



Sahi Fasal

नहीं है जल , तो नहीं फसल | कम जल ले, वो "सही फसल"

---Asok Kumar G.
Additional Secretary & Mission Director
National Water Mission
Ministry of Jal Shakti

NATIONAL WATER MISSION

Goals of NWM



Comprehensive water data base in public domain and assessment of impact of climate change on water resources



Promotion of citizen and State action for water conservation, augmentation and preservation



Focused attention to vulnerable areas including overexploited areas



Increasing water use efficiency by 20%



Promotion of basin level integrated water resources management

Water Availability in India

| Particulars | Quantum | |
|---------------------------|------------|-------------|
| | BCM* | % |
| Precipitation received | 4000 | 100 |
| Water Resource Potential | 1869 | 46.7 |
| Utilizable Water Resource | 1123 | 28.1 |
| Ground Water | 433 | 10.8 |
| Surface Water | 690 | 17.2 |

- ▶ Space & time related variability
- ▶ Per capita availability !



Population-2017
Global: 7.6 Billion
India: 1.34 Billion
(17.6%)

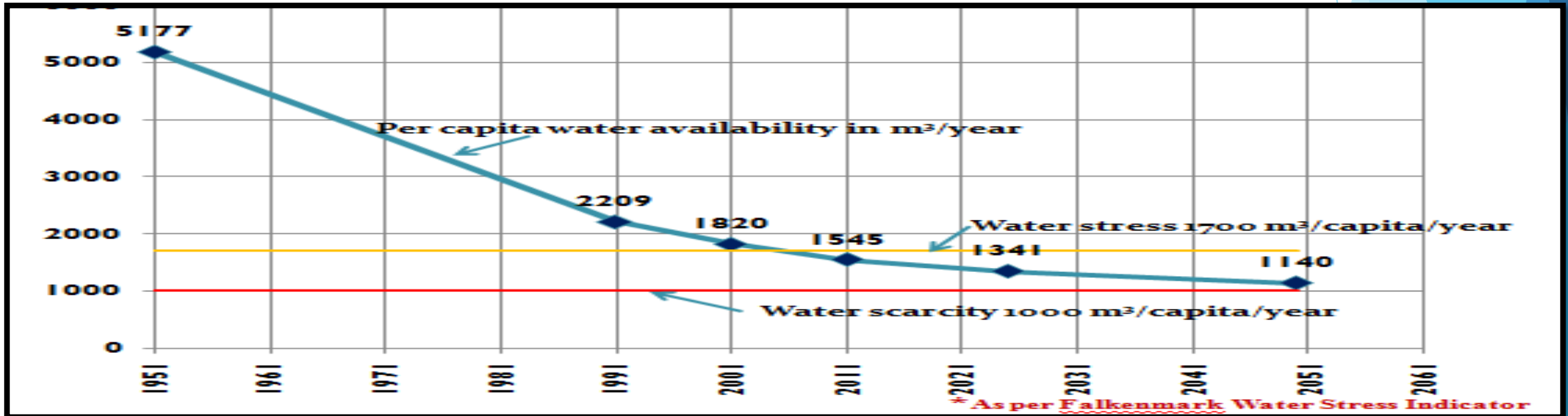
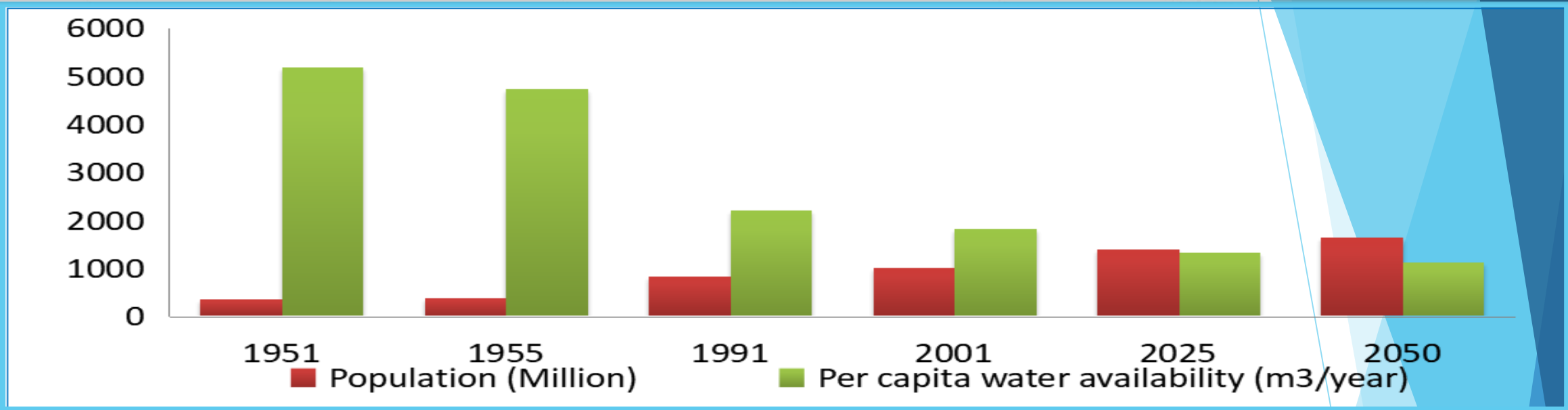
Global per capita annual availability
of water:

Year 1804: 42,370 M³

Year 2017: 5,575 M³

.....for India: 1400 M³

How much do we have ?

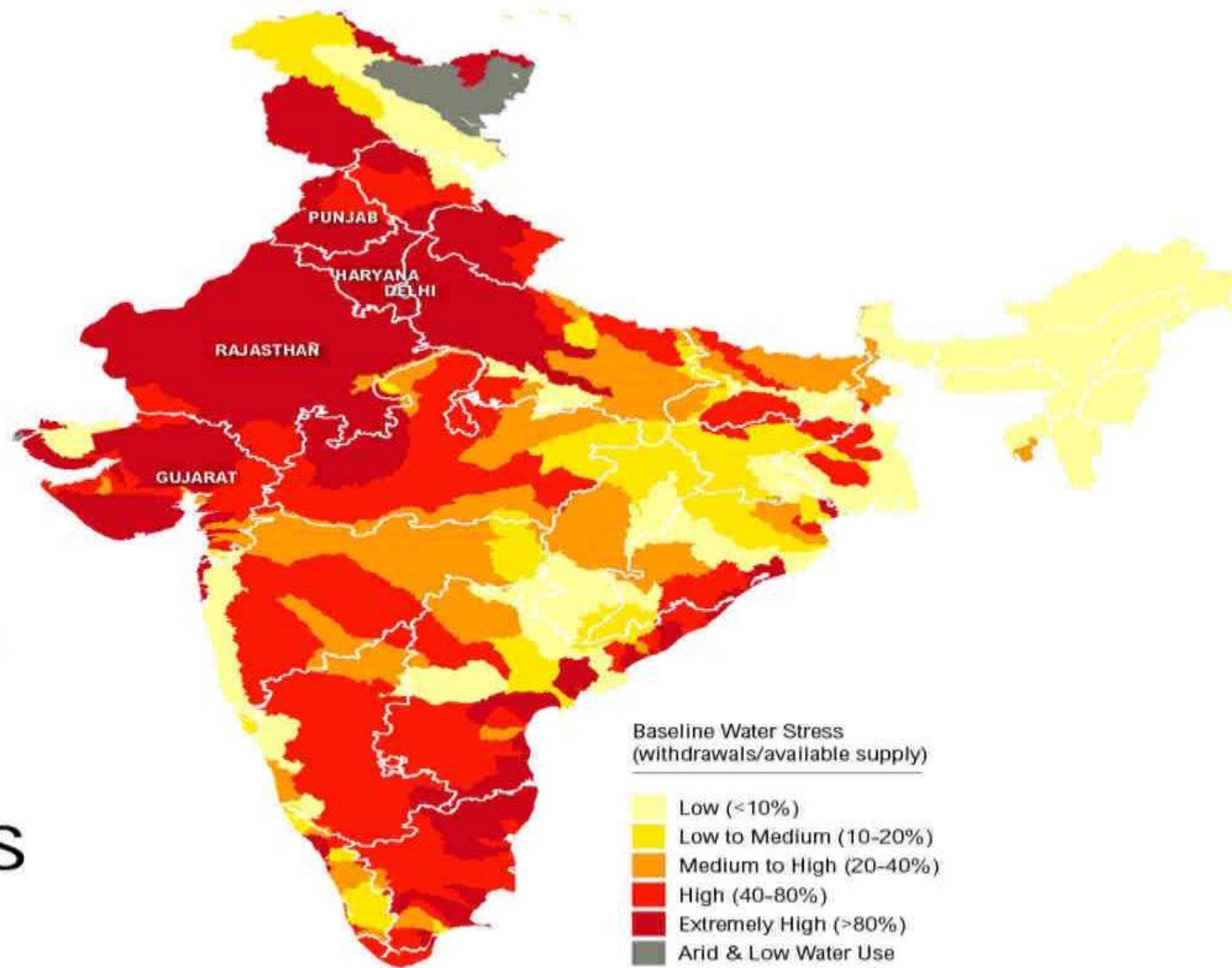


54%

of India
Faces

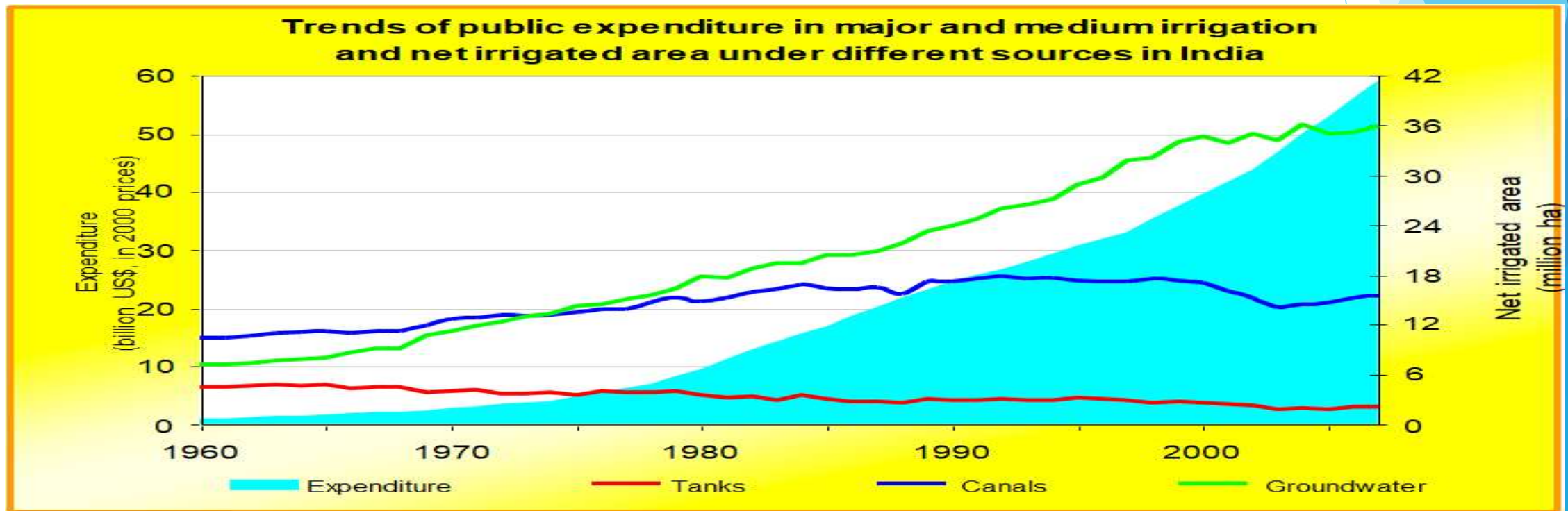
High to
Extremely
High

Water Stress



Water Use

| Usage (%) | World | Europe | Africa | India |
|-------------|-------|--------|--------|-------|
| Agriculture | 69 | 33 | 88 | 89 |
| Industry | 23 | 54 | 5 | |
| Domestic | 8 | 13 | 7 | 11 |



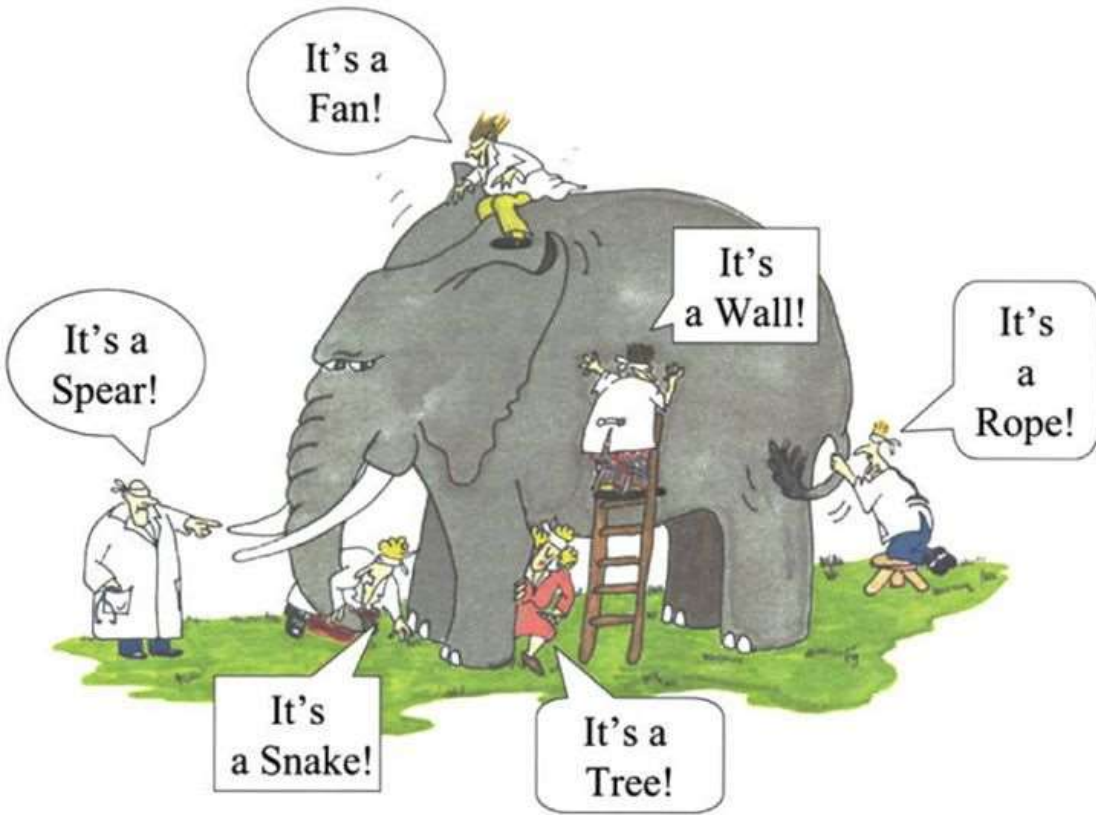
| Country | Water footprint of crop production (Gm ³ /yr) | | | |
|-----------------|--|--------------|-------------|-------------|
| | Green | Blue | Grey | Total |
| India | 716.0 | 231.4 | 99.4 | 1047 |
| China | 623.9 | 118.9 | 223.8 | 967 |
| USA | 612.0 | 95.9 | 118.2 | 826 |
| Canada | 120.3 | 1.6 | 18.2 | 140 |
| Pakistan | 40.6 | 74.3 | 21.8 | 137 |
| World | 5771 | 899 | 733 | 7404 |

Problem Statement

▶ India

- ▶ has 18% of world's population,
- ▶ has 4% of world's fresh **water**, out of which **85-89%** is **used in agriculture** (**even a reduction of 10% in agriculture water usage will result in a significant saving**)
- ▶ **uses 2-3 times water to produce one unit of major food crops compared to other major agricultural countries like China, Brazil and USA.**
- ▶ extracts more ground water than USA and China put together
- ▶ largely uses **flood irrigation** technique which results in huge wastage of water
- ▶ has water intensive crops like paddy and sugarcane together grown over one-fourth of the gross cropped area, consuming over 60% of the total irrigation water supplied to agriculture.

The elephant in the room and blind stakeholders



Do we need more cereals/rice/sugarcane?

- Our dietary pattern has changed.
- We have stock of grains more than three times the requirement of food security
- More states are growing paddy- ensures food security

DIL MANGE **MORE**.....

Each stake-holder has its own targets vis-a-vis previous year

- Agriculture department- **more** sown area and yield per acre
- Fertilizer companies- **more** fertilizers to be used
- Electricity dept- **more** sales of electricity
- Irrigation dept- **more** water released
- Borewell companies- **more** borewells dug
- Submersible motor companies- **more** motors to be sold
- Farmers- **More** income/money
- Agriculture Price Commission- **more** MSP
- Agriculture Market Committee-**more** procurement of grains
- FCI- **more** procurement
- Railways- **more** movement of rakes

All leading to

- More** production and procurement of grains
- More** wastage of grains
- More** water being lifted up
- More** consumption and depletion of water
- More** trouble for the future generation



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‘Sahi Fasal’

is a **campaign** launched
by **National Water Mission**

to the **challenge and change** the basic question
“**how to grow more agri-produce?**”

to

“**how to raise the income of farmers
with appropriate agri-produce
using less water on a sustainable basis?**”

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‘Sahi Fasal’



SAHI FASAL is to **NUDGE** farmers to **grow crops** which :

- ▶ Use **less water** or are not water intensive,
 - ▶ but use it **very efficiently**; and
 - ▶ are **remunerative** to them;
- at the same time
- ▶ are healthy and nutritious;
 - ▶ are suited to the **agro-climatic-hydro characteristics** of the area; and
 - ▶ are environmentally friendly; but
 - ▶ Without affecting the food security of the nation.

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Key steps towards promoting '*Sahi Fasal*'



- **Creating awareness among farmers on**
 - alternate crops which consume less water,
 - better irrigation practices,
 - micro –irrigation,
 - soil moisture conservation
- **Bringing policy makers, stakeholders, programmers together to**
 - frame policy/programs that promote water conservation in agriculture along with mainstream agricultural policies that will help to **increase the income of farmers** and **protect the environment**.
 - initiate dialogues among them to **improve procurement policies, effective pricing of inputs** (water, fertilizers and electricity)

Sahi Fasal:

- ▶ *launched* on **14.11.2019** with a workshop at **Amritsar**, Punjab attended by **850 farmers**
- ▶ Three more workshops have been held in New Delhi (26 & 27/11/2019), Aurangabad (Maharashtra, 13/1/2020) and Kurukshetra (Haryana, 14/2/2020).
- ▶ To create **multi-pronged strategy** that encompasses multiple dimensions of agriculture sector like *crop science, agriculture extension services, agriculture economics and marketing, irrigation sector, power sector* etc. so that institutional reforms can be made that have sustainable impact on the ground on encompassing *themes like crop choices, fertilizer usage, water & power usage in agriculture* in a hope to *maximize financial benefit to farmers, strengthening nutritional value of varied agriculture produce and sustaining the health of soil and water resources.*

Amritsar and Scope Complex Workshops





Sahi Fasal: Case Study 1:

Punjab:

- ▶ Has only **1.5%** of India's **geographic area**, but contributes **38% of wheat** and **31% of rice** to the **central pool of food grains** (Economic Survey of Punjab, 2018-2019).
- ▶ Area under rice cultivation has been proliferating through ever increasing ground-water exploitation that has now reached unsustainable levels.
- ▶ Out of the **138** assessed **blocks** in Punjab, **109** blocks have been categorized as '**Over-exploited**', **2** as '**Critical**', **5** as '**Semi-Critical**', **22** blocks as '**Safe**' in terms of ground water exploitation, (CGWB).
- ▶ uses 2 times more irrigation water than West Bengal and 3 times more irrigation water than Bihar for producing one kilogram of rice

Sahi Fasal: Case Study 2:

Haryana

- ▶ Accounts for >60 % export of Basmati Rice from India.
- ▶ 60% increase in rice production within the state led to an average fall of 10 meters in the state's water table between 1999 and 2018. (Haryana Agriculture Department's Ground Water Cell)
- ▶ The water level in these areas has been falling one metre every year due to paddy cultivation.
- ▶ Out of total 128 assessed blocks of the state, **78** have been categorized as '**Over-exploited**', **3** as '**Critical**', **21** as '**Semi Critical**' and **26** as '**Safe**' in terms of ground water exploitation.(CGWB).
- ▶ Faridabad, Gurugram, Mahendragarh, Bhiwani, Dadri, Palwal, Mewat, Kurukshetra, Kaithal, Panipat and Sirsa are the worst-affected districts in Haryana.

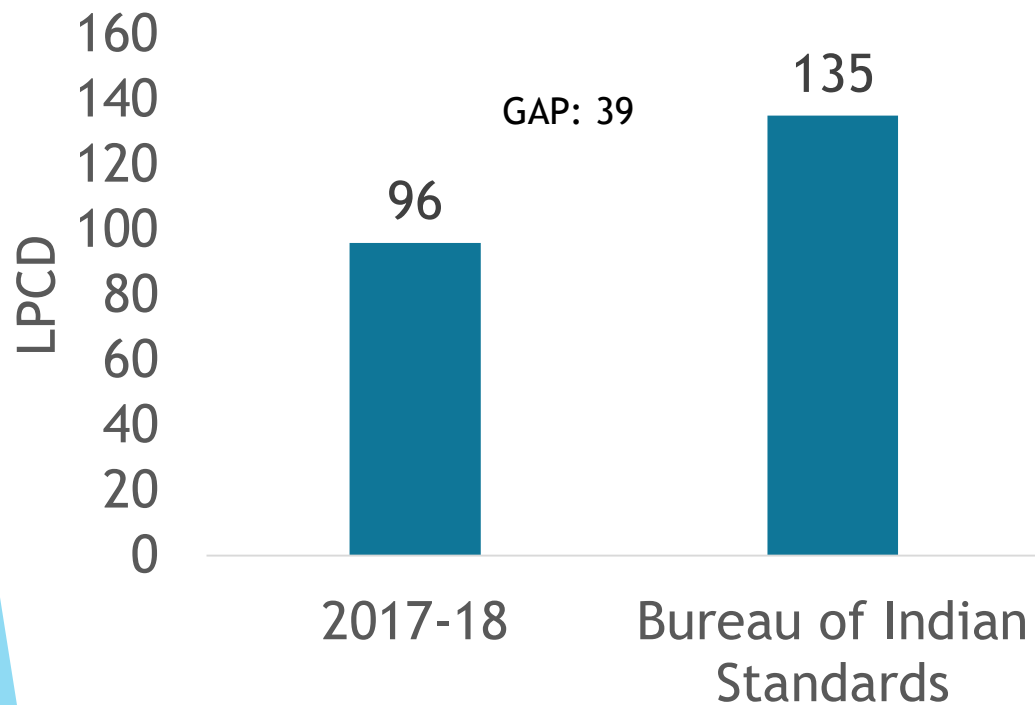
Sahi Fasal: CASE study 3*: NANDED - WAGHALA CITY (MC)

Total Population: 630,000

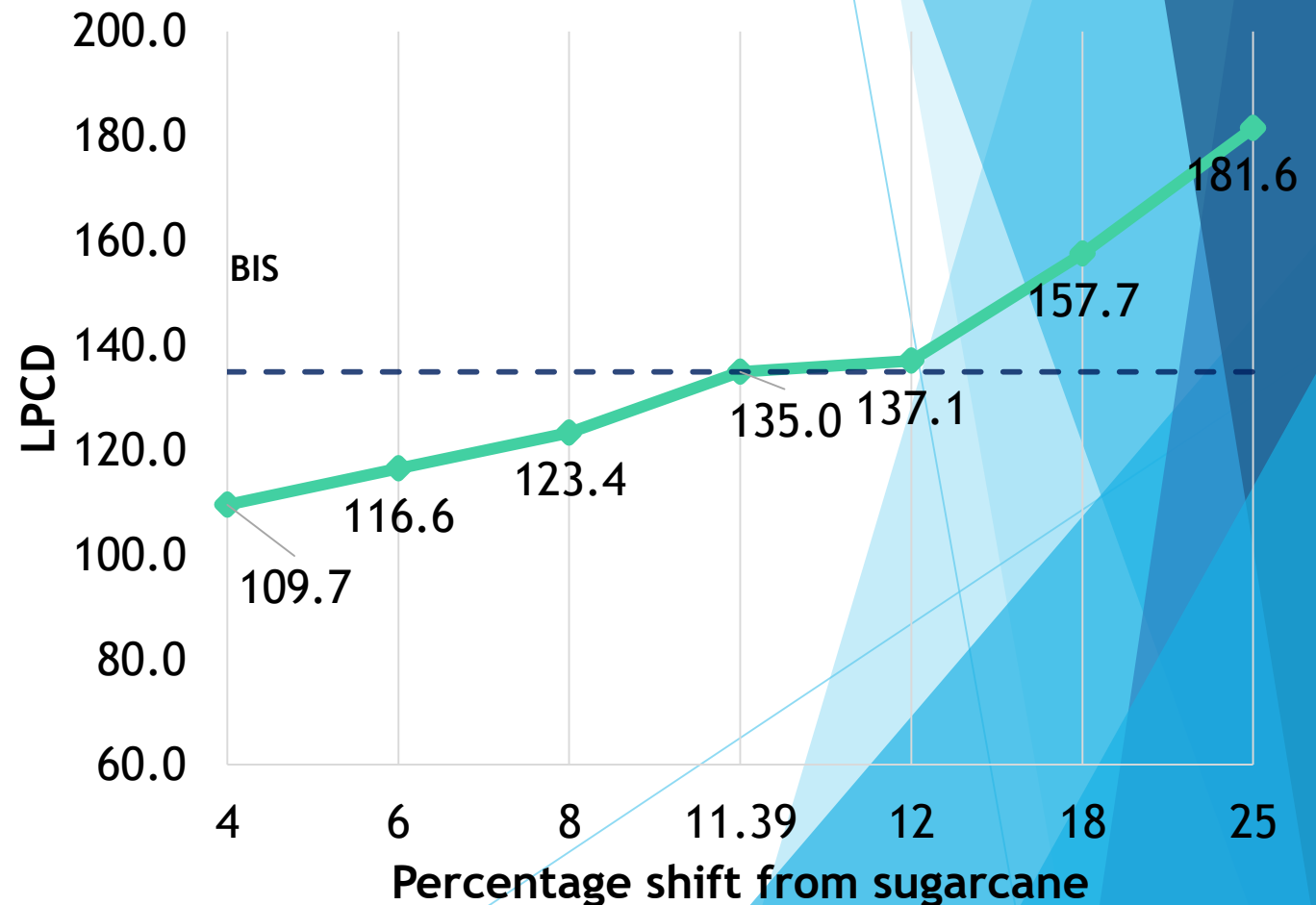
1. A switch of approximately 11.39% of agricultural area (1,183 Hectares) from Sugarcane to Soybean in Kharif and Jowar in Rabi would fill the gap.

Total water saved: 8,970,631 m³

Nanded water supply



* ISB Hyderabad study



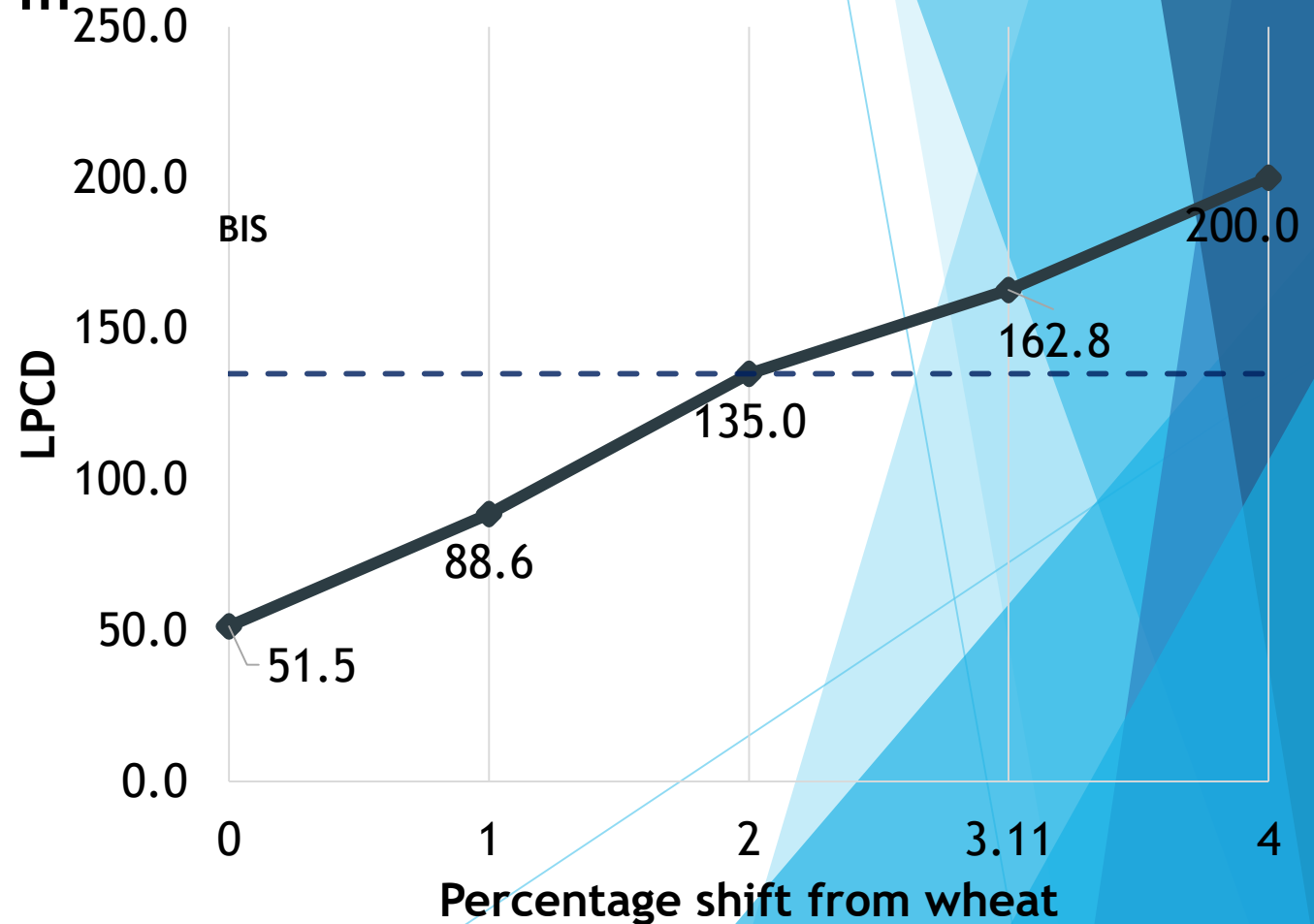
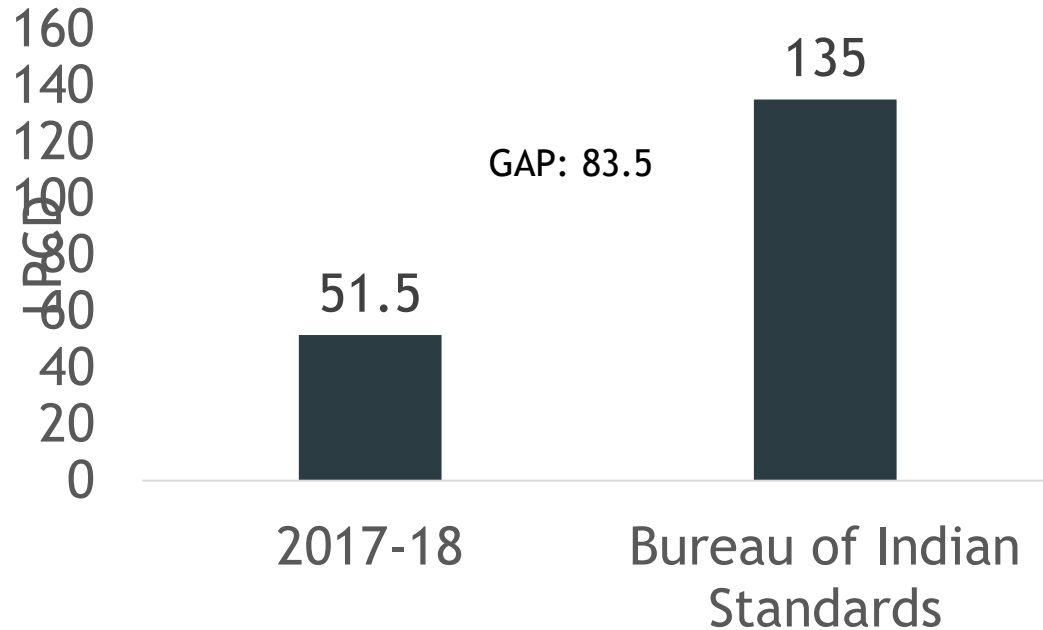
Sahi Fasal : CASE study 4* : PATHARI TOWN (Mun. Council)

Town Population: 46,636

2. A switch of approximately of 2.25% agricultural area (171 Hectares) from Wheat to Jowar in Rabi would fill the gap for Pathari.

Total water saved: 1,421,526 m³

Pathari water supply



* ISB Hyderabad study

What can be done:

**Look to the future through the “Water Glass lens”
in water stressed areas**

- ▶ **Intervene proactively to reduce** the area under water intensive crops like paddy, sugarcane, cotton. Farmers to **grow alternate crops** like corn, millets, soyabean, vegetables or horticulture .
- ▶ **Provide support** like seeds, technical help, markets to promote **crop diversification.**
- ▶ **Better and strengthened procurement policy** that promotes purchase of traditional crops.
- ▶ **Incentivize** farmers for use of **less water and electricity in agriculture**

What can be done:

Look to the future through the “Water Glass lens” in water stressed areas

- ▶ **Take MSP head-on:**
 - ▶ **Differential MSP** for crops grown in water stressed region or
 - ▶ **price difference payment** scheme like Bhavantar Bhugtan Yojana of Madhya Pradesh or
 - ▶ **even a procurement holiday** for water intensive crops
- ▶ **Strengthen supply chains** for agricultural commodities from production centers to consumption centers, **appropriate storage** for alternate crops like horti-produce etc.
- ▶ **Propagate water saving** techniques in paddy, sugarcane and cotton cultivation.
- ▶ To ensure food security, encourage paddy in **water abundant areas of Bihar, Odisha etc**

Increase Water Use Efficiency (1)

- ▶ Increase yield per unit of water by-
 - ▶ (a) Improving **non-water inputs** that increase production per unit of water consumed
 - ▶ (b) Changing to **new/ different crop varieties** with higher yield per unit of water consumed.
 - ▶ (c) using Micro-irrigation like drip, sprinkler and micro-sprinklers
- ▶ Reduce non-beneficial depletion and increase the intensity of water use by-
 - ▶ **restricting evaporation** from bare soil and from fallow land
 - ▶ **reducing water flows to sinks** (deep percolation and surface runoff) and
 - ▶ **minimizing salinization** of recoverable return flows

Increase Water Use Efficiency (2)

- ▶ Better Storage, Conveyance, distribution efficiencies
- ▶ Use better agriculture/ industrial practices that reduce water use
- ▶ Appropriate **Pricing of water** to make people aware of “**Water’s Value**”
- ▶ Reallocate water from lower to higher value uses within or between sectors
- ▶ Co-manage water by promoting multiple uses
- ▶ Mantras of 3Rs--**Reduce, Reuse, Recycle**

Water use (mm) under different methods

| | Flood | Drip | Sprinkler | LLL |
|-----------|-------|------|-----------|------|
| Cotton | 450 | 250 | — | — |
| Groundnut | 600 | 350 | 450 | — |
| Soyabean | 670 | 375 | 500 | — |
| Wheat | 450 | — | 300 | — |
| Bajra | 400 | — | 300 | — |
| Tur | 500 | 275 | — | — |
| Jowar | 400 | — | 300 | — |
| Gram | 240 | 130 | 150 | — |
| Barley | 400 | — | 300 | — |
| Sugarcane | 1600 | — | 1040 | — |
| Rice | 1000 | — | — | 750 |
| Rice | 1500 | — | — | 1200 |
| Maize | 650 | — | 450 | — |

Concluding, the **Sahi** Plan of Action will be to

- ▶ Look to the future through the “Water Glass lens” in water stressed areas
- ▶ Work together, coming out of our Silos and ask the question
- ▶ **“how to raise the income of farmers with appropriate agri-produce using less water on a sustainable basis?”**
 - ▶ So in a BOOND,
 - ▶ To Make our Jeevan Safal,
 - ▶ And for Achi Nasl,
 - ▶ Go for **Sahi Fasal**



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Thankyou!

Alternative Irrigation and other methods to improve Water Productivity

| | Situation | Yield | WP |
|---------------------------|---------------|-------------|--------------|
| Philippines (avg 1988-89) | Flooded | 5.25 | 0.245 |
| | AWD | 3.95 | 0.455 |
| China (1999-2000) | Flooded | 8.25 | 0.91 |
| | AWD | 8.20 | 1.01 |
| India (1983-84) | Flooded | 6.3 | 0.325 |
| | AWD 1d | 5.85 | 0.345 |
| | AWD 3d | 5.55 | 0.35 |
| | AWD 5d | 5.10 | 0.335 |
| | AWD 7d | 4.90 | 0.325 |

Under AWD

- Alternative Wetting and Drying (AWD)
- Dry direct seeding of rice
- Raised beds for Rice-Wheat rotations
- Aerobic rice for improving water productivity
- Chanel to field v/s Field to field irrigation

Policies to reduce groundwater overexploitation

| Control Policy instruments | Cost-effectiveness | Impact | |
|---|------------------------|----------------|---|
| | | Equity | Sustainability |
| i) Well spacing norms | Less costly to enforce | Inequitable | Very limited impact on sustainable use |
| ii) Volumetric limits on pumping | Costly | More equitable | Highly effective for sustainable use of water and electricity |
| iii) Electricity pricing | Less costly | Equitable | Limited impact on sustainable use of water and electricity |
| iv) Electricity rationing with pricing | Costly | Equitable | Highly effective on sustainability |
| v) Regulation on well digging and deepening | Costly | Inequitable | Limited impact on sustainability |
| vi) Credit restriction | Less costly | Inequitable | Very limited impact |
| vii) Crop restriction | Costly | Inequitable | Very limited impact |