ACCELERATING ADOPTION OF CLIMATE TECHNOLOGIES IN THE AGRIFOOD SECTOR

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Session 2
TECHNOLOGIES SESSION
BARRIERS AND OPPORTUNITIES
OBJECTIVE

Discuss the opportunities and challenges in fostering deployment of climate Technologies in the Kyrgyz Republic’s agrifood sector

• key trends in adoption of climate technologies
• challenges and opportunities for private sector investments
• possible areas for public support and cooperation with donors and IFIs
• experiences and suggestions to overcome constraints and encourage an enabling environment for investments
• Estimated investment vs contribution to climate change mitigation

• Current adoption vs potential

• Technology assessment

• Barriers and opportunities

• Guiding questions for panel discussion
01 CROP FARMING TECHNOLOGIES

- Conservation Agriculture
- Drip Irrigation
- Improved Greenhouses
- Efficient Machinery
Estimated total investment size

USD 1.0 billion

2.9 million tCO2eq/year

- Field Machinery: 36%
- Improved Greenhouses: 1%
- Manure Management: 33%
- Fattening Units: 9%
- Biogas (biofertilizer): 1%
- Steam Boilers: 0%
- Wind Water Pumps: 4%
- Solar Water Pumps: 1%
- Conservation Agriculture: 6%
- Drip Irrigation: 3%
- Pasture Improve: 9%
Investment and mitigation potential

Source: FAOSTAT and World Bank

Mitigation potential at full potential, KtCO2eq/year
Investments required, USD million
<table>
<thead>
<tr>
<th>Technology</th>
<th>Current Adoption</th>
<th>Potential Adoption</th>
<th>Potential Investment</th>
<th>Potential GHG Reduction</th>
<th>Potential Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation agriculture</td>
<td>0.4% of estimated 200,000 hectares</td>
<td>200,000 Ha (30% of total cereal, oil and leguminous crops area)</td>
<td>USD 60 Million</td>
<td>125,500 tons CO2eq/year</td>
<td>USD 35</td>
</tr>
<tr>
<td>Drip irrigation</td>
<td>6% of the estimated area where drip can be applied</td>
<td>Around 10,000 Ha and up to 35,000</td>
<td>USD 30 Million</td>
<td>1,500 tons CO2eq/year</td>
<td>USD XXXX</td>
</tr>
<tr>
<td>Field Machinery</td>
<td>16% of the needed fleet</td>
<td>14,000 tractors 2,400 harvesters</td>
<td>USD 350 Million</td>
<td>29,000 tCO2eq/year</td>
<td>USD XXXX</td>
</tr>
<tr>
<td>Improved greenhouses</td>
<td>2% of estimated greenhouse area</td>
<td>Around 100 ha and up to 1,100 Ha</td>
<td>USD 10 Million</td>
<td>49,000 tCO2eq/year</td>
<td>USD XXXX</td>
</tr>
</tbody>
</table>
## Technical and financial assessment (Step 2)

### Summary for crop farming technologies

<table>
<thead>
<tr>
<th>STEP</th>
<th>CRITERIA</th>
<th>HIGHLIGHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Performance compared to best practice</td>
<td>The four technologies are available and perform reasonably well when compared to IBP. However, they are costly. In CA and field machinery, farmers mainly use implements imported from Russia and Belarus. In drip and improved greenhouses imported technology is closer to IBP.</td>
</tr>
<tr>
<td></td>
<td>Maturity of technical support services</td>
<td>Technical support services exist for all the four technologies but they are not widespread and efficient (score from low to moderate). CA is very under-developed so unsurprisingly there is not a widespread support network.</td>
</tr>
<tr>
<td></td>
<td>Current adoption rate</td>
<td>Estimated adoption rates of these technologies in the country (between 0 and 16 percent of potential) are quite low suggesting significant potential for deployment. Field machinery presents the highest while CA is still at a very early stage.</td>
</tr>
<tr>
<td></td>
<td>Trends in gap between uptake and potential</td>
<td>The gap is large and has not been decreasing for CA and improved greenhouses. Renovation level of machinery has been increasing in recent years due to subsidized leasing products. Potential for installing drip irrigation is also expected to grow!</td>
</tr>
<tr>
<td></td>
<td>Financial returns</td>
<td>Good financial returns to investment in drip and improved greenhouses and moderate returns for CA. Field machinery presents low returns because of limited diesel savings when investing in regionally produced machinery.</td>
</tr>
</tbody>
</table>
### Economic and institutional assessment (Step 3 and 4)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ECONOMIC &amp; ENVIRONMENTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3</strong></td>
<td><strong>Potential to reduce annual GHG emissions</strong></td>
</tr>
<tr>
<td>Contribution to adaptation</td>
<td>USD 86 million or 86% of total adaptation benefits that have been quantified for all techs evaluated. CA and field machinery represent most of the quantified benefits (around USD 39 million annually for each of these technologies).</td>
</tr>
<tr>
<td>Mitigation cost</td>
<td>Drip shows a high negative mitigation cost (-850 USD/tCO2) driven by low mitigation potential and good economic returns on adoption of drip. It is followed by field machinery (-640 USD/tCO2eq), CA (-51 USD/tCO2eq) and improved GH.</td>
</tr>
<tr>
<td>Negative externalities</td>
<td>CA: Possible increases in herbicide use in the short term; Machinery: Manufacturing footprint of new tractors/harvesters; Drip: Labor impacts can be negative; tubing and other systems and GH: Can increase aggregate energy cons</td>
</tr>
<tr>
<td>Positive externalities</td>
<td>CA, Greenhouses and drip will increase food security in the long term. Drip can lead to aggregate savings in water with appropriate regulatory/institutional setting. FDI by larger suppliers of machinery can lead to jobs in the equipment sector</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>INSTITUTIONAL</th>
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</thead>
<tbody>
<tr>
<td><strong>4</strong></td>
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</table>
A closer look at the barriers (step 4)

<table>
<thead>
<tr>
<th>BARRIERS</th>
<th>Tecnology</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOWLEDGE AND INFORMATION</td>
<td>Conservation agriculture</td>
</tr>
<tr>
<td>ORGANIZATION/SOCIAL</td>
<td>Drip irrigation</td>
</tr>
<tr>
<td>REGULATION/INSTITUTIONS</td>
<td>Field machinery</td>
</tr>
<tr>
<td>SUPPORT SERVICES/STRUCTURES</td>
<td>Improved GH</td>
</tr>
<tr>
<td>FINANCIAL RETURNS</td>
<td></td>
</tr>
<tr>
<td>ACCESS/COST OF CAPITAL</td>
<td></td>
</tr>
</tbody>
</table>

- Drip irrigation
- Field machinery
- Improved GH
- Conservation agriculture
Technical and financial assessment (Step 2)

Summary assessment of livestock technologies

<table>
<thead>
<tr>
<th>Technology</th>
<th>Performance compared to best practice</th>
<th>Maturity of technical support</th>
<th>Current technology adoption</th>
<th>Trends in gap between uptake and</th>
<th>Financial returns</th>
<th>Potential to reduce annual GHG</th>
<th>Contribution to adaptation</th>
<th>Mitigation cost</th>
<th>Negative externalities</th>
<th>Positive externalities</th>
<th>Policy reform intensity</th>
<th>Weighted</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>50</td>
<td>33</td>
<td>100</td>
<td>67</td>
<td>45</td>
<td>20</td>
<td>67</td>
<td>57</td>
<td>75</td>
<td>100</td>
<td>0</td>
<td>47</td>
<td>4</td>
</tr>
<tr>
<td>Drip</td>
<td>75</td>
<td>67</td>
<td>91</td>
<td>0</td>
<td>82</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>50</td>
<td>0</td>
<td>33</td>
<td>49</td>
<td>3</td>
</tr>
<tr>
<td>Machinery</td>
<td>50</td>
<td>67</td>
<td>25</td>
<td>33</td>
<td>14</td>
<td>4</td>
<td>33</td>
<td>100</td>
<td>50</td>
<td>50</td>
<td>67</td>
<td>38</td>
<td>7</td>
</tr>
<tr>
<td>Improved GHs</td>
<td>75</td>
<td>67</td>
<td>100</td>
<td>67</td>
<td>90</td>
<td>7</td>
<td>67</td>
<td>46</td>
<td>25</td>
<td>50</td>
<td>100</td>
<td>49</td>
<td>4</td>
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