

# Bureau of Parliamentary Studies and Training, Lok Sabha Secretariat

*New Delhi, 17 May 2007*

## Crisis in the Indian Agriculture

**M.S. Swaminathan**

Member of Parliament (Rajya Sabha)

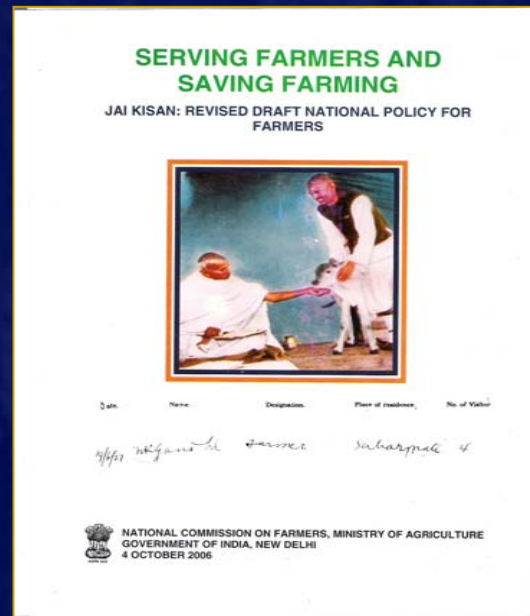


# Crisis in Indian Agriculture



# National Commission on Farmers

## Draft National Policy for Farmers



Gandhiji preferred to be known as a Farmer

Do not measure agricultural progress merely in statistical terms, but **mainstream the human dimension** in all agricultural programmes and strategies



# Strengthening the Ecological Foundations for Sustainable Agriculture

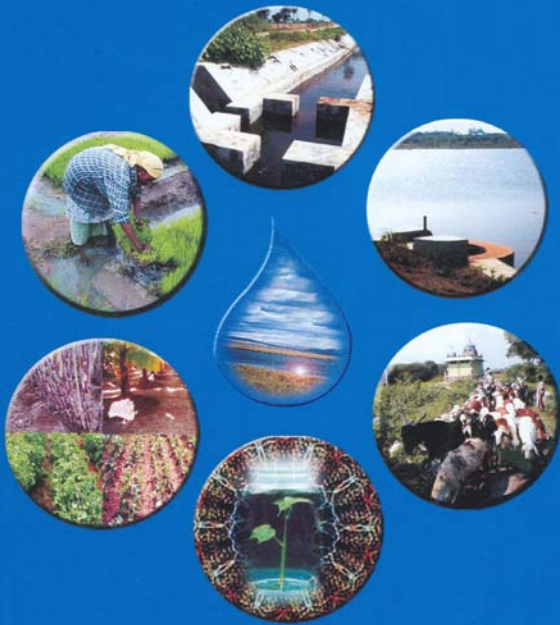
*“Despite the many accomplishments of mankind, we owe our existence to a six-inch layer of topsoil and the fact that it rains”*

*- Confucius*

- *Land*: Soil Health Enhancement – Soil Health Cards
- *Water*: Supply augmentation and demand management
- *Biodiversity*: Creating an economic stake in conservation – Recognition and Reward, Genetic and Legal Literacy
- *Climate Change*: Computer Simulation Models – contingency plans and compensatory production strategies; training local level climate managers
- *Sea Level Rise*: Bioshields, Anticipatory Research



Report  
of  
Sub-Committee  
on  
**MORE CROP AND INCOME PER DROP OF WATER**



Advisory Council on Artificial Recharge of Ground Water  
Ministry of Water Resources  
Government of India  
October 2006

An Action Plan for the  
Water Year 2007-08  
(June 1, 2007 to May 31, 2008)

Aim : Mind set change from  
quantity to the efficiency of  
use



# Inter-row Water Harvesting



Need for Agricultural Machinery



# Drip Irrigation in Banana



# Extension

- Farm Schools in fields of outstanding farmers
- Strengthening *Krishi Vigyan Kendras* with a post harvest technology wing (*Krishi aur Udyog Vigyan Kendra*)
- Organise Lab to Land programmes in the areas of catalytic technologies, agro-processing and value addition to primary products
- Establish *Gyan Chaupals*, atleast in one village in every block in collaboration with the CSC programme of DIT; digital gateway for content development for the *Gyan Chaupals*
- Establish 'Fish for All' Training Centres to impart integrated training in all aspects of fish production and consumption
- Establish **National and local level Science and Technology Alliances** (Consortia) for rural livelihood security.

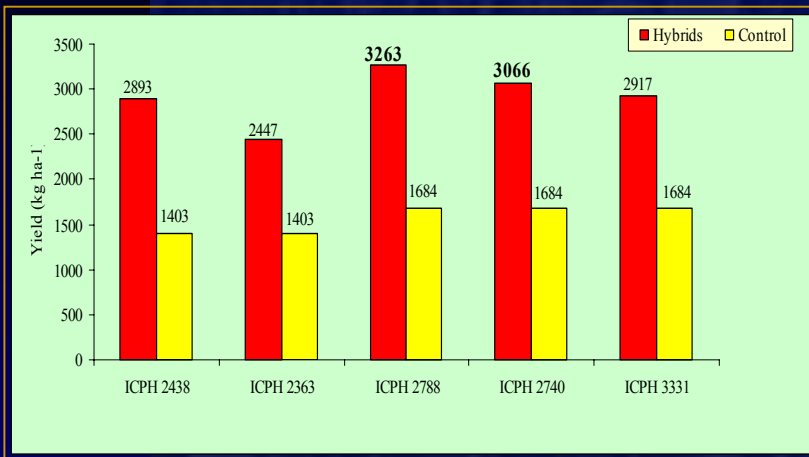




# Hybrid Arhar Villages : Pathway to a Pulses Revolution



- Rain water harvesting
- Hybrid Seed Production by SHGs
- Commercial Cultivation



# Livestock and Livelihoods

The real voyage of discovery does not consist of seeking new landscapes, but in having new eyes.

- Marcel Proust

Nearly 75 million women and 15 million men are involved in Dairy Enterprises in India. Ownership of Livestock is more egalitarian





**Tharakapar Breed of Cattle**

**Rathi Breed of Cattle**



**Establish Living Heritage  
Gene Banks**



# Rural Non-Farm Employment Initiative

- Rural India is confronted with declining share of agricultural GDP, worsening per capita farm and non-farm income ratio, decline in profitability of agriculture during the 1990s and less than 1 % growth in rural employment between 1993-94 and 1999-2000.
- Out of nearly 150 million rural households, 90 million are farmer households
- Need: Integrated on-farm and non-farm employment generation through a pan-Gol programme to establish Rural Business Hubs on the lines of China's Township & Village Enterprise (TVE) programme



# Assured and Remunerative Marketing

- Calculation of Minimum Support Price (MSP) – Cost [C2] + at least 50%
- Procurement price (MSP + Cost escalation)
- Issue of Smart Cards with specific entitlements to farmers who contribute to “Making Hunger History” movement
- Implementation of MSP throughout the country
- Market Intervention Scheme (MIS)
- Universal Public Distribution System (PDS) and enlarge the Food Basket to include maize, *jowar*, *bajra* and millets
- Commission on Agricultural Costs and Prices (CACP) – Autonomous, Statutory body
- Net take home income of Farmers – VI Pay Commission to study as background information
- Indian Single Market
- Price Stabilisation Fund



# National Rainfed Area Authority

## Simulation Modelling

- Alternative cropping strategies
- Seed reserves to implement contingency plans

## Crop Weather Watch Groups

- Rural Climate Managers
- Computer-aided knowledge centres



# National Monsoon Management Strategy

## Most Seriously Affected Areas (MSA)

- Food, water, fodder and work security
- **Ground Water Sanctuaries**
- Crop life saving agronomy

## Most Favourable Areas (MFA)

- Compensatory production programmes
- Production of seeds, feed grains, fodder and fuel wood



# Climate Change Management Act

- Drought Code
- Flood Code
- Good Weather Code
- Coastal Zone Management






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- audio links
- nuevo audio
- audio picks

**Our community**

- members
- working together
- competitions
- funding


**News and events**

- news
- events
- news links

**Resources**

- content ideas

**OneWorld Radio South Asia**



OneWorld South Asia and the M S Swaminathan Research Foundation are proud to launch the pilot edition of OneWorld Radio South Asia.

This pilot edition was launched on 16 January 2004 by Prof Bruce Alberts, President of the US National Academy of Sciences, and Dr Basheerhamad Shadrach, Director of OneWorld South Asia. We hope to be able to produce a full edition later this year.

As a platform for audio content exchange in the South Asian region, Radio South Asia will enable hundreds of organisations and individuals to download and broadcast audio programmes in South Asian languages to the communities they serve.

*We currently have the following audio programmes in Tamil...*

- About the Ecotechnology - Dr K Balasubramanian
- Sustainable Agriculture - Prof M S Swaminathan

By establishing linkages with

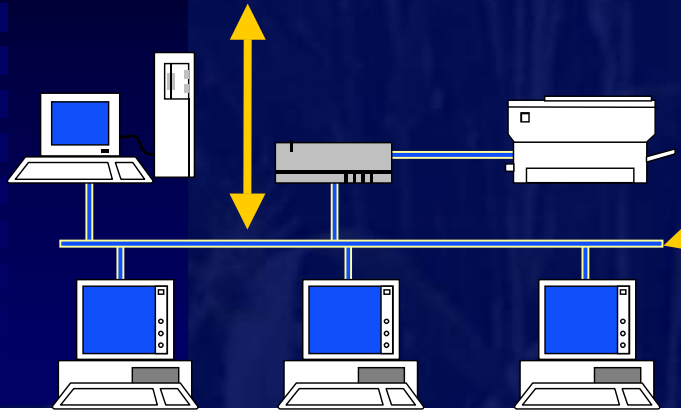
**Internet Radio - Synergy**

**Cell phone**

**Cable Radio**



**Educational Institutions  
Community Radio**



**MSSRF**

**Last mile and last person connectivity  
in knowledge empowerment**



# Special Agricultural Zones (SAZ)

## Small Farm Management Revolution

### Goals:

- To conserve prime farm land for agriculture
- To realise the untapped potential of rainfed areas
- To ensure National Nutrition Security and Food Sovereignty
- To bring about a systems approach with concurrent attention to all the links in the conservation, cultivation – consumption and commerce chain, with emphasis on assured and remunerative marketing
- To achieve an ever-green revolution through conservation farming and green agriculture and to achieve a balance between demand and supply in pulses, oilseeds, maize etc.
- To promote Organic Farming Zones



# Safeguarding National Food Security and Sovereignty

## Special Agricultural Zones

- Identify in every State areas with a high untapped agricultural potential and develop them into Special Agricultural Zones (SAZ)
- Introduce with the help of Farmers' Organizations and Gram Sabhas an integrated package of technology, services, techno-infrastructure and producer oriented trade
- Introduce Common Service Centres (including Gyan Chaupals) which will improve the economic and ecological efficiency of small scale farming through the provision of key centralised services to support decentralised production, eg, Small Farmers' Horticulture Estates, Small Farmers' Cotton Estates
- SAZ should aim to bring about a **Small Farm Management Revolution**

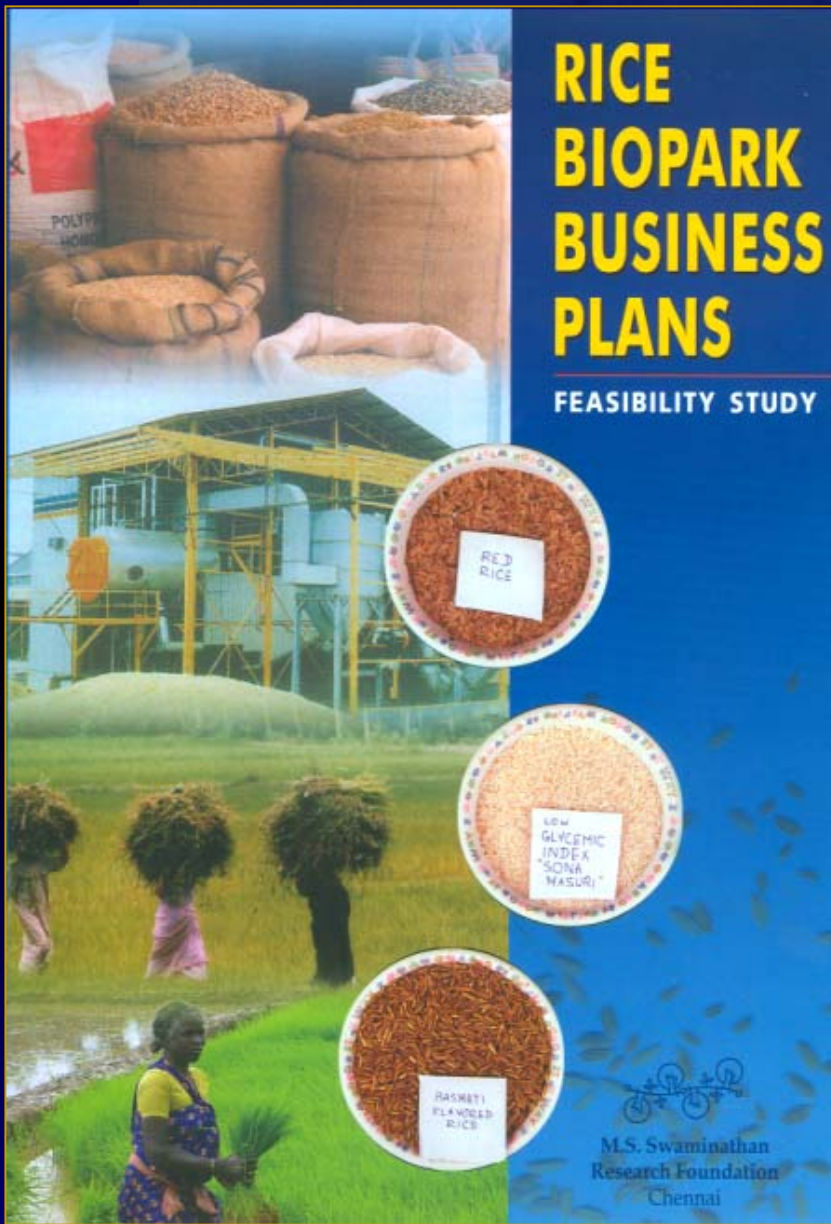


# Arid Zone SAZ



The Indira Gandhi Canal Area in Rajasthan would be ideal for being developed into a Special Agricultural Zone. Small farm families need urgently life saving support and incentives, more than rich industrialists do. A predominantly agricultural country like India should become a world leader in the establishment and nurturing of Special Agricultural Zones. This is the pathway to the sustainable enhancement of productivity per units of land, water and labour and to manage inflation





Biomass – an under- utilized  
resource for enhancing  
income  
and work security

# Producing 100 Million t of wheat by 2015

## Pathways

- Average yield of 4 t / ha from 25 million ha
- Large untapped yield reservoir in eastern, central and western India



## Three pronged strategy

- Defend the gains
- Extend the gains
- Make new gains



# Safeguarding the Heartland of the Green Revolution and Arousing the Sleeping Giant

- The 'fertile crescent' (Punjab, Haryana, Western UP) is in a state of ecological and economic crisis. This area constitutes the main anchor of our PDS and food security system - Launch a Conservation Farming and Green Agriculture Movement
- Eastern India, particularly Bihar, Eastern UP, Chattisgarh, Orissa, West Bengal and Assam, are well endowed with water resources. They have a large untapped yield reservoir. This region can become another fertile crescent, if a synergetic package of technology, services and market opportunities can be introduced.



# 2006-07 : Year of the Kisan for Agricultural Renewal (Third Report)

Integrated Five Point Action Plan for achieving the Tenth Plan Target of 4% growth rate in agriculture:

- Soil Health Enhancement and issue of soil health card
- Mandatory Rain water harvesting, aquifer recharge, efficient and conjunctive use
- Technology and Inputs including revitalisation of extension systems
- Insurance and Credit
- Fair price and Farmer centred Marketing





# Proactive Advice on Land and Water Use

- Organise National and State Land Use Advisory Services based on integration of data from meteorological, ecological and marketing factors
- Just as grain reserves are essential for food security, seed reserves are essential for crop security
- Technical advice to prevent losses from failed tube wells – use of Remote Sensing Data
- Priority attention to the crops covered under the National Horticulture Mission and Bio-fuel programme, particularly with reference to good quality seeds and planting material



# Assets - Livestock

- **National Livestock Development Council:** to give integrated attention to all aspects of the sector: breeding, fodder and feed, healthcare, marketing, value addition, meat and animal energy
- **Livestock Feed and Fodder Corporation** at the State level as facilitating agency for ensuring availability of quality fodder and feed
- Poultry to be declared as an agricultural activity
- Establish Living Heritage Gene Banks of local breeds of farm animals in State Farms



# Energy Security

- Promote an integrated rural energy security system
- Harness renewable energy such as biogas, wind, solar and bio-fuels
- Increase the technology component in the Jatropha programme, including the choice of high oil content genetic stains
- Promote decentralised energy generation through pyrolysis and biomass gasification



# Agricultural Biosecurity

- H5N1 Strain of Avian Flu – wake up call
- UG 99 stem rust of wheat
- Strengthen biosecurity infrastructure and capacity
- National Agricultural Biosecurity System with three mutually reinforcing components:
  - National Agricultural Biosecurity Council
  - National Centre for Agricultural Biosecurity
  - National Agricultural Biosecurity Network
- Strengthen sanitary and phytosanitary measures and set up an off-shore quarantine station, both to prevent the introduction of invasive alien species, and to identify resistance genes in native livestock / poultry



# Science and Technology

- Biotechnology Regulatory Authority
- Information and Communication Technology (Common Service Centres and Gyan Chaupals)
- Space Technology
  - Precision Farming
  - Ground Water Use
- Soil Health Cards
- Crop Care Consortium at Block level
- Implements – Agri-business Centres for custom hiring of farm machinery
- Productivity and competitiveness enhancement especially through value addition and prevention of post harvest losses.
- Professionalise the management of Technology Missions



# Establish an Indian Trade Organisation (ITO)

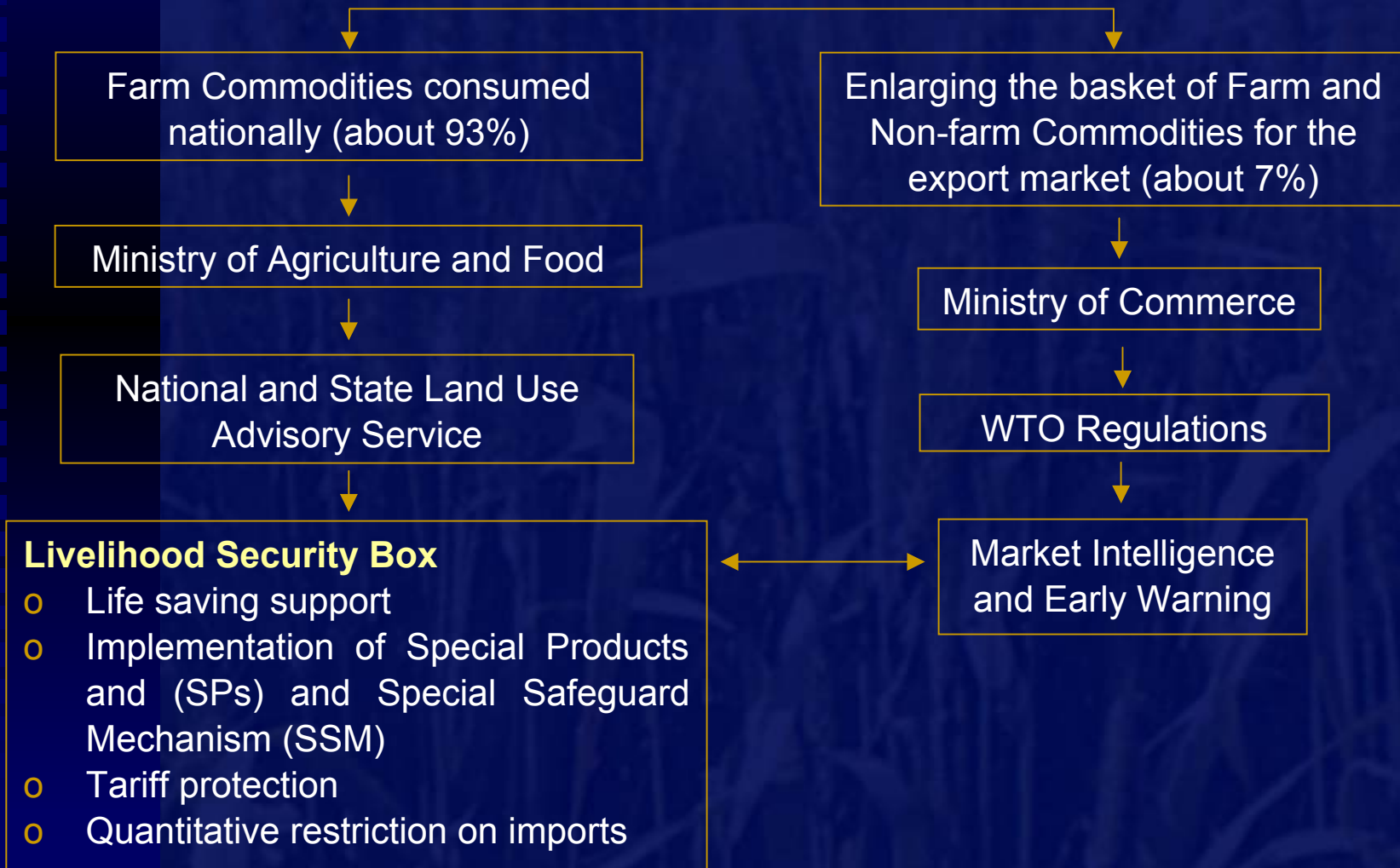
- Establish ITO as National Counterpart of WTO.
- Introduce our own boxes for domestic agricultural support on the model of WTO's Blue, Green and Amber boxes
- Our agricultural exports account for only 6.2 percent of total agricultural production
- Need to segregate the support we extend to our farmers into lives and livelihood saving support and support for commodities which can be considered trade distorting in the global market
- ITO should be a professionally managed Virtual Organisation



# Indian Trade Organisation (ITO)

(Professionally-led, 21<sup>st</sup> Century Virtual Organisation established by the Ministry of Commerce & Ministry of Agriculture and Food)

## Two Specialised Wings



# Credit and Insurance

- Need for a Credit Policy for small farm agriculture
- NABARD – time to review its mandate, role and business model; NABARD of the 21<sup>st</sup> Century with focus on farmers
- Need to improve outreach of the banking system and make credit hassle free, timely, adequate and flexible
- Credit cooperatives – Revitalise and implement Vaidyanathan Committee Report
- Expand scope of Agriculture Insurance Policies – should cover health insurance also (*Parivar Bima Policy*); Seed Companies to provide Insurance for GM crops
- Credit and Insurance Literacy
- Agriculture Risk Fund to insulate farmers from risks and crops failure due to aberrant weather conditions.





# Credit

- 4% interest
- 4-5 year Credit Cycle in drought prone areas
- Financial Inclusion – antyodaya principle (a beginning is being made in Wardha District)
- Credit and insurance literacy (hardly 4% of farmers are participating in insurance programmes)
- Set up a Rural Insurance Development Fund



# Social Security

- Health
- Occupational Hazards
- Life Insurance
- Old Age Pension
- Rs.1500 per month to fisher families during the closed season
- At the very minimum, adapt Arjun Sengupta Commission's recommendations for the unorganised sector, for farmers.



# Support Services for Women in Agriculture

- In 2004-05, women accounted for 34% principal and 89% of subsidiary workers in agriculture
- Women suffer from a multiple burden on their time
- The NREGP should enlarge the concept of work in the case of women by including activities like running creches and child care centres, preparing noon meals in schools, undertaking immunisation of children and providing family planning services
- A Gram Panchayat Mahila Fund should be established to meet gender-specific needs
- Credit including the issue of Kisan Credit Card, insurance, technology delivery and marketing should be engendered
- Strengthen the role of women in the National Horticulture Mission



# Special Categories of Farmers

- Scheduled Tribes and Other Traditional Forest Dwellers (Recogniton of Forest Rights) Bill, 2006
- Pastoralists
- Plantation Labour
- Island Farmers
- Urban Farmers
  - Home/Community Nutrition Gardens set up by individual / urban SHGs



# Special Categories of Farming

- Organic Farming
- Green Agriculture
- Genetically Modified Crops
- Protected Agriculture (green houses, fertigation), particularly in areas where evaporation exceeds precipitation
- Certification for Organic Farming and Green Agriculture Products
- Promote Private-private Partnership



# Farmers of the 21st Century : Conferring the economy and power of scale on small producers

- According to NSS data (2003), average total income of farmer households with upto 2 ha land, was less than 80% of their consumption expenditure
- Methods of increasing Farmers' Income:
  - Cooperative Farming and Service Cooperatives
  - Group Farming by SHGs
  - Small Holders' Estates
  - Contract Farming – Monitoring Committee at the State Level to prevent unequal trade bargain
  - Farmers' Companies
  - State Farms
- Farming Systems – diversification and value addition based on market demand



# Ministry of Agriculture and Farmers' Welfare

- Ministry / Departments of Agriculture both in the Centre and the States may be restructured to become Ministry / Department of Agriculture and Farmers' Welfare.
- Induct active farm men and women in senior positions in Governments for specific periods and specific tasks
- Set up State Farmers' Commission with an eminent farmer as Chairperson



# National Food Security and Sovereignty Board

- Prime Minister                      Chairperson
- Union Minister for Agriculture and Food
- Union Ministers of Finance, Rural Development, Commerce, Water Resources and other concerned Ministers
- Deputy Chairman, Planning Commission
- Chief Ministers of a few food surplus and deficit States
- Leaders of principal political parties
- A few experts and media representatives

Promote policies based on a holistic review and national consensus on conservation on natural resources (land and water), cultivation (green agriculture) consumption (pricing, procurement and universal PDS) and commerce (home and external)





# Climate Change Factors Affecting Agriculture

- Increase in temperature
- Changes in precipitation
- Widespread run off (leaching of soil nutrients)
- Reduction in fresh-water availability
- Adverse impact on coastal agriculture due to sea-water intrusion
- Outbreak of pests and diseases



# Effect of rise in Temperature & Co2 Concentration

## Impact of 1 - 2<sup>0</sup> C increase in mean air temp

- Rice yield decreases by about 0.75 ton/ha in efficient zones & 0.06 ton/ha in coastal regions

## Impact of 0.5<sup>0</sup> C increase in winter temp

- Wheat crop duration reduced by 7 days and yield decreases by about 0.45 ton/ha

*Reference : Deforestation, Climate Change and Sustainable Nutrition Security : A Case Study of India.*

*By S K Sinha & M S Swaminathan, Climate Change, 19: 201-209:1991*



# Green Revolution Symphony (1968)



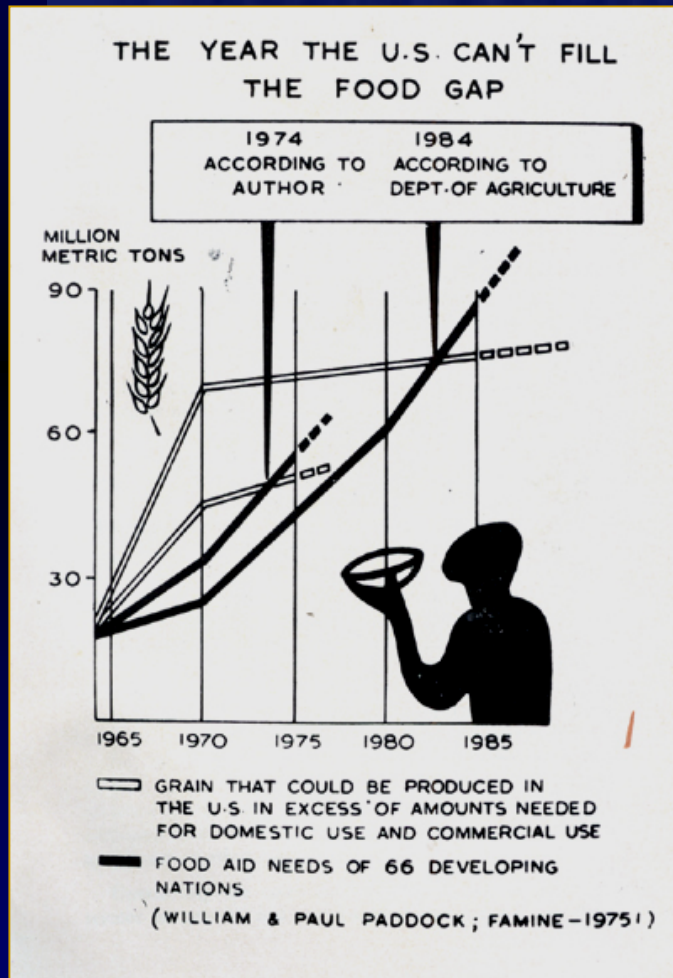
- Technology
- Services
- Public Policies
- Farmers' enthusiasm

Indian farmers achieved as much progress in wheat production in four years (1964–68), as during the preceding 4000 years.

**Urgent Need: Pan-Gol and State Government efforts**



# An era of Mass Famines (Paul and William Paddock – 1966)



40 years later :Revival of  
this scenario by Lester  
Brown

Growing Demand-Supply Gap



# Green Revolution and Evergreen Revolution : Pathways

**Green Revolution** : Commodity-centred increase in productivity



Change In plant architecture, and harvest index

Change in the physiological rhythm-insensitive to photoperiodism

Lodging resistance

**Evergreen Revolution** : increasing productivity in perpetuity without associated ecological harm



**Organic agriculture** : cultivation without any use of chemical inputs like mineral fertilizers and chemical pesticides

**Green Agriculture** : cultivation with the help of integrated pest management, integrated nutrient supply and integrated natural resource management systems

**Ecoagriculture** : Based on conservation of soil, water and biodiversity and the application of traditional knowledge and ecological prudence

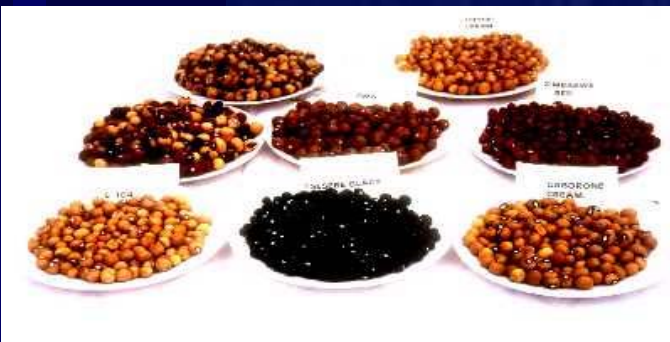
**EM Agriculture** : system of farming using effective microorganisms (EM)

**White agriculture** : System of agriculture based on substantial use of microorganisms, particularly fungi

**One-straw Revolution** : system of natural farming without ploughing, chemical fertilizers, weeding and chemical pesticides and herbicides



# Neglected Crops: Enlarging the Food Basket



- Time-Tested production and income stability under marginal and high-risk farming
- Contribution to local and regional food and income security
- Many crops are nutritionally rich to redress 'hidden hunger'
- Neglect leading to loss of genetic diversity and associated traditional knowledge
- Opportunity to enhance sustainable income, food and nutritional security



# Jatropha Curcus

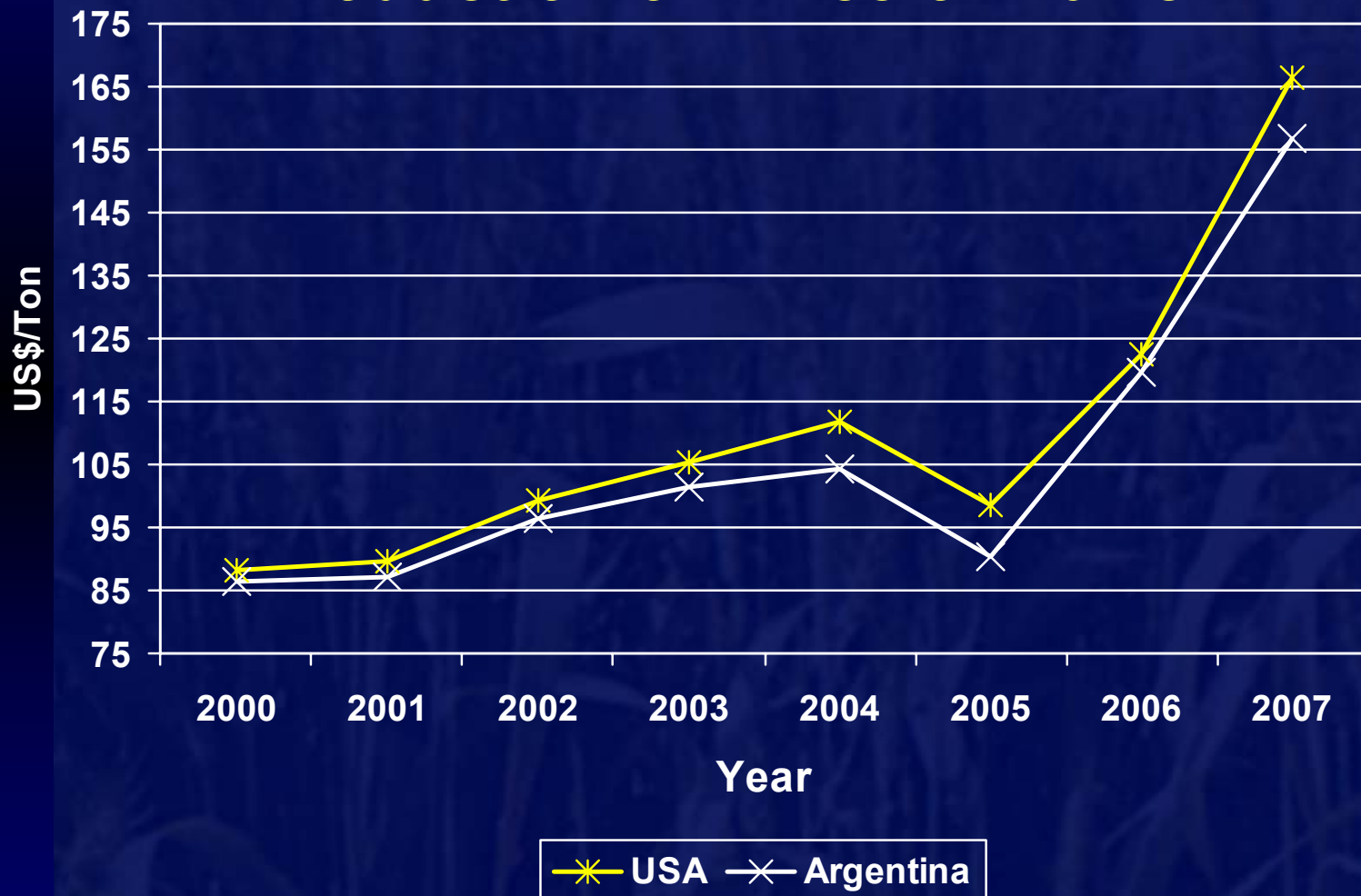


- Superior elite genotypes
- Selected out of 404 collections from TamilNadu
- Oil Yield: above 35%
- Seed yield: 2.5kg/ plant

**Land Use : Fuel  
Versus Food**



# Impact of Diversion for Ethanol Production on Price of Maize



Source: International Grain Council





# Transboundary Pests : Bird Flu outruns the vaccines



It's spreading through the market

The H5N1 virus has evolved into a new strain, and this time nearly three times as many birds are infected in China

*New Scientist, 4 November 2006*



# Genetic Shield against Sea Level Rise



Mangrove Forests : Anticipatory Research

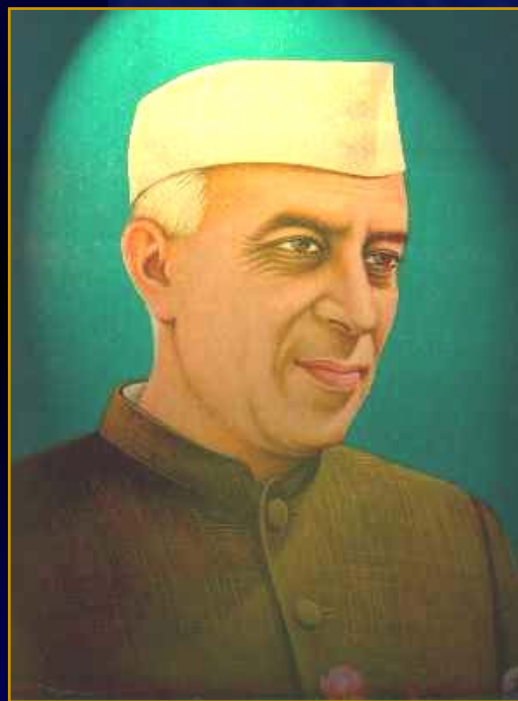


# Transgenic Indica Rice varieties with Mangrove genes (*Avicennia marina*)



# “Everything else can wait, but not Agriculture” Jawaharlal Nehru, 1947

## We reap as we sow



### Outlay for Irrigation Sector

Period	% Outlay
VI Plan	12.5%
VII Plan	7.6%
VIII Plan	7.5%
IX Plan	6.5%
X Plan	6.8%

VI Plan (1980-85) Growth rate in agriculture 5.7%;  
GDP Growth Rate 5.5%

