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Farmers Community Perception with that of Scientific
Information Collection Center on Climate Change:
A Comparative Case Study from Nawalparasi and
Kapilvastu Districts of Nepal

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Pravakar Pradhan
Research Faculty
AITM, Nepal



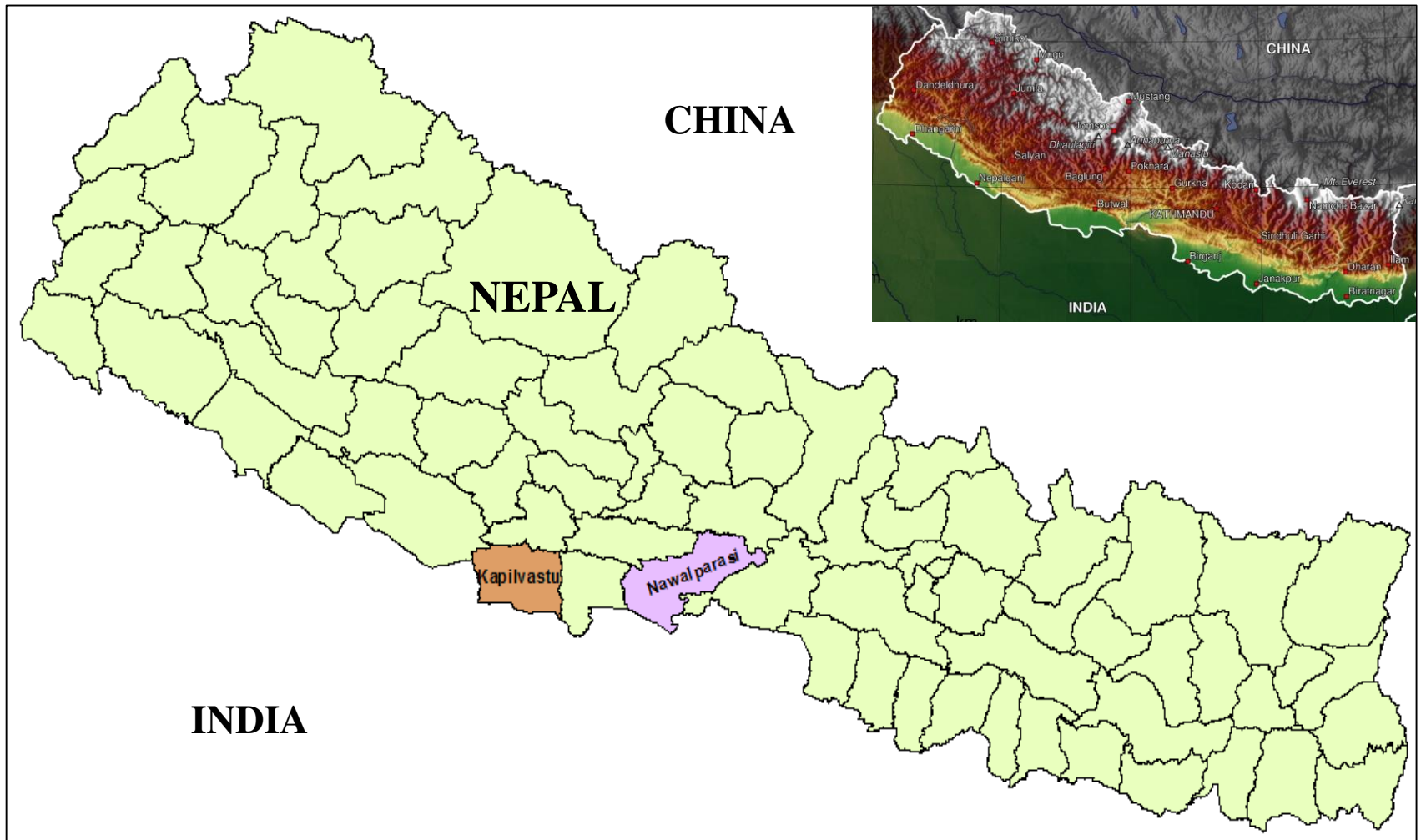


***Climate Change** will effect the basic elements of life for people around the world – access to **water, food production, health, and the environment**. Hundreds of millions of people could suffer hunger, **WATER SHORTAGES** and coastal flooding as the **World Warms**.*

***Prof. Nicholas Stern**
Grantham Research Institute on Climate Change
and the Environment
London School of Economics*

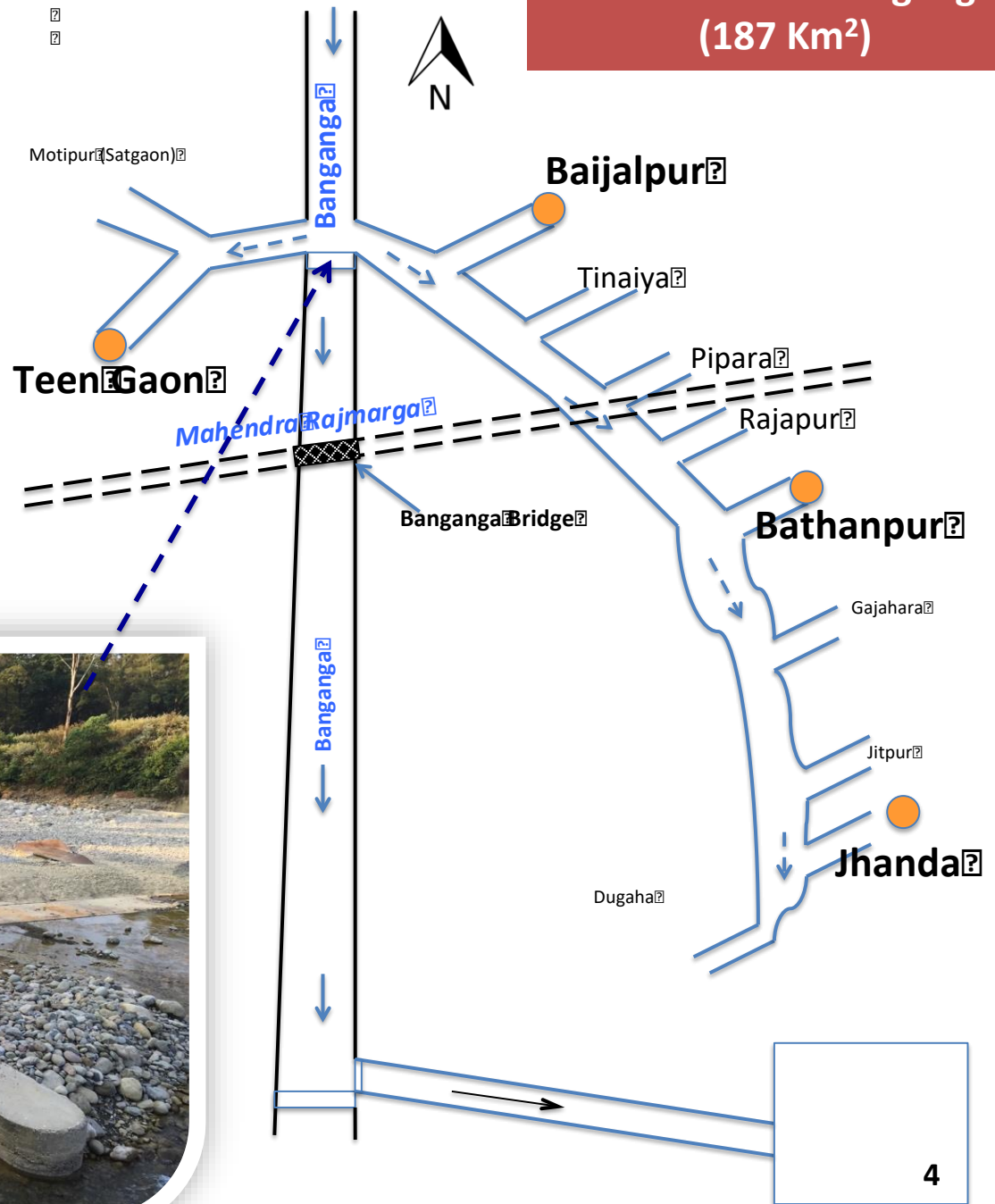
Study Areas:

Two Irrigation Systems



Singeghat Irrigation System in Kapilvastu District

Watershed of Banganga
(187 Km²)



Baijalpur Divider (Head)

2
2
2
2
2

44 paisa

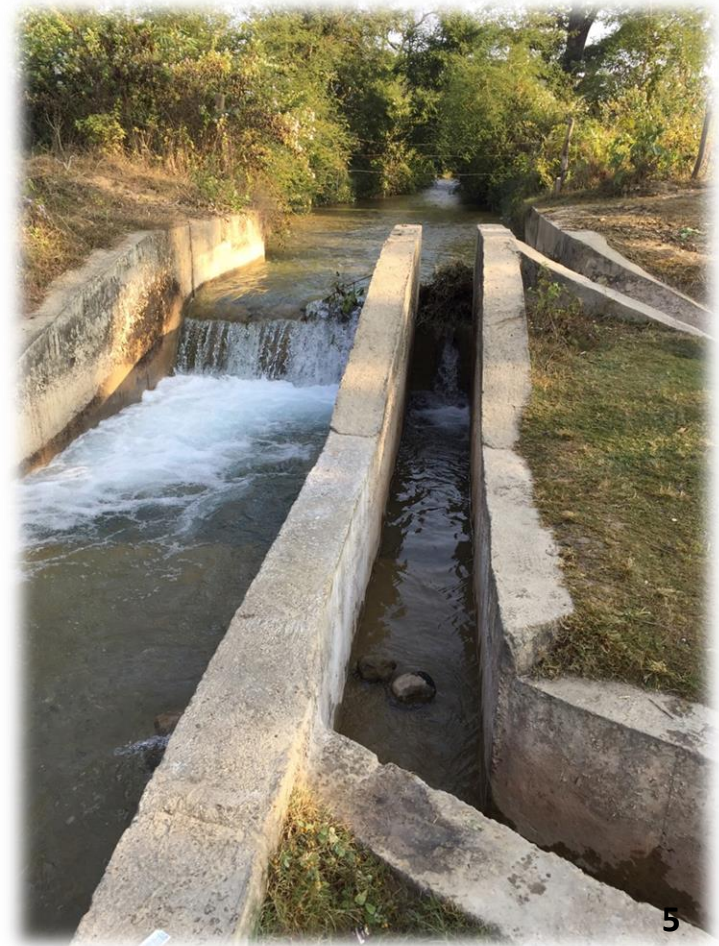
Mulkul

2 paisa

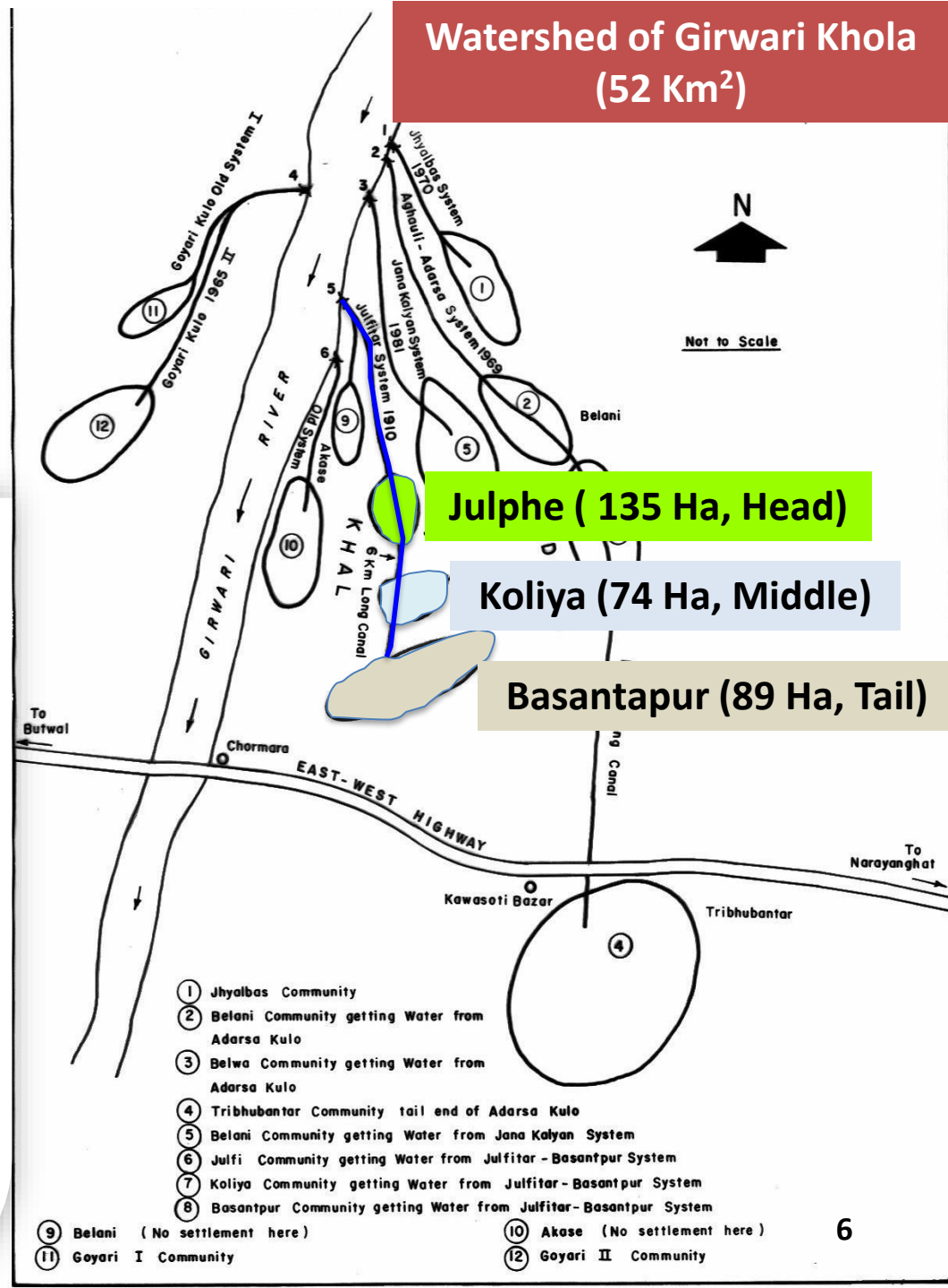
Tinaiya

2 paisa

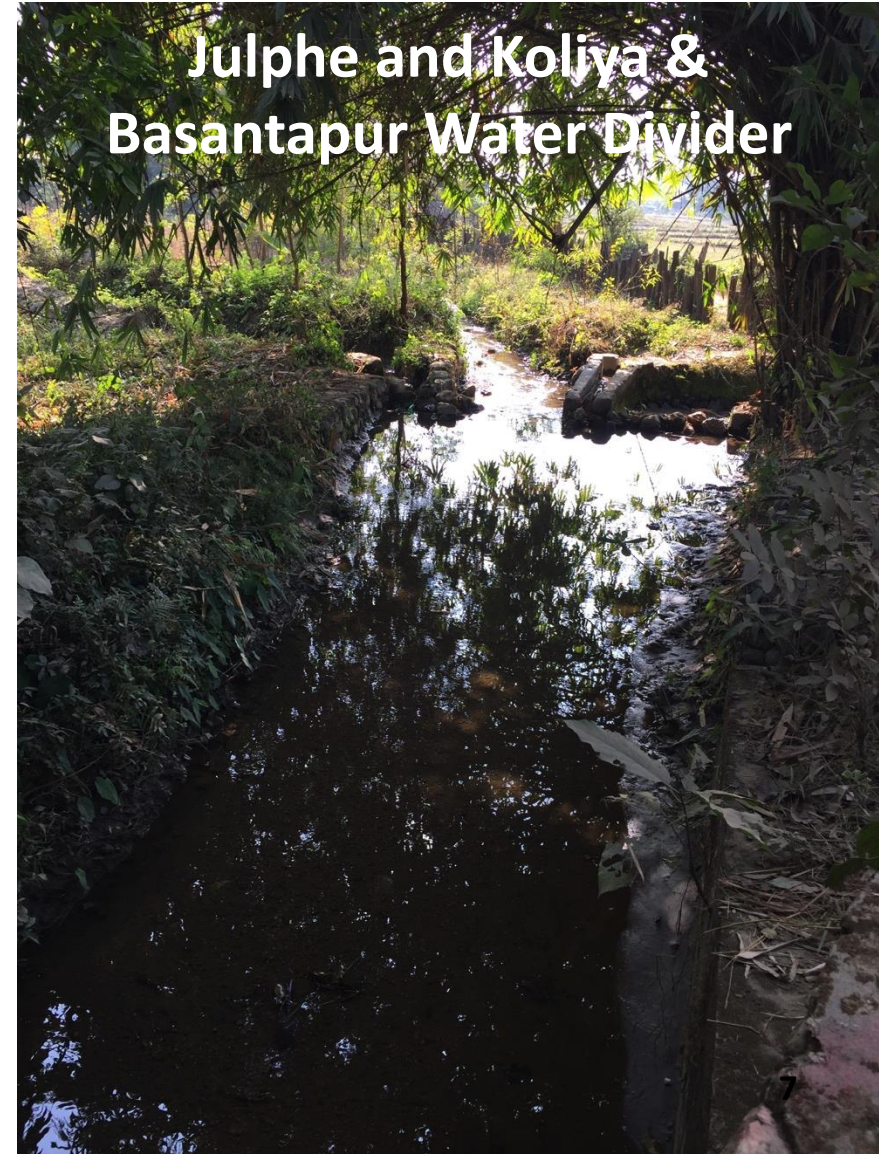
Baijalpur
(Irrigated Land 54 Ha)



Julphe Irrigation System in Nawalparasi District



Julphe Irrigation Canal and Water Divider



Study methodology steps

SELECTION OF IRRIGATION SYSTEMS

Singeghat

Julphe

Sub-division of Irrigation System

Head

Middle

Tail

Farmers Group Formation (10 to 12 person by including women) in each Sub-division & Verification of Checklist

Land holding
<3386m² (10Katha)

Land holding
>3386m² (10Katha)

SC Group, represents
Irrigation System

Organize Focus Group Discussion (FGD)

Land holding
<3386m² (10Katha)

Land holding
>3386m² (10Katha)

SC Group, represents
Irrigation System

Analysis of Farmer/SC Perceptions

Converted perception into
numerical values

Compared with locally available
scientific data

**Verification of Climate Change impacts on
S/M Scale Irrigation Systems and Agriculture**

Methodology

Focus Group Discussion (FGD)

Consultation with **Water Users Association (WUA)** and Farmers to Formulate Groups for FGD



Singeghat IS



Julphe IS

Methodology FGD

Farmers were divided into three groups

1. **Above 3,386m² (10 katha) land holding (Rich);**
2. **Less than 3,386m² (10 katha) land holding (Medium); and**
3. **Senior Citizen** who stay more than **20 years** in the command areas.

Methodology FGD

Selection of Rich & Medium Level Farmers and Senior Citizen

Command Area	Rich (More than 10 Katha)	Medium (Less than 10 Katha)	Senior Citizen
SINGEGHAT Irrigation System	4	4	1
JULPHE Irrigation System	3	3	1

Methodology FGD

- FGD was conducted based on **checklist**
- Each group consists of **10-12 members** including **women** members of the farming families



FGD with Senior Citizen in SIS



FGD with Senior Citizen in JIS



Identification of Institutional Involvement in Climate Resilience

- How these institutes helped or worked to absorb the **SHOCKS** and **STRESSES** induced by climate change
- Whether or not these activities address the **CLIMATE RESILIENCE** issues at individual farmer, community and WUA levels.

Outcomes of FGD with Rich and Medium Level Farmers “Perception on Climate Change”

- 1. General Information/ Current Livelihoods**
- 2. Temperature *(in 2015 and 2005)***
- 3. Rainfall *(in 2015 and 2005)***
- 4. Impacts from the Change of Temperature and Rainfall**
- 5. Water Resources**
- 6. Irrigation Management**
- 7. Agriculture**

Outcomes of FGD with SENIOR CITIZEN

“Perception on Climate Change”

1. Historical Trend of Irrigation Development and Management
2. Climate Change (*Temp' & Rainfall*)
3. Changes in Watershed (*Upstream of the Intake*)
4. Changes in Agriculture
5. Changes in Access / Transport for Inputs, Markets, Advice, etc.
6. Changes in Livelihoods
7. Trends in Water Availability
8. Trends in High Flows/Floods
9. Trends in Sediment

Perception on Climate Change vs Numerical Value

Perception on Temperature
(Compared between 2015 and 2005)

S. No.	Perception on temperature	Weightage
1.	Cold	1
2.	Pleasant	2
3.	Warm	3
4.	Hot	4

Perception on Climate Change vs Numerical Value

Perception on Rainfall

(Compared between 2015 and 2005)

S. No.	Perception on Rainfall	Weightage
1.	No rain	0
2.	Less rain	1
3.	Moderate rain	2
4.	Enough rain	3

Perception on Climate Change vs Numerical Value

Perception on Agriculture Production *(Compared between 2015 and 2005)*

S. No.	Perception on AP	Weightage
1.	Good production	4
2.	Enough production	3
3.	Not enough production	2.5
4.	Average production	2
5.	Less production	1.5

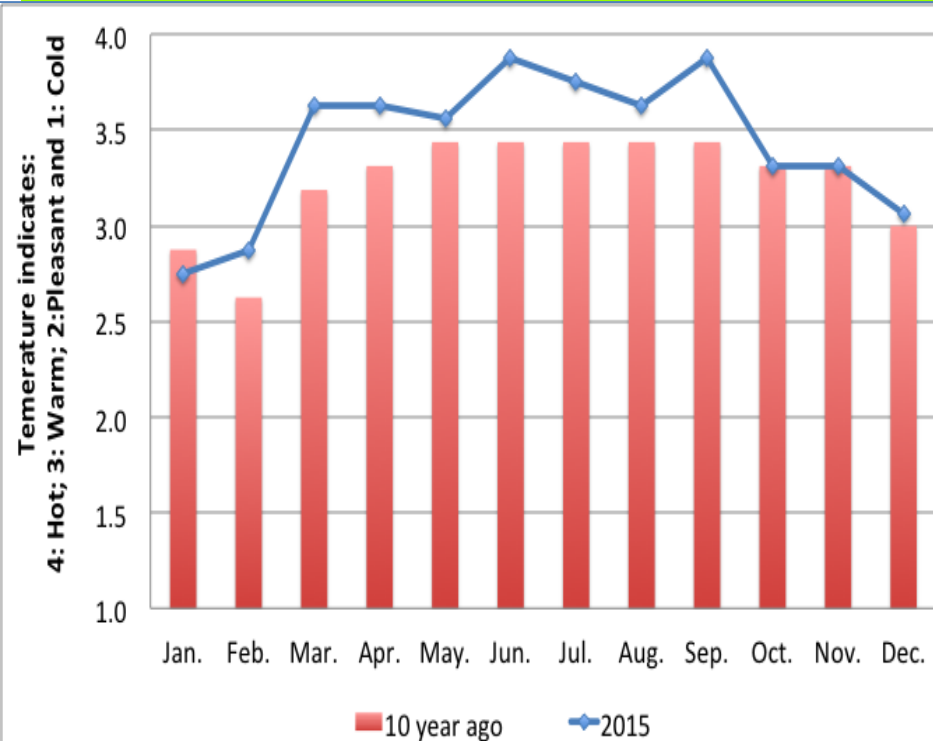
Perception on Climate Change

Temperature

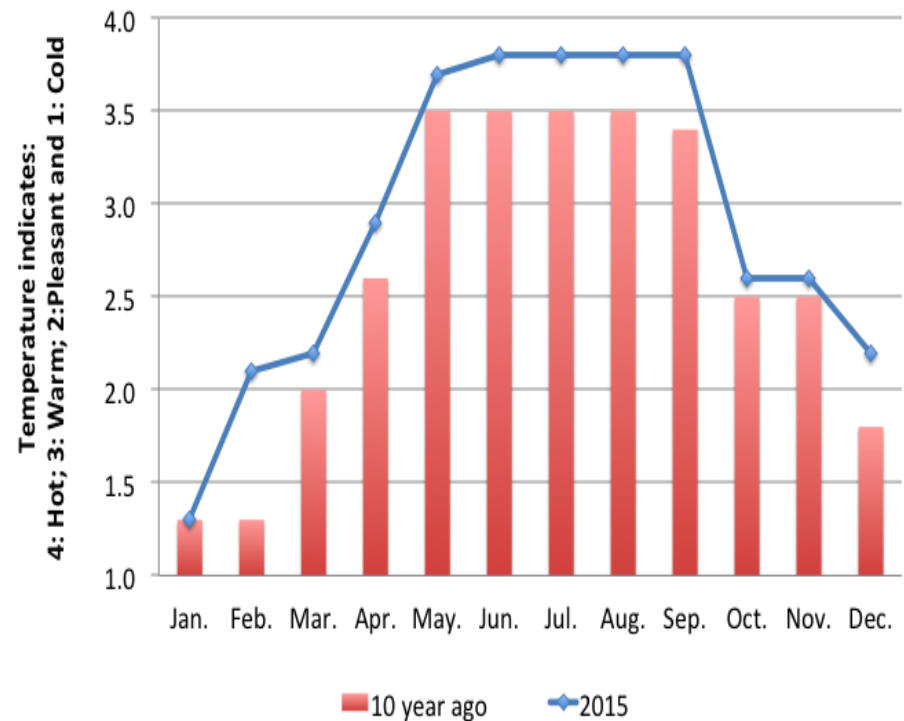
- **Experienced Change in Temperature**
- Rising temperature both in **summer** and **winter**
- Cold temperature has decreased
- Number of cold days decreased
- Experienced very less fog and frost

Temperature Variation between 2015 and 10 years ago

Singeghat Irrigation System



Julphe Irrigation System



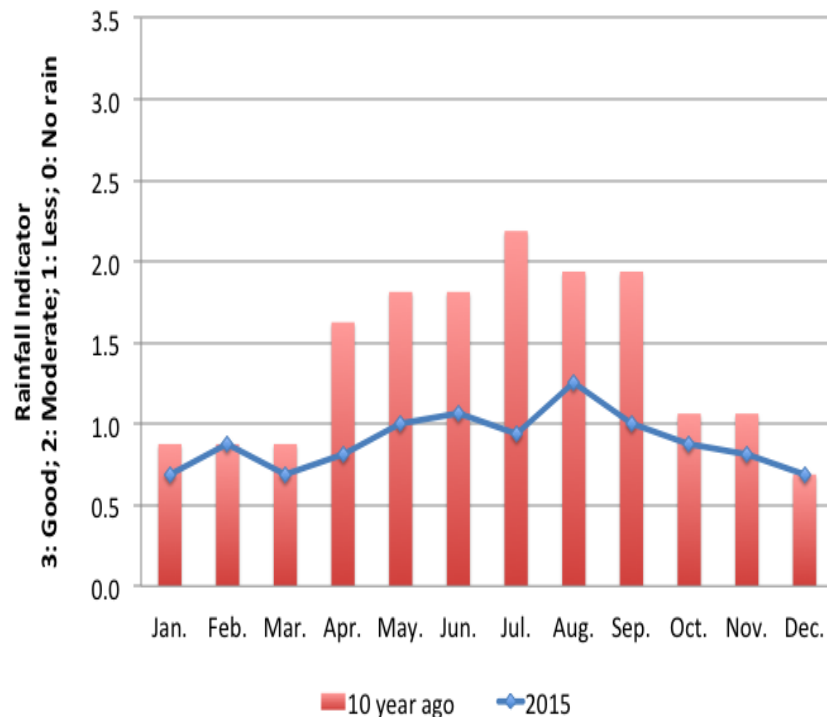
Perception in Climate Change

Rainfall

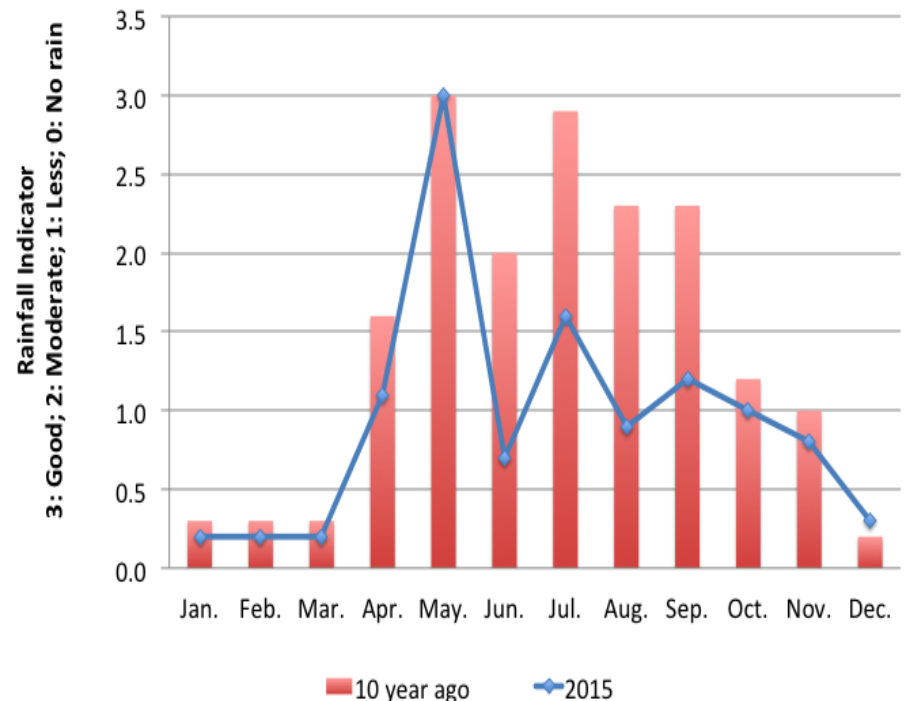
- **Felt Rainfall Pattern has Changed**
- Delayed monsoon and less rainfall during winter compared to 10 years ago
- Short duration heavy rainfall and long duration of dry spell events during monsoon
- Winter has less rainfall, [in 2015, long dry spell event occurred in winter]

Rainfall Variation between 2015 and 10 years ago

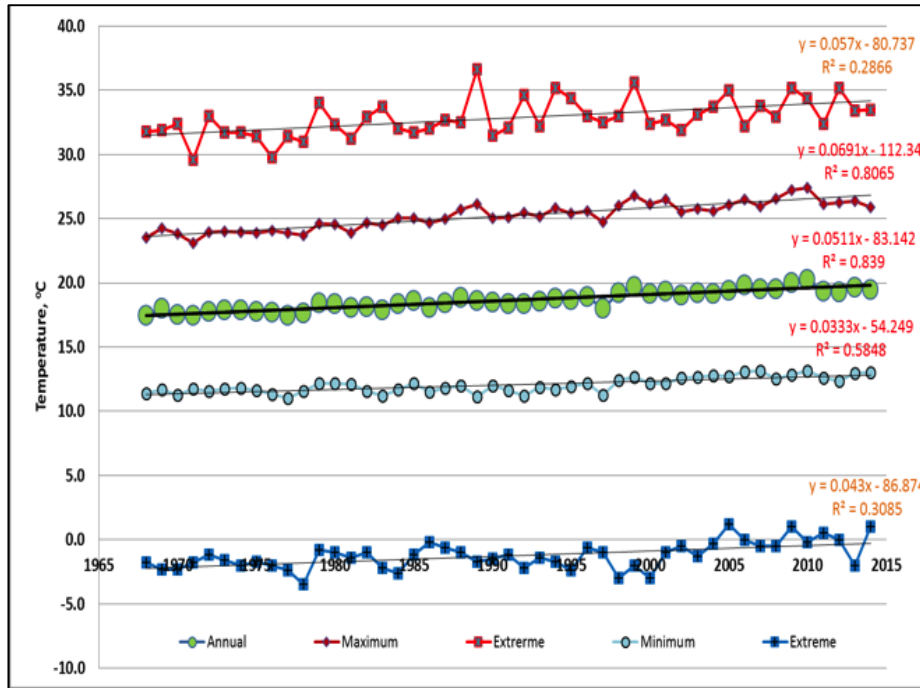
Singeghat Irrigation System



Julphe Irrigation System

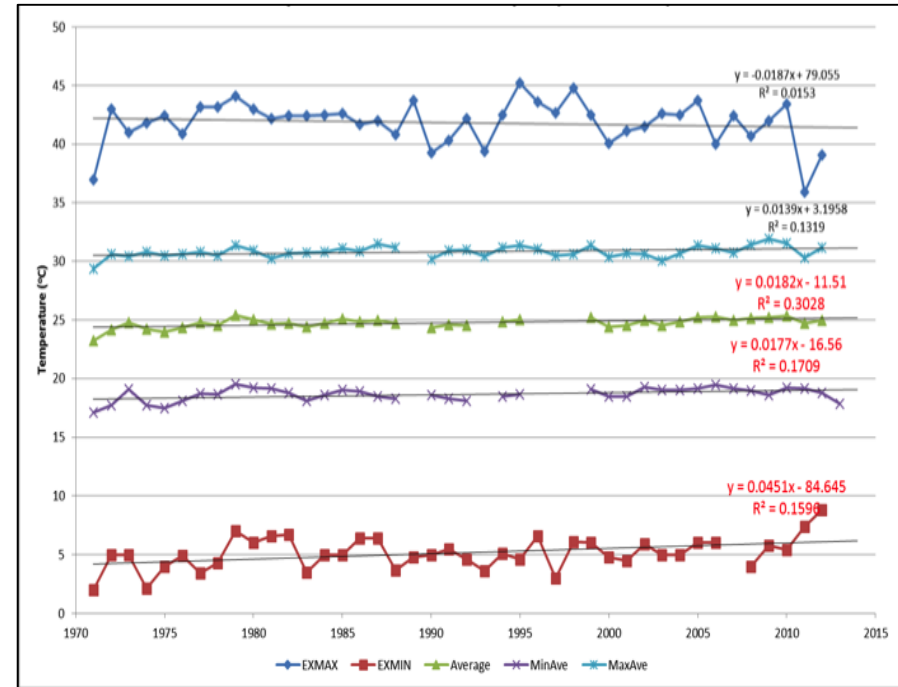


Temperature Trend



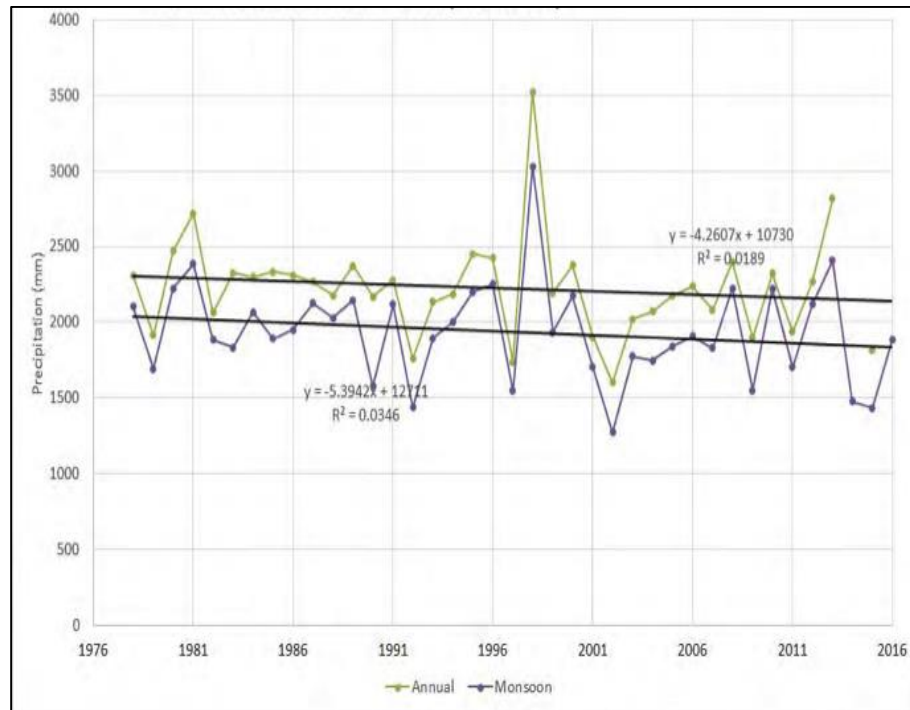
KATHMANDU AIRPORT (from 1965 to 2015)

Source: DHM Data



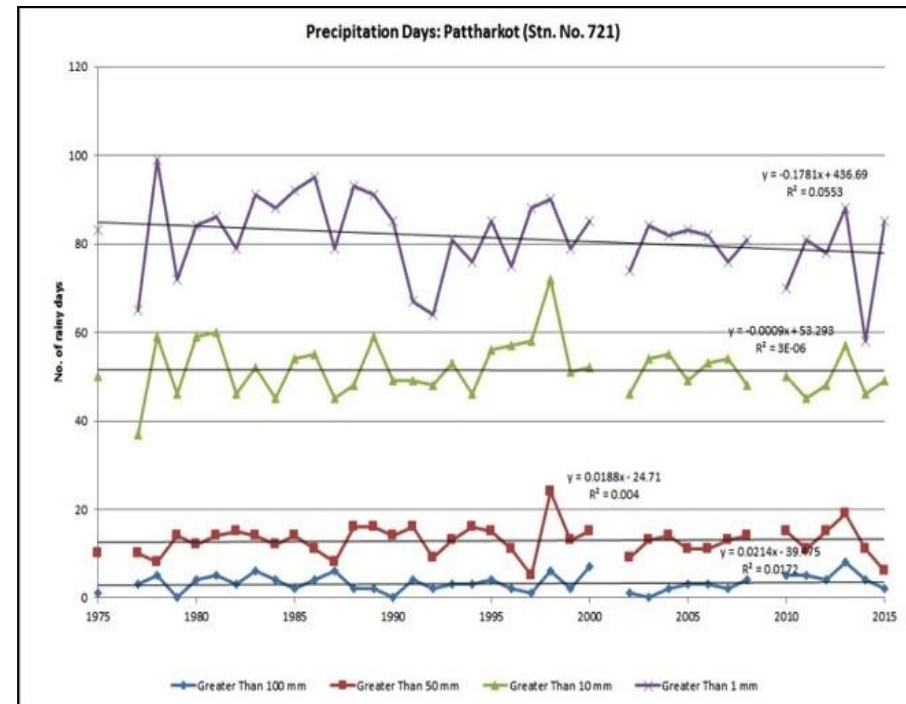
BHAIRAHAWA AIRPORT (from 1970 to 2015)

Precipitation Trend in Patharkot (for SIS)



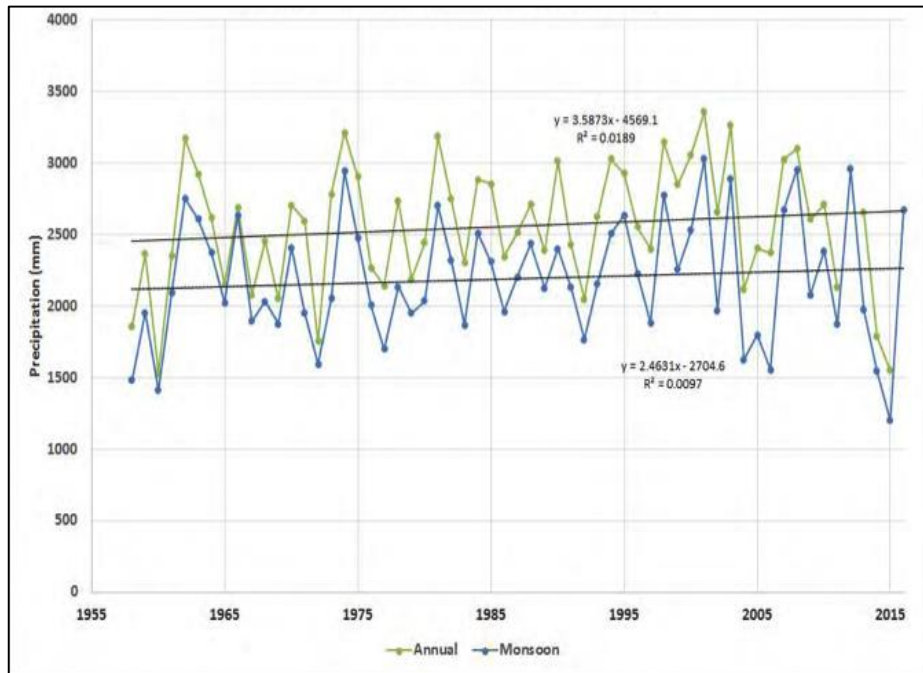
Precipitation Trend from
1976 to 2016

Source: DHM Data

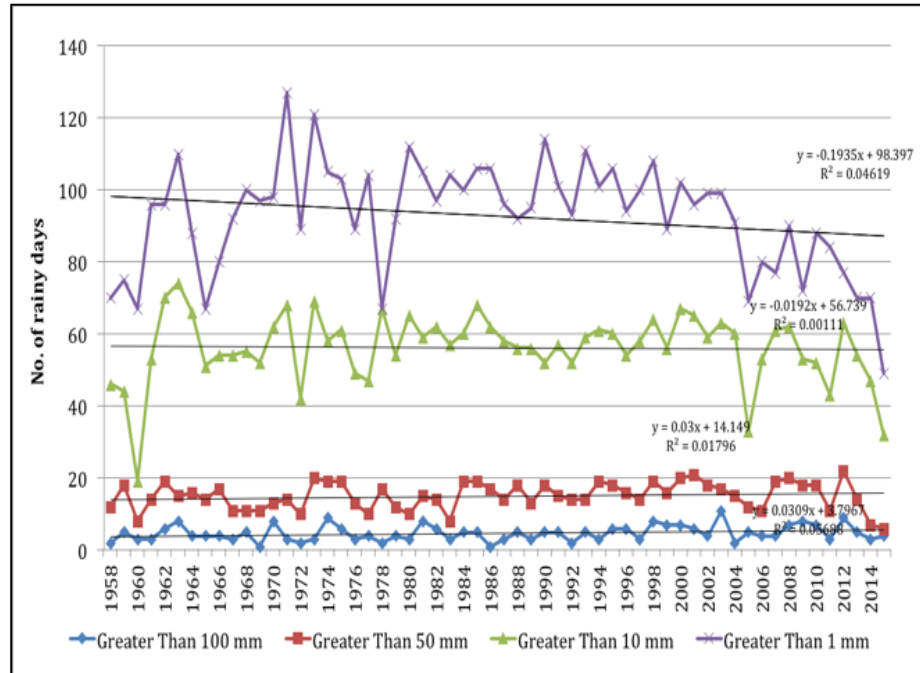


Days Rainfall Patterns
from 1975-2015

Precipitation Trend in Beluwa-Girwari (For JIS)



Precipitation Trend
from 1958 to 2015



Days Rainfall Patterns
from 1958 to 2014

Flood

- Occurrence of flood once in 10 years cycle
- Siltation in the canal and damages of structures
- **Monsoon Flood in 2016**
 - In **GIRWARI RIVER** washed away intake of *AKASE KULO* in **Julphe**
 - The flood havoc was not felt in **SINGEGHAT** due to **permanent intake structures** and many permanent structures along the canal

Local Adaptation and Resilience:

Irrigation Water Management

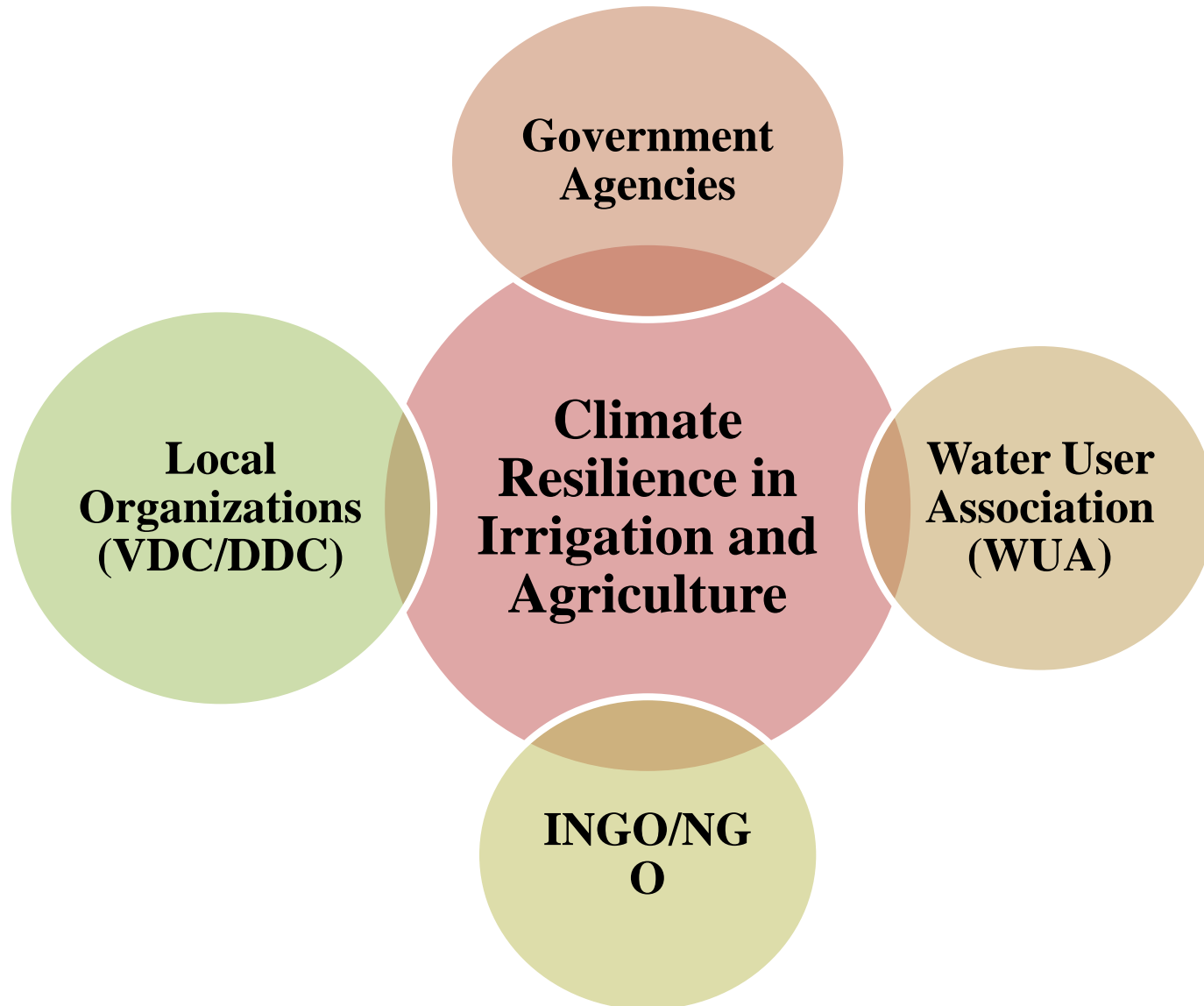
- Irrigation system provides only supplementary irrigation water
- Proper water distribution among the distributaries and villages is a **big challenges**
- According to **water regime** in the system, water management is followed by **rotation system** among the water users
- Water control structures have helped allocation of water in **SINGEGHAT** whereas, **JULPHE** has less control infrastructures along the canal

Local Adaptation and Resilience:

Irrigation Water Management

- Number of **STWs/DTWs** have been established in both Irrigation Systems
- **STW/DTW** groups are formed to manage water distribution
- **STWs /DTWs** in command area have helped for agriculture activities, (especially at the tail end).
- During dry spell events **in monsoon**, **STWs/DTWs** help for supplementary irrigation

Institutional Involvement in Climate Resilience



Agriculture Activities

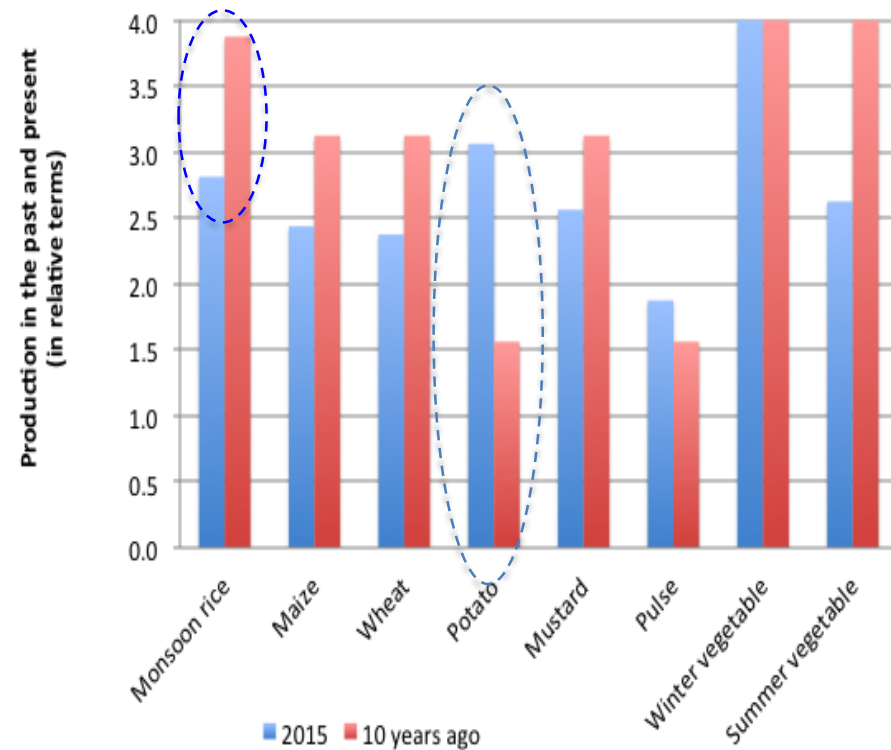
- **Paddy cultivation** is major crop; coverage of paddy has remain the same, (100% coverage); cultivation practices have changed; short gestation seeds are used
- With assured water supply by canal and other supplementary sources; paddy cultivation starts in **June**.
- Plantation is staggered based on water availability and rainfall
- **Dependence on rainfall** is greater at **tail end**, hence delayed paddy plantation

Winter and Spring Crops

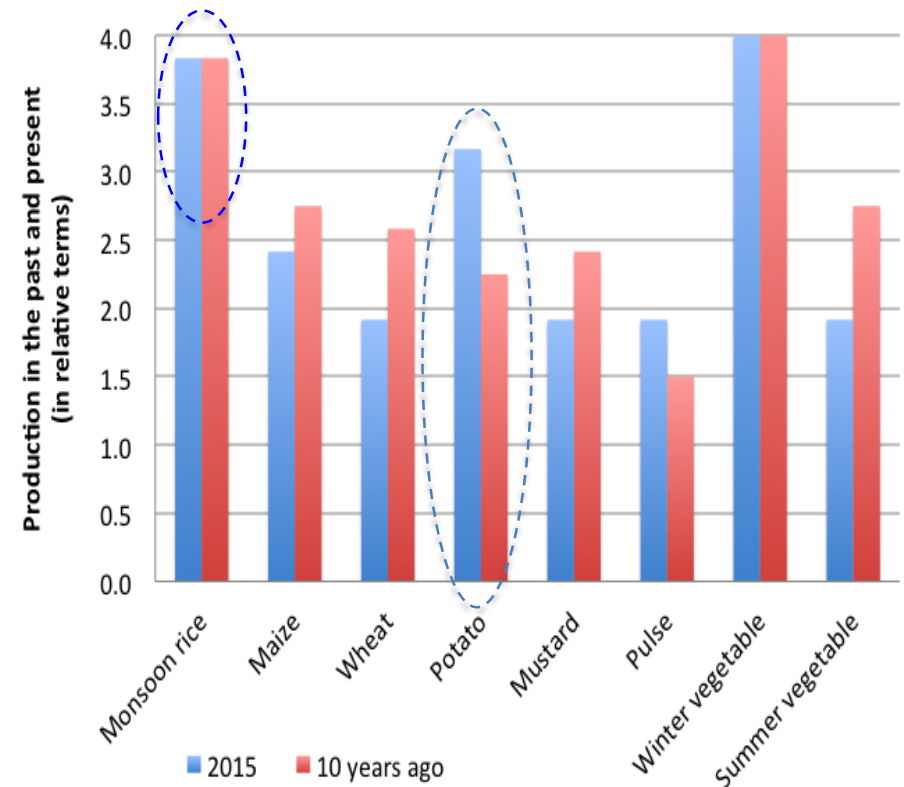
- Winter and spring crops are dependent on **temperature** and **rainfall**
- **Potato** and **Mustard** are grown instead of **Wheat**
- Winter crop also dependent on the land type like low land area is avoided for crop cultivation
- Matching with climate and water availability, black mustard or *Chaite tori* or rapeseed are grown
- By the help of STW/DTW, spring maize is also grown in some areas
- Winter has cropping intensity of **only 50%**

Agricultural Production Variation between 2015 and 10 years ago

Singeghat Irrigation System



Julphe Irrigation System



Factors Influencing Agriculture Practices

Three Factors have Influenced the Agriculture Practices

1. Unreliable water delivery
2. Uncertain climate effect
3. Uncertain price of agriculture products

STUDY FINDINGS

- **PERCEPTION OF FARMERS** on climate change and real data from DHM are almost **same in pattern.**
- Observed erratic rainfall patterns in **monsoon** and **winter.**
- Local level temperature and rainfall **data are missing.**

STUDY FINDINGS

- Farmers attract more on **cash crops** rather than traditional crops such as **wheat** and **maize**
- Along with impact of **CLIMATE CHANGE**; there are **MANY NON-CLIMATE FACTORS** which have influenced the **livelihood of farmers** in command areas.
- Number of **INSTITUTIONS** are involved in **climate resilience** activities in both irrigation systems.

Acknowledgement

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2. The Centre for Engineering Research and Development (CERD)
3. The ADAPT-Nepal



In Conjunction with

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Government of Nepal

