

## New Paradigms in Agricultural Extension: Implications for Bio-resource and Stress Management

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### Abstract

The agriculture sector is faced with several serious challenges: The spiraling demand for food and fibre, declining cultivated area due to population pressure, declining agricultural productivity due to natural resource degradation, abiotic and biotic stress factors, climate change and increasing competitions in International Markets. It has also become apparent worldwide that Intensive agricultural system involving high inputs are not only too costly but are contributing to soil degradation, pest resistance, global warming and loss of Bio-diversity. One fundamental element in meeting these challenges is the adoption of sustainable eco-friendly, cost effective agricultural and natural resource management practices by farmers. The sustainable agricultural development and Bio resource and stress management, therefore, are important factors for livelihood of millions of small scale, resource poor farmers in India. The environment and economics receives prime consideration under sustainable agricultural systems, which can kindle evergreen revolution. Agricultural extension should play a pivotal role in ushering such a revolution. Therefore, the transition from a resource based to a technology based system of agriculture, however plays a greater responsibility on the agricultural extension sector, for it is as a vital conduit to transform and educate farmers on the new agricultural information and technologies as well as a conduit to research and policy makers on farmers problems, needs and concerns.

**Keywords:** Bio resource, stress management, agricultural extension

### 1. Background

The agriculture sector is faced with several serious challenges: The spiraling demand for food and fibre, declining cultivated area due to population pressure, declining cultivated area due to population pressure, declining agricultural productivity due to natural resource degradation, abiotic and biotic stress factors, climate change and increasing competitions in International Markets. It has also become apparent worldwide that Intensive agricultural system involving high inputs are not only too costly but are contributing to soil degradation, pest resistance, global warming and loss of Bio-diversity. One fundamental element in meeting these challenges is the adoption of sustainable eco-friendly, cost effective agricultural and natural resource management practices by farmers. The sustainable agricultural development and Bio resource and stress management, therefore, are important factors for livelihood of millions of small scale, resource poor farmers in India. Sustainable agriculture aims to conserve and save water, regenerate soils by using manures, foregoing deep ploughing to prevent erosion, reclaim unproductive land and minimize the use of pesticides and fertilizers and maximize use of biotechnology products. The environment and economics receives prime consideration under sustainable agricultural systems, which can kindle evergreen revolution.

Agricultural extension should play a pivotal role in ushering such a revolution. Therefore, the transition from a resource based to a technology based system of agriculture, however plays a greater responsibility on the agricultural extension sector, for it is as a vital conduit to transform and educate farmers on the new agricultural information and technologies as well as a conduit to research and policy makers on farmers problems, needs and concerns. It is now time that agricultural extension should play a major role in ushering Natural Resources Management, include Bio-resource and Stress Management, Environmental Protection, climate change and global warming and marketing revolution through quality education of the farmers for not only increasing productivity but also ensuring the quality products to get good prices and thereby the millions of farmers change their lives.

### 2. New Dimensions

A new direction for agricultural extension is needed that captures the institutional reforms towards market-oriented privatizing innovations and non-market decentralizing reforms. But a new direction must accommodate the very many paradigm shifts taking place in the world.

### 3. Paradigm Shifts in Agriculture Extension

The following paradigm shifts have taken place in Agriculture



/ Agricultural Extension Green Revolution to Evergreen Revolution, Commodity approach to Integrated farming system approach, Mono disciplinary to Inter-disciplinary approach, Technology - crop technology, eco-technology and Biotechnology, Supply driven approach to demand driven approach, Farm employment to off-farm and non-farm employment, Self reliance to Self Sufficiency, Agricultural Development to Sustainable Agriculture Development, Knowledge and Skills to Empowerment, Agriculture to Agribusiness, Agricultural Development Approaches - Productivity to Profitability, Equity and Sustainability, Single Extension Approach to Pluralistic Extension Approach, Public Extension to Private – Public –Partnership

#### 4. Methods, Methodologies and Approaches

Farmers Field Schools, ICT, Kisan Call Centers, Farmers Portals, Common Service Centers, Mobile Telephones, Farm Schools, Farmer Life Schools, Strategic Planning (SREP), Tradition Media, Community Radio & TV, Front line Demonstrations, Farming system Approach, E- planning & Monitoring, Public Private Partnership, Convergence, Gender main streaming,

#### 5. Focused Areas

Climate Change, Global Warming, Personality Development, Biodiversity, Traditional knowledge, Value Addition, Supply Chain, Decent Work, Producer Organizations, Urban Agriculture, Organic Farming, Soil & Water Management, Abiotic and Biotic stress Management, Bio-Security Entrepreneurship Development, Sustainable Agriculture, Integrated Farming Systems, Natural Resource Management, Integrated Pest Management, Participatory Planning & Monitoring, Agribusiness, Contract Farming, Skill Development, Food and nutrition security, Animal Husbandry, Fisheries and Horticulture

#### 6. The Programmes / Schemes / Institutions

Agricultural Technology Management Agency (ATMA), Krushi Vignana Kendra (KVK), State Agricultural Management Extension Training Institute (SAMETI), Extension Education Institute (EEI), National Agricultural Extension Management Institute (MANAGE), State Agricultural University (SAUs), Agrilclinic and Agribusiness Centres, Mass Media Support to Agricultural Extension, Nation e-governance National Livelihood Mission, Rastriya Krishi Vikas Yojana, National Food Security Mission, National Horticultural Mission, Nation Dairy Mission, Poultry Development Scheme, Backward Regions Grant Fund (BRGF), Diploma for Input Dealers (DAESI), Nation Skill Development Mission, National Mission on Agricultural Extension and Technology (NMAET).

#### 7. The Implications and Strategy

The challenges facing agricultural extension are fourfold: enhanced production and productivity, and enhanced profitability. These call for developing alternative, viable and sustainable extension modalities. The extension services in the public and private sectors work without clear policy direction

are characterized by uniformity rather than specificity. There is a need for application of different extension strategies for different focused areas based on the situational analysis.

#### 8. Biodiversity and Biosecurity

India is one of the most vulnerable countries in the world to threats of bio diversity and bio--security. Food and agriculture have close links with human and environment health. If the security of food or agriculture is threatened, then everybody's life in the biosphere becomes insecure. In India, agricultural bio-diversity and bio-security (covering crops, farms and aquatic animals) is of ever greater importance since it relates to the livelihood, food health, and trade security of the nation. India's consignment of farm exports are rejected in hundreds every year on grounds of mycotoxin, pesticide residues, etc., therefore the Indian biosecurity infrastructure needs to be vastly strengthened. In addition, we need to check introduction of invasive alien species into the country and have effective systems to detect, report and mitigate these problems. Similarly, the export of genetic material legally and illegally is also a major threat. It is essential for sharing of information among different stakeholders, strengthening laws and increasing public awareness through different extension media and methods including ICT Technology Biodiversity Committee can be formed at Village Level to help in this direction. Thus community lead extension strategies could be adopted in addition to sensitizing all Stakeholders at various levels

#### 9. Climate Change and Global Warming

The vulnerability of Agriculture in India and other parts of world to climate change is well acknowledged. Frequency of cold and heat waves, droughts, floods, cyclones and tsunami, etc., has markedly increased in the recent past and has started impacting agricultural production and productivity. The impact of climate change is more prominent on rainfed agricultural which is practiced mostly by small and marginal farmers, who suffer the most. Food and water security are the major casualties of climate change as a result of global warming can create a plethora of problems that include variable rainfall patterns, water shortage/drought conditions, crop yield reduction, soil losses, microbial variability, insect-disease variability, biodiversity, and finally affect the socio-economic status of the people in general and farmers in particular. Extension efforts have to be directed in providing weather data and educating farmers to cooperate to change. Climate lead extension is the need of the hour and can be implemented through multimedia approaches.

#### 10. Natural Resource and Stress Management

India is bestowed with best kind of natural resources of land, water, climate and biodiversity. We need to make judicious use of these precious resources to meet our need but not the greed. The watershed development, moisture conservation practices, building soil health through different practices including composting, residue management and soil test



based fertilizer management, IPM, agro-ecosystem analysis are some of the measures agriculture extension should focus as a strategy towards biotic and abiotic stress management. Farmer Field Schools are excellent methods through which this can be achieved through Farmer to Farmer Extension. Besides this farmer organizations (SHGs) can play a vital role in this direction.

### 11. The Challenges

While the global forces are shaping future agricultural extension worldwide, national systems are experiencing institutional reforms. The following are enormous challenges that should be addressed by agricultural extension in making the extension services effective and meaningful for meeting, the demands of future agricultural development.

- Organizing client system (Farmers and consumers) into groups, associations and federations.
- Creating public awareness on the need for Evergreen Revolution for sustainable agriculture through multimedia communication strategies.
- Participating in technology development process with focus on R & D
- Transferring the sustainable agricultural technologies (Knowledge and skills) with minimum distortion through Farmer Field Schools (FFS) and other media.
- Educating and motivating client system to adopt the technology as well as empowering them and to create spread effect through FFS and other methods/media.
- Initiating interaction among the various technology uptake pathways to rationalize and harmonize resources
- Ensuring participating and commitment of farmers in agricultural extension process through formation of Self Help Groups (SHGs), associations and federations.
- Participatory monitoring and evaluating with focus to provide feed back to credit, input and marketing.
- Educating farmers on their rights, WTO, GATT implications, Biodiversity, climate change, Bio-security and Natural Resource Management.
- Human resources development, which includes training of farmers and extension staff.
- Provision of agri-business and farm management services and playing an advisory role.
- Development of personal efficacy and hope of success among farmers.
- Development of achievement motivation and scheme for competing with standards of excellence among farmers and extension workers.
- Improving on overall well-being and gross domestic happiness

### 4. A suggestive Futuristic Framework

A framework of the building blocks that could form the structure of future strategy could perhaps take the following steps, among others:

- At National / State Level, there is need to develop clear-cut extension policy with all stakeholders.
- The extension system should be participatory, bottom-up, result oriented and demand-driven
- Recognition of the need for re-orientation of the philosophy of extension-farm technology transfer mode to technology application and empowerment.
- Recognition of the need for private-public partnership in agricultural extension management.
- Extension to be broad-based in its programmes by utilizing group and farming systems approaches.
- Adopting pluralistic extension approaches that explicitly underscore the need for an integrating mechanism.
- Aggressive privatization of extension systems transiting to a demand-driven and cost sharing mode.
- Promoting agri-entrepreneurship through agri-clinics and agri-business centres
- Recognition of the need for strong research extension-farmer and market and consumer linkages
- An increasingly gender sensitized and social uptake extension strategy
- Providing training infrastructure to develop extension professionalism in a cost-effective manner
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- Agricultural Technology Management Agency (ATMA) model to be carefully evaluated with some improved interventions at grassroot level such as Village Level Participatory Approach (VLPA), Farmer-to-Farmer Extension through Farmer Field Schools and Unified Extension delivery. This could be done as a Action Research Project under current National Agricultural Extension and Technology Mission in India.
- Concentrating Extension focus on climate change Bio-diversity, Bio-security, NRM, Echo friendly Agricultural Practices.

### 5. Conclusion

In the present context, India's agricultural sector is faced with severe challenges. These include arresting decline in productivity, producing quality products with less costs for highly competitive external markets. The nation is marching towards sustainable agricultural development. India requires agricultural growth of 4% GDP within an expected economic growth of 7 to 8%. Poverty reduction will be possible only when small and marginal farmers and farmers from rain fed areas participate fully in economic growth.