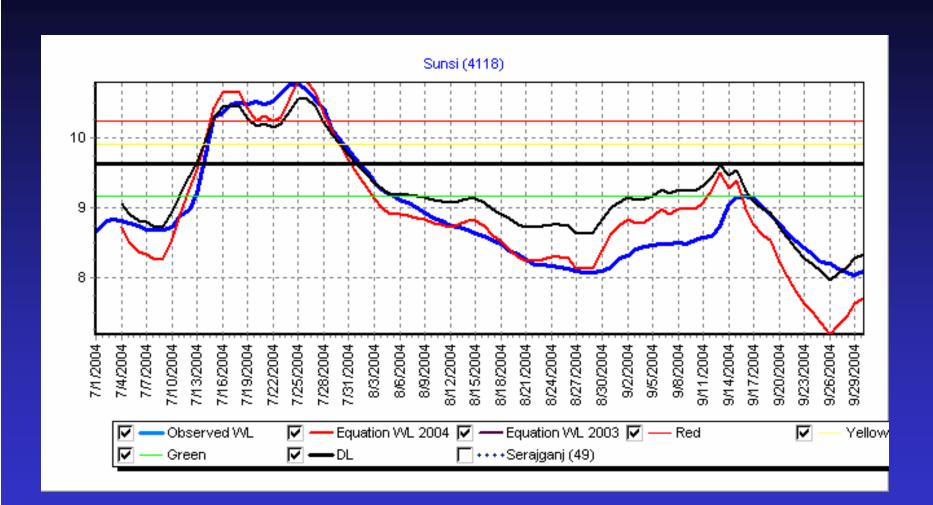


Comparison: Prediction vs Observed WLs



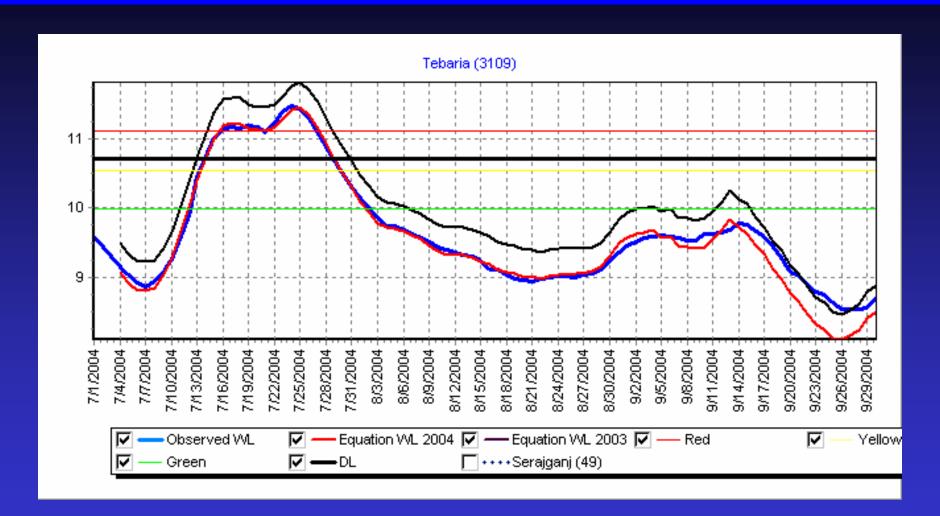


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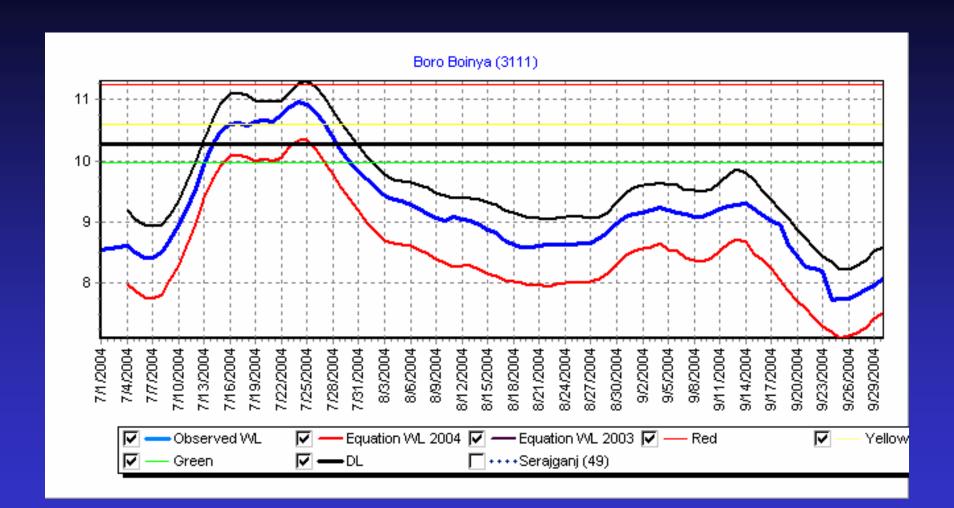




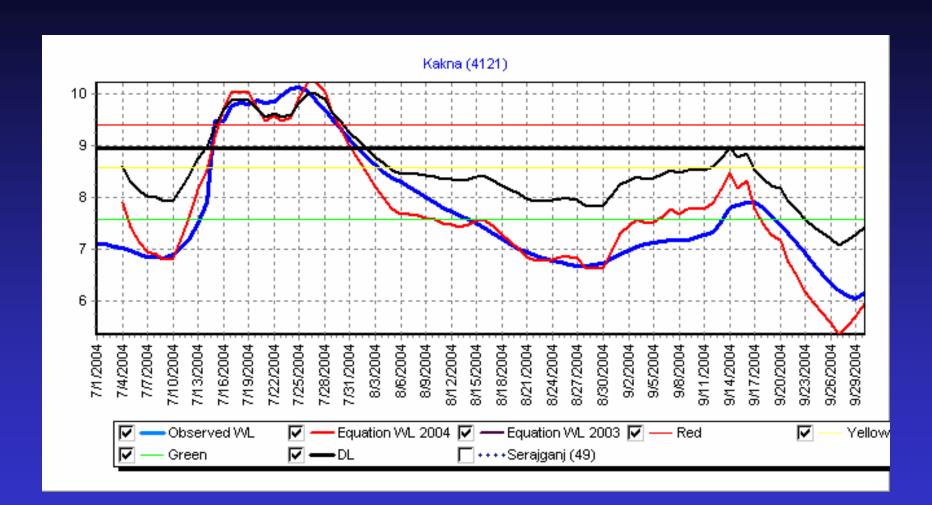
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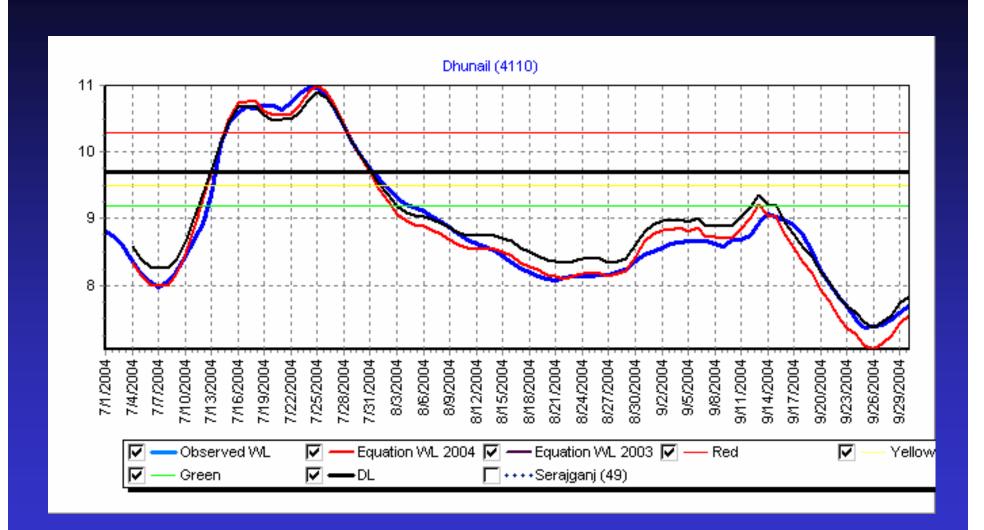




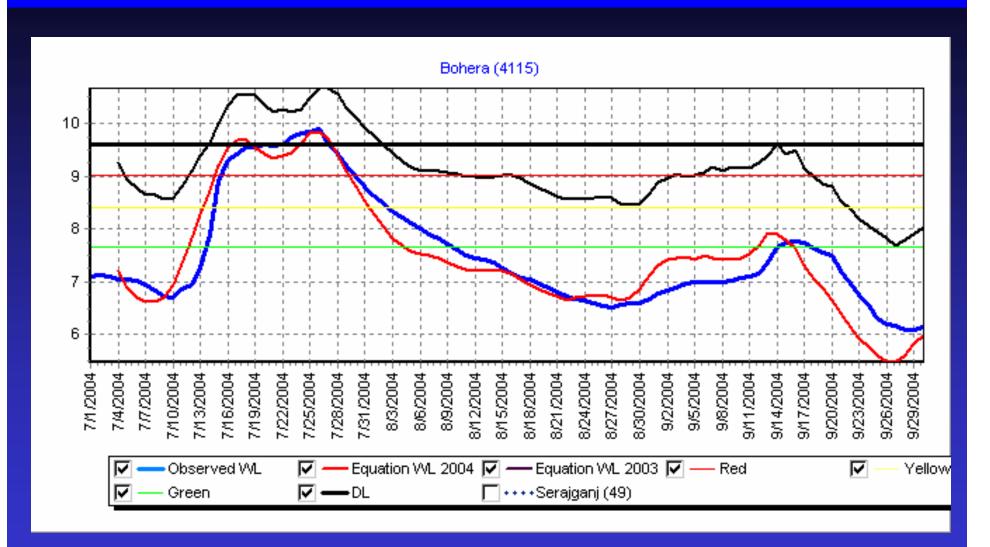




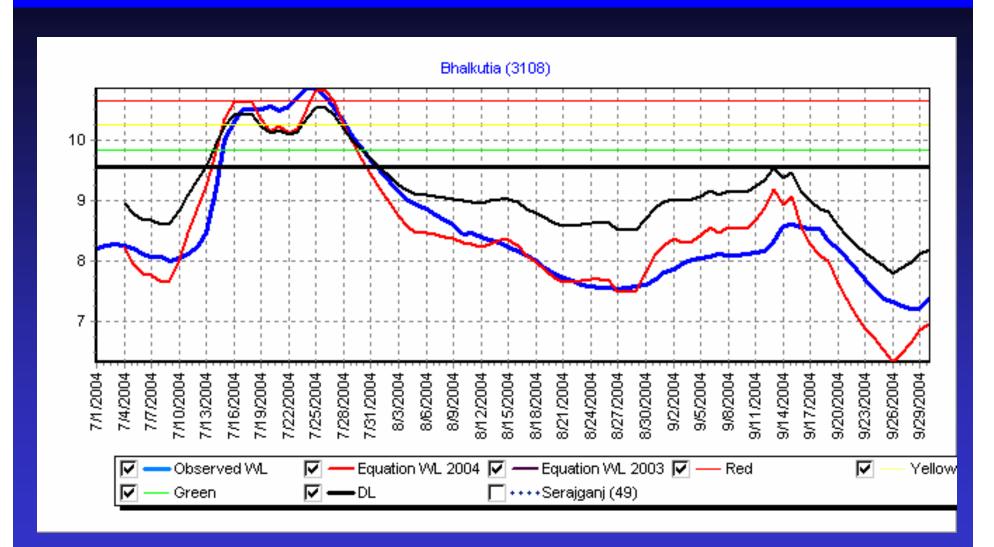






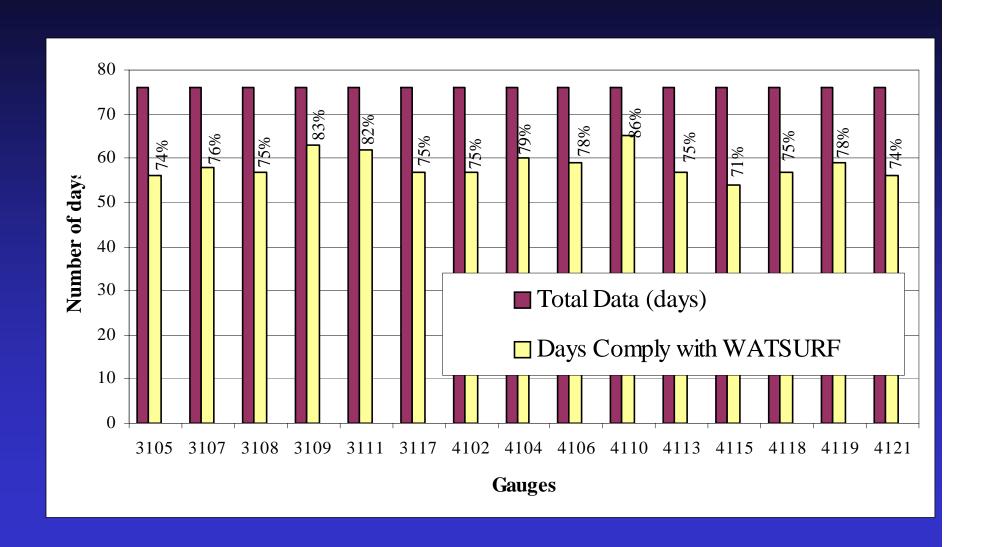








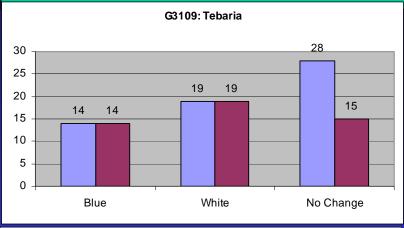
Model Result vs Observed WL for Flag

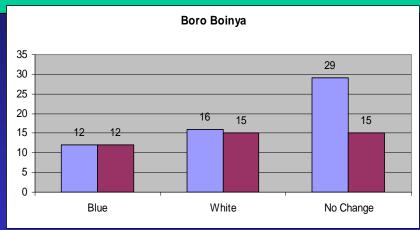


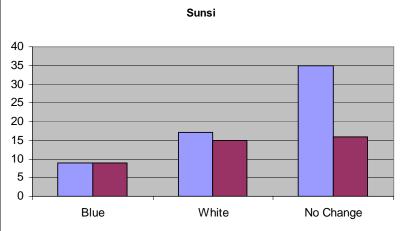


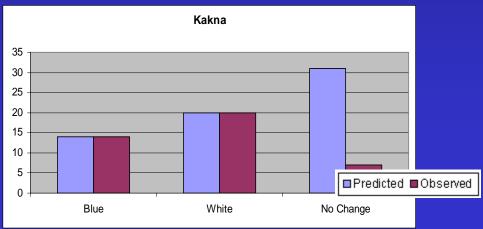
Model Result vs Observed WL change

Gauge	Total	Blue			White			No Change		
Name	Data	Pred	Obs	Comply %	Pred	Obs	Comply %	Pred	Obs	Comply %
Tebaria	61	14	14	100%	19	19	100%	28	15	54%
Boro Boinya	57	12	12	100%	16	15	94%	29	15	52%
Sunsi	61	9	9	100%	17	15	88%	35	16	46%
Kakna	65	14	14	100%	20	20	100%	31	7	23%









Post Flood Social Assessment



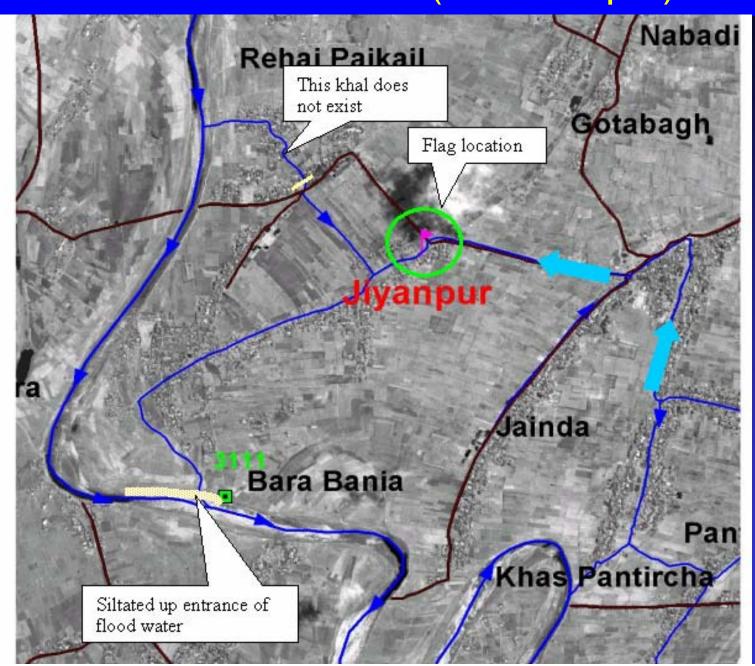
CFIS Team interviewing the community on WATSURF flag message



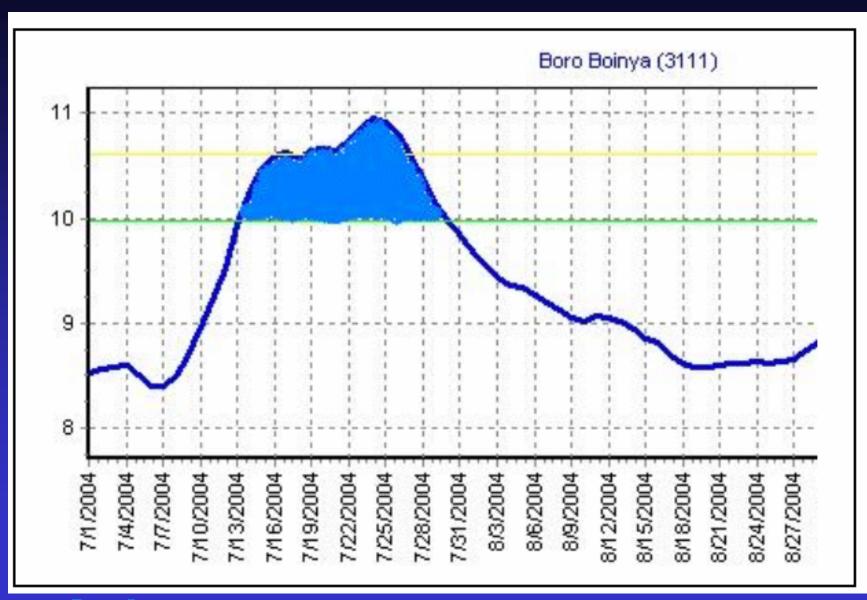
Mrs. <u>Padma</u> Rani saying she has been benefited by flag message



Technical assessment (an example)



Threshold Level at 3111





RMS error of predicted change in stage(m)

	Curr-Pre	24-Curr	48-Curr	Curr-72	96-Curr
3105	0.217	0.096	0.167	0.233	0.300
3107	0.342	0.149	0.246	0.360	0.445
3108	0.304	0.142	0.245	0.324	0.404
3109	0.053	0.053	0.072	0.167	0.244
3111	0.066	0.043	0.077	0.202	0.317
3117	0.165	0.068	0.117	0.228	0.309
4101	0.359	0.128	0.220	0.289	0.414
4102	0.331	0.154	0.257	0.322	0.372
4104	0.120	0.053	0.086	0.171	0.236
4106	0.242	0.128	0.210	0.271	0.325
4110	0.134	0.083	0.122	0.200	0.276
4112	0.143	0.092	0.142	0.227	0.312
4113	0.417	0.213	0.318	0.414	0.506
4115	0.278	0.150	0.262	0.328	0.381
4118	0.176	0.109	0.168	0.218	0.266
4119	0.116	0.071	0.108	0.188	0.264
4121	0.322	0.196	0.286	0.345	0.390
average	0.223	0.113	0.182	0.264	0.339

Difficulties Odds experienced

- Zero value error during gauge connection
 - this created a constant vertical offset in hydrograph
- Introduction of error during gauge shifting which caused erroneous WLs
- Gauge management: in few cases the gauges were found not vertical due to thrust of floating things, and those were not fixed in time in absence of care and funds
- Error in making SMS message to send WLs
- SMS communication disrupted due to Network failure, recharging problem and disconnected mobile due to irregularities in bill payments



CFIS at a glance!

- Technological
 - Easy to implement
 - Simple approach
 - Less higher skill required
- Institutional
 - Society and GoB involved
- Financial
 - Implementation cost
 - Operation & Maintenance cost



Thank You

