The transition of dysfunctional irrigation schemes towards Complex Adaptive Systems: The role of Agricultural Innovation Platforms

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Transitioning to climate-resilient farming systems in Sub-Saharan Africa

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Plethora of challenges and their interdependencies

Small-scale producers and other rural people are at the heart of food systems transformation and efforts to achieve the SDGs.

Complex challenges & an unknown future. High risk from climate change impacts, given the magnitude of existing stresses and vulnerabilities in the countries.
The hypothesis: Why more failures than successes in irrigation development?

• Solutions often focus on technologies for increasing yields and rebuilding the infrastructure
  —failure of smallholder irrigation schemes is not solely a water/engineering challenge.
  —challenges span policy (e.g., weak institutions), environmental (e.g., salinity and waterlogging), social (e.g., lack of agronomic and irrigation knowledge), financial (e.g., farmers’ inability to support scheme maintenance) and technical (e.g., infrastructure) barriers.

  *Trying to address system breakdown with new technology and hardware alone is a misdiagnosis of the problem.*
  —A mix of institutional, market, infrastructure and production issues.
Question: Can the AIP process be able to facilitate the institutional arrangements (and associated information flows) that will increase the performance of irrigation systems?
The value of the AIP

- Facilitates communication and coordination of all players within irrigation sector
- Value lies in the inclusive nature of the stakeholders,
  — representing traditional (agricultural-engineers, Irrigation Management Committees and Water authorities),
  — as well as stakeholders not normally associated with irrigation schemes (value chain players).
- Multidisciplinary in nature and establishes cognitive capacity
  — increasing the capacity to analyse and solve technical problems and address systemic challenges
Role of Agricultural Innovation Platforms (AIPs): Experiences from Zimbabwe

- Identifies main constraints (and opportunities) in irrigation systems
- Also identified relevant stakeholders that could help in dealing with the identified constraints
- Root causes clarified through asking the WHY question

<table>
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<tr>
<th>Challenge</th>
<th>Root causes</th>
<th>Solution</th>
<th>Partners who can assist</th>
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<tbody>
<tr>
<td>Low price of rice</td>
<td>• Lack of a joint market for farmers to sell their rice.</td>
<td>• Farmers have to organize themselves and sell their rice collectively.</td>
<td>• Farmers.</td>
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<td>• Flooding the market with different varieties of rice each in small quantities.</td>
<td>• There is a need to have storage warehouses to store rice while waiting for better price</td>
<td>• Iringa District Council.</td>
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<td>• High transportation costs to the market.</td>
<td>• Grow varieties which are in high demand by customers.</td>
<td>• Financial institutions such as NMB, Non-governmental organizations Member of Parliament.</td>
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<td>• Selling paddy instead of rice.</td>
<td>• Acquire and install rice hulling machines.</td>
<td>• Ministry of Agriculture, Food security and Cooperatives</td>
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<td>• Imported rice from abroad sold at a lower price compared to domestic rice prices.</td>
<td>• Adopt expert technical advice on growing, processing and marketing.</td>
<td>• Savings and Credit Cooperative Society.</td>
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<td>• Advocate to the government to give priority to locally produced rice before permitting imports.</td>
<td>• Private investors (rice hullers).</td>
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Main issues

1. Management of plots in the scheme
2. Water payment issues
3. Water management issues
4. Roles of various stakeholders
5. Product marketing
6. Plot allocation/cropping design
7. Change of mindset e.g. from subsistence to business
AIP facilitated the development of functional networks

• The AIP serve as a catalyst, bringing people and organizations together into an informal network
  – Locally relevant solutions by local players, including technical stakeholders
  – Develop local capacity to solve problems/innovate
  – Technical solutions (including the introduction of smart water management tools + agronomy) introduced in the context of AIP
Creating opportunity for self-organization: fulfilment of vision
Nurturing diversity: Market-Oriented Farming through the Agricultural Innovation Platforms (AIPs)

- Changing the goals of the system and the paradigm on which the system is based are very effective entry points to achieve impact.
- Many challenges faced by small-scale irrigation schemes reside in
  1) the transition from subsistence irrigated agriculture towards market-oriented production systems and
  2) the institutional changes required to facilitate this transition.
The role of markets in providing both the incentives and the means to invest

- Markets
  - Improved production
  - Incentives to invest
    - Food, education, and human health
  - Actual investments made in production
  - Means to invest
Role of Agricultural Innovation Platforms (AIPs): Addressing major stumbling blocks

• Focus on innovation rather than production.
  —Including institutions such as water- and local government authorities, who have great control over systems to become part of the multidirectional information sharing and innovation process is very important;
    o e.g. irrigation management committee owed the Zimbabwe National Water Authority US$ 280,000; the result of years of underpayment, multi-digit inflation and unrealistic exchange rates when the Zim$ collapsed and the US$ was introduced.
    o ZINWA’s understanding, and subsequently reducing their bill to US$ 80,000 to be paid back at 1% interest, unblocked the system and farmers were prepared to pay the bill and work.
  —Occupancy at the irrigation scheme was very low at the beginning of the project because many plots were owned by “irrigators” who were no longer actively using the scheme.
    o The District Council engaged in a land audit confirmed access to and reallocated unused plots.
  —Some of the other big result from the AIP process include conflict resolution, through structured governance systems, making the IMCs relevant.
Summary thoughts

• Technical fixes alone will not work as irrigation systems are part of a complex systems.
  — There is a need for several simultaneous interventions to overcome the challenges within small-scale irrigation systems.
  — Non-water related factors (access to inputs, farm equipment, transportation, value adding opportunities, and functional markets) associated with increasing production and securing profitability of the farm operations are prime on irrigators mind.

• Agriculture Innovation Platforms (AIPs) continuously guide dialogue between agricultural value chain stakeholders.
  — Help in making farmers align their operations to the demands of the market
  — Makes sure the market system responds to the opportunities and constraints faced by smallholders
  — Work on addressing some of the production constraints that affect the viability of the irrigation schemes e.g. lack of knowledge, lack of access to functional markets