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Regional Workshop on the Role of Mechanization in Strengthening Smallholders’ Resilience through Conservation Agriculture in Asia and the Pacific
18-20 April 2018, Phnom Penh, Cambodia
Conservation Agriculture (CA)-Rationale

➢ A powerful tool for meeting future food demands and contributing to sustainable agriculture and rural development

➢ Improve the efficiency of inputs, sustain crop yields, protect and revitalize soil, biodiversity and the natural resource base resulting enhanced and improved livelihood of resource poor farmers

➢ Provide ecological foundation to optimize resource use while protecting and enhancing eco-system processes over the long term
Indus Basin - Main Challenges

- Low agricultural productivity
- Increasing population pressure
- Dwindling land for agriculture
- Shrinking water resources
- Limiting/diminishing energy resources
  - Shortage of electricity
  - High cost of Diesel
- High water losses in irrigation system
- Over exploitation of groundwater
Rice Production Constraints

- Insufficient water availability
- Improper water management
- Undulated topography
- Sub-optimal plant population
- Imbalanced use of fertilizers
- Deterioration of soil fertility
- Inhumane & laborious method of transplanting
Conservation Agriculture Practices (CAPs)

- LASER Land Leveling
- Residue Management (ZT Drill, Happy Seeder)
- Raised Bed Planting
- Direct Seeded Rice Drill
LASER Land Leveling - A Gateway to CA Mechanization

- Zero Tillage
- Rice on Beds
- Wheat on Beds
- SRI Technology
- Cotton on Beds
LASER Land Leveling Process

- Unleveled Field
- Surveying and Planning
- Rough Land Leveling
- LASER Leveling
- LASER Leveled Field

The LASER Land Leveling Process involves:
1. Unleveled Field: The initial state of the land before any leveling activity.
2. Surveying and Planning: Gathering data and planning the leveling process.
3. Rough Land Leveling: The preliminary leveling of the land to create a basic, flat surface.
4. LASER Leveling: The use of laser technology to precisely level the land to the desired height.
5. LASER Leveled Field: The final state of the land, now uniformly leveled and ready for use.
Dissemination “Triple S” Model

International: CGIAR Centres
National: Universities, Research organizations, Public Sector
Private Sector: NGOs, SACAN

Technical Experts: Public Sector Agri. Departments, Machinery Service Hubs, NGOs, Manufacturers, R & D Organizations and SACAN

Public/Private Sector, Manufacturers
ASPs as Small Scale Rural Entrepreneurs
Application of “Triple S Model” for Conservation Agriculture Practices

Indigenization, Demonstration and Fine Tuning
Capacity Building of Professional, ASPs and farmers through FTCs, FFSs

Support from local community, political figures, and progressive farmers

Sun

Satellite

Agri. Service Providers (ASP)

Local Institutions:
Universities Research Institutions, (Federal, Provincial), Private Sector, Local NGOs

Technical & Logistic Support:
RWC, IRRI, CIMMYT, IWMI

Support from Research Institutions, NGOs, Farmers

Support from electronic, print and mass media including Radio, local Newspapers, TV

Acquisition of Technology

Assessment and Development

Funding:
Public Sector, Donor agencies like ADB, WB, JBIC etc.

Support from Universities, Education & Research Institutions, NGOs

International Institutions:
Universities, CGIAR Centers (CIMMYT), IWMI, IRRI, NGOs/Private sector.

Technology Transfer Center (TTC)

Up Scaling (ASPs)

RCT Package (LASER, ZT, Residue Management, SAG, SRI)

Wide Scale Adoption

Support from Universities, Research Institutions, (Federal, Provincial), Private Sector, Local NGOs
Dissemination of Laser Tech. “Triple-S” Model

➢ Acquisition (1984)
  ✓ Technology introduced by importing one LASER land leveling unit from USA

➢ Pilot Testing and Indigenization (1985-91)
  ✓ Equipment tested and various components indigenized

➢ Demonstration and Dissemination (1992-2004)
  ✓ Rental service started to introduce and promote the technology amongst farming community by operating 193 units through field formations of the Punjab agriculture department

➢ Diffusion and Adoption (2004 onwards)
  ✓ Private sector (ASPs) incentivized through provision of Rs. 160,000 (2005-06 to 2007-08) subsidy on purchase of laser unit - 2,500 service providers created
  ✓ Subsidy increased to 225,000 (2012-2015) - 5,000 additional ASPs created under World Bank funded Punjab Irrigated-Agriculture Productivity Improvement Project (PIPIP)
  ✓ Additional 4,000 units are being provided to ASPs from provincial ADP – about 2,400 provided so far

➢ Currently, Around 15,000 LASER Land Levers are Being Operated by ASPs with Combined Capacity to Annually Level About 1.5 MHA
Adoption Status
Conservation Agriculture Practices (CAPs)

<table>
<thead>
<tr>
<th>Practice</th>
<th>Units</th>
<th>MHa</th>
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</thead>
<tbody>
<tr>
<td>Laser Land Leveling</td>
<td>15000</td>
<td>6.5</td>
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<tr>
<td>Raised Bed Planting</td>
<td>850</td>
<td>0.1</td>
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<tr>
<td>No Till Farming (ZTD)</td>
<td>8450</td>
<td>0.69</td>
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<tr>
<td>Residue Management (Happy Seeder)</td>
<td>32</td>
<td></td>
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<tr>
<td>Direct Seeded Rice (DSR Drill)</td>
<td>450</td>
<td></td>
</tr>
</tbody>
</table>

- Laser Land Leveling: 15000 Units, 6.5 MHa
- Raised Bed Planting: 850 Units, 0.1 MHa
- No Till Farming (ZTD): 8450 Units, 0.69 MHa
- Residue Management (Happy Seeder): 32 Units
- Direct Seeded Rice (DSR Drill): 450 Units
Main Constraints for CA Adoption

- Constraints encompass intellectual, financial, technical and policy related support
- Lack of know-how and traditional mindset
- Inadequate policies and lack of institutional support
- Non-Availability of appropriate equipment, machinery and suitable chemicals
- Despite the obvious benefits, CA does not spread automatically, unless promoted
- Lack of locally generated experimental data on CA
- Prevailing policies are unsupportive to CA-practices
- Poor capacity building of HR to cater CA development and dissemination actors
Way Forward

❖ Being knowledge and management intensive, CA requires the support of both research and extension agents to support small farmers to compete climate change
❖ Innovative participatory approaches are inevitable to develop supply-chains for producing CA equipment targeted at small holders
❖ Community resilience towards climate change is necessitated to cope with day to day problems
❖ The out-scaling of proven technology, improved use and dissemination of existing know-how will drive global impacts
❖ CA practices be tagged to address poverty endemic areas to reduce climate change risks and manage vulnerability
❖ Improved and greater levels of meccanization in South Asia will help manage this region more effectively with regional support of ESCAP and CSAM