Prospects of Conservation Agriculture in Asia

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Agriculture in the Region

- Currently contributes up to 25 to 40 percent of GDP in countries of the region.
- Provides direct livelihood for over 60 percent of the people.
- Although the contribution to GDP will decline in the coming decades, growth in Agriculture is critical to achieve overall development goals.

- Population growth rates, though fast declining, the absolute numbers will still be increasing in near future.
- Declining per capita land availability
- No scope to expand area under agriculture; indeed pressure for other land uses will demand a reduction in area devoted to agriculture.
- Sustainable intensification is the need.

Most important elements that make Agriculture in the region different are:

- Monsoon type climate – Rains received during a short span of 3-4 months – with wide variability in time and space.
- Wide variability in biophysical and socio-economic conditions.

Agriculture in the Region must seek New Directions

- Past R&D strategies are no longer working.
- New directions / strategies are only beginning to emerge.

Past R & D Strategies

- Increasing production / productivity to achieve **self-sufficiency in food grains production** was the primary goal.
- Focus on better endowed regions – where irrigation facilities existed or could be expanded rapidly; - increased use of chemical inputs – fertilizer and pest control chemicals; - greatly strengthened transfer of technology infrastructure; - policy regimes favoring a few foodgrain crops (eg. rice and wheat and subsidies etc.)
- The strategies though successful in many ways have brought the region face to face with new challenges. The nature and dimensions of the challenges for exceeds what we faced in sixties and seventies.

Impact of the Past Strategies

- Self sufficiency goals achieved but only partially.
- Wide spread problems of resource degradation with serious socio economic and ecological consequences.
- Continuing low productivity of rainfed areas where vast majority of the poor live.

The Challenges

A **High Productivity Green Revolution Areas**

- Stagnating and declining productivity, increasing production costs in rice-wheat system – resulting in farmer dismay and despair.
- Widespread problems of resource degradation
  - Depletion of groundwater (energy nexus) – farmers resorting to extracting water from increasing depths.
  - Declining soil fertility, organic matter - farmers having to use increasing fertilizers to rectify multiple nutrient deficiencies.
  - Biodiversity, physical state of soil.
  - Increasing environmental hazards; quality of surface and groundwater, atmospheric pollution, biodiversity loss, soil salinization.
- A real threat to food security of the region.

B **Rainfed Areas**

- Practiced under diverse range of soil and climatic conditions (arid to humid;)
- Continuing problems of resource degradation (soil erosion, runoff, soil fertility decline); risk prone low productivity farming; Issues of resource conservation are fundamental to productivity enhancement.
- Home to vast majority of poorest and
- High priority for Government.

KASSA Project

- Provided an excellent opportunity to review the status, share knowledge and experiences, and assess the scope and prospects for moving to more sustainable ways of farming using approaches and elements which are covered by the broad term **'Conservation Agriculture'**.
- Learnings from KASSA platform permit us to assess prospects of CA in countries of Asian Platform.

Irrigated Ecologies

- The region is unique in that elements of CA eg. zero-tillage have evolved, unlike in other regions, in the irrigated ecologies.
- Zero-tillage and associated technologies including laser aided land levelling; bed planting etc. have evolved and spread rapidly in the context of problems facing farmers in the dominant and intensive rice-wheat cropping system in the indo-gangetic plains eg. control of weeds, need to reduce production costs enhance productivity.

- Development and spread of zero-tillage, a critical, but not stand alone, element of CA must be considered only a step towards evolution of CA systems. CA is yet to take firm roots in the region.

CA systems as they evolve have the potential to

- Reduce production costs; enhance use-efficiency of applied inputs - water, nutrients.
- Reduce/reverse processes of resource degradation eg. soil organic matter, fertility.
- Pave a way for diversified agriculture.
- Impact the environment in a positive way (water, soil quality, soil biodiversity etc.) eg through better management of crop residues.

- Enable better coping with climate change (an aspect which was not adequately emphasized) eg. increasing minimum temperature in the region.
- In short – A way to greater sustainability of production systems.

Rainfed Ecologies

- Globally CA technologies (zero tillage, residue managed on surface, crop sequencing etc.) have evolved and found wide acceptance under rainfed situations.
- Limited on – station and some on farm studies (eg. in Vietnam) have shown promising role of zero/reduced tillage-mulch based systems in enhancing productivity, reducing degradation. There has been little progress to develop and promote CA systems on a sizeable scale.
- Rainfed agriculture is practiced under a wide range of soil, climate (arid to humid) and farming (soico-economic) situations.

- Learning from experience of other platforms, elements of CA, would appear to offer a promising to way address resource degradation (soil erosion, runoff, siltation of farm ponds and reservoirs) linked continued low productivity in many rainfed areas.
- Technological options will be specific to agro ecological/socio economic situations which must emerge in relation to current farming situations.
- Important, in many situations, will be resolution of livestock-crop interactions in determining residue management/recycling/alternate land use options.

Most Important Learnings

- Conservation Agriculture is not only about technology.
- It is about technology, policy and much more.
- It is about whole range of institutional changes and ways to approach R&D.
- It is about a paradigm change.

Conservation Agriculture

It is about change which has a basis in

- Scientists working in partnership with a variety of stakeholders in developing and promoting technologies which integrate concerns of productivity, resource quality and environment.
- Provides a context for location specific R and D actions.

- Provides an entry point for reversing resource degradation issue and continuously improving upon resource quality and productivity.
- Capacity of system to evolve by adapting and accommodating changes in time and space.
- A way to operationalize sustainable agriculture.

CA Prospects

- The learnings from KASSA provide a basis for directional change in R&D. From one with primary focus on production to one that aims at sustainability. Learnings from KASSA project would appear excellent starting point for building effective partnerships with institutions in European Platform and elsewhere (Australia, USA) in our strive towards goals of sustainable agriculture.