# CLIMATE CHANGE VIS-À-VIS FARM DIVERSIFICATION FOR SUSTAINABLE AGRICULTURE

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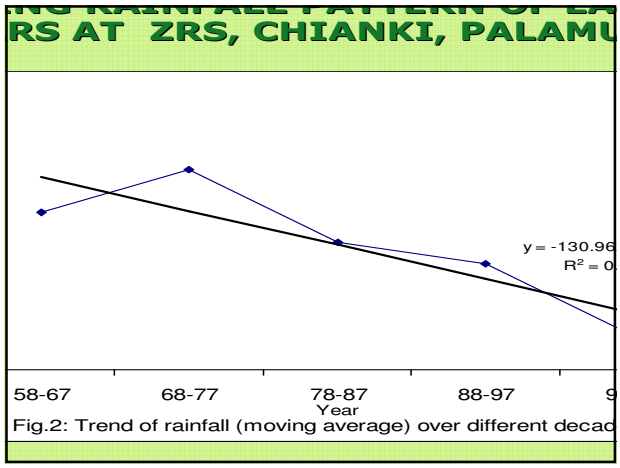


## Population Growth

| | 1950 | 2011 |
|---|---|---|
| World | 2.25 billion | 7 billion |
| India | 350 Million | 1.15 billion |
| Jharkhand | | 33 Million |

## Farming : A Way of Life

- Principal means of livelihood of 65% of India's population of 110 crores
- Farming population is increasing by 1.84% and average farm size is becoming smaller
- Cost risk-return structure of farming adverse
- 40% farmers would like to quit farming if they have other option

(National Sample Survey Report, 2007)

*India is facing serious AGRARIAN crises*

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## Share of Agriculture to India's GDP

- 1950……48.7% *Economic Survey*
- 1996-1997….. 24.4% *Report, 2007*
- 2007…… 18.7%

* 80% 0f the farm population operate small holdings

- Av. Holding size 1.41 ha.
- Out of 329 m ha , 142 m. ha. Net sown area
- Nearly 63 % of the area is rainfed

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## Farm diversification in rainfed rice areas (44 m Ha in India)

- **56% of the Country &72%(27 m Ha) in eastern India**
- **Upland (5.3 m.Ha),Medium (14 m.Ha), Low land(8.7%m Ha)**
- **Rainfed yield Low(1 ton/ha)and unstable**

**Need of *Replacement of rainfed upland rice with low water requiring high value crops***

***Best option for***

***Production, productivity,Income, and employment in rainfed upland rice areas in eastern India***

***Viable & Sustainable small Farm through Divercification of crop***

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## Poor Rice yield in rainfed uplands

- Vagaries of Southwest monsoon ,Occurrence of dry spells, Natural calamities
- Light texture acidic soil, low water holding capacity and severe nutrient deficiencies
- Biotic constrants, Socio- economic constrants
- Lack of proper soil and water conservation practices
- Lack of Efficient and effective research-extension – farmer-market linkages
- Delay in reaching appropriate technology to the farmer community in time
- Unremunerative prices do not encourage adoption of modern technology

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## Second Green Revolution through farm diversification

- 1950-51 per capita land holding 0.5 ha
- 2001-02…….0.15 ha
- Not possible to sustain a family with single crop enterprise and need of additional opportunities and income

`Non-adoption of New technology

Lack of awarenesss

Ineffective extension services

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## Lack of resources to invest require imput

- Researches only in Laboratory, not in farmer's field

Necessity of Farming System Research

Need for commercialization and diversification of small farms within and outside Agriculture and proper integration with local and global market

For that we have to overcome technological, infrastructural, institutional and policy constraints

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## Technological options

- Crop divercification in rainfed uplands
- Integrating farming systems in upland
- Integrated farming systems in lowland

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## Initiatives for viable small farmers

- Price protection
- Crop insurance
- Complementarity between NARS & Private Research Agencies
- Facilitate value addition attributes

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## Factors causing deceleration in productivity

- Soil fatigue
- Improper water management
- Imbalance use of N:P:K
- Improper choosing of crop
- Non-availability of certified seed
- Continuous cultivation
- Breakdown of Extension services
- Inadequate post harvest management infrastructure at farm level
- Lack of marketing infrastructure
- Low value addition

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## Region specific factor for deceleration in productivity

Lower and Mid Gangetic Plains

West Bengal,Bihar, Eastern U.P.

Flood / Water logging / Poor drainage

Salinity / Alkalinity/ Arsenic contamination

Low SSRs/ Non availability of Power /

High population growth/

Poor communication infrastructure

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## Major Initiatives Required

- Improve efficiency of delivery system in agriculture
- Need attention in Science-led and knowledge based productivity growth
- Water saving technologies
- Secure water rights to the users
- Pricing reforms
- Market
- Matching production technology for high yielding variety of seeds (Genetic enhancement through molecular biology and application of BIOTECHNOLOGY)

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## Potentiality of Agricultural productivity of Eastern Region

1950-51 Food Grain Production

- Eastern region 6.44 t/ha
- Northern region 6.08 t/ha
- Western region 3.90 t/ha
- Southern region 5.54 t/ha

2007

- Av. Yield of rice in Eastern region 1350kg/ha
- Av Yield of rice in India 1746kg/ha

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## Recommendations

- Sustainable agriculture with horizontal and vertical diversification involving high yielding , high income generating eco-friendly crop and non crop enterprise
- Development of appropriate technology for field crop with low gestation period
- Organic farming
- Strong Industry Agriculture linkage
- Dynamic price and crop insurance
- Agri- business and agro -processing unit
- Proper TOT

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## In One Slide

- Replacement of rainfed upland rice with low water requiring high value crop
- Horticulture and Agraforestry in sloppy land
- Integrated farming system involving pond based technology,Rice-fish,Rice-fish-poultry/Duck,Dairy,Sericulture, Apiary are important pathway for crop diversification to enhance employment and income generation
- It is generally recognizes that 2nd green revolution in India could be realized through Farm Development and Diversification particularly in rainfed areas of Eastern India which have been bypassed by 1st green revolution

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