Achieving self sufficiency in pulse production in India
Towards self sufficiency in pulse production

- On average, over the last three years Indian’s consumed approximately 22 million tonnes of pulses per annum but produced only 18 million tonnes, **leaving a shortfall of 4 million tonnes**.

- Pulse self-sufficiency means **food security, greater wealth** for Indian farmers and a **more favourable balance of trade for the nation**.

- **Protein energy malnutrition (PEM)** is a major public health problem in India. The prevalence of stunting among under fives is 48% and wasting is 19.8% and with an underweight prevalence of 42.5%, it is the highest in the world.
Projections for 2050

- Current Population of India: ~1.21 billion
- Expected population by 2050: ~1.69 billion
- Current per capita availability: 37 g/capita/day
- ICMR recommendation: 52 g/capita/day
- Present demand (@52 g./capita/day): 28 mt
- Projected demand in 2050: 39 mt
  - 32 mt (consumption) + 7 mt PHL, seeds, etc. @20%

Declining rate of India’s population
@ 0.1% per year

Projected demand @ 52g for 1.69 billion people
(28x1.69)/1.21 = 32 mt by 2050
## Important pulse growing states in India (2013-14)

<table>
<thead>
<tr>
<th>States</th>
<th>Area (Lakh ha)</th>
<th>Production (Lakh ton)</th>
<th>Yield (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>16.72</td>
<td>15.51</td>
<td>928</td>
</tr>
<tr>
<td>Bihar</td>
<td>5.00</td>
<td>5.22</td>
<td>1044</td>
</tr>
<tr>
<td>Chattisgarh</td>
<td>8.39</td>
<td>4.82</td>
<td>574</td>
</tr>
<tr>
<td>Gujarat</td>
<td>8.13</td>
<td>7.29</td>
<td>897</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>5.66</td>
<td>5.78</td>
<td>1021</td>
</tr>
<tr>
<td>Karnataka</td>
<td>24.98</td>
<td>16.00</td>
<td>641</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>53.95</td>
<td>46.44</td>
<td>861</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>39.53</td>
<td>31.69</td>
<td>802</td>
</tr>
<tr>
<td>Odisha</td>
<td>7.80</td>
<td>4.19</td>
<td>587</td>
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<tr>
<td>Rajasthan</td>
<td>41.97</td>
<td>24.90</td>
<td>593</td>
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<tr>
<td>Tamil Nadu</td>
<td>8.15</td>
<td>6.13</td>
<td>752</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>23.05</td>
<td>16.97</td>
<td>736</td>
</tr>
<tr>
<td>West Bengal</td>
<td>2.86</td>
<td>2.41</td>
<td>843</td>
</tr>
<tr>
<td>Others</td>
<td>5.92</td>
<td>10.48</td>
<td>1770</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>252.11</strong></td>
<td><strong>197.83</strong></td>
<td><strong>785</strong></td>
</tr>
</tbody>
</table>
Constraints to pulse production

- Inadequate knowledge of farmers and extension personnel of the available improved cultivars and technologies of pulses.
- Inadequate access of farmers to quality seed and other farm inputs.
- Poor adoption of improved cultivars and recommended crop production practices.
- Lack of varieties which resist excessive vegetative growth under high moisture/fertility conditions.

Continued.....
High vulnerability of pulse crops to both biotic (pests and diseases) and abiotic stresses (temperature extremes and aberrant rainfall driven by climate change).

Pulses are largely grown in marginal lands under rainfed conditions without much inputs.

Inadequate availability of labour-saving technologies (varieties suitable for machine harvesting, herbicide resistance) for pulses.

Pulses are prone to damage by storage pests.
Interventions over next three years

1. Continuation of Accelerated Pulses Production Programme (A3P)
   - More renewed focus
   - Reach the unreached
   - Targeting location specific technologies
   - Thrust on inputs including micro nutrients

**Estimated C:B Ratio: 1:28**
- Estimated cost of implementation per year: Rs 400 crores
- Anticipated benefits: Rs 11,542 crores through increased productivity of at least 10% across 5 pulse crops.

**Potential risks and their management:** None
2. Improving seed replacement ratio (SRR) by developing sustainable seed system:

- Integration of formal and informal seed systems
- Village based seed enterprises
- Motivate private sector in pulse seed production

**Estimated C:B Ratio: 1:28**

- Estimated cost of implementation per year: Rs 800 crores
- Anticipated benefits: Rs 23,056 crores through increased productivity of at least 20% across 5 pulse crops

**Potential risks and their management:** The private sector would be discouraged if seed subsidy is provided only to public seed sectors. Thus, if seed subsidy is provided, it should be provided to both public and private sectors.
Interventions over next three years

3. Bringing new niche areas under pulse cultivation:
   - Chickpea and lentil in rice-fallows of eastern states
   - Mungbean and urdbean in rice-fallows of southern states and Odisha
   - Pigeonpea in new cropping systems and higher altitudes

Estimated C:B Ratio: 1:13
   - Estimated cost of implementation per year: Rs 2500 crores
   - Anticipated benefits: Rs 33,164 crores through additional pulse production of at least 5 million tons.

Potential risks and their management: Inadequate rainfall in rainy season may lead to moisture stress in rice crop and thus crop establishment in rainfed rice-fallows may be difficult. Efficient management of rain waters may facilitate one irrigation for crop establishment.
Interventions over next three years

4. Scientific post-harvest handling and storage methods

- Minimizing post-harvest losses
- Reduced attack of storage pests
- Improved quality and nutrition of pulses
- Improved shelf-life

Estimated C:B Ratio: 1:23

- Estimated cost of implementation per year: Rs 1000 crores
- Anticipated benefits: Rs 23,022 crores through at least 20% reduction in the post-harvest losses

Potential risks and their management: None
Interventions over next 4-6 years:

Development of improved cultivars and production technologies

- Restructuring plant type for higher productivity
- Machine harvestable and herbicide tolerant cultivars
- Climate smart and short-duration cultivars
- Hybrids in pigeonpea
- Exploitation of wild species and Bt transgenic technology for pod borer resistance
- Refinement of integrated crop management (ICM) practices

Estimated C:B Ratio: 1:52

- Estimated cost of implementation per year: Rs 7000 crores
- Anticipated benefits: Rs 38,652 crores through enhanced productivity and/or reduced cost of production through enhanced mechanization.

Potential risks and their management: Development of some technologies may take longer time than initially anticipated. Continued funding would be required.
Required policy interventions

- Higher strategic research investments
- Accelerated Pulses Production Program (A3P) should be continued
- Agro ecoregion based specific water harvesting and conservation management practices should be designed
- Strengthening of kharif pulse production in the country by reducing shift in area.
- The Government of India has to sustain the incremental increases in pulse MSP on par with wheat and rice
- There is an urgent need to blend domestic price policy with tariff policy
- The role of private seed companies should be enhanced
Projected costs and benefits analysis

- The implementation of all initiatives together will cost about Rs. 11,700 crores over the next ten years period i.e., from 2015-16 to 2026-2027.

- The anticipated direct benefits to farmers are estimated at 1,18,674 crores (simple direct benefits) over the next ten year period and beyond.

- These estimated direct benefits would be equivalent to 0.94 per cent of national GDP (125.41 lakh crores) during 2014-15.

- Approximately, 350 crores worth fertilizer urea per annum can be saved through soil nitrogen fixation

- Nitrogen-use-efficiency (NUE), which is around 40 per cent for upland crops can save fertilizer expenditure of around Rs. 875 crores per year.
Thank you!

ICRISAT is a member of the CGIAR Consortium

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