# Water Security for Agriculture and Rural Development

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## Philosophy of the Talk

• WATER will determine the quality of life of both RURAL & URBAN citizens in future

#### No Water Scarcity in India

(My conviction)

• Strategy for Management of Water and Governance ability will decide the fate of future <u>GENERATIONS</u>.

#### Surface Water → 690 BCM

Total water stored in 5.5 k dams 257 BCM

80% SWR for IRRIGATION 206 BCM

IRRIGATION n 50 %

LOSS 103 BCM

**DOMESTIC WATER DEMAND** 

 $1.5 \times 1.140 \times 366 = 77 \text{ BCM}$ 

# Rainfall is the principal source of:

### WATER

## 2 Simple Points

Rainfall Deficit --- Irrigation

Rainfall Excess---- Drainage

On agricultural lands

# Complex and Compound Inferences

RF Deficit --- Extreme - Drought

RF Excess --- Extreme - Flood / Deluge

### Crisis of water

#### On the Ground Surface

#### **Below the Ground Surface**

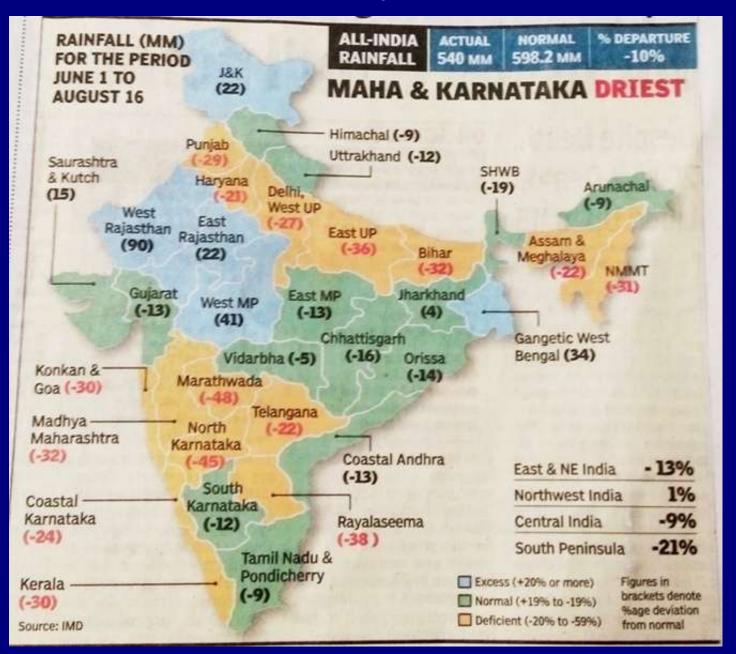
#### UNDERSTANDING

Behaviour of Rainfall

Rain-fed Agriculture

Climate Change

#### Rainfall trend in Any X,Y,,Z, Year



#### RAIN-FED AGRICULTURE

#### **Imagination and Assumption**

Ministers /Advisors/Bureaucrats/ Scientists / Engineers / Activists and other Freelance Thinkers are assumed to be sons of farmers of rain-fed areas. Conted....

Suppose.....

They also do not get any monthly salary (say).

#### Conted...

#### BUT

possess all wisdom & are aware of the <u>facts of rain-fed</u> agriculture, known for the last 6 decades or more.

### **Empathic Thinking**

In the backdrop of those assumptions & circumstances

Do they still recommend ....???
Practice of rain-fed Agriculture any more OR Is status quo sustainable ??

An honest answer will always be: NEGATIVE

# Jal Shakti Abhiyaan Big Goals

Har Khet Ko Jal

Har Ghar Ko Nal Se Jal

#### **Important Reviews of the Past**

- National Water Grid by Dr. K L Rao, 1972
- Garland Canal by Capt. Dastur, 1977
- Inter-Linking of Rivers by Bajpai Govt., 2001
- Directive by Supreme Court of India, 2014

The above mentioned ideas given by very influential leaders of the country could not be achieved till date.

### **VISION**

Long term investment for long term gain as compared to short term measures.

INR 3.5 to 8.0 lakh crore investment

### MANTRA

Think Big
Start Small
Act Fast

# Can we make Indian Farmers independent of

Monsoon

&

• Climate Change

???

# Prime Minister Narendra Modi used a Metaphor (2015) First in Public Meeting

and repeated on May 26, 2017.

"Farm Land is Like Human Body".

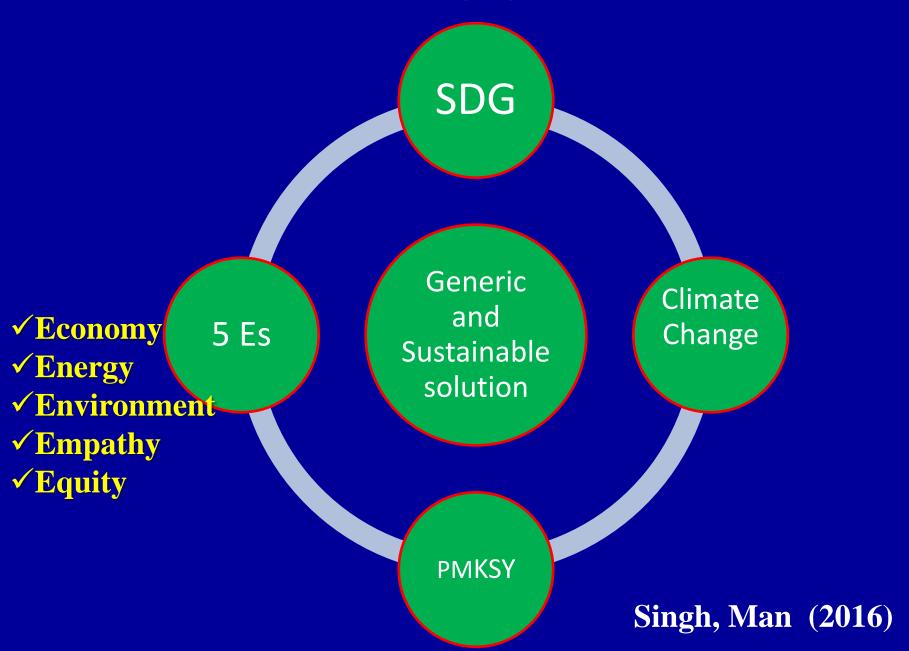
#### ARTERIAL SYSTEM (ANTERIOR VIEW) VENOUS SYSTEM (ANTERIOR VIEW) superior sagittal sinus superficial temporal vein maxillary artery superficial temporal artery superior ophthalmic vein infraorbital artery interior sagittal sinus cavemous sinus occipital artery straight sinus transverse facial artery angular vein transverse sinus infraorbital vein buccal artery vertebral artery maxiflary vein sigmoid sinus - facial artery internal carotid artery buccal vein occipital vein external carotid artery - inferior alveolar artery facial vein common carotid arteries internal jugular vein mental and submental arteries inferior labial vein thyrocervical trunk. external jugular vein lingual artery inferior alveolar vein costocervical trunk subclavian vein axillary artery subclavian artery internal thoracic vein aortic arch axitlary voin thoracoacromial artery pericardiacophrenic artery cephalic vein intercostal veins anterior and posterior descending aorta. brachial vein brachial vein circumflex humeral arteries inferior vena cava radial collateral artery basilic yein internal thoracic artery brachial artery lateral thoracic vein right, left, and middle hepatic veins radial collateral artery interior phrenic artery perforating branches of superior epigastric vein celiac trunk intercostal arteries internal thoracic vein renal vein superior mesenteric artery abdominal vena cava renal artery superior epigastric artery thoracoepigastric vein thoracoopigastric vein inferior mesenteric artery inferior epigastric artery gonadal vein median cubital vein radial recurrent artery common illac vein anterior interosseus artery gonadai artery inferior epigastric vein basilic vein common iliac artery internal itiac vein ascending branch of deep circumflex flac artery cephalic vein internal Iliac artery external iliac vein external iliac artery radial vein superficial circumflex iliac vein superficial circumflex iliac artery radial artery superficial epigastric vein ulnar vein medial and lateral ulnar artery femoral circumflex artery palmar venous arch deep palmar arch superficial and deep digital yeins deep palmar arches superficial digital yeins proper paimar perforating branches digital arteries femoral artery (of femoral vein) deep femoral artery descending branch of external pudendal vein lateral circumflex temoral artery perforating branches accessory saphenous vein femoral vein descending genicular artery great saphenous vein lateral superior genicular artery medial superior genicular artery popliteal vein popliteal artery medial inferior genicular artery deep veins of the knee superior medial and lateral interior genicular artery lateral genicular veins anterior tibial artery peroneal artery lesser saphenous veinposterior tibial artery tibialis anterior veins great saphenous vein anterior lateral malleolar arterial dorsalis pedis vein lateral plantar artery dorsal venous arch deep plantar arterial arch dorsalis pedis artery dorsal metatarsal arteries lateral tarsal artery superficial dorsal veins déep plantar veins dorsal digital arteries arcuste artery

### A-V MODEL



The human <u>artery</u>, <u>vein</u>, <u>tissues</u> and <u>cells</u> correspond to <u>irrigation</u>, <u>drainage</u>, <u>villages</u> and <u>individual</u> <u>farms</u>, respectively.

#### PARAGON - 30



#### Major Flaws- a reality

No where irrigation water is measured

No fair pricing of irrigation water

Can we expect higher ......

Irrigation W U Efficiency

?

# Paradigm Shift is Inevitable

### Define Water

Public Good Economic Good

#### POLICY CHANGE

MEASURE & TREASURE IRRIGATION
WATER AND PAYFOR IT

Muft Sichayi

&

Muft Bijali

#### **Natural Facts**

❖ Even If, Irrigation water is of excellent quality, still brings some amount of soluble salts into the field that is irrigated for 20, 30, 40, 50 years.

**\*** These salts need to be leached out to meet SDG and IIA.

#### GENERAL IRRIGATION PRACTICE

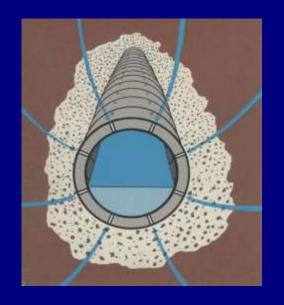
Uncontrolled usage of irrigation water[SW & GW] on one side and insufficient drainage or no sub-surface drainage on the other result in salt build-up in the root zone soil layer.

# SOIL HEALTH PROBLEM AND/OR GROUNDWATER QUANTITY AND QUALITY PROBLEMS

comes up

#### The solution to this problem is only

#### SUB SURFACE DRAINAGE TECHNOLOGY











#### Standing observations of 5 decades

Salinity Build-up in the Agricultural Lands is a very slow process.

Therefore,

Farmers, Engineers, other Govt. Officials, Policy Makers and Political Leaders

See

Irrigation only as a need of today and

Salinity and water table control through **Sub Surface Drainage**, is a problem of tomorrow.

#### Professional K & W

Irrigation and drainage go together like head and tail of the same coin.

Or A – V of Human Body

Face of Irrigation is seen for past over 60 years.

Drainage is still waiting for its turn.

# Transformation of Irrigation & Drainage Infrastructure

#### PROBLEM SOLVING APPROACH

We must CHANGE now and go for a paradigm shift

**Proactive and Creative cooperation** 

Public – Private & Farmers' Partnership

# Mechanized Subsurface drainage installation on the saline agricultural land

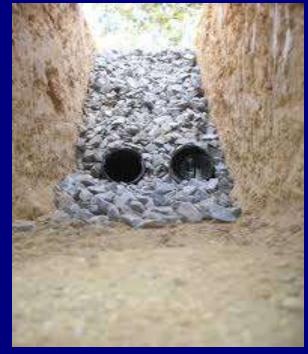


#### Subsurface drainage materials used in the Technology











Drain envelope

laying of complete lateral drain equipped with envelope material





#### SUBSURFACE DRAINAGE SYSTEM

Cost of Land Reclamation

INR 80 k to 200 k per ha

Cost of Land Acquisition INR 2.5 crore per ha

INR 7500 crore

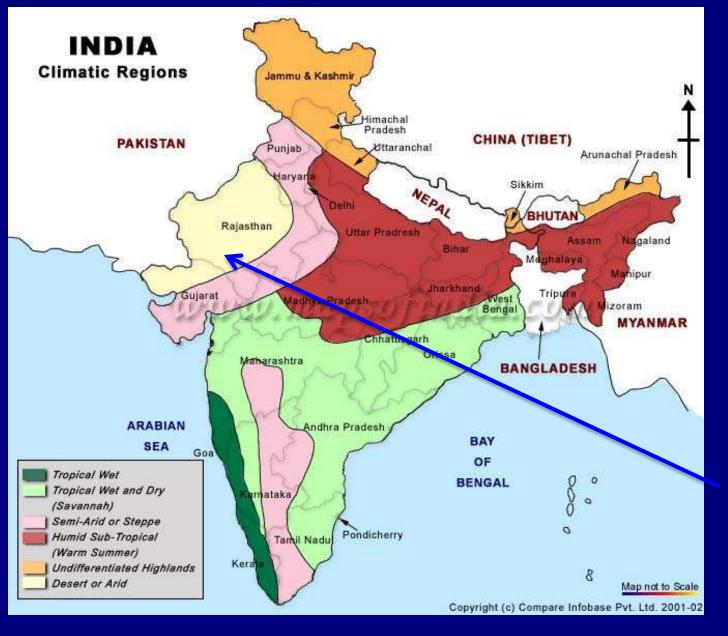
for 1 lakh ha

Transforming such lands into Cultivatable Land

Coastal
Lands' Care







Maximum area that could be cultivated

142 - 160 m ha

Power of Drainage

CLIMATIC REGIONS OF INDIA AND CULTIVABLE AREA

Large Scale SUBSURFACE
DRAINAGE technology
application for land
reclamation may

ease the smooth passage of pending land acquisition bill.

#### DRAINAGE - SOIL HEALTH

- \* Land Improvement
  - \* Adds More Cultivable lands for Production

#### OUTCOME EXPECTED

Once the countrywide Networks of Irrigation and Drainage Infrastructure is in place by the strong Political Will

Farmers may become independent of monsoon rainfall and climate change.

Poor husbandmen can take diversified crops round the year. [Min 3, Max 4 crops per year] and earn money like any salaried person.

### Some Quotes for Inspiration

- ❖ When dealing with WATER, place Practice before Theory − Leonardo da Vinci 400 yrs ago.
- Let us Collectively modify the Dictum in the context of Today
- **❖** When dealing with WATER, place Ancient Practices, Theory and Modern knowhow together to solve the WATER problems.

## Focus

"Farmer First and Water First"

#### F F W F

For Agriculture beyond 2024 in India



Soon India may have

Networks of Waterways Likewise

Roadways, Highways, Railways , Air ways and

• • • • • • •

## Modern Knowhow

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Thank You very much for your kind attention