Overview of AIP contribution to wheat improvement in Pakistan: 2013-14 to 2015-16
Themes

1. Increasing wheat production through rapid diffusion of high yielding rust resistant wheat
2. Effective fungicides introduced, evaluated and registered for controlling wheat rusts
3. Generating a durum wheat value chain for Pakistan
4. Products based wheat breeding to ensure end use quality
21 village-based seed groups also added to this platform
Scope of the partnership

- Public-private partnership
- Small seed companies in rural areas
- Rural Support Programmes (AKRSP, BRSP, NRSP): contact with a large grassroots organizations, smallholders & women
- Partnership with NRSP-quick impacts
- Private sector & RSPs vital: for routine & emergency response, e.g. UG99, wheat blast already confirmed in Bangladesh
- Basis for sustainability post AIP
Process adopted for implementation

**Identified districts with food insecurity**

Phase 2 or 3

**Moderately & highly food insecure**

**Selected remote parts of identified districts**

Smallholders (<5 acre), women headed households, tenants, vulnerable people including families affected by floods in Punjab
### Increasing wheat production through rapid diffusion of high-yielding rust-resistant wheat

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<th>Activity</th>
<th>Purpose</th>
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<td><strong>PVS</strong></td>
<td>Validation for local adaptation &amp; farmers’ preferences</td>
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<tr>
<td><strong>IRD</strong></td>
<td>Creating knowledge &amp; demand for new varieties, F-F-seed flow: varietal replacement</td>
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<td><strong>Diamond trial</strong></td>
<td>Replacing old improved by new improved</td>
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<td><strong>Seed system strengthening</strong></td>
<td>Fast delivery of genetic gains to farmers</td>
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</table>
Rapid transfer of genetic gains to farmers

Paired plot Demos

PVS trials

Diamond trial

Variety & agronomic trials

Seed production & provisioning

3739

6

0

0

26 = 3771

12175

610

55

229

671 = 13740

21.5%

78.5%

Female

Male
Coverage of AIP wheat activities

22: varieties
485: t seeds
17,511: farmers
52-63 districts
Number of collaborating farmers in various wheat improvement activities

- This should form the basis for sampling frame for any impact assessment for wheat in AIP
Key findings

PVS

- Not all new varieties were superior to check varieties; hard to beat Faisalabad08, Seher06, TD1, Pirsabak05, Zardana.
- Identified superior & acceptable & not at all acceptable varieties: in a single season
- Yield gain: few 100 kg to >1 ton /ha
- Yield differences: statistically significant except for in Sindh
Preferred varieties

- **Pakistan 13**: preferred across rainfed areas in Punjab, Baluchistan, KP and GB

- **Pirsabak-13**: KP & Punjab (DG Khan)

- **Lalma**: excellent in KP & Gilgit-Baltistan

- **Shakar 13**: KP, Baluchistan & GB

- **NIA-Amber, NIA-Sundar, NIA-Sunhari** and **NIA-Sarang**: low input agriculture, Sindh

- **Benazir** better than NIA varieties not seen superior over TD-1.
IRD

- Acceptance for new wheat varieties & willingness to grow those next season => 87% (n=603)

- 60% respondents indicated gains in wheat yields from new varieties.

- Average seed saved per household was 265 kg: access of new varieties-far-flung areas increased.

- Induced fast varietal replacement: due to F-F-seed flow
Diamond trial: fast varietal replacement

- New improved variety certified seeds
- Old improved variety certified seeds
- New improved variety farm saved seeds
- Old improved variety farm saved seeds
Diamond Trial

- Interaction of new improved & old improved varieties & their certified & farm-saved seed interesting results

- Yield difference (5-9%) between certified seeds & farm saved seed (both varieties) was statistically non-significant.

- Farm saved seeds of new improved variety was much better than growing even certified seeds of old & improved (obsolete) varieties
Seed system strengthening

3 Workshops: identified gaps & opportunities

- Creating knowledge & demand for new improved varieties (PVS, IRD, Diamond trials)
- Provision of more pre-basic seeds for private sector
- Public-private partnership for basic seeds: paved the way
- Pvt. Seed companies, seed groups identified & strengthened
12 seed companies—rural areas & DoAE, KP sold additional wheat seeds with a gross income of $389,879 autumn 2015.

43% budget of AIP wheat commissioned projects

Organized seed production
An example of village-based seed production: Semi-organized

Group of 8 farmers in Bhakkar
Produced 13 t wheat seeds

2.7 t used by them as seed
7.5 t sold @ $152/ton Total=$1155
2.6 t exchanged with relatives & neighbors

More documentation is needed to have complete picture of this innovation
Example of farmer-to-farmer seed flow from a paired plot demonstration (IRD)

Baba Mureed
Pind Malkan
From an IRD saved 640 kg graded locally & sold as seeds of AAS-11 to 7 farmers @Rs 16/kg with an extra income of = $100

- Documentation is vital more of these cases to get magnitude of F-F-seed flow
Munib Khan Gujar Khan growing NARC-09 (left compares with Seher06 in the right) in 11 Acre from the seeds harvested from last year IRD Demo. He intends to sell most of the harvest as seeds after grading locally.
Introducing fungicides to wheat management

- 6 sites; 2 each per rust type
- Three variety for each rust type; 1 susceptible, 1 resistant & Morocco
- Four fungicides: TILT, Folicur, Amistar & Nativo
- Two seed dressing fungicides in year I
- Split-split plot design
- Three replications
- TILT only fungicide effective against yellow rust reducing loss by 28%.

- Folicur, Nativo and Amistar were effective against leaf rust reducing yield loss of wheat 52-62%.

- Amistar and TILT both were effective against stem rust reducing yield loss by 31-41%.
Durum wheat value chain for Pakistan

- 9 sites: 5 irrigated, 4 rainfed
- 10 durum wheat lines + Durum97 & Pak-13
- No lines higher yielding than Pak-13
- 9% yield gain over Durum97 in irrigated & 16% in rainfed
- Combined yield difference & for rainfed sites: significant
- Yield difference irrigated: non-significant
- Six lines were selected & included into DWNUYT 2015-16
- PRD-1, PRD-6, PRD-4, PRD-5, V-12310, V-12306.
Products based wheat breeding to ensure end use quality

SGA in place, wheat grain samples (arranged)
Analysis: To be completed by the end of September; mainly Chemical/Rheological tests: gluten (wet & dry), gluten index, Falling Number. Test weight, 1000 kernel weight, hardness (PSI), Protein, flour yield, ash content

- Classification of wheat varieties by use based on the results
- Stakeholders meeting later in the year for dissemination of the results
2014-15 achievements
4,172: people trained
366: Formal training
3,806: Community-based
Women participation: 8% in formal & 37% in informal events
2015-16 data yet to come
Wheat Quality Training Program
Farmers Field Days & exposure visit

- Wheat grain quality analysis
- On farm research methodology
- Quality wheat seed production & handling

- Capacity building to improve wheat productivity
- Skill development: quality seed production, seed priming, fungicide application, safe storage of seed & grain, conducting on farm demos & trials
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<th>Suggested plan for 2016-17</th>
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<td>1.1 PVS</td>
<td>Continue for newly released, pipeline wheat varieties; rainfed &amp; irrigated domain</td>
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<tr>
<td>1.2 IRD</td>
<td>Drastically scale down—continue only in AJK, Balochistan &amp; GB</td>
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<tr>
<td>1.3 Diamond Trial</td>
<td>Continue (modest number)</td>
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<tr>
<td>1.4 Seed system strengthening</td>
<td>Scale down seed production Continue with capacity building of small seed companies, BRSP, AKRSP, 21 group members from NRSP, progressive farmers</td>
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| 2. Introducing fungicides to wheat management        | Synthesis & dissemination of results  
On farm superimposed demos in 3 provinces  
(modest number) to disseminate proven fungicides for reducing wheat yield loss  
Dissemination workshop ~ end September  
Preparing disseminating materials; electronic & print                                                                                     |
| 3. Durum wheat value chain                           | Synthesis of two year DWNUYT data, identify top 3 lines to propose for spot examination  
Seed increase: lines proposed & in DWNUYT  
DWNUYT: TBC-national program activity                                                     |
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<td>4. Product-based wheat</td>
<td>Only essential tests run for quality analysis, Synthesis of results &amp; dissemination workshop ~ end December 2016 Preparation of disseminating materials; electronic &amp; print</td>
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<td>Capacity building across themes</td>
<td>Quality wheat seed production &amp; handling, grading, branding, packaging (improved quality), business plan preparation, marketing skills, market networking</td>
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<td>Documentation of F-F-seed flow</td>
<td>On a randomly drawn sample of collaborating IRD farmers</td>
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<td>Technical backstopping &amp; coordination</td>
<td>Until the time all the data for 2016-17 activities are collected</td>
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Financial status

Total Commissioned budget committed: $654,000:
Total budget transferred as of today: $419,957
Of the total committed budget: $193,000 is for NRSP. They have agreed to share 50% of this (= $95,000) & also for coming season costs, need to work out the details.
Allocation for equipment to partner labs will be withhold & will be negotiated; save us $>40,000.
For coming season, we can still have $40-45,000
Will negotiate with private seed companies to share cost of current & coming season operations.
Support of services budget: Not clear, would need to wait
Thank you for your interest!

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