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First Anniversary Celebration Svalbard Global Seed Vault

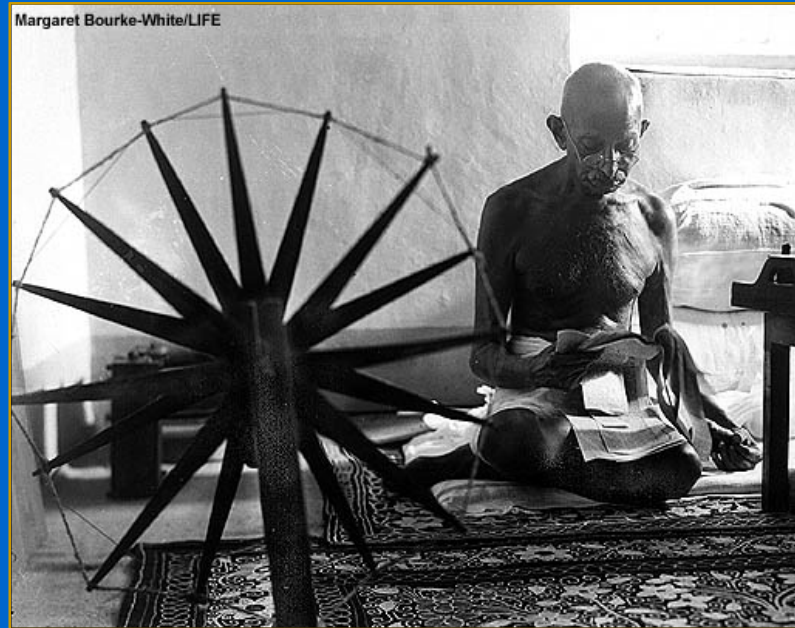
Frozen Seeds – a Humanitarian Issue?

Svalbard, 26 February 2009

M.S. Swaminathan
UNESCO Chair in Ecotechnology



Economics of Human Dignity



“To a people famishing and idle, the only acceptable form in which God can dare appear is work and promise of food as wages”

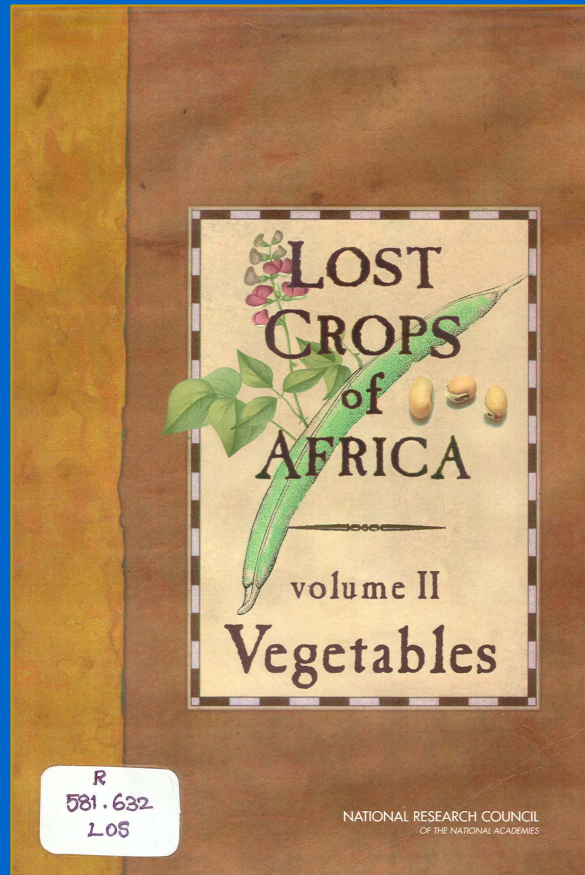
-Mahatma Gandhi



An Iyyanar Temple in front of a Sacred Grove Spiritual Dimension of Conservation



Lost Crops of Africa



Dying Wisdom and
Vanishing Crops



Overcoming Hidden Hunger Nutritional Malady and Horticultural Remedy

Malady:

Vitamins:

Vitamin A
Vitamin B Complex
Vitamin C

Minerals

Iron
Iodine
Zinc
Copper

Remedy:

Rape Leaves
Cauliflower
Amaranth
Drumstick leaves
Spinach
Parsley
Turnip Greens
Carrot
Tapioca chips
Sweet Potato
Yam
Radish



Neglected Crops: Genes for Coping with Climate Change

- Time-Tested production and income stability under marginal and high-risk farming
- 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



Medicinal Rice Varieties of Kerala

Arikkarai



Chennellu



Navara






Kunhi nellu



Jathisooki



-  State Capital
-  District Headquarter
-  Ayurveda centre



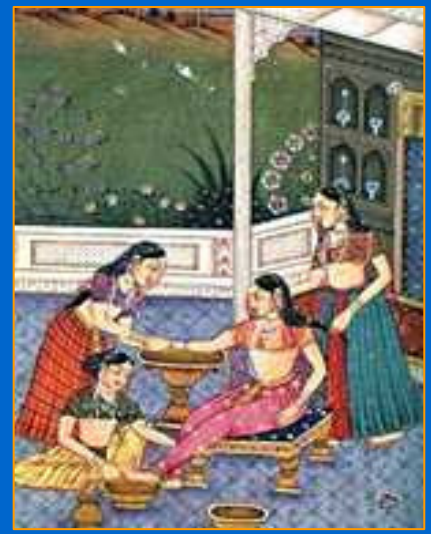
Kerala Ayurveda Centre

Map not to Scale

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Navara
 A rice variety
 with unique
 medicinal uses
 in Ayurveda in
 Kerala



Genome Saviours

Some Tribes of Jeypore Tract of Orissa



Bhumia



Paroja



Kutia Kandha

Bonda



Soura



Kalinga Kalajeera : Product of Participatory Breeding



Genetic Shield against Sea Level Rise



Mangrove Forests



: Field trial of a transgenic rice strain with Superoxide dismutase gene from *Avicennia marina*



The loss of every species and gene limits our
options for the future



Genetic Shield against adverse changes in precipitation



Prosopis juliflora has wide adaptation to water stress and drought conditions

Used as source of drought tolerant genes



Control

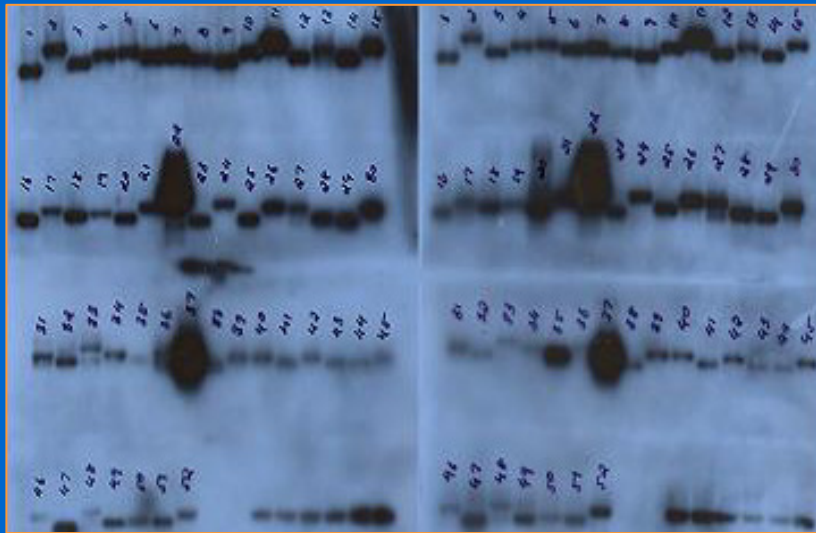
36 days of water withdrawal



Drought tolerant genes from *Prosopis juliflora*

Control

Treated



Potential Drought Tolerant Genes

- Glutathione-s-transferase
- RAB7D
- Ascorbate peroxidase
- Lipid Transfer protein
- Pottasium transporter (HAK1)
- Transcription factors (Myb, ZFP - Zinc Finger Protein)
- Dehydrin

Nucleotide sequences of 1467 ESTs from the cDNA library of drought tolerant plant *Prosopis juliflora* have been deposited in the NCBI EST database.



Tsunami and Salt Tolerant Rice Varieties

- Kunthanli
- Kallurundai
- KUzhivedichan
- Soorakuruvai
- Katchakombalai
- Vellakudavalai



Drought tolerant Lathyrus and Lathyrism



Lathyrism – a neurological disease of humans and domestic animals characterized by spastic paralysis. This is attributed to the neurotoxin beta-oxalyl-L-alpha, beta-diaminopropionic acid (ODAP)



Somaclonal Variation in *Lathyrus sativus*



Low neurotoxin varieties (β -N-oxalyl diamino propionic acid (ODAP))



Facing the challenge of Floods

Deepwater (floating) rice has three special adaptations:

- i. ability to elongate with the rise of water levels;
- ii. develop nodal tillers and roots from the upper nodes in the water
- iii. the upward bending of the terminal part of the plant called 'kneeing' that keeps the reproductive parts above the water as flood water subsides.

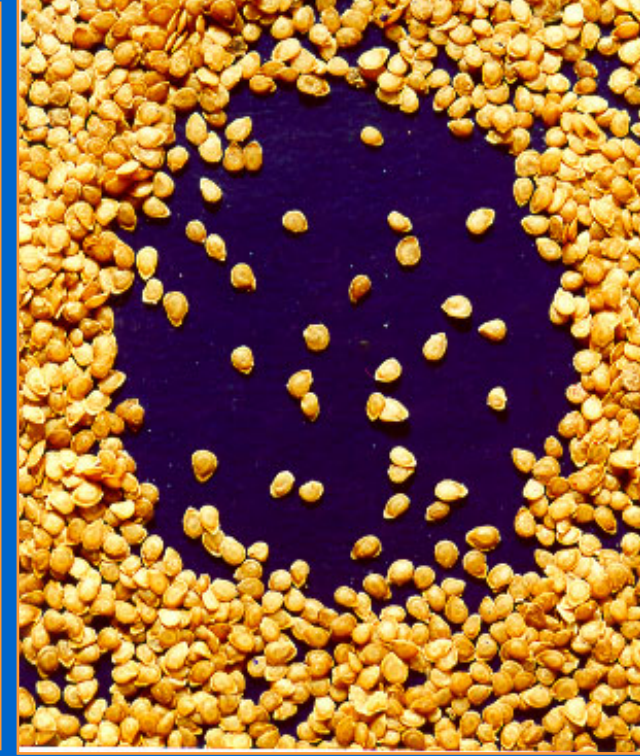


Rice – Anchor of Food Security in an era of global warming



Sustaining the Potato Revolution

True Potato Seed



Answer to the challenge of producing disease free planting material as a result of rise in temperature





XV INTERNATIONAL
CONGRESS
OF GENETICS

NEW DELHI, INDIA DECEMBER 12-21, 1983

Genetic Conservation : Microbes to Man

Presidential Address

by

Dr. M. S. Swaminathan

International Rice Research Institute
Los Banos, Philippines

NEW DELHI, DECEMBER 12, 1983



Frozen Seeds : Saviour of Sustainable Food Security

Community Gene & Seed Banks



National Gene Bank



Svalbard –
Global Seed Vault

Conservation continuum



Svalbard and an era of Biohappiness



Biohappiness results
from the conservation,
sustainable and equitable
use of biodiversity and
the blending of traditional
knowledge with frontier
technology



Svalbard : An Affirming Flame

“Hunger allows no choice
To the citizen or the police.
We must love one another or die.....
Defenceless under the night
Our world in stupor lies;
Yet, dotted everywhere,
ironic points of light
Flash out wherever the Just
Exchange their messages;
May I, composed like them
of Eros and of dust,
Beleaguered by the same
Negation and despair,
Show an affirming flame”

- W. H. Auden

