

# Improving the Climate Resilience and Performance of Small and Medium Scale Irrigation

## Household (HH) Survey and its Outcome

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Household Survey was carried out in two irrigation schemes

(I) Singeghat Irrigation System, Kapilbastu and

(II) Julfe Irrigation System, Nawalparasi

Both selected for detailed study

# RATIONAL FOR SURVEY

## **The rational for household survey is based on:**

- To confirm, justify and validate information, perception and conclusion obtained through various other primary and secondary sources
- To obtain key information about climate change at household level of selected important categories

# METHODOLOGY

- The sample sizes for two command area were determined based on the pilot mean and variances of land holding sizes.
- 7 branches of 2 systems (out of 14) comprising (H, M, T) were selected
- List of beneficiaries of branches received from WUAs
- Proportional sample distribution done at least 30 beneficiaries from each cluster.
- Total of 221 hhs (122 from Singeghat and 90 from Julfe) out of 1518 hhs of 7 clusters were selected.

# Outlines of Key Findings

# Approach of Analysis

Analysis was attempted mainly to compare the situation in 2015/16 with 10 year before 2005/06 on the selected parameters

# Change in Land Holding Pattern

Parameter	Julfe	Singeghat	Remarks
Change in <u>average size of land holding pattern</u> in terms of owned, farmed and seasonally irrigated area by HHs	No change in owned land holding size on average but <b>slightly increased</b> trend in farmed area, irrigated area in monsoon, winter and spring	<b>Slightly decrease</b> in owned area, <b>slightly increase</b> in farmed and monsoon irrigated area <b>no change</b> in winter and spring area	Major reasons for changes- selling and buying of lands, no longer seasonal cultivations and other miscellaneous

# Change in Temperature and Rainfall

Parameter	Julfe	Singeghat
Change in <u>temperature</u> in <u>summer</u> and <u>winter</u>	Slightly higher in both seasons (65% & 84% responses)	Slightly higher in both seasons (57% & 75% responses)
<u>Rainfall</u> in <u>summer</u> and <u>winter</u>	Slightly lowered in both seasons (72% and 70% responses)	Slightly lowered in both seasons (46% and 36% responses)
changes in <u>rainfall</u> <u>intensity</u>	Slightly lowered, 70% responses	Slightly lowered, 46% responses
changes in <u>rainfall</u> <u>frequency</u>	Slightly lowered, 57% responses	Slightly lowered, 25% responses



# Change in irrigated Area by Surface and Tube-well Systems

Parameter	Julfe	Singeghat
Change in % area irrigated in <u>monsoon</u> through surface system in 10 years	80% to 90% responses	89% to 94% responses
Change in % area irrigated in <u>winter</u> through surface system in 10 years	68% to 71%	64% to 62%
Change in % area irrigated in <u>monsoon</u> through tube-well system in 10 years	0% to 1%	1.1% to 0.6%
Change in % area irrigated in <u>winter</u> through tube-well system in 10 years	1% to 4%	5.8% to 6.6%
Change in % area irrigated in <u>spring</u> through tube-well system in 10 years	0% to 18%	3.9% to 3.9%

# Change in Season-wise Irrigated Crop Areas from the Systems

Parameter	Julfe	Singeghat	Remarks
Response on <u>change in irrigated crop area</u> in 10 years for all 3 seasons	<p><b>Same</b> 84%. 48% and 38%</p> <p><b>(Less</b> 13%, 27%, 33%)</p>	<p><b>Same</b> 75%. 60% and 59%</p> <p><b>(Less</b> 19%, 32%, 22%)</p>	Reasons for change : decreased water at intake, rainfall affecting, increase in demand of water at source, management deficiency
Response on <u>change in frequency of irrigation in crop</u> in 10 years for all 3 seasons	<p><b>Same</b> 54%. 70% and 5%</p> <p><b>(Less</b> 40%, 32%, 34%)</p>	<p><b>Same</b> 62%, 45% and 26%</p> <p><b>(Less</b> 33%, 40%, 41%)</p>	

# Change in Household's Contribution for Annual O&M

Parameter	Julfe	Singeghat
Response on change in household's contribution for annual O&M	Main canal <b>less</b> by 76% Branch canal <b>same</b> by 61%	Main canal <b>less</b> by 52% Branch canal <b>Less</b> by 51%

# Change in overall crop area in 10 years

Parameter	Julfe	Singeghat
Response on change in crop area in 10 years	Monsoon paddy <b>same</b> by 70% Winter crop <b>same</b> by 42 to 60% hhs	Monsoon paddy <b>same</b> by 71% Winter crop <b>same</b> by 23 to 79% hhs

# Change in Planting/Harvesting Time and Crop Yields

Parameter	Julfe	Singeghat	Remarks
Response on change in <u>planting and harvesting</u> time of crops in 10 years	Paddy <b>same</b> 53%, (latter 14% and earlier 9%) Other winter crops <b>same</b> by 27 to 61%	Monsoon paddy <b>same</b> by 62%, (latter by 34% and earlier by 3%) Winter crop same by 17 to 65% hhs	Reason for changes: more on other factors (input availability, type, variety etc ) than CC
Crop yields, current	Except paddy 3.62 t/ha other crop's yield too low	Except paddy 4.15 t/ha , potato 13.91 t/ha and Vegetable 12 t/ha other crop's yield too low	
Response on change in crop yields in 10 years	Paddy <b>same</b> -55%, (more 18% and less-16%) Other crops <b>same</b> by 8 to 51%, (more by 2 to 18% and less by 7% to 19%)	Paddy <b>same</b> -40%, (more 19% and less-39%) Other crops <b>same</b> by 16 to 54%, (more by 0 to 33% and less by 4% to 35%)	Reason for crop yield change- crop varieties, economics of crops, pest/diseases and very few on CC

# Summer & Winter Rainfall Status and Other Climatic Conditions

Parameter	Julfe	Singeghat
Responses on <u>start of monsoon rainfall</u> currently	<b>Late</b> by 96%, (early 2%, normal 2%)	<b>Late</b> by 87%, (early 4%, normal 62%)
Responses on <u>overall status of monsoon rainfall</u> currently	<b>Normal</b> 50%, (low 35%, high 1%)	<b>Normal</b> 53%, (low 44%, high 1%)
Responses on <u>status of winter rainfall</u> currently	<b>Low</b> by 72%, (normal 26%, high 1%)	<b>Low</b> by 77%, (normal 19%, high 2%)
Other <u>abnormal climatic phenomenon</u> (hot-waves, cold waves, frost, hailstone fogs etc)	<b>No change</b> by almost	<b>No change</b> by almost

# Effects on Crops and Strategies Adopted

Parameter	Julfe	Singeghat
Effects on monsoon & winter crops due to changes observed	Mostly <u>partial damage</u> and no very serious effects	Mostly <u>partial damage</u> and no very serious effects
Major strategies adopted in monsoon & winter crops	<u>Mostly no responses</u> , limited responses show nothing done, few response on change in crop variety and crop timing, use of alternative irrigation source	<u>Mostly nothing done</u> , few response on change in crop variety and crop timing, use of alternative irrigation source (Tube-wells etc)

# Change in Livestock Holding and Use of Farm Machineries

Parameter	Julfe	Singeghat	Remarks
Change in sizes of livestock holdings in 10 yrs.	Cattle & buffalo sizes <u>decreased</u> , goat & poultry slightly <u>increased</u>	Slightly decrease in all categories	Lack of labor, use of machinery and lack of fodder constraining
Change in Machinery & equipments use/holdings in 10 yrs	Tremendously <u>increase in use of</u> tractor, thresher & tube-wells	Tremendously <u>increase in use of</u> tractor, thresher & tube-wells	



# Labor shortage & supply system

Parameter	Julfe	Singeghat	Remarks
Responses on Labor shortage & supply system	<u>Yes-75%</u> , (no-8%) Supply: Family-12%, <u>exchange-66%</u> , hire-38%	<u>Yes-17%</u> , (no-13%), lack during planting& Harvesting time, Supply: <u>Family-46%</u> , exchange-16%, hire-35%	Reason for lack- lack of working member in family, involve in other profession, gone abroad etc

# Food self sufficiency and Other Means of Livelihoods

Parameter	Julfe	Singeghat
Food self sufficiency and change in 10 years	72.9% grow sufficiently, 10 yrs before 46.9% Increased	45% grow sufficiently, 10 yrs before 51% Slightly Decreased
Other means of livelihood	Remittance-63.2%, other employment-31.6%, other activities-26.2%	Wages- 17%, Remittance-16%, other employment-10%, other activities-15%

# Concluding Summary

- Strong perception on increasing temperature
- No clear consensus rainfall magnitude or intensity changed, but most feel rainfall declined, longer dry periods, later start of monsoon and less winter rain
- Less water available, but no consensus on the reasons
- Sufficient water for all in SIS in monsoon, but tail farmers rely partly on drainage flows from head. Only sufficient for head in winter/spring
- A large number but not a majority feel standards of management are declining
- Most people report declining contributions for maintenance
- Little change in crop areas or types and timing, but many new varieties
- Crop yields lower, despite new varieties, because of climate and pests
- Labor shortage is a problem, but an increased mechanization
- No specific coping strategies, but people adopt new varieties as they are made available and attempt to change timing

Thank You for Your  
Attention!