

Towards Improving Rapeseed-Mustard in partnership with farmers in India



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DFID Indo-UK Collaboration on Oilseed Crops (Rapeseed-Mustard)

- The current edible oil scenario in India
- Background and structural organisation
- Goal, purpose and outputs
- Progress highlights at institutions and Rainfed Farming & Watershed projects
- Networking

The Current Edible Oil Scenario in India

- India grows the largest area of oilseeds in the world, but still has to import large quantities of edible oils to meet its national demand.
- Annual import is currently c. 5.0 million tonnes (Approx. 50% of national consumption) valued at c. £1.5 billion, making India the world's largest importer of vegetable oils.

The Current Edible Oil Scenario in India

- Diet surveys by the Indian National Nutrition Monitoring Bureau in 10 States show that daily visible fat & oil intake ranges from 1-7 kg/person/year in rural India. This is far below the prescribed minimum nutritional norm of 14 kg/person/year.

The Current Edible Oil Scenario in India

- Average production of oilseeds in India is around 0.8 ton/ha, which is far below that of developed countries (2.5-3.0 ton/ha).
- Main reasons for low productivity are:
 - damage from pests and diseases,
 - vulnerability to drought,
 - poor dry farming practices,
 - lower inputs and poor soils.

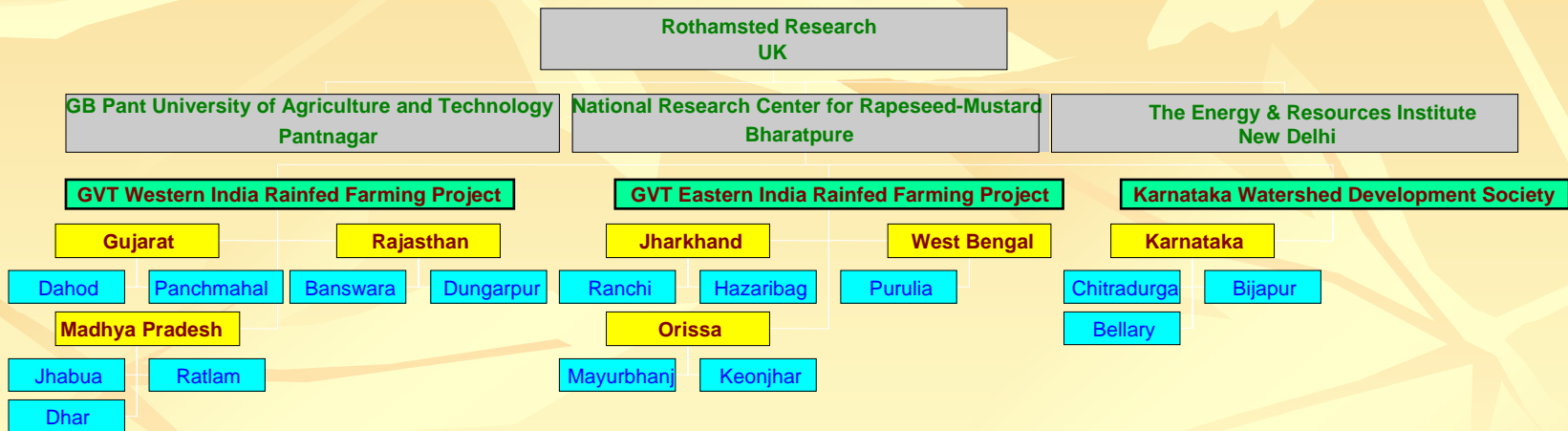
Major oilseed Crops in India: % Area

- Groundnut 28.6%
- Rapeseed-mustard 25%
- Soybean 23.4%
- Others: Sunflower, sesame, safflower, cotton seed, niger, linseed (non-edible) and castor seed (non-edible) 23%

Project's Focus

- The project is currently focusing on rapeseed-mustard crops: *Brassica juncea* (Indian mustard), *B. rapa* (yellow sarson, brown sarson and toria) and *B. napus* (Ghobi sarson)
- In India, rapeseed-mustard covers 7.0 million hectares and produces c. 5.7 million tonnes of seed per year with a local market value of about £1.3 billion.

DFID Indo-UK Collaboration on Oilseed Crops (Rapeseed-Mustard)



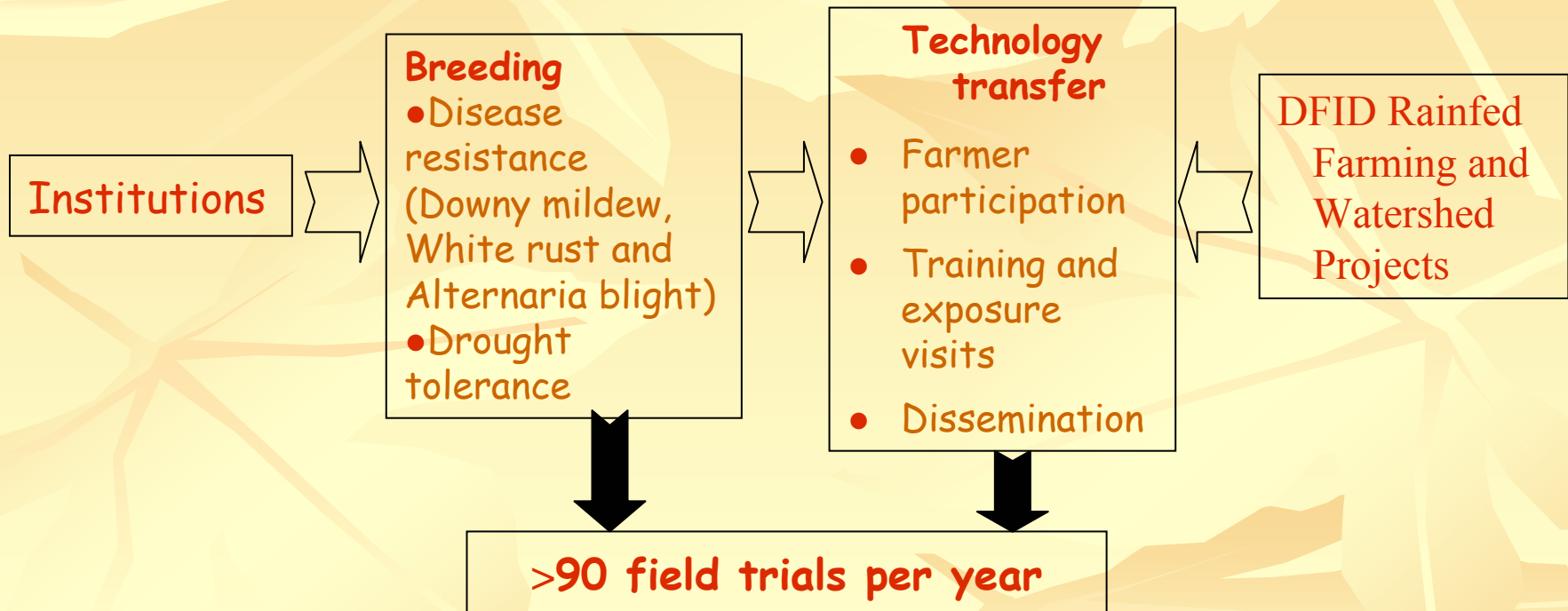
Project Outputs

- Disease resistance to Downy mildew, White rust and Alternaria blight.
- Drought tolerance.
- Farmers' participatory varieties selection and breeding.
- Training Scientific staff of Indian partners. institutions at Rothamsted Research (UK).
- Training farmers and field staff in improved crop production technology and integrated pest management.
- Project technologies and lessons disseminated.

Project's Operational Chart

Multidisciplinary

Technical and Socio-economic experts



Progress highlights to March 05

Institutions

- Disease resistance
- Drought tolerance
- Training



Disease Resistance

- Downy Mildew (*Peronospora parasitica*)
- White Rust (*Albugo candida*)
- Alternaria blight / Dark leaf spot (*Alternaria brassicae*)

(Annual yield losses of up to 70%)

Resistance to Downy Mildew (*Peronospora parasitica*)



- *B. napus*: (i) Four differential host response groups to 2 UK isolates; (ii) at least 2 independent genes for resistance to 2 isolates.
- *B. juncea*: (i) sixteen differential host response groups to 14 Indian & UK isolates; (ii) developed lines with resistant to all 14 isolates and (iii) identified at least 2 independent major genes for resistance to 4 Indian isolate
- *B. rapa*: (i) Nine differential host response groups of resistance to 12 Indian and UK isolates; (ii) developed a line with resistant to all 12 isolates.

Resistance to white rust (*Albugo candida*)



- *B. juncea* (Indian mustard): Eight differential resistance to 11 Indian and North American isolates have been produced; one isolate from Canada (2v) remains challenging.

Interaction between downy mildew and white rust

- White rust can induce susceptibility to downy mildew



Alternaria blight (*Alternaria brassicae*)



- Sources of tolerance have been identified in *B. carinata* and *B. Alba*; Tolerance in *B. carinata* is in the process of being transferred to *B. juncea*
- Two *B. napus* lines, originally selected for resistance to downy mildew (RES-25-2 and RES-15-1), were also found to be tolerant to Alternaria blight and Sclerotinia stem rot under Indian field conditions at Pantnagar.

○ Drought tolerance



- 494 breeding lines of *B. juncea* were generated under drought prone environment
- Three superior lines are currently at advanced stage of development (RESJ-837, BPR-558 and BPR-559).

Training scientists from Indian partner institutions

Seven Scientist (2000-05)



Progress highlights to March 05

Rainfed Farming and Watershed Projects

- Creating awareness
- Training farmers & staff
- Participatory research trials
- Farmers' field days
- Socio-economic analysis
- Publications



Creating Awareness

- Fifteen exposure visits for 264 selected farmers from key areas to institutions and traditional areas of Rapeseed-Mustard in India
- Conducted over 700 interactive meetings with >5000 farmers
- Organised 24 panel taste evaluations involving 1244 farmers with mustard oil *vis-à-vis* groundnut, coconut and cottonseed oil

Training Farmers & Staff

- 54 training programmes for 4068 women & men farmers on Rapeseed-Mustard production and protection technologies
- Five special training sessions for 158 project personnel at the National Research Center on Rapeseed-Mustard

Participatory research trials

- Tested 40 Rapeseed-Mustard varieties in 1543 participatory pure crop and inter-crop trials with wheat, barley, chickpea, minor millet, eggplant, potato, pea, radish and pomegranate.



Rice-Fallow Lands

- The rice-fallow lands in India are estimated to be 11.7 million hectares. Eastern India accounts for approx, 10% of this area.
- The project has demonstrated that suitable varieties of rapeseed-mustard can successfully be grown on the rice-fallow lands due to its low water requirements (80-240 mm). This has resulted in the fast spread of Rapeseed-Mustard on these lands, which otherwise were left uncultivated.

Farmers' Field Days

- 46 field days for 8500 farmers from 140 villages



Publications

Institutions 1998-2005

- 12 research papers; 19 abstracts; 3 Technical articles and bulletins.

<http://www.rothamsted.bbsrc.ac.uk/ppi/staff/nin.html>

Farmers

- 22 technical bulletins in local languages dealing with package and practices of growing Rapeseed-Mustard and safe use & handling of pesticides.

- 37 reports in local newspapers highlighting project's activities.

South Asia (SA) Networking

- SA networking activities involving Sri Lanka, Pakistan, Nepal, Bangladesh, Bhutan and Burma (Myanmar).
- A South-Asia workshop is planned in India at the end of the current phase involving the above SA countries to disseminate project's achievements and lessons learned,

Project Team

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A close-up, low-angle shot of a field of bright yellow flowers, likely rapeseed or mustard, against a clear blue sky. The flowers are in various stages of bloom, with some showing distinct petals and stamens. The green stems and leaves are visible, creating a dense, textured background. The overall mood is bright and cheerful.

Thank You!