INTERNATIONAL CONFERENCE

Agricultural Policies and Strategies for Profitable Farming:
Field Realities, Needed Reforms and Interventions

ABSTRACTS

ORGANISERS

International Extension Forum (IEF), TNAU Campus, Coimbatore
Gujarat Agricultural University (GAU)
Society of Extension Education (Gujarat Chapter)

SPONSOR

Indian Council of Agricultural Research (ICAR), New Delhi

December 5-7, 2003

College of Agriculture
Gujarat Agricultural University
Anand Campus, Gujarat State, India
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College of Agriculture
Gujarat Agricultural University
Anand Campus, Gujarat State, India
MESSAGE

I am pleased to know that an International Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions" is being organized by the International Extension Forum and Society of Extension Education, Gujarat in Collaboration with Gujarat Agricultural University on December 5th to 7th 2003. at Gujarat Agricultural University, Anand and that a Volume Consisting of research papers to be presented at the Conference is being brought out by the Society of Extension Education, Gujarat.

The International Conference would provide a golden opportunity to the scientists to exchange their innovative views for future agricultural strategy. I hope that the Conference would conclude with better practical proposals and suggestions beneficial not only for Agro-industry but for every small farmer of the Nation.

I wish the International Conference and the publication of the Volume of research paper all success.

Kallashpati Mishra
Message

I am glad that a three day International Conference on "Agricultural policies and strategies for profitable farming: field realities needed reforms and interventions" is being jointly organized by the National Extension Forum, Society of Extension Education (Gujarat) and Gujarat Agricultural University on December 5-7, 2003 at campus of the Gujarat Agricultural University.

It is timely that the conference will provide a platform for introduction between the farmers, extension educators and production systems researchers to collectively diagnose the problems. I am sure that the deliberations at the conference will go beyond the current problems to the issues like contract farming, participatory research and extension, private extension and also related to entrepreneurs to join agricultural business.

I congratulate the organizations involved for take up the task of organizing this conference. I am sure that fruitful deliberations on various issues will help in coming out with sound, workable and useful recommendations for all concerned.

I wish a grand success to the International Conference.

(BHUPENDRASINGH CHUDASAMA)
I am glad that a three day International Conference on "Agricultural policies and strategies for profitable farming field realities needed reforms and interventions" is being jointly organized by the International Extension Forum, Society of Extension Education (Gujarat) and Gujarat Agricultural University on December 5-7, 2003 at campus of the Gujarat Agricultural University.

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I wish a grand success to the International Conference.

(BHUPENDRASINH CHUDASAMA)
Government of Gujarat  
Minister for Agriculture and Cooperation  
Sardar Patel Bhavan, Block No. 5 
1st Floor, Sachivalaya, Gandhinagar-382 004

Dr. K. N. Shelat  
IAS  
Secretary  
November 27, 2003

Message

It is indeed a matter of great pleasure to know that a three-day International Conference on "Agricultural policy and strategies for profitable farming: field realities, needed reforms and interventions" is being organized by the International Extension Forum, Society of Extension Education (Gujarat) and Gujarat Agricultural University during December 5-7, 2003 at Anand.

Policy reforms in agricultural extension envisages the replacement of the old single-discipline based, commodity oriented approach of the T & V system, by the Farming System (FS) approach. The FS approach considers the farm, the farm household and off-farm activities in a holistic way to take care not only of farming but also aspects of nutrition, food security, sustainability, risk minimization, employment generation, etc. The farming-system approach emphasizes that research and extension agenda should be based on farmers' needs through an understanding of existing farming system rather than perceptions by the systems.

I am sure this conference will provide an opportunity to the learned participants for thorough and critical discussion on important issues from which useful recommendations will emerge to refine our approaches to make farming more profitable.

I wish the conference a great success.

[Signature]

K. N. SHELAT
Message

I am extremely happy that International Extension Forum and Society of Extension Education, Gujarat in collaboration with Gujarat Agricultural University is organizing an International Conference on "Agricultural policies and strategies for Profitable Farming: field realities needed reforms and interventions" on 5-7th December, 2003.

This conference aimed at providing a platform to discuss critically the issues related to agricultural policies and strategies for profitable and sustainable farming systems and shall in my opinion provide useful suggestions for needed reforms and interventions in agricultural policies in view of field realities.

It is my personal conviction that the strategy to address these important issues should include people, productivity, permanency, policy and partnership as the key elements. At the same time, there is an urgent need to keep our science and research and its transfer through extension at the cutting edge and relate it to the need of resource poor farmers. It must also be interwoven with the socio economic conditions of the farmers.

It is hoped that it will serve as a useful resource material for the policy makers, planners, researchers, educationists and other stakeholders associated with the process of agriculture development.

I am confident that this forum would use this opportunity adequately on the stated aim of discussing debating and working out a systematic approach not only for public sector extension but also other partners like corporate sector, farmers' organizations, NGOs and private sector.

My best wishes to all the participants and society members for their success in their endeavours in the coming years.

R. P. S. AHLAWAT
MESSAGE

It gives me immense pleasure to involve my colleagues and myself in a conference of timely topic on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions" being held at this great institution of repute during December 5-7, 2003 and I am also happier to collaborate with our University besides International Extension Forum.

I am confident that the Conference would bring a common platform to debate and come out with viable measures which all States and Central Governments can follow with necessary modifications.

My best wishes and blessing for the fruitful recommendations and useful strategies for better future for our farming community.

Dr. B.T. PATEL
PRESIDENT SEE (G)
Agricultural scenario in our country is undergoing a rapid change. In this context, food and nutritional security, poverty alleviation, diversifying market demands, export opportunities and environment concerns are the new challenges to technology dissemination system. To respond to these challenges, appropriate agricultural technologies and agro-management practices are to be developed and disseminated among the users. Effective linkages of production system with agro-processing and export market would play an important role in diversification of agriculture.

For making India a leading scientific Nation in 21st Century, science and technology should reach to the people rapidly and effectively to reap the fruits of new innovations. For this, we need to have more of Farmers' Extension Forum, just like this 'Extension Scientists Forum' in future.

The conference on "Agricultural policies and strategies for profitable farming field realities, needed reforms and interventions" is very timely and relevant in present era.

I wish a grant success to this conference.

D. N. PANDYA.
PREFACE

I am very glad to see the conference on “Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions” being held at the great Institution like Gujarat Agricultural University, College of Agriculture, Anand at a crucial time when the economy of our country, the whole world in general depends upon appropriate Agricultural Policies Strategies being adopted.

To trace back our agricultural heritage and tradition, our forefathers had started with family-oriented self-centered farming which was mostly hand-to-mouth kind of system. Later, they started producing more for marketing where they mostly had a barter-system i.e. exchange of commodities between farmers of neighbouring villages. Thereafter they started producing more and more and moved from subsistence farming to commercial farming.

After the advent of WTO and export opportunities, now it is time, though belated to thoroughly restructure our thinking and farming. We have to exploit our high potential and competitiveness such as diversifying our farming, growing export-oriented basmati rice, medicinal herbs, fruits, vegetables, etc., as we feel comfortable with regard to meeting our food requirements as we have enough and more buffer stock. This publication contains several useful papers such as lead papers, abstracts on major themes such as

1. Promotion of sustainable production through diversification of farming, agro-processing value addition and increase the income and employment potential.
2. Improve the effectiveness of public and encourage private extension organizations and systems.
3. Strengthening marketing extension for national and international trade.
4. Human resource development at various levels for improving technical and managerial skills and
5. Intervention and Implications

The deliberations of this conference, I am confident, will definitely bring out a lot of useful and implementable recommendations as we have got delegates over 150 representing almost all the states and cross-section of India.

I congratulate the organizers and acknowledge with thanks the sponsor ICAR and host organization - viz., GAU. I wish the conference a great success.

Dr.A.G. SAWANT
Member ASRB & Chairman, IEF
Pusa Campus, New Delhi.
Never in the history of about 10,000 years of Indian Agriculture, had the management of farming sector become so challenging and complicated as it is today. The major milestones of Indian agriculture encompass man's creativity in exploring various crops and trees for his food requirement; followed by nomadic agriculture for thousands and thousands of years; around four thousand years back or so, man started cultivation of crops especially cereals and millets for mass consumption; another milestone of the technology development was perhaps ushered in the last century; the fifth important milestone was the green revolution period from the middle of 1960s which resulted in nearly triple-fold increase in food grains production by 1990s. It was during this period when systematic and adequate institutional reforms and operational mechanisms were brought-out through successive policies of Central and State Governments for the growth and progress of the four major systems of agricultural development; viz., Agricultural Education System, Agricultural Research System, Agricultural Extension System & Agricultural Client System. The impact of such concerted efforts could be seen through the spectacular increase in the food grain production by way of bringing larger areas under cultivation, technological advancements of increasing productivity of crops, systematic and appreciable involvement of extension functionaries and impressive adoption of recommended technologies by farmers.

If we look at the other side of the coin, we are encountered with a few paramount challenges: first and foremost is the damage caused to the soil fertility and its health, environmental degradation and toxic food products due to unscrupulous application of chemical fertilizers and pesticides; secondly, over exploitation of ground water, which does not seem to be improving despite several policies and Acts; thirdly, the necessity to produce still more quantities of food grains for the future population; fourthly, dependence on rainfed areas.
for further increase of food grain production; migration of people engaged in farming to other non-farming sectors is the fifth one; the sixth challenge is inadequate price support to the farmers which has become a curse to the farming community since farmers do not have any role to play in fixing the price of their produce while the producers or manufacturers of all the other economic sectors have a say in fixing the price of their commodities; marketing difficulties and non-complimentary role of intermediaries is the seventh challenge; and unpreparedness of the farming community to compete with their counterparts in view of globalization and liberalization is the eighth challenge.

The above mentioned challenges are indicative of the fact that Indian Agriculture is certainly at the crossroads today. Profit per unit area and per unit time is what is required now instead of production per unit area and per unit time. Similarly, how to enable the farmers to become Agripreneurs with orientation on commercial agriculture is an important concern.

In order to address some of the above mentioned issues, the Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, needed Reforms and Interventions" has been organised by the Indian Extension Forum, Society of Extension Education, Gujarat and Gujarat Agricultural University during December 5-7, 2003. The tremendous response elicited by the farm scientists, research scholars and media personnel from different parts of the country by way of contributing lead papers and abstracts has prompted the organisers of the conference to bring out this publication which consists of five Lead papers and several abstracts. The abstracts have been categorized into five themes viz., Sustainable Agriculture, Privatization in Agriculture Sector, Marketing Extension, HRD in Agriculture and Interventions and Implications. In total, 154 numbers of abstracts have been included. It is our fervent hope that the ideas reflected by the lead papers and the abstracts will throw light on the issues in agriculture sector and the possible policy interventions required for making Indian Farming more profitable.

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LEAD PAPERS
Policies for Profitable Farming
PROMOTION OF SUSTAINABLE PRODUCTION, VALUE ADDITION AND INCREASING
THE INCOME AND EMPLOYMENT POTENTIALS

N.Raveendaran¹, N.Ajjan² and S.R.Rajesh³

The growth of agriculture sector in India was hovering around 5-7 percent during 1990's and it was 4.0 percent during 2000-2001 and increased to 5.4 per cent during 2001-2002. Much of the growth in agriculture sector is attributable to the rise in food grains production to 209 million tonnes in 2001-2002 from 196 million tones in 2000-2001 besides increase in the production of non-food crops including oil seeds, jute and cotton.

Estimates showed that agricultural output growth was 2.26 percent per annum during nineties as against 3.17 percent during the eighties (Misra and Govinda Rao, 2003). According to them, if one takes into account the aggregate crop output at 1993-94 prices a different picture emerges. The growth rate works out to slightly higher at 3.08 percent during the nineties as compared to 2.94 percent during the eighties ; and the difference in the growth rates was due to increasing composition of higher value crops in the nineties than in the eighties. Thus it could be emphasized that diversification played a vital role in enhancing the crop output during nineties.

During X Plan emphasis was laid on the development of new technologies to improve the productivity of crops and cropping systems. Modernizations of agriculture through improvement in infrastructure facilities in soil testing laboratories, tissue culture labs, quality control labs, biocontrol labs fabrication of machineries and establishment of new laboratories etc. was aimed at. Sub sector specific strategies include promotion of rice cultivation in potential areas, promotion of seed villages, production and distribution of quality planting materials, replanting senile and diseased plants, crop diversification and value addition, promotion of homestead cultivation, promotion of high value crops, popularization of suitable plantation based farming systems etc are also emphasised during Tenth Plan. Among them crop diversification is vital to ensure food security and to provide balanced diet through nutritive products to poor people.

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Lead Papers

International Conference on “Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions”
Diversification of Farming

With the ever increasing population, pressure on land is increasing. As a consequence, land available for cultivation is declining. This has created grave concern about the food security in future. As horizontal expansion of cultivated land is not possible, these requirements are to be met by utilizing the existing land resources. Diversified farming offers a possible solution to the problem. Major factors affecting crop diversification at macro level are rainfall and percent irrigated area by different sources (Harish Singhal and Ajay Kumar Gauraha, 1998).

Farm diversification would be advocated for reaping the gains of complimentary relationship or equating substitution and price ratio for competitive products. It may also be used as a risk precaution and stabilizing farm income. No doubt that crop diversification along with dairy enterprise can play more significant role in increasing income and employment on marginal farms as the crop cultivation is subject to high degree of risk and uncertainty. Dairying being a self income generating enterprise reduces the irregularity in farm business.

Besides the livestock sector, rural non-farm sector holds the key for promoting greater employment and income diversification among the landless and small farmers. In our country majority of the farming community belongs to marginal and small farmers (76.2 per cent) who have only 29 per cent of the total operational holding, while 71 per cent of the operated area is possessed by farmers who have medium and large size holdings. The food, fodder and fuel production will have to be increased by 60 per cent in the next 25 years to meet the needs of the growing population. By 2025 India's population will be near 1.4 billion requiring annually 380 million tones of food grains. Diversification of crop farming with high yielding milch animals can play an important role in increasing income and employment of marginal farms.

In spite of increase in food production, which is primarily in the north Western India where food production has increased while it has declined in all other parts. With the decline in farm size, it would be increasingly difficult to produce enough food for the family in near future. Only 25 to 30 per cent of the modern agricultural technology have reached the farmers. This modern technology however has been restricted to favorable farming situations. Since there is no further scope for horizontal expansion of land for cultivation the only alternative left is for vertical and that too through diversification of the farming systems.

The diversification in farming systems minimizes the risk of failure in productivity, increases income generation opportunities, stabilizes employment and provides food and nutritional security to farm family. Diversity of food crops, fodder and under utilized plants encourages improvement in overall farm production and fertility. It may assist in the farm conservation of plant genetic resources. Integrating livestock into the system adds income through animal products as well as draught animal power. Tree crops and on-farm forestry integrated into the system provide shade and windbreaks, which provide food, fodder, fuel and wood.
Agro forestry can play a very efficient role in the utilization of all the natural resources in a most effective manner for sustainable crop production. It provides services such as food security, conservation of soils, improvement of soil fertility, moderate microclimate, provide living fences for crops and fruit trees, demarcation of boundaries, reclamation of degraded lands and stabilization of watersheds.

**Agro processing**

India is the world's second largest producer of food next to China, and has the potential of being the biggest with the food and agricultural sector contributing around 26% of India's GDP. The total food production in India is likely to double in the next ten years and there is an opportunity for large investments in food and food processing technologies, skills and equipment, especially in areas of Canning, Dairy and Food Processing, Specialty Processing, Packaging, Frozen Food/Refrigeration and Thermo Processing. Fruits and vegetables, fisheries, milk and milk products, meat and poultry, packaged / convenience foods, alcoholic beverages and soft drinks and grains are important sub-sectors of the food processing industry. The Food Processing Industry sector in India has been accorded high priority by the Government of India, with a number of fiscal relief and incentives, to encourage commercialization and value addition to agricultural produce. As per a recent study, the turnover of the total food market is approximately Rs.250,000 crores (US $ 69.4 billion) out of which value-added food products comprise Rs.80,000 crores (US $ 22.2 billion). Since the liberalization in August, till February 2000 proposals for projects of over Rs.53,800 crores (US $13.4 billion) have been proposed in various segments of the food and agro-processing industry. Besides this, the Government has also approved proposals for joint ventures, foreign collaboration, industrial licenses and 100% export oriented units envisaging an investment of Rs.19,100 crores (US $ 4.80 billion) during the same period. Out of this, foreign investment is over Rs. 9100 crores (US $ 18.2 billion).

Agro processing increases income and access to food for the poor, by establishing small-scale, appropriate and sustainable processing businesses that are flexible, require limited capital investment and can be carried out in the home without the need for sophisticated or expensive equipment. The overall potential of agro-processing is huge. It can reduce wastage, enhance food security.

Food Processing Industry is of enormous significance for India's development because of the vital linkages and synergies it promotes between the two pillars of the economy, namely Industry and Agriculture. India is world's second largest producer of food and has the potential to become number one in course of time with sustained efforts. The growth potential of this sector is enormous and it is expected that food production will double in the next 10 years and the consumption of value added food products will grow at a fast pace. This growth of the Food Processing Industry will bring immense benefits to the economy, raising agricultural yields, meeting productivity, creating employment and raising the standard of very large number of people through out the country, specially, in the rural areas. Economic liberalization and rising consumer prosperity is opening up new opportunities for diversification in Food Processing Sector. Liberalization of world trade will open up new vistas for growth.

*Lead Papers*

International Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions"
The Food Processing Industry has been identified as a thrust area for development. This industry is included in the priority lending sector. Most of the Food Processing Industries have been exempted from the provisions of industrial licensing under Industries (Development and Regulation) Act, 1951 with the exception of beer and alcoholic drinks and items reserved for Small Scale Sector, like vinegar, bread, bakery. As far as foreign investment is concerned automatic approval for even 100% equity is available for majority of the processed food items.

Food processing involves any type of value addition to the agricultural produce starting at the post harvest level. It includes even primary processing like grading, sorting, cutting, seeding, shelling packaging etc.

**Food Processing Industry**

Food Processing Industry, a strong component of the larger agro-industrial sector evolved through several distinct and successive phases is influenced by economic growth, changing consumer attitudes and Government policies.

In terms of various raw material production and supply to processing the following segments contribution is substantial as perceived from Table -1.

<table>
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<th>S.No.</th>
<th>Material</th>
<th>Production</th>
<th>Rank</th>
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<tr>
<td>1.</td>
<td>Food grains</td>
<td>205</td>
<td>2</td>
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<td>2.</td>
<td>Cereals</td>
<td>185</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Pulses / Legume</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Oil Seeds</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Sugarcane</td>
<td>285</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Horticultural crops</td>
<td>125</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>Milk</td>
<td>75</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Fisheries</td>
<td>5.5</td>
<td>3</td>
</tr>
<tr>
<td>9.</td>
<td>Livestock (million)</td>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Poultry birds</td>
<td>250</td>
<td>5</td>
</tr>
<tr>
<td>11.</td>
<td>Egg (billion)</td>
<td>25</td>
<td>5</td>
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It is evident from the table that India is the major producer of most of the raw material for processing of most of the food products.

Food Industry is managing only less than 26 percent value addition to the agricultural raw material as compared to 180 percent achieved by food industry in U.S.A.

**Lead Papers**

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INDIAN PROCESSED FOOD INDUSTRY PROFILE

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<th>S.No.</th>
<th>Processed Food item</th>
<th>Market size (US $ million)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Marine products</td>
<td>5306</td>
<td>24.76</td>
</tr>
<tr>
<td>2.</td>
<td>Edible oil</td>
<td>5520</td>
<td>25.76</td>
</tr>
<tr>
<td>3.</td>
<td>Sugar</td>
<td>4104</td>
<td>19.15</td>
</tr>
<tr>
<td>4.</td>
<td>Tea and Coffee</td>
<td>2120</td>
<td>9.89</td>
</tr>
<tr>
<td>5.</td>
<td>Flour milling products</td>
<td>1470</td>
<td>6.86</td>
</tr>
<tr>
<td>6.</td>
<td>Hydrogenated fat</td>
<td>918</td>
<td>4.28</td>
</tr>
<tr>
<td>7.</td>
<td>Dairy products</td>
<td>818</td>
<td>3.82</td>
</tr>
<tr>
<td>8.</td>
<td>Bakery products</td>
<td>688</td>
<td>3.22</td>
</tr>
<tr>
<td>9.</td>
<td>Confectionary</td>
<td>262</td>
<td>1.22</td>
</tr>
<tr>
<td>10.</td>
<td>Fruits and Vegetable products</td>
<td>97</td>
<td>0.45</td>
</tr>
<tr>
<td>11.</td>
<td>Others</td>
<td>127</td>
<td>0.59</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>21,430</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

(Source: The Indian Food Industry March-April 2003)

It could be understood that edible oils, marine products, sugar, tea and coffee, wheat products and dairy products dominate the food industry sector in India. Despite the market for processed and packaged foods is of the size of US$ 21.43 billion. A close look will reveal that larger volume business is based either on foods with minimum value addition or exports. There exist scope for expanding value addition of fruits and vegetables from current level of 2 percent to 10 percent of production.

India's livestock population is the largest in the world with 50 percent of world buffaloes and 20 percent of cattle, but only one percent of total meat is converted to value added products.

Regarding export the total processed food exports were at over Rs.39.33 billion during 1999-2000 accounting for 28 percent of the total agro based exports in volume terms and 46% in value terms.

In terms of employment this sector is highly labour intensive and it is estimated that for every Rs.10 billion worth of investment in this sector, will generate an additional 54,000 people jobs as compared to 48,000 jobs for the textile industry and 25000 for the paper industry.

Constraints in Food Industry

1. As far as quality and safety aspects is concerned the Indian food industry is handicapped by many impediments in keeping up with the aspirations and expectations of the consumer. For instance, the absence of backward integration forcing the industry to depend on raw materials not specifically suited to obtain good quality products.

2. The Indian food laws and regulation first promulgated in 1955 which have undergone a series of piece meal changes and the industry is severely handicapped by in upgrading their performance in time with international development in food technology.

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3. Innovations and development are rather slow in both packaging materials, package designing and packaging machinery probably due to uncertain demands from the industry aggravated further by their high cost.

The sector comprises of the following major areas:

**Fruit & Vegetable**

Major Products - Beverages, Juices, Concentrates, Pulps, Slices, Frozen & Dehydrated products, Wine, Potato Wafers/Chips etc.

**Fisheries**

Major Products - Frozen & Canned products mainly in fresh form.

**Meat & Poultry**

Major Products - Frozen and packed mainly in fresh form, Egg Powder (only a couple of units).

**Milk & Dairy**

Major Products - Whole Milk Powder, Skimmed milk powder, Condensed milk, Ice cream, Butter and Ghee.

**Grain and Cereals**

Major Products - Flour, Bakeries, Biscuits, Starch Glucose, Cornflakes, Malted Foods, Vermicelli, Pasta Foods, Beer and Malt extracts, Grain based Alcohol.

**Consumer Industry**

Major Products - Chocolates, Confectionery, Soft/Aerated Beverages/Drinks.

**Plantation**

Major Products - Tea, coffee, cashew, cocoa, coconut etc.

**Challenges, Constraints and Concerns**

1. India is already a major producer of food (first in cereals, livestock population, milk and second in fruits and vegetables), producing over 600 million tons of food products, and if the immense untapped potential of growth is achieved, the country can emerge as the largest producer of major food items.

2. Processing level presently being extremely low, the wastage levels are very high resulting in colossal wastage of national wealth running in thousands of crores.

3. Value addition to the raw produce in the country is only seven per cent, compared to as much as 23% in China, 45% in the Philippines and 188 in the U.K.

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4. The small scale and unorganized sectors today account for 75% of the total industry having only local presence without much access to knowledge, technology and marketing network.

5. The differential between the farmer's realization and the final consumer price is very high in our country even in the fresh produce. In processed food products the high price on account of cumulative effect of low productivity, high cost of raw material, spoilage due to poor infrastructure, inefficient and costly transportation, high cost of finance and high incidence of taxes and duties, leads to the vicious cycle of low demand viz., low capacity utilization, high per unit cost and low demand.

6. Despite the existence of a strong and wide network of R&D institutions (CSIR labs, ICAR institutions, ICMR Establishments, Universities and Private institutions), their linkage with the users like farmers and industry, is not well established resulting in lack of technology flow, pure and academic research rather than applied and commercial, lack of involvement of industry in research work, and resource crunch.

7. The unattractive nature and the high risk profile of food processing industry has impeded required flow of credit from financial institutions who are yet to acquire the proper understanding of this sector to attain the requisite levels of appraising skills.

8. Low margins, seasonality and high perishability being the distinct features of the food processing industry, the access to seed capital and working capital is not easy. Despite having been declared a priority-lending sector, there is hardly any growth in capital flow to this industry.

9. Despite vast domestic market size, the present level of processed food marketability is very low but by doing massive awareness and educational campaigns this market could grow higher enough to consume substantial part of any quantum of our processed foods.

10. Indian brands are yet to establish in the international markets calling for a concerted effort to capture world market share in tune with our standing in the production front.

11. With the coming in of WTO regime the country has to prepare for meeting the requisite quality standards in order to compete with imported goods in the domestic market itself. This calls for adoption of high tech machine and technologies as also development of entire chain of the infrastructure.

12. Weak database and lack of market intelligence are the prevailing features of this sector.

13. Poor infrastructure of not only processing but even transportation, ports, airports, storage and handling etc.

14. The backward linkage between the farmer and the processor is yet to take proper shape to tide over the impediments which exist on account of fragmented and small land holdings, erratic production due to natural factors, non uniformity and inconsistent supply of raw material and longer chain of intermediaries.

15. Prevailing packaging system lacks requisite quality and presentability parameters creating handicap as compared to the imported products.

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Policy relating to agro-processing industry.

As the Agriculture remains on the pointy list of the state's development the state's strategy for achieving equitable development of agriculture and sustainable agriculture growth revolves around the following four policy environment areas.

1) Policy for creation of better environment for establishment of agro processing
2) Provision of infrastructure development
3) Promotion of backward linkage
4) Promotion of forward linkage

1) Provision of better Environment

The Policy will seek to create an appropriate environment for entrepreneurs to set up Food Processing Industries through:

I. Fiscal initiatives/interventions like rationalization of tax structure on fresh foods as well as processed foods and machinery used for the production of processed foods.

II. Harmonization & Simplification of food laws by an appropriate enactment to cover all provisions relating to food products so that the existing system of multiple laws is replaced and also covering issues concerning standards Nutrition, Merit goods, futures marketing, equalisation fund etc.

III. A concerted promotion campaign to create market for processed foods by providing financial assistance to Industry Associations, NGOs/Cooperatives, Private Sector Units, State Government Organization for undertaking generic market promotion.

IV. Efforts to expand the availability of the right kind and quality of raw material round the year by increasing production, improving strengthening of database and market intelligence system through studies and surveys to be conducted in various States to enable planned investment in the appropriate sector matching with the availability of raw material and marketability of processed products.

V. Strengthening extension services and to the farmers and co-operatives in the areas of post harvest management of agro-produce to encourage creation of pre-processing facilities near the farms like washing, fumigation, packaging etc.

VI. Efforts to encourage setting up of agro-processing facilities as close to the area of production as possible to avoid wastage and reduce transportation cost. Promotion of investments, both foreign and domestic.

VII. Simplification of documentation and procedures under taxation laws to avoid unnecessary harassment arising out of mere technicalities.

2) Development of Infrastructural Facilities

Interms of infrastructural development the policy will facilitate
I. Establishment of cold chain, low cost pre-cooling facilities near farms, cold stores and grading, sorting, packing facilities to reduce wastage, improve quality and shelf life of products.

II. Application of biotechnology, remote sensing technology, energy saving technologies and technologies for environmental protection.

III. Building up a strong infrastructural base for production of value added products with special emphasis on food safety and quality matching international standards.

IV. Development of Packaging Technologies for individual products, especially cut-fruits & vegetables, so as to increase their shelf life and improve consumer acceptance both in the domestic and international markets.

V. Development of new technologies in Food Processing & Packaging and also to provide for the mechanism to facilitate quick transfer of technologies to field through a net work of R&D Institutions having a Central Institute at the national level with satellite institutions located strategically in various regions to cover up the whole Country and to make available the required testing facilities. This could be done by establishing a new institution or strengthening an existing one.

VI. Development of area-specific Agro Food Parks dedicated to processing of the predominant produce of the area e.g., apple in J&K, pineapple in North East, Lichi in Bihar, Mango in Maharashtra & Andhra Pradesh etc. etc.

3. Promotion of Backward Linkage

I. Establishment of a sustained and lasting linkage between the farmers and the processors based on mutual trust and benefits by utilizing the existing infrastructure of cooperative, village panchayats and such other institutions.

II. Development of Futures Market in the best interest of both the farmers and the processors ensuring a minimum price stability to the farmer and a sustained supply of raw material to the processor.

III. Mechanism to reduce the gap between the farm gate price of agro-produce and the final price paid by the consumer.

4. Promotion of Forward Linkage

I. Establishment of a strong linkage between the processor and the market to effect cost economies by elimination of avoidable intermediaries.

II. Establishment of marketing network with an apex body to ensure proper marketing of processed products.

III. Development of marketing capabilities both with regard to infrastructure and quality in order to promote competitive capabilities to face not only the WTO challenge but to undertake exports in a big way.

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The first 60 years of the 20th century were marked by a sense of despair and frustration regarding our capability to achieve a balance between human numbers and the production of food grains and other agricultural commodities. In 1968, this mood of despair and diffidence gave way to one of optimism and self-confidence in relation to our agricultural potential and our farmers' ability to adapt and adopt new technologies, a phenomenon which was christened in that year as 'Green Revolution'. This agricultural transformation helped to strengthen our national sovereignty in foreign policy.

Agricultural progress will determine India's economic and political future. We can shape this future in a desirable direction through synergy among technology, public policy and farmers' cooperative action. If such a synergy can be achieved, India can become the foremost among the nations of the world in "farm power". If our agricultural progress is halted or reversed through inappropriate or inadequate agric policies and research priorities, social disintegration will be the result. The prosperity of the virtual world and the misery of the real world cannot co-exist for long.

Profitable agricultural industries producing high quality agricultural products in an ecologically sustainable manner that meets consumer needs, and based on a better understanding of the relationship between product prices and production costs, including environmental costs. Achieving and maintaining sustainable agriculture has become one of the focal points. Agricultural Policies and Strategies are categorized under six divisions.

**Agricultural Production**

Agriculture, encompassing crop and animal husbandry, horticulture, forestry and agro-forestry, inland and marine fisheries and agro-processing, is the major determinant of the livelihood destiny of nearly 700 million people, out of 1 billion of India. The methodology of "production by masses" characteristic of Indian agriculture cannot easily compete with products resulting from mass production technologies, until the power of scale both at the production and marketing ends is conferred on small scale production units, as has been done in the cooperative dairy sector. Therefore, trade policies, which impact on this destiny, are of vital concern to a majority of the rural population as well as to large numbers of the urban poor. There is need for an integrated trade strategy, which gives concurrent attention to home and external trade.

**Development of Policies and Strategies**

Existing models of agricultural intensification (that is, greater agricultural production on the same amount of land) assume that population growth, access to markets, and agricultural potential will...
lead farmers to adopt new technologies, intensify farming, and use resources sustainably. Yet despite policy reforms and structural and sectoral adjustment programmes designed to improve production and marketing incentives for farmers, low agricultural productivity, resource degradation, and poverty are still severe and worsening problem.

**Policies and Strategies**

- Evolve and adopt best management practices for agricultural industries.
- Facilitate agro industry adoption of environmental management systems and other quality assurance processes to meet community demands and provide market advantage.
- Promote training in and adoption of property management planning, including business and risk management.
- Develop and adopt best practices for animal welfare on farms, in research and in transport and marketing sectors.
- Cultivate and adopt alternative farming systems that allow adaptation to suit the variable soil and climate conditions.
- Enhance (with appropriate safeguards) the diversity of genotypes used in agricultural systems to provide increased security and quality of production.
- Explore and develop new domestic and export market opportunities for agricultural products (including organically grown products).
- Produce agricultural products that satisfy market needs and meet industry and trade standards, where appropriate, inform the markets and adjust the standards to avoid unsustainable practices.
- Amplify and adopt food production, processing and marketing strategies that improve human health.
- Define and measure quantifiable indicators of the state of the agricultural and related environment, to allow better decision making (both on-farm and regionally).
- Promote the long-term economic, environmental and social benefits of sustainable agriculture to farmers and the general community.
- Better inform rural communities of the role and appropriate use of agricultural and veterinary chemicals and biological pest control in sustainable agriculture.
- Reduce the reliance of agro industry on pesticides.
- Diminish the risks caused by pesticides to the environment and to human health.
- Elevate community awareness of the relationships between product prices and production costs.

**Land management**

Agricultural land protected and managed for sustainable agricultural use with agricultural activity contributing to its protection and enhancement. In green revolution witnessed by our Country, resulting from expansion in cultivated area, introduction of high yielding cultivars and improved management.
technologies has increased crop production. The increasing population has resulted the per capita availability of land, which is 0.14ha.by 2000AD and further likely to decline to 0.08 ha.by 2020AD. Thus, the logical way to manage long-term soil fertility and productivity of soil with low cost inputs for larger agro based outputs may gain momentum.

Policies and Strategies
- Develop awareness of the need to minimise adverse off-site impacts of land management practices.
- Improve awareness and assessment of the causes, symptoms and impacts of soil degradation.
- Encourage the protection, and promote the value of native vegetation and biodiversity in agricultural land management.
- Amplify and adopt management practices and farming systems that conserve and enhance the health of soil resources.
- Maintain effective barriers to the importation and spread of weeds, pests and diseases
- Promote and adopt integrated weed, pest and disease management strategies and best management practices (e.g. improved application technology, plant and animal breeding and biological control agents) that reduce the risks arising from use of agricultural and veterinary chemicals, with special recognition of the needs of farmers.
- Use fertilisers to achieve maximum benefits in replacing nutrients used to produce agricultural products, with minimal adverse impact on the environment.
- Monitor agricultural and veterinary chemical residues in agricultural products and in the environment; use the results to improve management performance.
- Encourage and manage the agricultural use of organic wastes from urban, industrial and agricultural activities so that the components of waste are effectively used by plant growth or sustain ably assimilated by the soil at the application site.

Water use and quality
Agriculture as an efficient and productive user of water contributing to the achievement of water quality and environmental flow objectives. Prime farmland is all the time going out of agriculture and groundwater depletion is proceeding at an alarming rate.

Our agriculture has reached a stage when proactive advice to farm families on land and water use planning based on an assessment of national and global market demand is vital for progress. At the national and state levels there is need for technical resource centres for monsoon management and water security. They should help to train rural climate managers who can help to maximise the benefits of good monsoons and minimise the impact of unfavourable monsoons.
Policies and strategies

- Develop, promote and adopt agricultural management practices that contribute beneficially to the management of rivers and riverside ecosystems, estuaries, groundwater and wetlands associated with agriculture.
- Adopt efficient and effective water use practices (by irrigators, and other water users) that conserve and enhance the quality of the environment.
- Evolve and implement land and water management plans in irrigated agricultural areas including adoption of best farming practice, irrigation system designs and decision support systems that overcome water degradation and provide for long-term irrigation community viability.
- Provide government incentive programmes that improve the sustainable use of water by agriculture.
- Participate collaboratively in the development of water reform policy by promoting and adopting river and ground water management plans.

Nature conservation on farms and forests

Agriculture: making a beneficial contribution to the protection and management of the State’s natural heritage and biodiversity.

Policies and strategies

- Identify priorities for conservation on agricultural land.
- Adopt farming systems that conserve and enhance biodiversity.
- Follow management plans that integrate nature conservation on-farm with agricultural production systems.
- Investigate and promote, using appropriate incentives, the agricultural and ecological benefits of conserving and supplementing remnant native vegetation.
- Recognise the integral role of trees, shrubs, perennial grasses and legumes in property and catchments management planning.
- Manage pest and diseases in ways that optimise agricultural and ecological benefits, and promote species conservation.
- Consider the establishment of sustainable farming of suitable native species.
- Ensure that the off-site effects of agriculture do not adversely affect areas set aside for nature conservation.

Rural communities

Agriculture: making a beneficial contribution to Regional and State economies and contributing to the support of the State’s rural people and communities.
Policies and strategies

- Facilitate consultation among agricultural industries, indigenous stakeholders, government and the community on issues affecting rural people, families and communities.
- Improve the coordination and complementary nature of rural policies and services.
- Popularize the structural adjustment of agricultural industries and rural communities to enhance the sustainability of agriculture, including the provision and effective use of rural adjustment assistance.
- Provide opportunities for agricultural processing facilities to be located in rural areas and to strengthen their associated support infrastructure.
- Include the full range of agricultural industries in regional development strategies.

Integrated management

Agricultural industries, communities and governments working together to achieve positive economic, environmental and social outcomes.

Policies and strategies

- Implement policies and provide information to encourage the adoption of sustainable agricultural practices.
- Effect collaboration in the development, implementation and review of plans, policies and legislation relating to agriculture.
- Use Total Catchments Management and Land Care principles and plans to ensure that the off-site impacts of agriculture are considered and managed effectively.
- Confirm the equitable and efficient allocation of land and other natural resources between agriculture and other sectors of the community.
- Guard land use planning is undertaken, where appropriate, in association with agriculture to avoid conflict that may jeopardise agriculture’s sustainability.
- Ensure enactment of environmental impact assessment procedures that result in the sustainable development of agriculture.
- Coordinate monitoring and reporting of the state of the agricultural and related environment, using measurable indicators that contribute to decision making.
- Evolve and adopt agricultural activities and planning strategies that minimise impacts on community amenity from noise, dust and odour.
- Identify lands and farming methods best suited to specific agricultural industries and retain production options for those lands in the future.
- Develop and adopt appropriate planning mechanisms to avoid future conflict over land use (e.g. competing demands for land for agricultural, residential and recreational uses).
- Proceed efficient allocation and use of resources provided by the Central and State governments for agricultural resource management and improvement.

Lead Papers
Sustainable agriculture

In recent years, many people, both rural and urban become residents, have concerned that the agricultural practices used during the past 30 to 40 years may be damaging the environment and reducing food quality. Many people also worry that the economic strength and vigour of rural families and communities may decline unless farmers and communities can develop profitable farm and related non-farm activities. These concerns have prompted interest and discussion about sustainable agriculture.

A variety of labels have emerged over the past several years that attempt to classify sustainable agriculture. These include alternative, sustainable, low-input, regenerative, biodynamic, and agro ecological agriculture. Despite the different labels, they tend to focus on physical or biological relationships. Simply stated, sustainable agriculture focuses on farmers' profit in the short run, while preserving rural communities and natural resources in the long run.

Some ways to achieve a more sustainable agriculture

- Identify, evaluate, and develop alternatives to those current farm practices that have the greatest potential to harm the environment or the health of farmers or consumers.
- Most people in agriculture are concerned about soil erosion, surface water contamination, ground water pollution and depletion, food quality, and reductions in wildlife populations. Research, education and policy initiatives are needed for long-term solutions to these problems.
- Several practices that address environmental concerns already exist. Contour planting, minimal tillage systems, cover crops, crop rotation, and perennial grasses can reduce soil erosion and improve profitability.
- Many sustainable agriculture practices substitute on-farm resources and management for purchased inputs. Increasingly, some farmers use crop rotation systems, animal manures, and mechanical cultivation to maintain soil fertility and productivity. Develop profitability strategies that focus on diversified farming systems that effectively use both external and internal inputs and assist farmers creatively marketing their goods.
- If adequate management and labour resources exist, diversification reduces financial risk.

Diversification hedges against drought and economic pressures from increased input costs, commodity price declines, and regulations that affect the supply of certain commodities. Diversified farm strategies may also include premium-prices products, such as organic or superior quality products. In other words, the focus may be on higher quality products that are more valuable as opposed to focusing on simply increasing production. A diversified strategy also seeks to access local, regional, national, and international markets.
Develop policies that maintain a diversified farm structure and rejuvenate rural communities. This is a "big picture" perspective of sustainable agriculture. A diversified agricultural structure includes part-time farmers, full-time farmers, single-family farmers, and larger multi-family partnerships or cooperatives. A diversified rural community structure also focuses on creating and maintaining non-farm enterprises that complement farm families' rhythms and needs for off-farm employment featuring well-paying jobs and adequate benefits. The idea is to build both income and an "infrastructure" of business and community services. (Steve Stevenson, 2003)

Satellite farm approach for sustainable agriculture
(Tamil Nadu Agricultural University, Coimbatore, India)

Satellite farm approach: For sustainable farm enterprises and human development

The Satellite Farm Approach is the outcome of action research, and its unique feature is that farmers become the focal point of all developmental efforts facilitated by field level extension workers and scientists. In a nutshell, a Satellite Farm is of any size, diversified, and developed over a period of time by applying appropriate technologies generated by the research system and recommended by development departments, NGO, media and other supporting agencies.

Satellite Farm Approach is a bottom-up approach that starts by trying to understand the dynamics of particular situation-neighbouring farmers, their daily tasks, needs, and aspirations, as well as constraints hindering their acceptance of different enterprises for progress. This approach is a farm family centered process that involves a holistic analysis of a given farm and family situation. It also demonstrates the application of two basic principles—community participation and sharing interdisciplinary work methods (G. Perumal and K.A. Ponnuswamy, 2003).

Advantages
- Facilitates desirable 'farmer-farmer-extension worker-scientist' interaction,
- Provides greater scope to extension workers and farmers for experiential learning,
- Gives opportunities to study and understand interdisciplinary and interenterprise technology, behaviour, and also the complementary flow of bioresources within the farm,
- Enables identification and understanding of the use of Indigenous Technical Knowledge,
- Helps extension workers and scientists to understand the ability of farmers to manage crisis situations based on their native wisdom and experience,
- Helps farmers to develop their own skills in choosing the appropriate combination of enterprises,
- Creates a cooperative attitude among farmers for better production and marketing of various agricultural products,
- Does not warrant any additional cost of manpower on the part of the development departments,
- Above all, it ensures cost-effective and quality extension work.
Food, Farming and the Future: Field realities, Needed reforms and Interventions

There is growing consumer demand for high quality food, produced safely in ways that do not harm the environment, yet even though consumers want high standards, they still want to buy food as cheaply as possible. In these circumstances a tendency has developed for retailers to try to pass on higher production costs, not to the consumer who demands them, but to the producer. As costs are passed on to the producers, wherever they live and work in the world, rural communities will become increasingly impoverished, widening the gap between urban and rural communities still further, and placing additional pressures on rural communities and therefore, ultimately, the environment.

The conference of Common Agricultural Policy, was set against the background of the need, to further reform — both in its regional structure and 1992 reformation has kept farming profitable (Farmer’s Link- UK, 2003). However, many people all over the globe believe that further change is inevitable (and indeed desirable) for the benefit of rural societies. Farmers’ Link continue to facilitate debate on the future of food and farming by offering a regional forum where farmers, consumers and policy makers can discuss what they wish to see happen in the future to food and farming, as well as the sustainability of current agriculture and trade policies.

India has pursued ten years of economic reforms to increase growth. These efforts achieved positive results; however several challenges remain in reforming food and agriculture. The government still intervenes heavily in key areas, such as, controlling the price of food and fertilizer. Many people charge that these practices lead to higher food prices for consumers and wasted tax money. Subsidies and price controls can reduce the incentive to innovate and increase efficiency. But changing these practices is a politically sensitive issue and requires thorough analysis of policy options (Suresh Babu International Food Policy Research Institute, 2003)

In improving Agricultural Policies in India, Subba Rao, 2003 stressed - Policymakers need to use research information on the impact of current practices and on the potential effect of reforms.

The dire need of the hour for the Nation in terms of agricultural reform and modalities are to be decided by the policymakers, academics, farmers, and representatives of non-governmental organizations and the private sector, based on their recent experiences.

Less Intensive Farming and Environment (LIFE)

Integrated pest management, integrated farming systems, integrated production, integrated farming, integrated ecological farming systems, less-intensive input production—and outline what is happening in practice. By David Buffin.
Less Intensive farming (LIFE) demand a holistic pattern of land use, which integrates natural regulation processes. This helps to reduce the need for off-farm inputs such as, fertilisers, pesticides etc. Crop rotation, cultivation and soil management, cultivars resistant to pests and diseases, sowing date, nutrition, biodiversity etc, are optimised, they all form important components of integrated farming systems.

Profitability can be maintained with less-intensive production (Vic Jordan, 2003). Results from arable production have shown that herbicide use has been reduced by 19%, fungicide use by 84% and insecticide use by 100%. The management of input has not yet been optimised.

**In relation to pesticides, the following practices for LIFE farming have been adopted**
- The use of chemicals that are more selective
- The use of minimal dosage and frequency of application;
- Spot treatment or inter-row applications (not yet fully implemented on pilot farms)
- Low volume sprays and more careful timing of application.

**The following strategies are recommended in order to reduce inputs**
- Modification of cropping sequences to increase crop diversity
- Use of tillage systems that favour natural control of key pests (pests, diseases and weeds) improve soil structure and reduce demand for external nitrogen
- Development and use of pest thresholds— with decision models and non-chemical methods to reduce agrochemical input— use of biofertilisers
- Modification of field margins to encourage natural pests.

**Indian scenario**
Sukhdev Singh Dhindsa (2003) said that the National Average Consumption of Fertilizers in India, in terms of NPK has shown a steady growth during the last decade and is now estimated to be in the range of 90-95 kgs per hectare for the last two to three years (2000-2003). Unfortunately, indiscriminate use of fertilizers without scientific basis has had an adverse impact on soil fertility. There is a need to promote integrated nutrient management system that envisages simultaneous use of chemical fertilizers, organics, and bio-fertilizers.

**Value added products**
Value-added products are made from other primary agricultural products. Some are turning waste straw into board or using it to build stronger auto parts. Others are making nutritious animal feed from waste eggs. Producing value-added products is a growing trend that benefits both farmers and economy. Farmers can get more financial return from their agricultural products, which is important in this day of the farm crisis when many are struggling to keep afloat.
The Food Processing Industry sector in India is one of the largest in terms of production, consumption, export and growth prospects. The government has accorded it a high priority, with a number of fiscal reliefs and incentives, to encourage commercialisation and value addition to agricultural produce; for minimising pre/post harvest wastage, generating employment and export growth.

Important sub sectors in food processing industries are: - Fruit & Vegetable Processing, Fish-processing, Milk Processing, Meat & Poultry Processing, Packaged/Convenience Foods, Alcoholic beverages & Soft drinks and Grain Processing etc.

Organic Farming

Agriculture and health promoting: A shift to natural food

The Natural farming promotes and provides the nation with healthy food and other raw materials produced in a sustainable, humane and pollution-free way. Thus, the high-quality and healthy food thereby helps in reducing disease and medical costs. In turn it may be useful to increase and diversify rural employment, thereby bringing balance and vitality to country communities. Long-term, our policies will lead to a diversified, ecologically sustainable, aesthetically pleasing countryside. We will not allow short-term gain to compromise the future health and well being of the population and the ecological integrity of the environment

Organic crops can be as, or more, profitable as conventional

Organic cropping systems in the Midwestern United States can be as profitable, or even more profitable, than most conventional rotations. (Henry A. Wallace, 2003) To help farmers understand the profitability of organic agriculture, the Wallace Institute report, by policy analyst Rick Welsh, analyzes studies comparing organic and conventional grain cropping systems. The report also reviews past and current research on the conditions under which growing organic crops is profitable. There has been dramatic worldwide growth in the production of, and demand for, organically produced agricultural products. In addition, consumers have consistently been willing to pay premium prices for organic products, which have often caused processors to pay premiums to farmers for organic grains. However, the study found that premiums are not always necessary for organic systems to outperform conventional systems.

- When the organic systems were more profitable, it was due to one or more factors, including:
- The organic system having lower production costs.
- The net returns for the types of crops in the organic rotation were higher than the net returns for the types of crops in the conventional rotation.
- Organic systems are drought hardy and can outperform conventional systems in drier areas or during drier periods.

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The marketing aspects of organic agriculture

State departments of agriculture, and other interested parties that view organic agriculture as a potentially fruitful area for environmental management and rural development, might invest resources to develop marketing information useful to organic farmers. In addition, extension services could assist organic farmers in developing or locating market outlets or developing individual or cooperative marketing strategies.

In India, self help groups, non-governmental organizations, voluntary associations may be involved for promoting organic agriculture programmes Many Agricultural Universities started issuing certificates for the standard-quality organics.

Interventions

- The global necessity to increase agricultural production from a steadily decreasing and degrading land resource base places considerable strain on the fragile ecosystem. Land must be cultivated more intensely, water and labour be utilized more optimally and fertilizer and other purchased inputs used more efficiently. While the use of mineral fertilizers is the quickest and surest way of boosting crop production, their cost and other constraints frequently, deter farmers from using them in recommended quantities and in balanced proportions.

- Organic residues both of plant and animal origin are by-products of agricultural activities and thus virtually a source of plant nutrients. Organic manure, though bulky in nature and with low nutrient content, have the property of improving soil physical and microbial conditions, and thus enhance fertilizer use efficiency when applied in conjunction with mineral fertilizers. Organically produced products a fetch premium prices.

- Integrated nutrient management differs from conventional nutrient management in that it is more explicitly considers nutrients from different sources, notably organic materials, biofertilisers, nutrients carried over from previous cropping seasons, the dynamics and transformation of nutrients in soil, interaction between nutrients, and the availability of nutrients in space and time in relation to the nutrient demand by the crop. Integrated nutrient management is to be considered an integral part of any sustainable agricultural system for profitable Agriculture.

- Demographic trends in India have two important implications for agricultural research and development. First, more than 50 per cent of the over 1 billion populations belong to the age group 21 and below. Unless farming becomes both intellectually stimulating through the pathway of profit-based precision farming, and economically rewarding through value-addition to primary produce, it will be difficult to attract or retain youth in farming.

- The other demographic trend is increasing urbanisation. Soon, 50 per cent of the population will be living in towns and cities. Urban agriculture and urban green belts offer opportunities for jobs and income, as well as for improving the urban environment and quality of life. Schools and colleges in
urban areas can promote with the help of agricultural universities and institutions urban horticulture and green belt development, which can help to promote symbiotic links between rural and urban farmers and urban consumers. Also they will help to generate more non-farm jobs, which is an urgent need in rural areas (Swaminathan, 2003).

- There is need to restructure research strategies in a manner that strategic, anticipatory and participatory (i.e. with farm families) research all receives adequate attention. Similarly, extension services should become farmer owned and controlled and should become capable of converting generic into location specific knowledge essential for taking to precision farming methods.

- Technology research is needed on intensification of intercropping and mixed cropping techniques that increase output, incorporate cash perennials, and increase crop density while protecting the soil.

- The Satellite Farm Approach is the dire need of the hour as it is holistic, induces farmers to develop their own skills in choosing the appropriate combination of enterprises, creates cooperative attitude for better production and marketing of agricultural products.

- At the National and State levels there is need for Technical Resource Centres for monsoon management and water security. They should help to train Rural Climate Managers who can help to maximise the benefits of good monsoons and minimise the impact of unfavourable monsoons.

- Import policies relating to farm commodities should be based on a careful assessment of their impact on all those who depend upon agriculture for their livelihood security. Government should bring out a White Paper on the World Trade Agreement and Indian agriculture.

- The Rural Knowledge Centres should provide computer aided and Internet connected information services, so that farm families have timely and relevant meteorological, management and marketing information of agricultural/ agricultural industry’s end produces.

* * * * *
India’s National Agricultural Policy was approved by the Union Cabinet on July 25th, 2000. It has been described as the first of its kind, since independence. The policy has proposed significant structural and institutional reforms in the country’s farm sector; to be implemented through the following major thrust areas:

1. Sustainable Agriculture
2. Food and nutritional security
3. Generation and Transfer of technology
4. Input management
5. Incentives for agriculture
6. Institutional structure

Of these, the generation and transfer of technology, forms a major thrust area and the reforms in agricultural extension will be implemented through a unique policy framework called the National Agricultural Extension Policy (NAEP). The following paper examines the major priority areas of the policy, the challenges of the Research, Extension and Clientele system; in the wake of the policy commitments and the transition to the new role. A number of suggestions have also been enumerated to streamline and strengthen the policy.

As per the internet and other documents available, the GOI has published its draft policy for Agricultural Extension, while State Governments are still not clear. Extension paradigms have been changing globally over a period of time. It has metamorphosed from “diffusion of innovations” in the 1960’s to constraint identification of 70’s to improved management in the 1980’s. The much acclaimed Training and Visit system revealed its impressive gains in resource rich/well - endowed areas, and its failure in making an impact in rainfed areas (Farrington et al., 1998).

This paradigm shift calls for the increasing role of extension as an enabler, though its role as a doer should continue, in a qualitatively different way. The change from “technology transfer to collaborative learning” paradigm (Will Allen, 2000) to meet the challenges in the area of natural resource management is easily said than done. To remain relevant and useful in the years to come, the public extension system has to strengthen its understanding on technology, markets, prices, demand and policies (Rasheed and Van den Ban, 2000). This necessitates a sound agricultural extension policy which is innovative farmer-friendly and capable of nurturing a plurality of institutions.

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In this context, the NAEP of the Tenth plan period, seeks to address the challenges of the changing economic scenario in India and the need for appropriate agricultural technologies to respond to poverty alleviation, food and national security, diversified market demands and export opportunities. The national agricultural extension policy should be consistent with and supportive of national agricultural development policy and goals (Swanson, 1990).

The following paper attempts to study the broad areas / issues and clauses in the National agricultural extension policy and suggests ways and means of reinforcing / strengthening the policy with respect to the following broad issues in the policy; which are dealt in detail one by one.

1. Policy reforms
2. Institutional restructuring
3. Management reforms
4. Strengthening research – extension linkage
5. Capacity building and skill upgradation
6. Empowerment of farmers
7. Mainstreaming of women in agriculture
8. Use of media and information technology
9. Financial sustainability
10. Changing role of Government

I. Policy Reforms

The reforms emphasize on a multi agency extension service comprising of public extension, private extension and mass media and information technology.

The public extension system in the country suffers from the following lacunae:

a) Public extension services are widely viewed as supply driven, rather than demand driven.
b) Commercialization of agriculture has given rise to specialized client and demand for location specific extension services, not entered by public extension.
c) Insufficient face to face contact between extension worker and farmer.
d) Inadequate funds for operational purpose.
e) Majority of the extension services are curative in nature.
f) Incomplete and inefficient extension services rendered.

In the light of the above discussions, the number and types of organizations providing extension services in India has shown an increase over the last two decades. The Department of Agriculture (DOA) continues to dominate the extension scene in terms of manpower and geographical coverage, though it is not often the primary source of farm information for majority of the farmers (Sulaiman et al., 2002).
Farmer's dependence on other farmers and input dealers as source of agricultural information continues to be high reflecting the limited reach of DOA in its area of operation. The main function performed by the DOA is the delivery of technical messages to individual farmers in his circle/area. These are not regular due to his preoccupation with the implementation of a number of schemes having input/subsidy delivery. The DOA has been facing a number of constraints (financial, human resources and institutional) and without a total restructuring, its ability to provide services demanded by farmers is under serious doubt. Though several experiments to improve the performance of public sector extension were undertaken since 90's its impact has been negligible mainly due to lack of a shared understanding on the role of extension in the country's context and lack of operational flexibility in achieving the goals.

The performance of the private extension agents (farmers organizations, producers co-operatives) vary widely and their presence is more skewed towards well endowed regions. Even in those regions where there is some significant presence, there has not been any integration of efforts by the various agencies. A good number of farmers are willing to pay for quality extension services especially in the area of plant protection and training programmes. One important condition for paid services is the farmer's insistence on field visit based advice. The demand for paid services was more in non-food grain crops, especially horticultural crops (fruits, vegetables, flowers and spices) and oilseeds. Thus, considerable scope exists for initiating paid extension services in agriculture. With greater emphasis given by India for diversifying its agriculture to horticulture crops and also due to the increasing realization of knowledge as a most important input for efficient farming, the institutional diversity in provision of extension services would increase in the coming years. In the light of the above facts, the following suggestions emerge:

Though it is said that a clear cut demarcation should be made between public and private extension, based on the socio-economic criteria, and specificity of extension services required; it is practically not possible, atleast for the present, to have a water tight compartmentalization of the two.

This shows that both public and private sector extension should co-exist and function simultaneously. Public extension can play a dominant role in dissemination of knowledge based technologies, that are central to farmers' concerns and that will maintain the natural resource base. These are subject matter areas that are not likely to be taken up by the private sector e.g. include dissemination of production management technologies that are specific to different crops and livestock systems; natural resource management technologies, such as soil and water management and integrated pest management. The small and marginal farmers, which are not a focus of attention for private extension have to depend largely on Public Extension Services. This calls for a reorientation of the Government's policies to encourage both public and private extension.

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The potentiality of private extension in terms of information technology, and creation of market tie up should be explored. However, with the Government's attitude of downsizing the public sector, it is expected in the long run, public extension will be shrunk and private extension will be encouraged. When private extension services multiply in size and number, cost effective extension service will be provided, due to market competition.

The third approach would call for suitable Government policies, in streamlining the work of NGO's (who are expected to be service oriented) and harnessing their potential.

In the phase of globalization and liberalization policies, marginal farmers and small farmers in the context of availing private extension services will get their dividends, only if they can meet the demands of a diversified market, of value addition, and of producing these products at a competitive pricing at the same time, maintaining the quality standards. Another grey area which demands more of in depth study is consumer preference. Consumer preference for agriculture and allied products have to be identified through direct contact, interviews and questionnaire methods. This calls for strengthening of market extension research.

Agriculture extension policies should be oriented towards strengthening of market extension for small and marginal farmers. It is also suggested that lack of funds for public extension can be overcome by collection of taxes for providing extension services, on the lines of irrigation taxes.

II. Institutional restructuring

Under the NAEP, the Institutional restructuring aims at decentralizing the management of the public agricultural technology system by the establishment of Agricultural Technology Management Agency (ATMA), which is a registered society for technology dissemination at the district level. By ensuring farmers representation in the governing board of ATMA, as well as the management committee of ATMA, farmers play a pivotal role in preparation of block action plans, in setting up of block extension priorities and recommended resource allocation across programme areas.

It is strongly emphasized that, farmer's role in ATMA should not only be restricted preparation and implementation of Strategic Research and Extension Plan (SREP) and block plans, and setting up of research and extension priorities for district and block, but their role should be enhanced up to the level of providing a suitable market for the farmers produce. In this context, concept of "seed village", and popularization of green manuring and organic manuring should be strengthened. With respect to the creation of Agri Export Zones in the respective states as per the new agricultural policy, efforts should be made to set up specialized agencies like Export inspection agencies (EIA) to uphold quality parameters of the produce, and such agencies should be made responsible for any serious lapses encountered if any, in the functioning of these zones.

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Besides, scientists of the respective zones should find a place in the marketing committee; and also in monitoring of training programmes for both extension personnel and farmers e.g. agro processing.

It is high time that, the Government thought of reorienting technologies especially in farm mechanization. Farm mechanization should suit farmer's situation and conditions e.g. farm mechanization can be advocated in areas where labour scarcity exists and use of cost effective technologies like use of augurs for taking banana pits which costs only Re.1 per pit. The agro services have to be improved and made available to a group of farmers on a cost sharing basis.

III. Management Reforms

Under the new policy agenda, Para extension professionals will supplement the public extension in a cost-effective manner. For e.g. the Para extension workers at grass root level will be supported through public through payment of honorarium, routed through farmers groups to which they are attached. Once the Para worker is able to demonstrate his/her usefulness to the client group, the honorarium paid to him through public funds will be phased out and replaced by the clients paying for the services of the Para extension worker. This will promote more of accountability on the part of the extension workers.

IV. Strengthening Research-Extension linkages

The direct face-to-face interaction between scientists and farmers is the most ideal and provides the effective Research-Extension linkage. It has been successful in the state of Punjab, though geographically small in area; its feasibility in larger states remains to be tested.

V. Capacity building of Extension functionaries

India, has to her credit, a vast network of about 0.1 million extension functionaries in agriculture, animal husbandry, agricultural engineering to meet the needs of nearly 250 million economically active population in agriculture. Over 90 per cent of the extension workers are at the field level. Under the new extension policy, skill upgradeation of all extension functionaries would be done through HRD policy, which envisages a systematic skill gap analysis, on the basis of which long-term training plans will be devised.

State level training institutions would have institutional links with MANAGE (National Institute of Agricultural Extension Management).

It is suggested that

- A complete refresher training course to be administered to extension personnel every 3 – 5 years.
- Three performance appraisal assessments should be conducted.
- Provision of monetary benefits (intrinsic) and extrinsic, like job elevation, promotion should be necessarily given to effectively motivate the staff.
- Short trainings may be imparted to all the change agents on rotational basis based on the practical needs.
VI. Empowerment of farmers

Farmers should be fully empowered from production till marketing. A transparent system should be present, wherein facilities like inputs credit facilities linked to domestic markets and distance markets should exist. An e.g. of a case of successful farmer empowerment is seen in Sathyamangalam flower market, wherein marketing, price structure is entirely controlled by farmers and a direct transaction exists between farmers and buyers.

VII. Mainstreaming of women in Agriculture

Recognizing the substantial though invisible contribution of women in Agriculture, the NAEP seeks to recognize farm women as agricultural extension clientele. More training to men and women extension workers will be made on the role of women in agriculture. Taking into consideration, the traditional and cultural milieu of our country, which lay barriers which restrict women's accessibility to extension services, more number of female extension workers will be deputed to provide greater accessibility of extension services to women beneficiaries.

VIII. Use of Media and Information Technology

Rather than production, marketing of agricultural produce is a major challenge faced by the Indian farmer. Hence all efforts to make use of e-commerce, World Wide Web, market intelligence, should concentrate on providing more of market information to farmers. The use of information shops on the lines recommended by M.S.Swaminathan should be established throughout the country, rather than existing in few isolated pockets.

IX. Financial Sustainability and Resource Mobilization

In the phase of the emerging multi extension service, gaining prominence and extension being a state subject, the role of the Government will be to balance the functioning of Public, Private Extension, NGOs, the mass media and information technology services.

Government policies should aim at setting up of Zonal Agricultural Marketing Research centres, which provide information on the market intelligence, and also on the geographic crop potentiality of each region, and such centres can be linked with Agri Export Zones.

Issues Needing Reconsideration

In the context of trade liberalization and globalization, creation of potentially demarcated areas for specific commodities in the form of Agri export zones is a welcome initiative, accruing from the new policy. However, the performance of these zones can be strengthened only if specific agencies/committees on the lines of Export inspection agencies (EIA) are attached to these zones; so that there is no compromise on the quality parameters. The setting up of agro processing facilities in each of these zones; further enhances the performance of the zones.

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As pointed out earlier, the public and private extension systems will continue to co-exist, with the private extension providing services, mainly in the area of non-food grain crops like spices, plantation crops, floriculture and medicinal plants. The public extension can focus its attention on resource poor farmers, and small and marginal farmers. Small and marginal farmers; can benefit their maximum by investing in private extension, provided they go for diversified value added and consumer preferred items; targeting on domestic and foreign markets.

Establishment of market information centres / information shops / kiosks at village level, which provides for an easy, accessible information support system from farmers and traders in agriculture, needs to be done; through emphatic government interventions and policies.

Conclusion

Though agriculture is a state subject, still the GOI can play an advisory role so as to encourage different State Governments to follow its guidelines. Taking advantage of the emerging pluralistic extension system, the public sector extension in India should restructure itself to meet the emerging demands of farmers. Public extension will play a dominant role in dissemination of knowledge based technology and private extension can be utilized to deliver specific extension services in view of commercialization and diversification of agriculture. Small and marginal farmers, who take up private extension service, should be encouraged to produce diversified products based on market demand and consumer preference, if they have to gain substantially for the cost of private extension service incurred. In course of time, the burden on Public Extension should gradually be decreased and encourage private extension to come up.

Farmers involvement in determining research and extension priorities and formulation of block and district plans through the decentralized system of ATMA, should also assign a prime role for farmers in deciding the market for their produce.
STRATEGY FOR MAKING FARMING SUSTAINABLE AND PROFITABLE THROUGH ITS DIVERSIFICATION, AGRO-PROCESSING AND GAINFUL EMPLOYMENT GENERATION

P.N. Jha

Emphasis in farming till very recently has been on growing foodgrain crops particularly cereals like Rice, Maize, wheat, millets, some pulses and oilseeds. Though food production has increased yet Agriculture does not have sustainability and margin of profit is not lucrative. There is unemployment and farmers and farm youth. Keep on migrating outside in search of jobs and gainful employment. Thus, this is the need of the time to go for diversification in Agriculture and apart from foodgrains, the main plank should now be profit-earning farm ventures like growing. Horticultural crops like Vegetables, fruits, flowers, spices, tuber crops, plantation crops and medicinal and aromatic plants. Farming system approach has to be encouraged and should also include Dairying, Poultry, Cattle breeding, Apiculture, Mushroom culture, Lac culture, Sericulture, Agro-forestry, Agri-Horti-silviculture, Fish culture, Rice + Fish culture and Rice + Duck culture. Agro-processing units have to be established at Block / Taluka headquarters for agro-processing and value addition. Proper storage, packaging etc. have to be done for better marketability and to attract foreign market also. We shall have to modify our TOT mode from merely communicating techniques of know-how to do-how i.e. from mere technology transfer to technology application mode.

For all this, what is urgently needed is logistics and infrastructural support from the Government Departments, partnership approach between different Agencies like Govt. Departments, Private organisations, ICAR, SAUs, Stake holders, NGOs, Credit Agencies and Self-Help groups of men and women. Farmers' Participatory Approach in Technology generation and dissemination has to be ensured. Market intelligence, regulated market, better transport and communication System are also urgently needed. Above all farmers' motivation, training for equipping them with knowledge of and skill in different domains of diversified farming, agro-processing, quality maintenance and market-consciousness are very important steps to be taken for facilitating the task. All this will create additional gainful employment / engagement of farmers, farm women and farm youth right in their villages, Agriculture can, thus, be turned into a commercial and profitable venture rather than merely a source of livelihood and subsistence living.

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A HOLISTIC RURAL EXTENSION SERVICE TO USHER IN AGRARIAN PROSPERITY

G. Venkataramani

"The business as usual approach in agricultural extension will not take us any where. A paradigm shift in the perspective on transfer of technology and dissemination of value-added information for agrarian prosperity is the need of the hour. A holistic rural extension, which integrates farm and non-farm enterprises, would bring about the much desired pace of growth in the agricultural sector and rural development. It will be the roadmap to rural transformation in the new world trade order," say experts in agricultural extension.

"The new form extension system should take advantage of the revolutionary developments and unlimited opportunities created by the information technology, and the time honoured eco-technologies that would enhance farm and non-farm productivity without endangering the ecological assets in the rural areas," they point out. The holistic extension services for rural prosperity will be complementary to the existing extension agencies run by the various service departments such as agriculture, fisheries, animal husbandry and forests.

"It will only go to the streamline the efforts of these agencies and ensure quality and value-added service to the farmers. It could be efficiently run through the cooperative efforts of technologists and professionals drawn from the various disciplines of agriculture, fisheries, animal husbandry and forestry with the active partnership of farming communities," explain the experts. It should be aimed at disseminating information needs of the farming communities to take informed decisions on various issues.

Special emphasis should be given to eco-friendly technologies, intensive integrated farming systems (IIFS), precision farming technologies, value-addition at farm level, micro-credit systems, collective marketing and development of basic infra-structure on a cooperative basis. The holistic rural extension services should be given the needed support by the government, financial institutions and the marketing agencies, and it should be run on the technology mission-mode to achieve rewarding results in the short run, according to experts.

Once it is commissioned on a grand scale covering several districts in State, the spin-off effects from it will be dramatic. An all round rural development and agrarian prosperity ensuring livelihood security and household nutrition security should be the logical outcome once the system is implemented with total conviction and commitment of the professionals. "It will be a total solution for rural development and it will lay the solid ecological foundation for sustainable agriculture and rural development in the country," aver the experts.

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In the new millennium, the challenges met by the present day farmers are quite different from those met by their predecessors. The aspirations and "appetite for new information" of the new corps of farmers also vary correspondingly. The enormous pressure to produce more food from less land with shrinking natural resources is a tough task. It calls for special efforts to use the key inputs without eroding the ecological capital, and a sound knowledge base to sustain agricultural productivity and profitability.

The recent trends in globalization and increased interest in factory- and corporate-farming should not allowed to jeopardise the interests of millions of small and marginal farmers and landless agriculturists, who form the backbone of the agricultural economy in many developing countries. They should be protected at any cost. This could only be possible by empowering the farmers with new techniques and skills that foster sustainable agriculture. The underlying spirit of cooperation with a few good principles of corporate management approach should be reflected to make it a successful venture. The Gandhian philosophy of "production by the masses" should be extended to "processing by the masses using industrial hygiene" to usher in sustainable agrarian prosperity.

The "digital revolution" or "information super-highway", that brought about spectacular transformation in the industrial and business sectors through the use of information and communication technologies (ICT) in the last decade, will prove to be an ideal tool for achieving the goal of dissemination of knowledge and skill development among the rural communities. A number of isolated exercises in "bridging the digital divide" and "digital inclusion" have proved the potential of the new technology in bringing about rural prosperity.

A simplified and "farmer-friendly" version of ICT tools backed up by easy-to-follow texts and illustrations highlighting environmentally benign agricultural technologies would prove to be a low-cost and powerful medium in imparting training to the farmers. The rich and dynamic information should form the pithy content of this package, and it should be fully geared up to meet the economic expectations and intellectual aspirations of the new breed of farmers.

Such well-structured information technology package can help serve as a market information network, weather, pest and disease surveillance system, and can be a storehouse of various farming technologies and practices in vogue. Setting up of "rural knowledge banks" with a network of computers in various clusters of villages will for the foundation of a meaningful holistic rural extension system. Again, fitting into the "digital inclusion" strategy, the new approach will pave way for more jobs and more income in the rural areas.

The present agricultural extension system, which is highly compartmentalised, has several inherent weaknesses. The new agricultural extension system will have to break away from these shackles and it should be re-oriented to meet the needs of "information hungry" farmers, especially the educated women and youth engaged in farming. Dedicated and highly motivated agricultural professionals, who have special skills in dealing with ICT, should man it.

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It is an acknowledged fact that information is a critical input for agricultural development. It is as important as other key inputs such as credit, seed, nutrients and water. Information can be efficiently converted into economically rewarding opportunities through innovative approaches.

This fact is well stressed by Prof. M.S. Swaminathan, an eminent agricultural scientist and the father of economic ecology and movement for evergreen revolution, in several international and national fora. He has pioneered the movement for taking ICT to empower rural communities by setting up rural knowledge centres in Pondicherry, which have won global acclaim. Prof. Swaminathan, recently launched the Virtual Academy for Food Security and Rural Prosperity (VARP) involving the active participation of progressive farmers and social workers as “fellows” of the academy. It is a path-breaking venture with a holistic vision for a vibrant rural economy and well being of rural communities.

In the present day context of “privatisation spree”, privatisation of farm extension also assumes great significance. It has been demonstrated time and again that private enterprises are far more efficient than governmental agencies in delivering goods and services. It is also well known that farmers do not hesitate to pay for any valuable information, fail-safe services and delivery mechanisms. They will patronize any system that would empower them with skills in sustainable agriculture, encourage micro-credit system, organise group action and tap collective wisdom, make available quality inputs at the desired time, encourage value-addition at farm level through efficient post-harvest technologies and instill the spirit of cooperative spirit while marketing the final produce. A combination of all these will go a long way to prove the success of a viable and meaningful private rural extension system, according to extension specialists.

The holistic rural extension system can be run by a group of young agricultural professionals, who have adequate training in ICT and agricultural extension methodologies. It can be take up as a “venture capital” exercise by enterprising young professionals. It can provide fruitful job opportunities for several graduates of various disciplines of agriculture including horticulture, fisheries, agricultural engineering and veterinary sciences. A basic training for this band of disciplined and mission-oriented cadres should be included in the curriculum of agricultural and veterinary universities. Being an independent (private) venture, the new extension system should focus attention on providing all the information needs of the farming community, which have not been addressed by the present system. A committed and systematic approach to organise farmers’ groups and assembling various technologies could prove to be rewarding. The extension personnel should act as a two-way channel for communicating with the farmers and getting their feedback.

These extension professionals should help farmers with all the necessary information regarding timely inputs, marketing and their entitlements to various governmental programmes and benefits. The private extension should aim at filling all the gaps found in the present system. An extension officer and two field assistants should be able to cater to the needs of a cluster of about 10 villages or an active
group of 1000 farmers who will pay a monthly subscription. The farmers should be convinced that they are paying for efficient and productive services and supplies. In short, the extension services in a cluster should function like a "farmers' club", with a good training infrastructure and ICT network.

The extension staff should visit the villages or group of member-farmers at a specified time or fixed days of the week. The staff should have sound knowledge of the various farming enterprises in the region. They should also have hands-on experience in dealing with field problems such as enhancing production from the farm, value-addition to the farm produce, post-harvest technology and marketing facilities. Good exposure to the concepts of integrated intensive farming system (IIFS) and recycling of farm residues will prove to be advantageous. Sound knowledge about the recent trends in growing and marketing medicinal plants of commercial significance will also be a great asset.

The extension personnel should be able to coordinate the efforts of farmers and tie up with efficient transport and marketing network to make the entire exercise more rewarding. They should have access to information through a good network and provide solutions to field problems. To retain the youth in farming, agriculture has to be not only economically rewarding, but also intellectually stimulating and gratifying. The tenets of ecological agriculture are built on environmentally benign technologies coupled with time-honoured wisdom and knowledge of the farmers.

The educated youth crave for information, which will enrich their knowledge and fetch more dividends. The challenge before the private extension system lies in constantly feeding meaningful and value-enriched information to the end-users. The concept of “precision farming” will provide an ideal platform for launching the private extension. Once the farmers realise that they are able to reap more from their farms because of the timely information or a new technology, they would appreciate the efforts of the private extension service and start patronising it.

The private extension service will then become an integral component of the farming communities. However, it is not easy to set in motion a pro-active private extension machinery to complement the efforts of the reigning systems. The toughest task is to win the confidence of the farmers through regular interaction and liberal exchange of information on technologies and markets. The farmers should be taken as partners in this mission-mode approach, and they should be encouraged to actively participate and contribute with full conviction.

The farmer’s subscription should not be taken as initial payment at the time of enrolling memberships. Instead, it should follow the concept of “use now and pay later”, a result-oriented approach. It has been the general experience that farmers do not hesitate to pay a fee for any additional returns they get at the time of harvests. For them, it is always “harvesting is believing”. A blue-print for such private extension system, underscoring the economic returns from such a venture, has demonstrated the development of a good linkage between various on-farm and non-farm enterprises at the village level.
The private extension should not be misconstrued as a competition to government extension programmes. It should be taken as a complementary effort. With the private extension in place, the governmental agencies will naturally be toned up to meet the supply and services demand of the enlightened farming community. This healthy trend will facilitate free information flow in rural areas, and make agriculture more knowledge-intensive, productive and profitable.

Once farming becomes a paying proposition, there will be more educated youth getting into it actively. The spin-off of this process will generate more jobs in a healthy environment and also contribute to reversing the trend of rural-urban migration. A private agricultural extension will become a focal point and active platform to promote rural marketing of various consumer products. It can also effectively serve as a forum for consumer protection and redressal.

Rural marketing and advertising is emerging as a new thrust area for several commercial firms in the country. If properly designed and executed, the private agricultural extension can also take advantage of the opportunities springing from rural marketing and advertising efforts (EOM).

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THEME I
Sustainable Agriculture
COMMUNICATION STRATEGY FOR PROMOTION OF AGRICULTURAL DIVERSIFICATION FOR SUSTAINABLE DEVELOPMENT

Baldeo Singh ¹ and Vinod Chaturvedi ²

The Indian agriculture is fast changing and a number of challenges are emerging which need to be systematically attended for sustainable development. The major challenges are degrading natural resource base, increasing fragmentation and marginalisation of land holdings, declining public investments, growing competition in agricultural marketing, international developments like WTO etc. Of late, it is being exceedingly realized that agricultural diversification stands out as a promising alternative for generating additional income and employment in the rural areas. Diversification of agriculture holds ample scope as a strategy for sustainable development which inter-alia calls for developing rural families in the context of economic, social, ecological and cultural dimensions. The factors favouring to push up agricultural diversification may be attributed to technological breakthroughs, development of infrastructure facilities, shifts in consumption patterns, risk management in farming enterprise, better economic returns, scope for value addition and agro-processing, encouraging government policies etc.

The essentials for promotion of diversification of agriculture are appropriate production and processing technologies, good infrastructural facilities including marketing, proper input delivery system, remunerative prices, efficient management of resources, effective extension strategies etc. As a part of overall extension programmes, an appropriate and effective communication strategy is an imperative condition for promotion of agricultural diversification vis-a-vis realization of overall objectives of sustainable development. This necessitates to make systematic and organized efforts to disseminate need based, location specific, target-group oriented and cost-effective technologies and methodologies relevant to agricultural diversification. Based on the overall analysis of pertinent issues and avenues, a communication strategy for promotion of agricultural diversification has been suggested in the present paper. The major highlights of the strategy involve (i) assessing and responding to the specific and diverse information needs of farmers relating to various aspects of agricultural diversification, (ii) identify appropriate production and processing technologies and methodologies in the context of agricultural diversification, (iii) addressing to the farmers’ specific communication requirements vis-a-vis agricultural diversification in the wake of national and international agricultural developments, (iv) harnessing the potential of mass media (print and electronic media) to disseminate appropriate technologies to realize objectives of agricultural diversification, (v) following participatory communication approaches to address the issues of agricultural diversification, (vi) Creating awareness and adequately updating knowledge about diversified farming systems among field level extension workers, (vii) evolving suitable media planning/media mix studies involving appropriate communication channels and mechanisms for promoting adoption of agricultural diversification systems, and (viii) exploiting information and communication technologies (computer and internet based media) for wider and faster dissemination of technology relevant to agricultural diversification.

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"EXTENSION STRATEGIES FOR PROMOTING AGRO PROCESSING AND VALUE ADDITION IN HORTICULTURAL CROPS"

A. Palaniswamy and V. Alagesan

With the liberalization and globalization of the economy, the food processing industries are being expanded rapidly in our country. Food processing industry has between termed as a "Sunrise industry" since the demand for processed food is likely to multiply significantly in the coming years. Rapid industrialization, increase in the number of working women, higher income, have all contributed to the rapid growth and change in the dietary pattern, that is, westernization of the diets which give a big boost to this sector. The growth of the food sector is expected to make a quantum jump of 1,75,000 crores by 2005. In India less than 2% of our farm produce are processed, compared with 30% in Thailand, 70% in Brazil, and 80% in Malaysia and Phillipines. The value addition in the food sector is still very low at 7% when compared to more than 450% in developed countries and in some of the developing countries as well.

More over, the current consumer demand for safe, nutritious and fresh like quality food has changed the craft-based food industries into science-based industries, which operate in a commercial environment to fulfill the market need. The food industries must continuously develop new processes and techniques and products to remain competitive in local and international markets. More so in the case of horticultural crops.

In this context, the role of extension workers becomes more crucial in igniting the transfer of technology mechanisms. The extension scientists first of all have to find the appropriate needs of the rural and urban entrepreneurs for processing the horticultural crops. An inventory of cropping intensity, rainfall pattern, market price and intelligence, support price offered by the government, incentives for export potential etc have to be made. The SAUs must undertake extension studies for preparing the project profiles, successful case studies and consultancy jobs. The institution-industry linkage must be strengthened for focusing on commercial courses, research on standardizing the procedures and principles of food processing engineering and technology and creation of an exclusive cell in the Directorate of Extension Education for disseminating among their TOT centers.

The State Development Department extension workers on the other hand must highlight the incentives for establishing the processed and value added food industries among semi-urban areas and progressive villages to provide employment to the rural poor. Familiarizing the self help groups, farmers discussion groups, youth organizations and NGOs in the direction would be an added advantage. The government must step in opening more number of cold storage facilities, food processing and exclusive export zones for horticultural products. Lastly in an era of information technologies, a digital repository has to be created at SAUs to monitor and coordinate all these extension efforts.

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MODERN COMMUNICATION TECHNOLOGIES FOR SUSTAINABLE FARMING IN GLOBALIZED ERA  
M. Senthil Kumar1, K. Chandrakandan2, C. Padma3 and S.R. Padma4

The fast advances in the Information Technology revolution has rapidly changed the way people have been living on this planet. This development has shrunk the world and has affected almost every walk of life. The extension system cannot keep themselves aloof by sticking on the old practice of delivering the same technical messages to all farmers using the same extension methodology. The power of advanced information technology need to be harnessed so as to meet the challenges of world trade in the globalized and liberalized era. This paper highlights the modern information and communication technologies (ICTs) that can be tapped for agricultural farm technology transfer. The modern ICTs which are discussed in this paper are online and offline resources such as IMCD, Web page, Portals, UseNet, e-mail, Group mail, Video conferencing, Computer conferencing, Internet radio, Digital radio etc., this paper also discussed the ways and means of establishing and implementing cyber extension using modern ICTs.

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INFORMATION AND COMMUNICATION TECHNOLOGY AND POVERTY ALLEVIATION  
Manish Kumar1

Though, there has been a reduction in extent of poverty, the pace of reduction has not been commensurate with the resources deployed and magnitude of the problem indicating flaws in delivery mechanism. Major failure of the strategies of poverty alleviation efforts is the top down and ‘over determined’ approach. The delivery mechanism’s pre-eminent concern being physical and financial achievement, it failed to enthuse people and they were not taken in as partners affecting the quality and effectiveness of programme. It is this aspect of development that calls for understanding how development programmes are communicated among people and made use of, how do people view their problem. In other words, role of information and information technology in poverty alleviation has not been seriously considered so far, at least in India.

We need to widen the accessibility to ICT infrastructures and services. To realise this goal we need a type of governance that is concerned more with the public interest rather than championing the corporate cause or commercial interests. The actual beneficiaries must have the opportunity to negotiate their own cause. With the growing uncertainty in the market world, social life is also becoming increasingly uncertain and further aggravating poverty. The price fall in petroleum products results in higher transport charges and affects peoples way of life. As they have to cut down their spending on other essential things. More worse is the situation when there is fluctuation in foodgrain prices. All this emphasises the need to have the greatest possible diversity of information and knowledge sources.

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But, I think, simply relying on potential of ICT in development is not going to work if we do not negotiate with all the stakeholders in the development process as to what role they see for ICT in social and national development. This paper discusses the issues and the role of ICTs in poverty alleviation.

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VIABLE EXTENSION REFORMS FOR ECOLOGY AND SUSTAINABLE AGRICULTURE DEVELOPMENT

V. Alagesan¹, A. Palaniswamy² and Shibi Sebastian³

The World Bank estimate that between 70 to 90 per cent of the recent increases in food production are the result of conventional agriculture rather than greater acreage under cultivation. Conventional farming systems vary from farm to farm and country to country. However, they share many characteristics: rapid technological innovation; large capital investments in order to apply production and management technology; single crops / row crops grown continuously over many seasons; uniform high yield hybrid crops; extensive use of pesticides, fertilizers and external energy inputs.

Agriculture profoundly affects many ecological systems like soil productivity, water, climatic conditions etc. Economic and social problems associated with agriculture cannot be separated from external economic and social pressures. The sustainable agriculture means as integrated system of plant and animal production practices having a site specific application that will, over the long term satisfy human food and fibre needs, enhance environmental quality and the natural resource base upon which the agricultural economy depends, make the most efficient use of non-renewable resources and on farm resources, sustain the economic viability of farm operations and enhance the quality of life of farmers and society as a whole.

Many studies indicated the extent of degradation of natural resources that have occurred over a period of time. This in turn necessitates the need for convergence of viable extension reforms for ecology and sustainable agriculture development. These include resources conserving technologies and processes, organisation of local groups and institutions, enabling external institutions, supportive state policies and reforms in extension management. The extension system must be sensitive to environmental issues and promote eco-friendly approaches and technologies for natural resource management which are technology based, information based, environmental based and community organisation based approaches.

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INDIA'S NATIONAL AGRICULTURAL POLICY, IN THE BACK DROP OF WTO RELATED ISSUES

K. Chandrakandan, P. S. Swathi Lekshmi and N. Balasubramani

India’s National Agricultural policy 2000 has proposed significant structural and Institutional reforms in the country's farm sector. It seeks to achieve a 4 per cent annual agricultural growth in an ecologically and environmentally sustainable manner, while prompting input use efficiency levels. The policy has a total of 48 propositions, made under the following broad areas of

* Sustainable Agriculture
* Food and Nutritional security
* Generation and Transfer of Technology
* Inputs management
* Incentives for Agriculture
* Investments in Agriculture
* Institutional Structure
* Risk management
* Management reforms.

Among the major thrust areas cited above, those which have a significant bearing on the WTO agreements include, Incentives for Agriculture, Investments in Agriculture, Inputs management, Food and nutritional security, Institutional structure and Risk management.

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CONSEQUENCES OF AGRICULTURAL DIVERSIFICATION ON FOOD SECURITY AND SOCIO-ECONOMIC STATUS OF FARMING COMMUNITY

M. A. Khan, M. L. Sharma and J. D. Sarkar

Agriculture is one of the most crucial and mega sector in the Indian economy which contributes about 27% to the GDP. The production growth of this sector has been steadily increasing over the years due to which we have reached to 210 million tones food grain, 20 million tones oilseeds, world's 13% vegetable output, 82 million tones milk etc. landmarks. The price index of agricultural commodities also increased from 116.9 during 1994-95 to 169.9 during 2001-02, whereas the corresponding figures for manufacturing products respectively are 112.3 and 144.4. The agricultural export ($ 6 billion) and growth is mainly obtained from rice, wheat and marine products, while the growth in production of oilseeds, and pulses have been negligible over the past 5 years that exhausted 4.3 % of the total national import. This feature of Indian agriculture widened the gap between commodity based demands and supply, hence could not helped the farmers in terms of economic benefits. Therefore, the only alternate left for marching with the time is to go with the diversification of agriculture and animal husbandry production both in terms of time and space as per need and requirement of the ever-growing population to ensure

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their food security. The phenomenon of demand driven agriculture is still far behind with the farmers of backward regions like Chhattisgarh having more that 40% tribal population. Looking to these facts, the present investigation was undertaken in Chattisgarh state with primary data collected from 480 respondents (240 tribal and 240 non-tribal) randomly selected from various parts of the state. In addition to comparative analysis of existing farming practices between both the communities, the trends of diversification were also studied in terms of selected agricultural and socio-economic aspects.

The findings show a clear change in the cultivation of crops and varieties resulting in cultivation of less remunerative lathyrus and kodo-kutki crops were significantly reduced in the non-tribal and tribal areas, respectively while, rice is still continued to be grown in both the areas. Also, both the farmers’ group recorded considerable diversification in the adoption of various agricultural practices. Factors pertaining to socio-economic aspects were also diversified with the passing of time. The major consequences of such diversification are appeared on the food security and increased income of the farm families. Various constraints and suggestions in farm diversification were also obtained for future strategies.

IMPACT OF COASTAL SALINITY ON AGRICULTURE AND MANAGEMENT OPTION FOR SUSTAINABLE AGRICULTURE


Coastal salinity is and would continue to be the great menace to sustainable crop production in the Gujarat State in particular, as it has very long coastal line over 1600 km. Besides the massive efforts made by Government of Gujarat, coastal salinity is on the increase. Thus, to have the perspectives of salinity, the present study was carried out in coastal area of western Gujarat.

The loss of yield was found for the crops viz., groundnut (24.03 %), sesame (20.91 %), hybrid cotton (4.39 to 32.11 %), desi cotton (33.14 %), jowar (28.98 %), wheat (40.50 to 44.47 %), fodder crops (21.67 %) and sapota (56.82 %) in saline tract of various agro-climatic zones when compared with non-saline tract. The rate of loss was not uniform with the level of salinity in different zones. The loss was also observed in terms of gross income and extinction of important species of crops, trees and weeds. In both the tracts with existing technology and capital, over utilization of human labour and credit was observed. There exists a scope of optimisation of farm income through reallocation of acreage under different crops. Additional supply of credit to agriculture of these regions would further increase the farm income and employment. In saline tract, adoption of improved salinity management technology pertaining to groundnut variety GG-2, desi cotton DCH-7, castor GAUCH-I, jowar GJ-36, bajra + wheat sequence, jowar fodder GFSH-1 and sapota-Kalipatti in judicious combinations of existing crops with adequate credit supply would increase the farm employment and the farm income to a greater extent.
POPULARISATION OF MOLLUSCAN CULTURE TECHNOLOGIES IN INDIA-AN ANSWER TO THE DWINDLING FISHERY RESOURCES?
P.S.Swathi Lekshmi¹, K.Chandrakandan² and N.Balasubramani³

India with a vast coastline of 7500 km, and with an exclusive economic zone of 2 million square km, has a wealth of fisheries resources in the world producing 14mt of fish annually (marine, in land and brackish) and is one among the top ten fish producing nations in the world.

Our annual fisheries export is 0.4mt worth 47,000 million rupees (Pandian, 2000). However, the fishery exports are of the opinion that, to achieve greater production of food from the sea, in the next few decades, it is going to be difficult to rely solely on intensive capture fishery operations, alone in the Exclusive Economic Zone and Oceanic Zone. These operations are fossil fuel dependent and would be more expensive as time goes on. In the face of the dwindling fishery resources the current line of thinking is towards promoting production of food resources of in shore forms such as the edible molluscs or bivalves like the Oysters, mussels and clams which remain largely neglected due to disinterest or lack of knowledge of these forms and their potentialities. The acceptability of the molluscan meat as an item of diet; was caught up amongst the Indian Public and the present trends indicate great interest in utilizing molluscan meat as diet, both exploiting natural beds and by trying to evolve suitable technologies in producing them by culture practices. In India, technologies for farming several species of molluscs, have been developed, during the past two decades. This paper examines the efforts taken by the Central Marine Fisheries Research Institute, India, which has been the pioneer in the production of these technologies, and also the extent of reach; and their feasibility for culture among the fisher folk of the country.

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MANGROVE ECOSYSTEMS AND ITS POTENTIAL FOR AQUACULTURE DEVELOPMENT IN INDIA
P.S.Swathi Lekshmi¹, K.Chandrakandan² and N.Balasubramani³

Mangrove ecosystem – the ecosystem dominated by intertidal salt tolerant halophytic vegetation enjoying the influences of two high and two low tides a day, offers an unique environment for aquaculture development. Aquaculture activities in Mangrove swamps date back about 500 years to the development of coastal milk fish culture in Indonesia during the fifteenth century Chakraborthy (1996). Fishery activities by simple nets and traps are a regular practice in Mangrove areas. Despite sheltering a number of endemic species of estuarine flora and fauna, the ecosystem also attracts faunal components from adjoining marine, fresh water and terrestrial habitat.

The importance of Mangrove ecosystem for its potential for fisheries and aquaculture development has received wide acceptance all over the globe mainly due to two reasons. Firstly, large quantities of energy, in the form of Mangrove plants contributed detritus, are exported from the

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Mangrove forests to open water bodies, and positive correlation between the extent of Mangroves and total fisheries yield from adjacent waters. Secondly profitable regional and international markets for high quality aquaculture products are available.

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COMMON PROPERTY RESOURCES (CPRS) IN AGRICULTURAL PRODUCTION SYSTEM:  
CAN THEY SUSTAIN? 
N. Balasubramani¹, D. Puthira Prathap² and K. Chandrakandan³ 

In India nearly 40 percent of rural poor are suffering from poverty and largely depend on Common Property Resources (CPRS). The commons in a wider sense covers most of our environment – air, water, Oceans, rivers and other inland water bodies, forests, grazing lands and so on. They directly provide means of livelihood to hundreds of millions of people, particularly rural poor and directly and indirectly contribute to agricultural growth and economic development and also the quality of environment. One of the major causes of the rural poverty in India is the unequal access and control of the poor on CPRs. (Singh 1994). Depletion of CPRs has also been a major cause of the displacing of a large number of rural people and reducing their status to environmental refugees. Because of its unique characteristics like, use of a resource by any single individual would ultimately reduce the welfare of others of practical grounds. CPRs become an open access resource and its process of depletion begins. The shrinkage is visible in shrinkage of their areas; biophysical degradation and loss of management (Jodha 2002).

CPRs are described to represent as “Bio-diversity in bush, uncultivated half of India. This offers a lot of services and production for agricultural sectors. CPRs generally comprising fragile and marginal landscapes unsuited for cropping are occupied by natural vegetation, besides helping in protecting and harnessing of nature's diversity; influences micro-climate; improves hydrological and nutrient flow and reduces the chances of erosion of fragile lands.

The effectiveness of the CPRs as a collective strategy is directly linked to the community's concern in terms of both rights and duties with respect to the use and maintenance; commitment, norms and promotion of user group action to enforce them. Also, CPR - centered policies and programs, redesigning management systems helps to overcome, the so-called tragedy of commons. This paper discusses the whole range of measures directed to ecological, environmental stability and improving sustainable resource base of CPRs in the fragile and marginal land, which sustain the production system of agriculture.

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TRAINING NEED ASSESSMENT FOR PROMOTION OF SUSTAINABLE PRODUCTION IN AGRICULTURE

S. Parvathy¹, Allan Thomas² and Usha C. Thomas³

The study was conducted in Thiruvananthapuram district of Kerala state to assess the training need of farm women in agriculture and allied activities. The data were collected from thirty rural women members of self-help group. Training need on areas like fruit and vegetable processing, Bakery unit, Nursery management, Mushroom production, medicinal plants cultivation, and poultry management was assessed using the method of paired comparison. It was found that majority of the respondents needed training on fruit and vegetable processing.

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TRENDS AND CHALLENGES IN EXTENSION SERVICES FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT.

Allan Thomas¹, S. Parvathy², Usha C. Thomas³ and Johnkutty George⁴

Kerala State blessed with its bio-ecographic position, mountains, valleys, hills, lakes, rivers, ponds regular monsoon, large coast and many other unique characteristics can be described as the best venue for sustainable agricultural development. Besides the richness in natural resources coupled with a high living indices the economic scenario of Kerala is not satisfactory. It is in this context an attempt was made to analyse the trends and challenges in extension services for sustainable agricultural development. A brainstorming discussion of research scholars followed by Delphi analysis was done in order to arrive at a consensus for the improvisation of extension services for sustainable agricultural development. The most important consensus arrived was that the extension agencies or extension personals rendering extension services to the farming community was to be made accountable as the general view was that the farmers were willing to pay for the services rendered to them provided production, productivity and increased profit was ensured.

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BIO-INTENSIVE IPM STRATEGY FOR PROFITABLE FARMING AND SAFE ENVIRONMENT

K. Natarajan¹

Among the several ecology based pest management techniques developed in the recent past, biological control is of paramount importance. The products of biological origin are more eco-compatible. Crop produce, free of inorganic pesticide residues and obtained from organic farming fetch more price in the market.

In bio-intensive IPM system, biological measures are adopted on priority basis avoiding inorganic forms of inputs Biocontrol agents viz., the natural enemies like parasites and predators for

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Insects and *Trichoderma* and *Pseudomonas* for diseases fit well in the system. The major advantages of bio-insecticides over synthetic insecticides is their high species – specific activity, target accuracy and absence of residual or side effects because of their innate biodegradability.

Several case studies are present wherein private farmers and entrepreneurs have ventured in this field of bio-intensive IPM strategy and turned their agriculture avocation as profitable one. Thiru N. Rajendran, a farmer in Chittar Village near Bhavani in Periyar District of Tamil Nadu has started his own “Rajendra Biocontrol Lab” in which he produces parasites, predators and NPV for the major pests on sugarcane, cotton, etc. Besides his own use, he sells them to other farmers by mass multiplying them and thus obtains profit.

Similarly, three agricultural graduates joined hands in developing Basarass Biocontrol lab in Eraiyur, Pennadam in Cuddalore District of Tamil Nadu, which is run profitably. Certain other agencies like SRRI Durga Agencies, a Parasite Production Centre in Thiruvalluvar Nagar near Bharathiyar University at Coimbatore and “Eco Max Agro System” and “WOCKHARDT Bio Agro” at Coimbatore are worth-mentioning.

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**AGRI-PRENEURSHIP AND DIVERSIFICATION OF AGRICULTURE IN UTTARANCHAL: PROSPECTS**

*Anil Kumar* and *Amardeep*

In newly created state Uttaranchal only 10% of area is plain that support 22% population, average holding is below half hectare, average fertilizer consumption is 5kg. /hectare, average productivity of cereal crop is around 13 qt / hectare and irrigation cost very high. Problem associated with agriculture in this state is not limited to these only. There are very variable conditions that change from village to village even with in village. Land is very precious and prone to erosion, limited area is suitable for field crop and production, storage, transport, processing and marketing of agri-products need huge capital investment.

Hill agriculture is based on field crops, horticulture, forestry, floriculture, Fisheries, Poultry, and animal husbandry etc. Fruits and vegetable are highly vulnerable to market fluctuations and trade manipulation. As far as economic status is concerned man/land ratio is very narrow and level of income and employment is quite low. In this state agriculture is not very much profit making business for hill community. Lack of commercialization and diversification of agriculture, location and resource specific package of technology, management of multidisciplinary researches are very crucial factors in proper development of agriculture in Uttaranchal. Thus there is need to improve the scenario.

For this holistic strategy based on diversification and employment generation should be started. Conservation of natural resources should be directed towards ecological balance and income generation.

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Efforts may also be directed towards commercialization of agriculture. A policy on entrepreneurship development in potential areas of agriculture may be helpful in improvement of economy. Agripreneurship centers may be established at district level for ensuring sustainability and stability. People should have easy access to consultancies and advisory services that also need to be established. Proper techno-managerial and financial support that is backbone of entrepreneurship is needed at various stage and arrangements in this regard should made.

This paper discusses various issues associated with agripreneurship and diversification of agriculture in Uttaranchal and also suggests measures to promote these activities for Uttaranchal development in general and rural development in particular.

APPLICATION OF FYM- AN ECO-FRIENDLY WAY TO ACHIEVE HIGHER GROUNDNUT YIELD

D.M. Thakrar1, P.D. Verma2, M.A. Munshi3 & M.N. Popat4

The study was conducted in Junagadh district of Gujarat during 2002. Kharif groundnut crop was selected for the study. By using proportionate random sampling technique, a total number of 100 respondents were interviewed from 3 selected villages of Junagadh district. The results of the study clearly revealed that the application of FYM with chemical fertilizers showed the positive results on groundnut yield. The farmers who were using FYM with fertilizers in an appropriate combination obtained 2146.00 kg/ha yield of groundnut. However, the respondents using only FYM and Chemical fertilizers alone, secured 1770 kg/ha and 1335 kg/ha yield of groundnut crop respectively. The results of the study also indicated that out of 11 selected independent variables three variables namely; education, animal possession and use of FYM were showed their highly significant relationship with the pod yield of groundnut. The contribution of all the selected 11 independent variables was 48.00 per cent in the pod yield of groundnut crop. In the regression analysis FYM was highly significantly contributed to the groundnut yield. This clearly indicated the importance of FYM in groundnut production. It may also be concluded that the Integrated Nutrient Management (INM) strategy is proved to be superior as compared to utilization of these important inputs alone, which is the main theme behind the eco-friendly way for increasing the crop production.

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DIFFERENTIAL PERCEPTION AND EXPERIENCES AMONGST FARMERS ABOUT VALUE ADDITION IN SPICES

A.Pariari S.Acharya¹, A.B. Sharangi² and R. Chatterjee³

In the post GATT scenario, the prospect of export for some crops grown in India has gone up like anything and spices crops are of the few. To go competition in world agri-business, value addition to the produce is the most critical intervention. The present study envisages the area, method and process of value addition for some selected spice crops on ginger (Gingiber officinale), turmeric (Curcuma longa), Chilli (Capsicum annuum), blackpepper (Piper nigrum) and various seed spices in West Bengal. In approaching the issue, the value addition process has been scanned into and dovetailed to pre, on and post production phases. However, the study focused on the general perception of value addition amongst the farming stakeholders, what the gaps were and what sort of intervention thus need to produce and dispose value added spices crops. The methodology followed here was interviewing, analysis of field observation and collection of some laboratory data. All these data were matched against a standard quality parameter to assess the gap.

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INTEGRATED PEST MANAGEMENT FOR SUSTAINABLE FARMING OF COTTON

J.B. Patel¹, K.S. Patel² and S.N. Gajjar³

In the last decade the country has been focusing on export of agriculture commodities. Quality consciousness of western countries are prepared for no compromises on quality irrespective of the price. Therefore, Integrated Pest Management has become inevitable for sustainable agriculture. KVK, Mangal Bharati organized 80 On & Off campus training programmes, 34 Ha. FLDs and 47 different extension activities on IPM in cotton. The study was carried out to see the impact of whole extension strategy in terms of knowledge level, extent of adoption and constraints faced by rural farmers in adoption of such sustainable technology. A total of 50 farmers were selected randomly from trained farming community.

The data regarding knowledge level of IPM practices in cotton revealed that cent percent respondents were aware about deep ploughing in summer, identification of major insect pests and their chemical control. It is further observed that 94.00, 86.00 and 84.00 percent of the respondents had knowledge about IPM practices like seed treatment with insecticides / pesticides, installation of pheromone traps and insects – pests resistant variety, respectively. Less number of respondents aware about mechanical / physical control of insect – pest. Based on overall knowledge, it could be observed that majority of the respondents had high level of knowledge of IPM practices in cotton. Whereas, more than eighty percent of respondents had fully adopted deep ploughing in summer & installation of pheromone traps. This is because of the fact that these practices are cheaper, cost effective and eco-friendly. It is further observed that more than seventy percent respondents adopted cultural practices.

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and neem based pesticides & recommended dose of pesticides for the management of pest. However lower adoption rate of Bio-logical control of insect pest and seed treatment might be due to non availability of bioagents in local market, while very less respondents adopted Bt. cotton because of high cost in local market. Very few respondents adopted mechanical control method because farming community not identifying the eggs & initial stage of larvae for their method and stage of control and also it is tedious job.

The main constraints faced by respondents are (i) Bioagent’s mass multiplication is very less, hence it is not available timely in the market and are costly (ii) Chemical companies push their products much more aggressively and (iii) IPM require muchmore understanding of the agro ecology.

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ECOFRIENDLY AGRICULTURAL PRACTICES: A QUINTESSENTIAL PARADIGM OF SUSTAINABILITY

M.K.Sahoo¹, P.R.Kanan², B.A.Savaliya³ & N.B. Jadav⁴

When many of our modern technologies were found to have adverse impact on soil, plant and atmosphere and in a long run on the agro ecosystem balance our researchers start to look back for our eco-friendly practices, which are environmentally safe and sustainable. Eco-friendly practices are environmentally benign, ecologically protective, technically sound, economically viable and socially acceptable practices. Ecofriendly practices generally avoid or largely exclude the use of inorganic fertilizers, pesticides, growth regulators and live stock feed additives. To maximum extent feasible these practices rely on crop rotations, crop residues, animal manures, legumes, green manures, off farm organic wastes and aspects of biological pest control to maintain soil fertility and productivity to supply plant nutrients and to control insects, weeds, other pests and diseases.

The ecofriendly practices followed by the groundnut growers of South Saurashtra agroclimatic zone of Gujarat state were studied with the help of a well structured schedule with farmer's participation in sharing of ideas. The study was based on random selection of villages and farmers practicing ecofriendly practices. A total number of six villages and one hundred farmers were covered under this study.

The study found different ecofriendly practices followed by groundnut growers. Viz, winter ploughing, permanent furrows, open furrow, application of morum or tanch, application of banana stem as a manure, application of gypsum, use of castor husk as manure and for pest control, planking practices in groundnut, calcium application in furrow for better germination, mulching, immature coconut water spray, buttermilk spray.

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International Conference on “Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions”
BANANA TISSUE CULTURE: A NEW DIRECTION IN DIVERSIFICATION OF
CONVENTIONAL BANANA FARMING IN GUJARAT
D.R. Patel1, N. Subhash2, J.K. Patel1 and S.A. Patel1

Banana (Musa acuminate) is a herbaceous monocot belonging to the genus Musa; mostly seedless, sterile and conventionally propagated by suckers. Increased cultivation in various states of India especially in Gujarat and Maharastra has led to unavailability of genuine disease free planting material (i.e., sucker) leading to inter state indiscriminate transport of suckers resulting into widespread dissemination of various fungal and viral diseases from its endemic spot to new areas. This has posed a serious threat to banana cultivation in Gujarat.

Recent advances in biotechnology had a great impact on bananas. The micropropagation of shoot tips in vitro is the most common application of biotechnology currently used in many countries for rapid multiplication of disease free planting material for its distribution on large scale to banana growers. An efficient technique for mass in vitro multiplication of banana var. Robusta has been developed by the authors followed by a two years study for field performance of TC raised banana plants in comparison with conventional method of planting suckers at Anand to demonstrate the superiority of TC raised plants to farmers.

The results revealed that TC raised plants were significantly superior for days to flower initiation, days to flower completion, days to maturity, number of combs per bunch, number of fingers per bunch and number of fingers per hand in both the years as well as on pooled basis emphasizing the earliness and higher yield of TC raised plants as compared to control. TC raised plants gave 29.9% higher yield over control on pooled basis. The frequency distribution analysis for flower initiation and harvesting exhibited synchronization for flowering and harvesting in TC raised plants. Data on disease incidence showed negligible incidence (0.94%) in TC plants as compared to 9.84% in control on pooled basis suggesting that TC raised plants are disease free and may check the disease spread in new areas.

Economic return analysis indicated net average realization of Rs 28,669/hectare with a cost benefit ratio (CBR) of 1:1.43. The advantages of TC raised banana plants had made a great impact on the demand of TC raised plants for banana cultivation. Present Status and future prospects of new technology is discussed as a case study.

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INDIGENOUS TECHNICAL KNOWLEDGE: A BASIS OF SUSTAINABLE AGRICULTURE
M.K. Sahoo1, P. R. Kanani2 and N. B. Jadav3

Farming in India dates back to more than ten thousand years. During this period farmers have evolved various technologies in crops and livestock husbandry by trial and error, and based on the continuous observation and evaluation at a cost which modern science cannot afford. With the passage of time, this wisdom is passing in oblivion and unless we make earliest and speedy efforts to trace and document these practices, this valuable wisdom or knowledge will be lost soon, and cannot regain in future at any cost.

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Indigenous Technical Knowledge in various parts of the world in general and India in particular are in fact still less explored. Traditional knowledge clearly points out the wisdom embodied in the observation, interpretation and prediction that were shaped over ages. The modern technologies alone are not enough to overcome the problem of agriculture and its allied field. There are some unique traditional practices followed by the farmers which should be documented, trapped and tested for modification and recommendation for the benefit of peasants. Modern technology and traditional experiences of the past when blended together can definitely help in evolving nationalist programme which can help in increasing the annual food grain production from 200 million tonnes to 400 million tonnes sustainably to meet the demand of the growing population. In this paper the topics covered via; indigenous pest management, indigenous disease management, indigenous and nutrient management.

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DIVERSIFICATION OF AGRICULTURE IN PUNJAB
Jaswinder Kaur 1, R.K. Kalra 2 and B.S. Hansra 3

Diversification is an integral part of the process of structural transformation of an economy by ensuring food security, stabilize farm income, conserve natural resources and generate employment opportunities. Diversification of agriculture is nothing but having a larger crop mix or enterprise-mix. The past experiences showed that higher agricultural growth was attained only at the cost of over-exploitation and degradation of natural resources. Declining water table, soil salinity, water-logging, became the acute problems in many agricultural systems. Diversification of agriculture will play a key role in overcoming these problems. In one of the studies it was found that farmers showed their willingness to shift only 7 per cent of their operational holdings (Kaur 1990), while Johl Committee Report (1986) suggested that if 20 per cent of area is shifted to other crop alternatives then farming can be said to be diversified. Diversification of crops is essential in Punjab to maintain the fertility of soil, to minimize risk to maintain ecological balance and for sustainability. Major problems in diversification lack of marketing facilities, yield of other crops being not sure as of wheat and paddy, lack of support price, credit requirement, lack of resources and technology and irrigation water scarcity. Under the conditions for diversification the technological innovations must be further supported by institutional innovations in terms of production, processing and marketing. To encourage diversification of agriculture, an integrated strategy needs to be designed. The principle of 5-Is expected to meet the objectives of diversification in a competitive environment needs to be implemented.

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BLENDING OF INDIGENOUS TECHNOLOGICAL KNOWLEDGE (ITK) AS THE
STRATEGIES FOR MINIMIZING RISK IN DRY LAND AGRICULTURE

P.R. Kanan, A.O. Kher and V.J. Savaliya

The farmer has been diligent in carrying out experiment with plants, animals, tools and implements to optimize resources use and to improve production, processing and storage. The information thus gained over a period of time was passed on from generation to generation by the words of mouth. This knowledge in today's parlance is called local knowledge, traditional knowledge, traditional wisdom or simply indigenous knowledge (Chittiraichelvan and Raman, 1991). Indigenous knowledge may be the sum total of knowledge and practices which are based on people's accumulated experience in dealing with situations and problems in various aspects of life and such knowledge and practices are special to a particular culture (Wang, 1988). Rajasekaran and Warren (1994) opined that ITK can be used to fulfill socio-economic needs and conserve bio-diversity. At the same time, Hiranand (1979) pointed out that folk beliefs play an important role in indigenous knowledge system and it was found that out of twenty dry farming practices recommended by the formal (R. and D) as many as nine practices were almost similar to the local practices followed by the farmers.

Gujarat accounts for about one third of the country's groundnut production and cropped area under groundnut. About 75 percent of this production is confined in Saurashtra region. South Saurashtra zone is characterized by dry land agriculture, high risk and low yield. The study was undertaken in the zone, to identify and document the various indigenous practices of groundnut with their rationale as perceived by farmers and agricultural scientists and also to document the contemporary innovations prevailing at grass root level. In this study, as many as 50 and 6 ITK and contemporary innovations were identified, respectively during first stage of investigation. Maximum 14 practices were found from sowing, spacing, interculturing, planking practices and application of fertilizers. The practices like application of TANCH was found to have scientific rationale, some practices like opened furrows, use of iron ring for sowing, U band around coulters, pre-monsoon sowing through furrow irrigation are the emergence of practices due to the felt need of farmers as monsoon is uneven and ill-distributed in the zone with a specific rationale. The implications, adoption vis-a-vis the constraints of these practices in the state context are discussed in the greater detail in the paper.

Thus, testing of these type of indigenous groundnut production technology by replications and if necessary blending them with scientific recommendations is prime need in research area and is as the strategy for minimizing risk in dry land agriculture.

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REMEDIAL STRATEGIES OF AGRICULTURAL DEVELOPMENT IN INDIA
N.B.Chauhan\(^1\), K.F.Patef\(^2\) and R.C.Patei\(^3\)

The population has already been crossed 102 billion and is still increasing alarmingly that put a
great pressure on the food grain production of India. On a rough calculation there is an increase in
per capita availability of food grain in India but there is no certainty of filling the number of empty
stomachs multiplied in the new millennium. Unless we concentrate our efforts in this area, the shortage of
the food is likely to be one of the greatest problems in the years to come. To achieve best result from the
agriculture, Indian farmers will have to make best use of available modern high production oriented
agricultural technologies. It is said that out of available agricultural technologies with research system,
only thirty to forty per cent have been transferred or reached up to the client system. It is therefore, some
remedial changes need to be adopted in existing system of agricultural development to accelerate rate of
adoption of agricultural technology. For this, policy makes involved in planning and implementation of
research and extension activities of agricultural fields should think to appoint Agricultural Graduate in
each village, bring improvement in agriculture related programmes of mass media, adopt simplicity in
naming the agricultural technology, develop practically adoptable new agricultural technology, improve
peoples’ participation in various extension programmes, link SAUs with other agricultural development
related private agencies, provide input supply units at different centers of SAUs, use combinations of
traditional and electronic extension methods, make available rural agricultural libraries and facility of
Internet at village level, use experiences of successful farmers for the extension of technology, establish
farm clinics and service centers in villages, motivate NGOs to change their role for marketing oriented
work and encourage private extension services. Thus, present system of transfer of agricultural
technology needs to be changed for widespread and sustainable agricultural development of India.

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PROMOTION OF SUSTAINABLE AGRICULTURAL DEVELOPMENT THROUGH
WATERSHED DEVELOPMENT TECHNOLOGY IN DRY FARMING AREA
R.C.Patei\(^2\) and N.B.Chauhan\(^2\)

Rainfed area accounts for nearly 70 per cent of the total cultivated land of 142 million hectares
of cropped area in the India and contributes 46.00 per cent of national agricultural production. Realizing
the importance of rainfed farming, “National Watershed Development Project for Rainfed Areas
(NWDPRA)” was introduced in July 1986, covering 16 states and 99 districts and further restructured in
1990-91 with the assumption that its widespread adoption will generate a dynamic spark resulting in the
economic revolution of the farming community. The redefined NWDPRA financed by GOI is in
operation in all districts of Gujarat State, since 1990-91. Keeping this in view, the present investigation
was carried to study the consequences of adoption of watershed management technology on the
beneficiary farmers in watershed area of Kheda district of Gujarat state”. In order to achieve objective of

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the study, Kapadwanj and Balashinor watershed areas of Kheda district of Gujarat were purposively selected. All the 10 villages covered under selected sample watersheds were included in the study. A sample of 217 beneficiary farmers (66 farmers from 4 villages of Kapadwanj and 151 farmers from 6 villages of Balashinor watersheds) was selected by proportionate random sampling technique. The information pertaining to the study was collected through structured schedule by personal interview. The collected data were analysed by using suitable statistical techniques.

The study concluded that majority of the beneficiary farmers of watershed development programme had shown their more interest in adopting no cost and low cost technology than the high cost and complex technology. As a result of adoption of watershed development programme, significant increase was observed in beneficiary farmers in terms of their area of cropping intensity, use of improved seeds, chemical fertilizers, plant protection chemicals and farm implements. Adoption of watershed development practices had also played significant role in improving number of household items possession and annual income of the farmers. India is such a country where more than seventy percent agriculture is being done under rainfed conditions with limited technologies. Watershed development is one of the best means to generate a dynamic spark for the economic revolution of the rainfed farming community and country as a whole. Maximum efforts should be made to motivate farmers to adopt watershed management practices by providing technical and financial supports.

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PROFITABLE FARMING IN THE ARID ZONE

Surya Rathore¹ and S.L. Intodia²

The Arid zone of Rajasthan is occupied by desert soils and sand dunes. Rainfall is very scanty in the zone ranging from 200 millimetre to 370 millimetre. Summer temperatures are high with hot wind blowing while winters are cold. Pearl millet (Pennisetum glaucum) is the predominant crop of the zone followed by cluster bean (Cymopsis tetragonoloba) and dew gram (Vigna aconitifolia). The zone is famous for chillie (Capsicum annum), cumin (Cuminum cuminum), psyllium (Plantago ovata), Sesame (Sesamum indicum). The scientific research in Agriculture is moving very fast and practically every month new practices of improved cultivation are being evolved by the scientists. It is essential that the farmers be kept abreast of this dynamic agriculture through an equally dynamic system of extension education. The Agriculture Research Station, Mandore working under the banner of Rajasthan Agriculture University, Bikaner is involved in releasing zone specific varieties of crops along with its package of practices. These technologies reach the farmers through the various agencies involved in transfer of technology such as Central Arid Zone Research Institute (CAZRI), Jodhpur, Krishi Vigyan Kendras (Jodhpur & Barmer) and State department of Agriculture. The main idea behind popularizing these varieties among the farmers is to increase the production, productivity and economic returns of the

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farmers of Arid Zone. The study was conducted in the Jodhpur and Barmer districts of Rajasthan on 300 farmers and the profitability was found out in terms of increase in productivity of ses|am, dew gram and cumin. It was found that the productivity of the University released varieties was almost double of that of farmers' practice. As regards economic returns, these zone specific varieties of crops had led the farmers to earn an average additional economic returns of rupees 9,454 to 57,834.76 in an average area of 1.59 to 3.75 hectares for an individual crop season.

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SCOPE AND POSSIBILITIES OF DIVERSIFIED FARMING PRACTICES FOR SUSTAINABLE PRODUCTION

S.S. Singh¹ and S. Elamathi²

Due to ever increasing population and decline in per capita availability of land in India, there is hardly any scope for horizontal expansion of land for food feed, fuel and fibre production. India with 2.2% of world geographical area has to support more than 15% of the total world population and 16% of the world cattle population. In a cropping system the amount of byproducts can be as high or higher than marketable produce. This may go to waste if not utilized in an animal enterprise. The income from conventional cropping system included seasonal field crops on small and marginal farms are hardly sufficient to sustain the farmers family and the crop cultivation is subjected to some degree of risk, uncertainty and provides only seasonal, irregular and uncertain income and employment to the farmer. Under such conditions, it will be required to undertake some other enterprises diversified farming includes livestock, fishery, poultry, duckery, apiary, mushroom production, sericulture and agroforestry which will mitigate risks and uncertainties and provides an alternate way to meet the needs for sustainable crop production and better standard of living.

Integration of different enterprises along with crop component have the great potential in the agricultural economy. Many diversified farming system (IFS) models were developed under different conditions throughout the country. Farming system under wetland condition, the components like crop, fishery, poultry, mushroom cultivation can be effectively incorporated. IFS under arable/garden land conditions along with crop component, other enterprises like dairying, grass cultivation, sericulture, biogas, spawn and mushroom production can be included. IFS under dryland conditions, goat rearing, fodder cultivation and agroforestry can be effectively included. It is concluded that diversified farming system deals with whole farm approach to maximize risk and increase the production and profit with better use of wastes and residues.

Diversified farming system seems to be the answer to the problem of increasing food production, for increasing income and for improving nutrition of the small scale farmers with limited resources without any adverse effect on environment and agro-eco system. Diversified farming also provides

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additional employment opportunities than conventional cropping system. In the present context, the growing of surplus labour force could be minimized or absorbed in the villages itself and migration of labourers from villages to city could be minimized. Diversified farming system practices will be technically feasible, economically viable and socially acceptable to the farming community.

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STATUS OF SHRIMP AQUACULTURE IN INDIA - ISSUES AND PROSPECTS

Agriculture and fishing in India have traditionally been strong export markets. For instance roughly 70 per cent of the overall population remains rural, and in certain states, like Andhra Pradesh, farming is a major part of the economy. Roughly twenty years ago, some people in this state began to experiment with small scale shrimp farms. While some of these people have been fishermen who have been seeing a recent decline in catches in the Ocean, most are private businessmen. Fairly recently, over the past five years or so, aquaculture has taken off in India. It is no longer the enterprise of small scale farmers. Rather, Indian business is investing heavily in this industry. Currently, there are over 80,000 hectares of shrimp farms which are expected to grow rapidly. In 1993, for example, India’s marine exports totaled 70,000 tons, which is expected to reach 200,000 tons by the year 2000.

Marine product exports from India have grown from Rs. 4 billion in 1985-86 to Rs. 8.75 billion in 1990-91. Many of India’s big business conglomerates like the Tata group, Thapar Group, Unilever, has invested heavily in this sector. This is because aquaculture provides a quick profit with quick turn over, and shrimp particularly is a short duration crop that receives high investment returns and enjoys an expanding market. However, Aquaculture has some downsides also. There is growing uproar among environmentalists and the public at large that shrimp culture leads to environmental degradation, affects the nice crops, and enters into the animal and human food chain through the use of pesticides; some of which are banned in other countries, other than India.

While, environmentalists and shrimp farmers are divided on the opinion as to whether the Government should favour / encourage the shrimp culture industry in India, it cannot be forgotten that, as a highly prized seafood delicacy, shrimps are a major cash crop grown mainly for the affluent export and urban markets, contributing to a major share of our foreign exchange reserves. This paper examines the various issues affecting the shrimp farming in India, the efforts taken by the Government in the light of these issues and the future prospects, this sector holds for the country.

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AGROBIODIVERSITY CONSERVATION
S. Sri Vara Buddhi Bhuvaneswari and P. Athimuthu

Paradoxically, even as income levels rise in many sections of society, nutritional levels, and stability of access to food, are often declining. There are many reasons for these paradoxes. Among these reasons, the loss of biological diversity needs urgent attention. What role does agricultural biodiversity have to play in this? How has the modernisation process affected the diversity found in nature and on farmer's fields, and will this have an impact on the paramount goal of providing food and livelihood security? These questions have assumed special significance because of the increasing unsustainability and ecological/social dangers of the current Green Revolution Methods.

In this context, this paper attempts to demonstrate the importance of biological diversity in Indian Agriculture, to analyse the crisis which Indian agriculture faces, especially in terms of the serious loss of biodiversity and farmer's self-reliance, to examine the widespread efforts at reviving biologically diverse agricultural practices and to draw critical policy implications for Indian agriculture, outlining measures which are necessary of the goals achieve agrobiodiversity conservation, productivity, and self-reliance. This paper high light the agrobiodiversity conservation practices carried out by the tribal people in different parts of our country.

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SUSTAINABLE PRODUCTION THROUGH INTEGRATED PLANT NUTRIENT MANAGEMENT
T.S. Kushwaha, K.K. Saxena and Arvind Saxena

Promotion of organic farming should not mean total opposition to the use of chemical fertilizers. Infect it is promotion of sustainable production through IPNM. Integrated plant Nutrient Management (IPNM) has an important role to play in maintaining or improving soil health stabilizing productivity crops reducing the dangers of pollution of environment and food material used for human consumption. In real perspective, organic farming is an ancient part of Indian Agriculture. Practices, which are relevant, even in this modern era of chemical dominated agriculture.

The present research work has been undertaken with a point of view to determine the extend use of organic farming practices by the farmers in the selected villages for popularizing and diffusing the organic farming technology by the State Department of Agriculture of Madhya Pradesh. The massive programme of organic farming has launch to reduce the increasing cost of chemical fertilizer.

The study was conducted in Sehore district; total 75 respondents were selected from five adopted villages under the massive programme. Agriculture Department and scientists of Agricultural University considered a list of 10 practices as the component of IPNM as suggested.

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The results of study was clear-cut showed that out of ten practices included in IPNM, most of respondents had used seed inoculation, application of FYM/NADEP compost, selection of good seeds about half of respondents adopted use of bio-gas slurry and in situ incorporation of crop residues. Application of vermicompost and use of amrit sanjeevani were used only by few of the respondent.

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CANCUN AND NECESSARY SHIFTS IN INDIA’S AGRICULTURE POLICY
S. Renganathan and M. Jegadeesan

During the recently concluded WTO Ministerial Conference at Cancun, Mexico, India emerged as a leader of the developing nations of the world. India and other G-22 countries succeeded in getting attention focussed on their concerns on the export and domestic subsidies offered by the developed countries to their farmers. This paper throws light on what India wanted from the conference, whether it has succeeded in getting it and the implications.

As a member of the WTO, India has the opportunity to become a huge export country. She has to achieve this, by giving thrust to land reforms, irrigation, agriculture modernization, cold chain establishment and better grain storage. Efforts have to be taken to ensure free movement of grains and other goods, providing reliable and continuos supply of power and improved road, rail and air-cargo facilities for easy and efficient transportation.

UNTAPPED PROCESSING INDUSTRY: CASE STUDY OF KASHMIR RAW APPLE CULLS
F.A. Shaheen

Agro-processing industries offer vast opportunities for increasing farm incomes, generating employment and earning foreign exchange. Though the government policy for agro-processing industries in general and food processing industries in particular has become much more favourable in recent years, the momentum of this sector in India and its exports is not of desirable level, thereby lagging behind in achieving the targets. While area and production of fruits and vegetables have been increasing at a faster pace, their post harvest losses are quite serious in the country. The total post harvest losses in fruits and vegetables are estimated to be 20 to 40 per cent, amounting to more than Rs 4000 crores, annually. Inspite of all the efforts of policy makers and planners to develop food processing industry in India, it is still at the infancy stage and could process even less than 2 per cent of the fruits and vegetables produce.

The Kashmir province of Jammu and Kashmir state, which is specialized in temperate horticulture, produces fruits such as apple, pear, apricot, peach plum, cherry and grapes besides other dry fruit crops. The total production of fresh fruits in the year 1998-99 was reported as 8,81,141 metric tonnes.

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tones (MT), of which, apple contributes about 90 per cent. The apple crop dominates the horticultural industry and has an important role in the economic scenario of the state. Nearly 30 per cent of total produce of apple crop goes waste due to pre-harvest drop, under development of colour, inferior grade and other reasons, are utilized for the purpose of processing. These apples cannot be marketed as they give negative returns to growers. Due to non-availability of adequate processing facilities in the state, such fruits do not find an appropriate outlet in the market. Against the huge un-marketable surplus (0.28 million MT), the state has facilities to process just about 60,000 MT of apple, which is only 24 per cent of total availability of apple culls. Remaining apple culls offers a good potential for processing industry. Though there have been multi-dimensional efforts to increase the production of apple in the state but processing sector has not received proper attention. The study was conducted to evaluate the processing cost, economics and potentials of apple processing industry in the state. Out of two processing plants, the Apple Processing Plant, Sopore, run by Jammu & Kashmir Horticulture Produce Marketing and Processing Corporation (JKHPMC), was selected for study purpose. The other plant, owned by private entrepreneur could not be taken for study purpose as it was installed in the same year. The study was carried out in the year 2000.

The processing cost of Concentrated Apple Juice was computed Rs.2807.13 per quintal. More than 70 per cent of this cost was constituted by variable cost – the major portion of which goes on wages and salaries to staff and casual labourers. The average capacity utilization was found 69.03 per cent. Similarly, the recovery, on an average was found 7.42 kgs of concentrated apple juice (CAJ) from one quintal of raw apple culls. The cost-benefit ratios were computed as 1: 2.22, 1: 1.36 and 1: 1.66 for the year 1997-98, 1998-99 and 1999-2000, respectively. The low return to plant in last two years were attributed to less processing of culls, as the plant had not fully exploited the economies of scale for these years. The potential of apple processing industry was estimated on the basis of secondary data of area and production of apple, as well as some estimates based on the data collected from apple growers. The quantity of raw apple culls was estimated as 0.28 million MT, with per hectare production of 3.74 MT. The income realized from these waste apples will be Rs. 2,917.20/ha. According to recovery per cent (8%) estimated in present study, the total apple culls will produce 22,377.60 MT of CAJ. Taking Rs.53,000 per MT as price of CAJ, the total quantity of CAJ will give revenue of about Rs.118.60 crore annually to state. In addition to this, apple juice processing industry will make a good platform to generate the considerable employment in the State. At least 4 processing plants of 50,000 MT processing capacity per annum can be established in Kashmir province, where the raw material is sufficient to run them at full capacity. These facts clearly indicate that the State Government as well as private entrepreneurs should come forward in this direction to exploit the potential of this untapped industry.

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FIELD REALITIES AND STRATEGIES FOR THE ENHANCEMENT OF ONION CROP PRODUCTION THROUGH THE APPLICATION OF PSYCHOLOGICAL TRAITS
N.B. Jadav¹, M.A. Munshi² and G. R. Gohil³

The gap between the know-how already attained and their field reality is still large despite of considerable advancement in onion production technology. Onion is the important vegetable bulb crop of the world. However, majority of the onion growers did not know and had not yet adopted recommended onion production technology, due to lack of technical know-how and several constraints experienced by them. The study was conducted in Bhavnagar district with two blocks leading onion production and productivity constituting 120 respondents. The field realities about recommended onion production technology are, a majority of the onion grower had medium level of knowledge followed by high and low level of the knowledge, as well as, more than one half of the onion growers had medium adoption index.

There was non-significant association of the knowledge and adoption of onion growers about recommended onion production technology with their size of land holding, while age and size of family of the onion growers were negatively and significantly associated with the knowledge and adoption of recommended onion production technology. Some important strategies expressed by more than one half per cent of the respondents were provision of irrigation water, remunerative price should be given to onion grower, sufficient and regular electricity should be available are in order. The implications, the psychological traits influencing the onion production are discussed in detail in the paper.

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TRASH INTO TREASURE-A BOON FOR BANANA FARMERS
B.S. Hansra¹, R. Sudhakar², V. Venkatasubramanian³, K. Deo Singh⁴

Next to Brazil, India is the largest Banana producing country in the world. The fruit bunches and leaves are the main sources of income and other portion of the Banana plant are dumped as waste. Farmer often face the problem of disposal of pseudo stem and huge stocks of the pseudo stem are getting accumulated in the banana growing areas. The fruitful utilization of these stems is therefore an important issue related to banana cultivation. Extraction of fibre and preparation of organic manure etc., from these stems are some of the possible utilization of this biological plant waste. The manual fibre extraction process presently in vogue is a cumbersome process. In this process an expert person can hardly produce a maximum quantity of 500 to 600 gms of dry fibre in eight hours. It is a tedious process involving patience, drudgery by means of straining and staining of palms of the extractor. Due to this cumbersome process with less economic output the extraction of fibre from the pseudo stems of banana has not received desired attention. Therefore, a suitable user friendly fibre extraction device Banana Fibre Extractor was designed and developed for the commercial exploitation of unutilized banana waste such as Pseudo stems, peduncles and leaf stalks. The machine reduces drudgery and results in 20-fold increase in
fibre production compared to manual process. The machine helps banana cultivators to get additional income through economic utilization of the hitherto unutilized portions. An additional maximum income of Rs.5000/- per acre is assured to the banana cultivators.

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VALUE ADDITION IN FRUITS AND VEGETABLES IN INDIAN CONTEXT
H.U. Vyas1, N.V. Soni2 and K.F. Patel3

In present scenario the value addition plays an important role in Indian agriculture. The demand of the value added products are risen day by day in international market thought export. India’s share in the world production is nearly 10 per cent in the fruits and 14.4 per cent in vegetables (Kartar Sing, 2002), but its share in the world exports of fruits and vegetable is only about one per cent. It is estimated that at present only about two per cent of the quantity of fruits and vegetable product in the country is processed and that it could easily be increased to 10 per cent (Nayar, 2002) of means at value addition concept. This include various measures like use of recommended agricultural technology, application of bio-technology, grading, processing, packaging cold chain linkage, certification for quality standard (ISO 9000, IS 14000, HACCP, ISI etc.) Co-operative marketing infrastructure facilities, use of information technology, export policy & taxes etc.

For the economic benefit of peasantry in terms of value addition in fruits and vegetables the more stress should be given on following steps by government, scientific community as well as farmers.

1) Government should establish the value added centers, more agricultural Export zones, Food Processing Parks, infrastructure facilities etc, and change the policy for taxes on value added products and packaging materials.

2) The agriculture scientist should evolve new varieties for better quality yield, develop new processing techniques arrange demonstration and training related to value added products to farmers, businessmen and industrialists. Extension scientists should disseminate the information on the value added products by using various devices of information technology.

3) Farmers should adopt recommended agricultural practices including post harvest technology to obtain qualitative crop production; also co-operative structures should be established to minimize the post harvest losses.

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International Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions"
PEOPLE'S PARTICIPATION IN IMPLEMENTATION OF SOIL AND WATER CONSERVATION PROGRAMME IN THE ANTISAR WATERSHED OF GUJARAT

G. L. Bagdi and U. Joshi

The study was conducted during 2000-01 in the Integrated Wasteland Development Project (IWDPP), Antisar watershed located in Kapadwanj Taluka of Kheda district in Gujarat. It was revealed that more than three fourth of the respondents (76.02%) showed moderate level of participation, nearly one fifth of them (19.64%) having less participation level and few of them with more participation level in implementation of the soil and water conservation programme. The overall extent of the male as well as female respondents' participation in the programme at the stage of its implementation was calculated with the help of People's Participation Index (PPI) and it was found 69.29 per cent and 71.66 per cent respectively. It means that overall extent of participation of male and female farmers in the implementation stage was near high level.

The variables socio-economic status, farm power, risk preference, knowledge and attitude were positively and significantly correlated with the participation of male farmers in implementation of SWC programme. Whereas, the variables socio-economic status, education, family size, social participation, risk preference, knowledge and attitude were positively and significantly correlated with the participation of female farmers in implementation of SWC programme, and the variables age and income were negatively and significantly correlated with the participation of female farmers in implementation of soil and water conservation programme.

SUSTAINABILITY OF RICE BASED FARMING SYSTEMS IN TAMIL NADU

R.K. Theodore, K.A.Ponnusamy and G. Selvaraj

Increase in area under irrigation also leads to crop specialization, increased use of inorganic fertilizers and pesticides and associated problems, which threaten the sustainability of wetlands, mainly rice-based farming systems. The Tambraparani river irrigation system of Southern Tamil Nadu has a command area of 34,443 hectares. It is characterized by four types of farming systems viz., i) rice, ii) rice + banana iii) rice + dairy and iv) rice + banana + dairy. An index was developed to assess the level of sustainability of the four farming systems. The sustainability index (SI) was the simple arithmetic mean of economic viability and ecological soundness, where the economic viability is the simple arithmetic mean of the nine economic viability parameters. Similarly, the ecological soundness is the simple arithmetic mean of the four ecological parameters.

It was found that the economic viability of the system 'rice + banana + dairy' was the highest, followed by a similar level of economic viability in the systems - 'rice + dairy' and 'rice + banana'. The least economically viable system was 'rice'. The 't' test also revealed that the ecological soundness of the...
system – ‘rice + banana + dairy’ was the highest, followed by ‘rice + dairy’, ‘rice + banana’ and ‘rice’ in that order. Further, it was observed that the sustainability of the system – ‘rice + banana + dairy’ was the highest, followed by a similar level of sustainability in the systems - ‘rice + dairy’, and ‘rice + banana’. The sustainability level was lowest in the system - ‘rice’. The presence of three activities and especially dairy activity made the system – ‘rice + banana + dairy’ the most sustainable rice based farming system in the Tambiraparani river command area.

The ranks of the principal component weights indicated that the parameters viz., technology use level, low-cost technology use level, farm family employment level, eco-friendly technology use level, organic recycling level and low-external input use level were responsible for the high level of sustainability of the paddy + banana + dairy system.

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SUSTAINABLE LIVELIHOODS ANALYSIS: NEW APPROACH FOR EXTENSION
K.M.Sakthivel and Prakash Khandekar

The green, white, blue and yellow revolutions are the remarkable achievements of India during the past few decades. Despite this, the paradox is that, India has the largest number of poor (around 250 millions) who lack access to square meals a day (Paroda 2003). According to a recent study on the global poor, more than 1.2 million people are living in abject poverty (World bank, 2001). Approximately, one quarter of these global poor are estimated to be livestock keepers. In many developing countries, including India, livestock are one of the few means by which the poor can generate capital assets. Although new frameworks of development support a focus on rural poor old arguments about the strong livestock sectors and the secondary benefits to the improvised stubbornly remain. Moreover, livestock have been under utilized as a weapon against poverty reduction. The livestock projects and programmes have not had a pro-poor focus (LID, 1998). Nevertheless in India millions of rural poor depend on livestock as their only means of livelihood. A livelihood comprises the capabilities, assets (both material and social resources) and activities required for a means of living. A livelihood is sustainable when it copes with and recovers from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining natural resource base (Scoones, 1998). Livelihood (Pro-poor) extension is broader in scope than traditional agricultural extension. It must go beyond agricultural production and productivity. And should identify most suitable and feasible ways to reduce poverty and insecurity. SLA is a holistic approach and builds upon strength of poor people. It tries to capture and provide better understanding of vital causes and dimensions of poverty. The focus is not limited to just few factors (e.g. economic issues, food security, etc). But attempts to determine relationships between the different aspects (causes and manifestations) of poverty, allowing far more effective prioritization of action at an operational level. Therefore, SL framework has implications for the role and scope of extension. Importantly, extension

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policy and practice must expand its focus not only on increasing agricultural production but also on tapping new employment opportunities and reducing the impact of shocks, trends and seasonalities. This paradigm shift in thinking from production research that leads to technology transfer to farmers, to a research on how to create social processes that enable poor farmers to develop solutions to their own problems. The paper will attempt to discuss the implications and applications of SL approach in rural areas.

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SCENARIO OF SUSTAINABILITY OF INDIAN AGRICULTURE AND CHALLENGES AHEAD

S.K. Gopal

Development has to be in harmony with nature. We have to believe that nature is a complete system, a living system. It can’t be over exploited. Human beings are not over and above the nature. In agriculture the present rate of consumption, acquisition and degradation of resources and the neglect of human development is ultimately suicidal. So, the situation forces us to adopt sustainable integrated agriculture to meet the needs of today and future generations. But a change in production, consumption, patterns in an equitable manner whereby resources which are currently being wasted are saved and re-channeled to meeting the needs of everyone today as well as the needs of the future generations.

Sustainable agriculture, which is environmentally, non-degrading, technically appropriate, economically viable and socially acceptable.

Constraints in the present sustainable agriculture system

1. Lack of networking / coalition building among community organisation
2. Absence of social institutions, norms, values, more ethics in development activities.
3. Uniform technology development leads to adverse effect
4. Low level of farmers representation in the technology development
5. Weak research – Extension – farmers linkages
6. Lack of research in bio-diversity farming
7. Poor people responsibility to maintaining the common property resources
8. Lack of knowledge about food grains storage
9. Low option for agro-based enterprises
10. Lack of youth participation in sustainable agriculture

Challenges ahead

1. Strengthening the networking institutions for convergence of various sustainable agriculture development schemes and organizations.
2. Promotion of sustainability enhancing technologies to become demand driven and responsibly for solving problems of farmers.

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3. Enable to research in the bio-diversity farming system
4. Establishment of rural goddown for agricultural products
5. Promotion of value based industries.
6. Include educated youth to participate in sustainable agriculture

To sum up, sustainable agriculture can only be achieved in a paradigm that has parameters, for economically, environmentally and socially viable. If a processes not sustainable in all these dimensions, then it is on borrowed time. To succeed more on sustainable agriculture, the government should declare national policy for sustainable agriculture.

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SUSTAINABLE PRODUCTION THROUGH ECO FRIENDLY CULTIVATION PRACTICES
Rexlin Selvin1, R. Shiraj2 and T.Selvin Jebaraj Norman3

Agriculture was started as an activity very close to nature and in harmony with all living and non-living things on earth. It was dependent on the natural cycle of seasons and was sustainable in the past. But now crop production is a crisis. With the development of the technologies especially after the green revolution, things have changed drastically in human life. Man claims to have control over nature. To achieve high yield within a shorter time, chemical fertilizers were applied to the field abundantly. The indiscriminate use of chemical fertilizers and pesticides to combat the increasing menace of insect pest and diseases has caused serious damage to the soil, make them saline and less suitable for cultivation. The over reliance on chemical application has created many adverse effects on many beneficial organisms in the ecosystem. Use of agro-chemicals causes severe environmental pollution problems and human health hazards. Agro-chemicals reach the deep layers of soil while ploughing. Besides, they enter into the water supplies and they disrupt the aquatic ecosystem also. Recently researchers have focused their attention on ecologically sound and sustainable method of crop production especially in the aftermath of ecological horrows spawned by the chemical pesticides. Even farmers have been experimenting with various natural resources to improve the results in their field and to optimize the input use. Eco-friendly cultivation practices are organic which provides balanced environment in which the maintenance of soil fertility and control of pest and diseases were achieved by the enhancement of natural processes and cycles with moderate inputs of energy while maintaining optimum, sustainable production. Hence, study was conducted to know the effectiveness of eco-friendly cultivation practices in paddy in Pudukottai District. The results showed that as direst economic consequences, 80 percent of farmers expressed reduction in cost of cultivation and sustainable, optimum production through out because the eco-friendly practices were cost effective making use of local resources. The expensive inputs like chemical fertilizers and pesticides were replaced with cheaper and locally available manure, farm yard manure, compost and herbal repellents. As socio-psychological effect 50 percent expressed increased health condition as earlier the chemical fertilizer and pesticides causes harmful effect on human

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and animal health and pollute the environment where they live. At present, we have so many eco-friendly practices at hand primarily the attitude of farmers towards eco-friendly should be changed favourably by educating them. Also they should be aware of the environmental degradation, because it is a slow and gradual process but it takes many years for its effect on surface.

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ORGANIC FARMING: A ROAD MAP FOR SUSTAINABLE LIVELIHOOD

C. Padma¹, S. R. Padma², M. Senthil Kumar³, and N. Balasubramani⁴

The green revolution has made farming more intensive with the use of improved varieties, chemical fertilizers and pesticide helps to attain the self sufficiency. But the prolonged usage of chemicals has resulted in human health hazards, environmental pollutions and made soil unfit for cultivation. Organic farming system primarily aims at cultivating land and raising crops, in such a way to keep the soil alive. This method of farming leads to pollution free environment, Higher and sustainable production and improves the soil health. Sustainability not only means the output but also the socio-economic and ecological factors. This paper mainly highlights the importance of organic farming for sustainable food production, promotional strategies followed by various agencies, initiatives taken by the Government to promote Organic Farming.

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INDIGENOUS TECHNICAL KNOWLEDGE (ITK): A SCOPE FOR SUSTAINABLE FARMING OF PADDY IN SOUTH GUJRAT

S. R. Patel¹, R. B. Patel², and J. B. Patel³

The sustainable Agriculture currently tops the agenda list of issues in all Agricultural Development meets emphasizing the need and importance of traditional wisdom i.e., Indigenous Technical Knowledge (ITK) of farmer with regard to agricultural practices ITKs are very cheap, easy to handle and adopt and are location specific. They would have been developed by trial and error, hit and miss methods.

On the other hand, recommended technologies are adopted by farmers but they are still adopting some local practices develop through experience of several years which are eco-friendly and based on using locally available resources. In the recent time greater attention has been paid to make use of Indigenous Knowledge in overall development process in different fields like agricultural, animal husbandry, health etc. Some of the questions once rise in mind like why they are adopting? Upto what extent they adopt? To answer such question the study was planned.

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The findings of the study indicated that majority of the farmers adopting ITKs in paddy nursery were: preparation of flatbed for raising seedlings, seed sowing without chemical or non-chemical treatment and application of ammonium sulphate before a day of transplanting. While, in case of paddy field, threshing on wooden table and after establishment of seedling, walking in paddy field and uprooting the weeds in initial stage of crop. Most of ITKs are scientifically not true. The study also stated that there is a highly significant difference exists between tribal and non-tribal farmers as regards their extent of adoption of ITKs.

PROMOTION OF SUSTAINABLE AGRICULTURAL DEVELOPMENT THROUGH WATERSHED DEVELOPMENT TECHNOLOGY IN DRY FARMING AREA

Rainfed area accounts for nearly 70 per cent of the total cultivated land of 142 million hectares of cropped area in India and contributes 46.00 per cent of national agricultural production. Realizing the importance of rainfed farming, "National Watershed Development Project for Rainfed Areas (NWDPRA)" was introduced in July 1986, covering 16 states and 99 districts and further restructured in 1990-91 with the assumption that its widespread adoption will generate a dynamic spark resulting in the economic revolution of the farming community. The redefined NWDPRA financed by GOI is in operation in all districts of Gujarat State, since 1990-91. Keeping this in view, the present investigation was carried to study the consequences of adoption of watershed management technology on the beneficiary farmers in watershed area of Kheda district of Gujarat state. In order to achieve objective of the study, Kapadwanj and Balashinor watershed areas of Kheda district of Gujarat were purposively selected. All the 10 villages covered under selected sample watersheds were included in the study. A sample of 217 beneficiary farmers (66 farmers from 4 villages of Kapadwanj and 151 farmers from 6 villages of Balashinor watersheds) was selected by proportionate random sampling technique. The information pertaining to the study was collected through structured schedule by personal interview. The collected data were analysed by using suitable statistical techniques.

The study concluded that majority of the beneficiary farmers of watershed development programme had shown their more interest in adopting no cost and low cost technology than the high cost and complex technology. As a result of adoption of watershed development programme, significant increase was observed in beneficiary farmers in terms of their area of cropping intensity, use of improved seeds, chemical fertilizers, plant protection chemicals and farm implements. Adoption of watershed development practices had also played significant role in improving number of household items possession and annual income of the farmers. India is such a country where more than seventy per cent agriculture is being done under rainfed conditions with limited technologies. Watershed development is
one of the best means to generate a dynamic spark for the economic revolution of the rainfed farming community and country as a whole. Maximum effort should be made to motivate farmers to adopt watershed management practices by providing technical and financial supports.

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BIOTECHNOLOGY: A BOON FOR THE SUSTAINABLE PRODUCTION IN BANANA CROP
J.B.Patel1, S.R.Patel2 and K.S.Patel3

The food security of the country has however depended heavily on green revolution technology in high production areas. The total factor productivity in high production areas has been showing a declining trend and the resource base has weakened progressively and clearly. Therefore, the need of continued productivity increase and reconciling it with the requirement of environmental protection and sustainability calls for new and innovative ways of thinking and working. In this context, bio-technology itself acts as a text of great promise. Looking to the present scenario, it clearly appears that farmers cultivating banana crop face many problems like reduction in yield potential, bacterial, fungal, viral diseases and premature ripening etc. To overcome above mentioned problems through Biotechnology i.e., Tissue culture raised banana plants are introduced to the farming community. Krishi Vigyan Kendra (ICAR) Mangal Bharati is the pioneer institute to introduce biotechnology among farming community in Vadodara district has decided to adopt by only 400 tissue culture plants. After the innovative approach of this progressive farmer, area covered under tissue culture gradually increased and till today in 88 farmers of 12 different villages are adopting tissue culture technology in banana crop in 161 ha. A study was undertaken to know the consequences of this technology, 50 farmers purposively selected among farming community.

The study stated that more than three-fourth of the respondents increased their yield from 25 to 50 per cent along with improving the quality with decreasing maturity days and it directly affect on getting higher market price. Whereas, fertilizer use efficiency has no significant effect in banana crop under this technology but it helpful in decreasing the fertilizer cost upto Rs.1,000/- per ha. The data also indicated that most of the respondents observed very less pest and disease problem and mortality rate in their banana field. Whereas, upto certain level the problem of side suckers solved by this technology. Majority of the respondents suggested that multiplication of tissue culture plants should be increased with maintaining genetic purity. It is also available at cheaper rate to small and medium category of farmers for its wider adoption.

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International Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions"
BIOFERTILIZERS FOR SUSTAINABLE AGRICULTURAL PRODUCTION
S.R.Patel¹ and J.B.Patel²

Biofertilizers play a key role in Integrated Plant Nutrient Management (INM). Great emphasis has been laid on, development and use of bio-fertilizers during last two decades. As a cost-effective supplement to chemical fertilizers and renewable energy source, biofertilizer can help to economize on the high investment needed for fertilizer use as far as N and P are concerned. Krishi Vigyan Kendra (ICAR), Mangal Bharati had imparted a training and conducted demonstration on use of biofertilizers, from these trainees, a list of 50 respondents were selected purposively.

The knowledge level of respondents regarding biofertilizers showed that more than 50 per cent of the respondents know the different types of biofertilizers available in market. Not only this but majority of the respondents awarded about which types of biofertilizers used in different crops along with its quantity, method of application, care taken at the time of its application and its preservation. Nearly half of the respondents adopted the specific bio-fertilizers in groundnut and banana crops. Majority of the respondents had taken necessary care in applying biofertilizers as per the recommendation through seed treatment.

Most of the respondents introduced biofertilizers on their field with the intention of increasing soil fertility, getting higher yield, improving germination percentage and better growth and development of crop plant and they have got that benefits. Almost all of the respondents have favourable opinion regarding biofertilizers. The respondents also positively opined that biofertilizers helped in increasing soil fertility, improving physical and chemical properties of soil along with yield and quality of farm product.

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STRATEGIES FOR HORTICULTURE DEVELOPMENT IN INDIA
V.Lenin¹

India is a vast nation endowed with high biodiversity; varied agro-ecological regions; and abundant sunshine. After independence, efforts were made towards development of agriculture. Horticulture is given attention since late sixties with the establishment of research infrastructure and separate plan allocation in IV Five Year Plan. In many states, department of horticulture is created. India is the second largest producer of fruits and vegetables in the world. Horticulture is contributing 24.5 per cent of GDP from 8 per cent land area. Resource-rich, big farmers who can absorb the risk predominantly practice horticulture. In India, 70 per cent of the farmers are practicing rainfed farming with small land holding.

Now, the challenge is to persuade these resource-poor farmers to adopt horticultural technologies. The major challenges to be tackled to advance the development of horticulture in India are small land holding, subsistence farming, lack of irrigation facility, frequent drought, heavy initial capital investment, non-availability of genuine plant materials, no easy access to credit facility, poor storage, packing and transport facility, unstable market etc.

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A strategy for development of horticulture in India is proposed. The state departments of horticulture have to be strengthened by improving the manpower, qualitatively by capacity building and quantitatively by recruiting more staff. New insurance policies specially designed for individual small and marginal farmers, covering all risks should be launched. The credit organizations like bank, cooperative society should provide loan to venture in horticulture, at low interest. The ways of harvesting rainwater, judicial use of ground water should be explored. Irrigation projects, and watershed development projects should be geared up. Water use policy should be streamlined. All the organizations involved in horticulture viz., state department of horticulture, research institutes, input agencies, credit organizations, insurance corporations, marketing cooperatives should be networked and all the services of these organizations should reach the farmer through a 'single window'. This window should take care of his all requirements including technology, input, credit and market.

Once the technology is provided with full risk coverage, credit, timely and adequate supply of quality inputs, total technical support, assured market, and guaranteed returns the horticulture will make headway into small and marginal farmers' farms. This will not only increase the area and production of horticultural crops in India, but also take the small and marginal farmers out of the clutches of poverty.

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SUSTAINABLE PRODUCTION THROUGH INTEGRATED PLANT NUTRIENT MANAGEMENT
T.S.Kushwaha¹, K.K.Saxena² and Arvind Saxena³

Promotion of organic farming should not mean total opposition to the use of chemical fertilizers. In fact it is promotion of sustainable production through IPNM. Integrated Plant Nutrient Management (IPNM) has an important role to play in maintaining or improving soil health stabilizing productivity crops reducing the dangers of pollution of environment and food material used for human consumption. In real perspective, organic farming is an ancient part of Indian Agriculture. Practices, which are relevant, even in this modern era of chemical dominated agriculture.

The present research work has been undertaken with a point of view to determine the extend use of organic farming practices by the farmers in the selected villages for popularizing and diffusing the organic farming technology by the State Department of Agriculture of Madhya Pradesh. The massive programme of organic farming has launched to reduce the increasing cost of chemical fertilizer.

The study was conducted in Sehore district; total 75 respondents were selected from five adopted villages under the massive programme. Agriculture Department and scientists of Agricultural University considered a list of 10 practices as the component of IPNM as suggested.

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The results of study was clear-cut showed that out of ten practices included in IPNM, most of respondents had used seed inoculation, application of FYM/NADEP compost, selection of good seeds about half of respondents adopted use of bio-gas slurry and in situ incorporation of crop residues. Application of vermicompost and use of amrit sanjeevani were used only by few of the respondents.

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THEME II

Privatisation in Agriculture Sector
STRENGTHENING PRIVATE EXTENSION IN INDIA: ACTION NEEDED

Amardeep1 and B.B. Singh2 Anil Kumar3

Importance of private extension is now being emphasized in current changing scenario. In private extension an individual or organization other than government becomes involved in providing single or package of services to the farmers. Although in Indian context policy makers think of promoting, regulating and introducing new innovations in extension but concept of private extension was not given due consideration.

In country like India there is wide scope of private extension for ensuring quality services and establishing effective and efficient support system. Here, out of 11900 agriculture graduates who pass out every year, only 2000 get job. This potent reservoir of 9900 unemployed agricultural graduates may be used for private extension work. These graduates may be directed and motivated to adopt agri-clinics and agri-business centres for farmers. Training programmes may also be designed and implemented in the field of agricultural consultancy. Various institutes including State Agricultural Universities may come up with these of training. Team of para-technicians in agriculture may be trained and deputed after giving them proper training in agriculture consultancy.

Empirical evidences show that farmers have easy and immediate access to local and informal sources like local leaders, progressive farmers neighbours etc. In this situation reach to each farmers is ensured. Thus it will be very useful and effective approach if efforts are made to develop these sources as private extension functionaries. To promote the private extension at village level farmers need to be motivated for formation of SHGs, farmers' societies and local organizations. Major advantage of the above two approaches is that there will be proper understanding of problems by farmers in the role of private extension agent. Direct involvement of villagers in such activities will also lead to sense of their participation. Contract farming which is largely for big farmers may also be introduced where holding size is quite large. This paper analyse various of private extension existing approaches in India. It also suggests the measure to promote and strengthen private extension in India context.

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3 - Assistant Professor, Department of Agricultural Economics, G.B.Pant University of Agriculture and Technology, PANTNAGAR –263145, Uitaranchal.

PARTIALLY PRIVATIZED AND PLURALISTIC EXTENSION SYSTEM FOR EFFECTIVE DELIVERY OF AGRICULTURAL EXTENSION SERVICES IN INDIA

M. Senthil Kumar1, N.Balasubramani2, S.R.Padma3 and C. Padma4

The practice of delivering the same technical message to all farmers using the same extension methodology will not support the needs of the farmers who are much interested in export oriented and commercial agriculture. Farmers need new skills in farm management and marketing. The Shrinking of

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public sector resources and downsizing and streamlining of extension personnel, forces to go for privatization. The public institution was made inefficient, less productive causes financial losses and creates discontent among the farmers. Moreover, the present public extension system has only limited professionals who are unable to cover the existing 500 districts, 6000 blocks and over 6 lakh villages in India. So, there exists a need for specialized extension services for farmers who are opting for commercial or export oriented agriculture. This paper emphasizes the need for privatized extension services and pluralistic extension system such as creating partnerships among public/private sector, traditional/political/religious leadership and farmer organisations for effective delivery of agricultural extension services, and presents case studies of privatized extension system from different countries and gives means and ways of privatization of extension services in India.

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MODERNIZING INDIAN AGRICULTURE EXTENSION SERVICES AND APPROACHES TO MEET THE FUTURE CHALLENGES
K. Chandrakandan

It is but unfortunate that our Extension system has been doing a stereo typed activities since our Independence, through there had been tremendous advancements in communication media especially in the field of multimedia / electronic media of Information Communication Technology (ICT) all over the world. There is an urgent need for structural and functional linkages within and outside the country through modern media.

There had been metamorphic changes in transfer of technology in most of the nations and it is more pronounced in the developed nations like US, UK, Canada etc., If we want to take the advantages of WTO and world trade, we need to change our approach so as to become more efficient and cost effective. Besides these, we have to also prepare our farming community to make use of modern gadgets and interconnectivity more so for market related information and news.

To orient them, we need to make a change in the mind-set of our farming community and attitudinal change in them.

Thondamuthur Experiment (Tn) 2001-03

Keeping the above scenario in mind, an NATP project was implemented in Thondamuthur block of Coimbatore district of Tamil Nadu (INDIA). This project had the mandates of studying the current Extension approaches, devising a modernised and participatory extension system and study the impact after implementing for 3 years. An action plan was developed and participatory group methods were used. The results are highly encouraging and it is Cyber Extension, a pioneering work in India.

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The modern Extension tools and techniques used were: Interactive Multimedia Compact Disc (IMCD), Web – Site, (on-line) computer conferencing, Group mail system, besides computerized power-point presentation of varied techniques & technologies relating to Sericulture, Sugarcane cultivation Vis-à-Vis Video presentation and many such attempts.

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<td>IMCD</td>
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Out comes: Further, a 20 – point action plan was developed and field tested. The results are highly encouraging. Our experiences show that there is ample scope for modernizing our extension services and approaches and take the advantages of WTO and global trade of farm commodities.

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EXPERIENCES OF PRIVATE EXTENSION ORGANISATION IN AGRICULTURE
D.Vengatesan, D, Santha Govind² and T. Kalidasan³

Since independence the policy on agriculture in India has undergone a sea change from an initial focus on food production to concerns such as environment, poverty and stakeholder participation. During 1950s and 1960s, the concerns were over food shortages and the agenda was to increase productivity. The task of transferring technology was given to the institutionally separate extension system (Hall et al., 2000). This approach resulted in the spread and development of input responsive high yielding crop varieties and consequently the green revolution.

Private extension initiatives have been expanding in India. Notable among them are recent efforts by several Indian agri-business firms. All of these models are new experiments and the firms are still developing their strategies. Extension systems are under pressure to improve performance and impact and contracting is one strategy to expand extension coverage and improve performance (Rivera et al., 2000).

This paper explores about the privatisation through institutional innovation, contracting for extension, policy issues and emerging issues and emerging issues in privatization.

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International Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions"
APPROACHES FOR STRENGTHENING THE PUBLIC-PRIVATE EXTENSION SYSTEM
S.S.Vinayagam1, B.U.Dupare2, Dharmendra3

In the areas of relevance, accountability and sustainability, the public extension system has played a major role during the post Green Revolution period. The public extension began with community development during 1952 and different transfer of technological programmes are being continued with the different approaches keeping in view to increase the productivity, assessing the different agricultural technologies, and refining the technologies based on the need of farming community. The present public system has nearly 1,17,603 extension staff covering 90 million farm families in the country (Chandrakantan and Kartikeyan 2002). This system has brought the agricultural production in a sustainable way. An analysis on efforts made by research and extension system since 1950 to 2001 shows that the productivity of food grains, fruits, vegetables and milk has been increased to 3.3, 1.6, 2.1 and 1.8 times respectively (The Hindu dated 16.07.2003). Along with progressiveness in agricultural technology, it is also necessary to privatize the agricultural extension system. The privatization in agricultural extension will widen the scope of agri-business and reduce the cost of public extension system. The public sector extension should embrace, besides technology transfer, other roles like human resource development, broad basing and farming system perspective and gender differentiated strategies. For the development of extension system and sharing the financial pressures of the central/state Govt., it is very much essential to get assistance or fees or a proportion of total cost from those who accrue benefit. The crucial issue looked into, are the ability of farmers to pay for the extension services, the areas from which cost recovery is possible and the implication of cost recovery or privatization under the present agricultural and socio-economic conditions.

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STRENGTHENING RESEARCH - EXTENSION FUNCTIONS WITH EFFECTIVE PRIVATE AND PUBLIC PARTNERSHIP IN AGRICULTURE SECTOR
N.Balasubramani1, K.Chandrakandan2 and P.S.Swathilekshmi3

In India with the current technology, agricultural production can be sustained for another ten years (Swaminathan, 1996). But the real problem is that the results achieved in the lab does not reach the farmers in the field. The research, extension function of public, private are carried out separately. This problem is more serious. The problem of lack of linkage thus cause unnecessary wastage of time, money, resources, unnecessary competition, duplication of efforts and increased cost of agricultural research and extension activities. All these point out the need for effective co-ordination and the significance of a strong linkage between research and extension agencies for technology transfer and thereby increasing agricultural production (FAO.1997).

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In the absence of effective linkage, researchers do not receive enough information about the environment specific needs of farmers and resource constraints under which farmers are operating. The common reasons that weaken the research extension linkages are political, technical, organisational etc. For strengthening linkage it is important to understand the principles that determine the success of linkage activities.

Ghosh (1992) classified linkage mechanism / principles under two heads, structural and organisational mechanisms. The basic assumption behind this is that through co-operation and co-ordination of programs the public clientele will be better served (Jha & Jha, 1998).

Hence there may be one or more of the following reasons for partnership. To develop joint program efforts between extension and other agencies and organisations; To facilitate communication between extension and other agencies and organisations; To articulate to other agencies and organizations regarding extensions capability to carryout appropriate aspects of programs at national, state and / or local levels; To gain resources and support for extension and other concerned programs; To minimize duplication of efforts; To co-ordinate and develop educational materials with requirements of regulatory agencies.

If proper mechanism of linkage to facilitate the two-way flow of messages between and among the farmers, research, extension support systems, and concerned government institutions are inculcated in present extension system, we may be able to meet the challenges of fast changing scenario of agriculture today, and cherished goal of sustainable agricultural development in the 21st century.

PRIVATIZATION OF AGRICULTURAL EXTENSION SERVICES - NEED OF THE DAY

Agricultural extension services in India are mostly funded and delivered by public system. It is well appreciated in taking benefits of green revolution to the farmers. However, all is not well now. Financial burden on governments have forced to make sharp reduction in budget of public extension programmes (Van Den Ban and Hawkins, 1996). Moreover, public extension will never answer the entire demand of farming community (Rivera and Gustafson, 1991).

In recent past most of the developing countries including Indian agriculture is shifting from subsistence to commercial agriculture. Besides this, implication of WTO will bring lot of changes in agriculture. The extension focus would be on quality, cost of production, value addition, market led extension and cyber application in agriculture. These challenges require the change in the role of present extension system.

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Bloome (1993) indicated that private extension involves any personnel in private sector which delivers advisory services in the area of agriculture and is seen as an alternative to public extension. Whereas, Van Den Ban and Hawkins, say that farmers are expected to share the responsibilities for these services and pay either full or part of the cost.

Role of Private Extension:
- Farm advisory services for profit maximization
- Timely input supply for better production
- Providing market information and market intelligence
- Processing and marketing the client’s produce

Strategies for Privatizing extension Services:
- Introducing contract farming system and Share cropping system
- Village extension contract system
- Contract extension system
- Public extension through private dealing
- Service vouchers

Emerging issues such as financial constraints of government, inability of public extension, to reach increasing need of farmers and commercial agriculture will make privatization of agricultural extension services unavoidable. Farmers group, co-operatives, private firms, Non Government Organizations can play an important role in providing extension services. However considering vast heterogeneity in Indian farming, small holding and large area under dry farming, privatization should be experimented only in potential areas.

PRIVATISATION OF ANIMAL HUSBANDRY SERVICES IN THE CHANGING SCENARIO – A CASE STUDY
R. D. Pandya and R. B. Patel

The escalating fiscal deficits in developing country like India and in many cases, problems of poor governance of public programmes over the last decade have increasingly redirected attention towards how to make extension services of animal husbandry more effective and responsive to animal owners. Majority of respondents had medium level of favorable attitude towards privatisation of extension services of animal husbandry while, out of 13 extension services of animal husbandry, general information on animal husbandry, availability of financial aid for purchasing animals, information on selection of animals, services for natural/artificial insemination, availability of cattle feeds, information on balanced feeding, availability of veterinary services, availability of drinking water, availability of milking equipment, services in milk marketing and guidance on technical problem were found successfully served by private extension services.
ATTITUDE OF FARMERS TOWARDS PRIVATISATION OF AGRICULTURAL EXTENSION SERVICES

M. Jegadeesan¹, T. Rathakrishnan¹ and S. Renganathan³

In the present day context of globalisation and liberation shift that are occurring in agriculture, information technology and government policy are all in the process of change. These socio-economic, political and technical changes inevitably impact the institution of agricultural extension and bring pressure on it also to change. Again there has been a trend towards privatisation of government extension services. Extension services mostly public funded world wide increasingly coming under private domain. The increasing inability of governments to adequately fund its extension machinery was forced to think about alternatives like "cost sharing" and "privatization". Before effecting any change in existing system, it is necessary to know the preferences of farmers. Hence, this research paper conceived with prime objective of measuring attitudes of farmers towards privatisation of Agricultural extension services in Dindigul district of Tamil Nadu.

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EXPECTED CONSEQUENCES OF PRIVATISATION OF AGRICULTURAL EXTENSION SERVICES

M. Jegadeesan¹, T. Rathakrishnan¹ and S. Renganathan³

Agriculture is considered as back bone of India, where around 70 per cent of the population are dependent on agriculture and allied activities for their livelihood. Agricultural important is reasonably recognisable considering the progress of 50 million tonnes of food grain production in 1950 to 196.13 million tonnes in 2000-01. While we can rejoice about past achievement of farmers scientist extension workers and policy makers there is no room for complacency. Since, it is about 16 million tonnes short of the targeted 212 million tonnes of the year. The country will face several new problems since, the resources of agriculture the land and water is fastly shrinking; there is no option in future except to produce more food and other agricultural commodities from less per capita arable land and irrigation water. Mostly it is possible only through information and technology transfer to the farmers as early as possible. Considering poor action of government extension service, thinking about privatisation of extension services is need of the hour. Hence this paper is an attempt to reveal what are the consequences will happen if Privatisation of Agricultural Extension Services are made as perceived by farm scientists.

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ENCOURAGING PRIVATE EXTENSION SERVICES: NEED OF THE DAY
K.M.Dakhore\textsuperscript{1} and K.A.Deshmukh\textsuperscript{2}

Previously most of the extension services were public funded. But in recent years, there has been a trend towards privatization of government or public extension service in our country or worldwide. There is lot of critical observations, regarding privatization of extension services not only in India but also in the world. However, fiscal crisis of the government, poor performance of public extension system, changing context and opportunity like improved transport network, mass media, competency of extension personnel etc were some of the important reasons towards privatization of extension services.

‘Privatization’ refers to the process of which government reduces its role and encourage private sector to take up their roles.

There are mainly two types of private extension services in the world, one which directly involved in farming activities through farmers co-operative society, banks, private agro-business, agricultural input industries, processing industries, marketing firms and multimedia, another is farmers association, self help organization and NGO’s which remain largest dependence on government association.

The economic liberalization has changed the economic scenario in the agricultural sector too. Most the farmers are actively engaged in commercial enterprises, privatization of extension services would be beneficial to them on cost sharing. It is a bare fact that an agricultural technology is becoming more complicated that can no longer be dealt with a bureaucratic approach. Therefore the appropriate time has come to turn wherever possible to the privatization for support not for total substitution. The privatization would create a healthy service that in turn will reduce the financial burden of the government.

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BARRICADES IN ADOPTION OF COTTON INTERVENTIONS INTRODUCED UNDER INSTITUTION – VILLAGE – LINKAGE PROGRAMME
F.L.Sharma\textsuperscript{1}, Bindu Podikunj\textsuperscript{2} and J.S.Panwar\textsuperscript{1}

The study was carried out in Ajmer district of Rajasthan. For this purpose two villages namely Saradhana and Mayapur were purposively selected as Ajmer KVK was implementing TAR in these two villages. The results of the study indicated that inadequate material provided during training, insufficient training to build confidence to initiate crop production activities, improved varieties required more fertilizer for their response, operational difficulties in application of technology, high prices of HYV seeds, lack of money to purchase requisite, lack of motivation and education, lack of coordination among the beneficiaries, adverse climatic and edaphic factors and high cost of inputs were expressed as important barricades by the beneficiary respondents of IVLP in the adoption of cotton interventions.

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It is recommended on the basis of results that ICAR and Government should provide adequate and timely attention to overcome the various problems being faced by the respondents in the adoption of cotton intervention introduced in the study area.

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CONSTRAINTS IN PRIVATISATION OF AGRICULTURAL EXTENSION SERVICES
M. Jegadeesan¹, T. Rathakrishnan² and S. Renganathan³

Recent experiences worldwide suggested that changes may be needed in extension methods and approaches, organisational structures, the content of extension advice, approaches to targeting, the training at extension workers and attitude towards farmers and these all were changed possibly if extension privatised. But it is common fear that the education role played by public extension agencies at present, may lose sight in case extension service are privatised. It likely to widen the already prevailing socio-economic inequality in different parts of the country further. In general the ability of the farmers to pay for the extension service is very weak, because 90 per cent of net sown area is rainfed, farmers are mostly small and marginal, resource-poor. Extension is very serious business these cannot be left to the commercial agencies. Hence this paper attempt to explore the constraints or demerits of the privatisation as perceived by farmers.

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THEME III

Marketing Extension
MODERNIZING EXTENSION APPROACHES AND TOOLS FOR GLOBAL MARKETING

K. Chandrakandan

“One Can’t Employ Yesterday’s Methods today and be in the Business Tomorrow”

From the above quotation, it is evident that we have to keep pace with the changing needs of times. So far and so long, we have been employing mostly personal contact by the extension personnel as the main live wire besides of course, the utilization of mass media such as printed extension literature, magazines, newspapers, radio, TV etc. But most of these were found to be inadequate to deliver the goods timely and effectively.

Alternatively, we can and probably we have to resort to modern media such as use of computers for providing information and messages on crop production, marketing etc. To cite a few, Interactive Multimedia Compact Disc (IMCD), Internet, websites, Agri portals, computer based e-mail groups, computer conferencing etc. In order to make use of the above mentioned modern media, We all need orientation and adequate training in using computers. By we, we mean, the researchers extension staff of Government and NGO, village leaders and others interested.

Now-a-days, farmers need more of marketing news and prices than production technology and so we have to satisfy their expectations through appropriate market intelligence cell, websites exclusively dedicated for market information – not only demand and arrivals, future price prediction and advice on profitable disposal of farm commodities. We can cite a few popular websites an marketing such as http://www.odanchatrammarket.com which had made goods strides not only in terms of getting good price but also creating better publicity for global marketing of some of the vegetables, tomato, onion etc.

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PROSPECTS FOR MARKET EXTENSION EDUCATION FOR AGRICULTURAL DEVELOPMENT

A. Janakirani, H. Philip and P.P. Murugan

Indian agriculture is known for its functionalities of providing employment, livelihood, food, nutritional and ecological securities. Agriculture and allied activities contribute 29.1 per cent to the gross domestic production of India as compared to 2 per cent in the U.S., France, Norway, Japan. Indian agriculture employs 69 per cent of the total work force as compared to 2 per cent in the U.S., U.K., 2.6 per cent in Germany and is a major source of poverty alleviation. So, the economic growth of India is very much depends on agricultural sector. Hence it is necessary to safe guard the agriculture completely.

In the present day agriculture is facing lot of problems like water scarcity, pest and disease incidence, natural calamities, marketing etc. With all such problems farmer harvest good yield. On the other hand farmers well being is ultimately determined at market place. They are not able get reasonable prices due to lack of adequate knowledge on marketing process.

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Farmers marketing knowledge is comparatively lower than the crop production aspects. As farmers are facing heavy competition in marketing, they need education on marketing extension. The marketing extension involves transfer of marketing technologies from the marketing institutions to the stakeholders, namely primary producer (farmers), the intermediaries and the ultimate consumers. In other words, marketing extension refers to the dissemination of information/ideas/knowledge on the improved facilities available in the organized marketing institutions, market arrivals and prices to the farmers, merchants and the consumers and making them to utilize these facilities for their advantages. Therefore, the objective of marketing extension is to appraise the producers, traders and consumers and various voluntary and regulatory measures brought into force for the improvement of marketing system to meet global demands in marketing. Thus, marketing extension education helps in improving the marketing efficiency, which is a single ratio of output to input, by minimizing the marketing costs and maximizing the satisfaction at various stages.

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AGRI PORTALS – A TRANSFER OF TECHNOLOGY TOOL FOR EFFECTIVE MARKET EXTENSION
M. Senthil Kumar, K. Chandrakandan, S.R. Padma and C. Padma

In the globalized era, the world becomes a single entity for living and business, being governed by a common law, without any restrictions on people’s movement. Under present conditions, the developing countries are unable to compete with the developed nations in the international market in terms of production, quality and exports. The farming communities, therefore, must be educated and prepared to adjust their agricultural operations within the context of globalization, by and large, the present extension system cannot do alone, it must be supported with a quick transfer of technology tool. Agri portal is one such tool, which can fulfill the challenges faced by the farmers in globalization and market liberalization, privatization, commercialization, and agri-business etc., Agri-portals are larger websites, which gives information to a particular target audience. Using web browser programs like Netscape and Internet Explorer users can access and retrieve information from web servers around the world.


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MARKET INFORMATION KIOSKS FOR EFFICIENT MARKETING EXTENSION

S. Renganathan and M. Jegadeesan

Efficient marketing extension is an essential component of an ideal marketing policy. In this era of IT revolution, we have ample opportunities to utilise those hi-tech gadgets for providing accurate and latest market information to the farmers.

This would be possible through the establishment of Market Information Kiosks at district level. These kiosks would endeavour to provide one-stop solution to various marketing problems of the farmers. These kiosks would have three-fold objectives viz., to undertake localised region-based market research, to provide market intelligence and to provide consultancy services to the farmers. An attempt has been made in this paper to portray the role and benefits of these market information kiosks and also a model has been suggested to strengthen the linkages between different components of the marketing system through these kiosks.

MARKETING EXTENSION: A NEW DEVELOPMENTAL CONCEPT OF EXTENSION

R. Ganesan

Extension professionals have to bother much about the consequences of innovations when it affects the end-receivers. When once the farmers have positively responded and accepted to fully adopt the technologies advocated, it makes the change agency system to be accountable to them. They have to satisfy the so called “responsive” clientele system by way of providing the terminal services such as marketing, processing, value addition etc. Here comes the significance of the new concept “Marketing Extension” to introduce as a new developmental theme in Extension service.

Marketing Extension, as defined by Thomson, means to extend the knowledge of marketing and solution to the problems of those who are in a position to apply this knowledge in improving marketing.

Comparatively, while Agricultural Extension transfers the technologies of lab to land, Marketing extension intends to transfer the marketing technologies to benefit the specific clientele / stake-holders such as producers, traders and consumers.

This paper would amplify the scope of Marketing extension as a new dimension in the concept of Extension focusing on marketing behaviour, market mechanisms / agencies, motivational issues, farmer-based marketing organizations and the needed reorientation to accomplish the effects of the overall efforts of extension service thereby benefiting the stake-holders.

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STRENGTHENING MARKETING EXTENSION FOR NATIONAL AND INTERNATIONAL TRADE
A.Sakunthalal¹, R.Ganesan² and J.Venkatapurabu³

The inception of WTO provides ample opportunities to maximize the foreign currency of our National economy. The thrusting concept of WTO with the farmers category emphasized the term “agricultural marketing extension”. The essence of the past studies along with TOT implies that the agricultural marketing extension refers to the dissemination of information on the improved marketing technologies to the stakeholders to know about the marketing institutions, market arrivals and price fluctuations globally. The agricultural marketing extension has to educate the stakeholders (farmers) about what to produce? How much to produce? When to produce? Where to market? and How to market? Similarly the traders has to be educated as what to buy? When to buy? From where to buy? How much to buy? and where to sell to fetch higher price? The end users should know the right type of buying aspects like right quantity, right quality, in right place, in right time with right price so as to derive the maximum satisfaction. The agricultural sector accounts for about 19.17 per cent of the total export basket of India and occupied the first position in export among all the major export groups during 1995-96. Foreign exchange earnings for agricultural exports have increased significantly from Rs.1,608 crores in 1971-72 to Rs.1,063 lakh crores in 1995-96. The composition of commodities export from India has also diversified in the recent past from tea, coffee and tobacco to cereals and cereal preparation, fruits, vegetables and their preparations and marine products. Some of these commodities show good promise for boosting exports. If India has to emerge as a major player in the international agricultural market. Agricultural marketing extension has to open many avenues for the farmers to produce produces for export and increasing their income. What is needed in this regard is formulating effective extension training programmes and educating potential farmers towards WTO is (i) Helping farmers to choose right type of crop, (ii) Effective integration of resource system to enhance the biodiversity there by reducing the production cost, (iii) Motivating farmers to follow the recommended production strategies, (iv) Paving way to know the international quality standards stipulated for export, (v) creating awareness about various marketing infrastructure available and government policies in the light of globalization of farm trade, (vi) Helping the farmers to organize the commodity clubs so as to commercialize their production activities, (vii) Making access to utilize the production technologies of the export oriented crops by creating websites and (viii) Also encouraging the farmers to utilize the existing websites for up-to-date and authentic information on production and marketing. Similarly, other measures such as setting up of agro-processing industries, packaging technology, market information network, development of pests and disease resistant varieties through the application of bio-technology, proper advertisement in the international market etc., needs to be given their due attention.

Export promotion organizations and WTO cells should be established in each state of the country to entrust the responsibilities of studying the export competitiveness, impact of WTA

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commitments on Indian agriculture, drawing safeguard measures to protect the interests of Indian farmers from time to time. Thus marketing extension paves way for agricultural export nationally and internationally.

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EXPORT OPPORTUNITIES FOR ORGANIC SPICES
C.Padma¹, S.R.Padma², M.Senthil kumar², and N.Balasubramani³

Given the increasing demand for organic spices in the global market, there is a tremendous potential for its export, if concentrated efforts are taken to promote their organic cultivation, say Spice Exporters. The Global demand expected to be 57,000 tonnes which is about 10 per cent of the conventional spices market estimated at 5.7 lakh tonnes. Spice exporters, attributes this growth to the move towards convenient foods which has an impact on the demand for organic spices. Besides, there is a growing shift in the developed World towards the organic food products and processed food can be labeled only if 95 per cent of the ingredients originate from organic Agriculture. This paper highlights, the Organic Markets available around the World, Consumption pattern of organic products, demand and export potential of Organic Spices.

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MARKET ORIENTED EXTENSION EDUCATION FOR LIVESTOCK DEVELOPMENT
AN EMERGING ISSUE
B.p.Singh¹, Rupasi Tiwari² and M.K.Mandape³

Extension Education is playing a pivotal role in teaching and sensitizing the farmers on various sphere of their livelihood system and is being used as a tool or strategy and over a period of time has emerged as an intervening agency to resolve farmers' problems and assist them in enhancing production and productivity. Although, India has attained first position in milk production (85 MT) but has not been able to make any dent in international market, because of serious quality constraints in products, in corresponding figure of production. Out of total milk production, maximum milk is being produced at small scale farm equipped with poor resources and there is always a question mark about hygienic milk production and livestock management which is not as per the national and international standards earmarked to meet the prerequisite condition for WTO (World Trade Organization). This calls for policy support to encourage use of latest technologies at the milk producers' level, for promotion of quality and clean milk production. Enhancing export opportunities for livestock produces require strengthening the technical and managerial skills and capacity of farmers and marketing extension as well. Moreover, a Kisan credit like schemes need to be formulated for livestock production. For this, the Extension

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Education as a discipline require to play a major role, which has been concentrating so far in augmenting the adoption rate of the profit-driven technology to escalate farmers socio-economic strata. But now the scenario has changed and the extension education needs to be focussed, particularly on to produce more quantitative and qualitative products for export-oriented standard. There is a need to make the farmers technically capable and skill oriented by formulating extension education programmes so that products of international standards can be manufactured and exported to gain foreign revenue.

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INNOVATIVE APPROACHES FOR EFFECTIVE FUNCTIONS OF PUBLIC AND PRIVATE EXTENSION SYSTEM – A CRITICAL ANALYSIS
A.Sakunthalai, R.Ganesan and J.Venkatapirabu

Farming community in India constitutes more than 65 per cent population and contributes 27 per cent of its Gross Domestic Product (GDP) besides contributing considerably to its export earnings. Significant and meaningful revolution in the technology adoption led to unprecedented changes. However in 21st century, the challenges are immense to produce more from less per capitis arable land and irrigation water in an environment friendly manner. Socio-economic development of the farmers dependent on technological development by the National Agricultural Research System. Tremendous progress has been made in increasing agricultural production and productivity in our country with the combined efforts of farmers, extension personnel and research workers have made it possible to achieve the progress. In addition, from the early 60s onwards, ICAR has been implementing a series of frontline extension programmes starting with National Demonstration scheme followed by Krishi Vigyan Kendra, Lab to Land Programme and the Operational Research Projects, covering various crops in different agro-climatic regions of the country.

During the last decade, ICAR initiated the Institutional Village Linkage Programme for assessing the technologies for their suitability to different agro-ecological situations and also to refine these technology to make them more acceptable. Under “Innovation in Technology Dissemination” component of the National Agricultural Technology Project (NATP) a series of strategic investments intended to introduce programmes and institutional adjustment at national state, district, block and village level and operational changes in the methodology in which the extension workers are trained, interact with farmers and communities, communicate information and coordinate with the private sector. This will enable the technology dissemination system to focus more precisely. On solving farmers’ problems while enhancing the financial sustainability of the farming community. The implications of Policy Reforms for Agricultural Extension System (2000) such as expanded role in Public Extension System, partnership between public and private extension and finance, decentralized plannings, larger degree of flexibility, farmers self help groups as viable economic organizations and more resources favours the inclusion of more innovative approaches.

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The contribution of public extension in attaining self reliance in food production is very well recognized. But in this changing time, public extension alone cannot be adequately addressed with the limited resources and wide ratio between farmers and extension workers and also by added responsibility of handling emerging issues like marketing extension, agri business and WTO. So it required the combined strengths and synergies of a pluralistic, multi agency system in which the private corporate sector, farmers organizations, cooperatives, NGOs, para professionals, small agri business, self help groups, input dealers and suppliers, electronic and print media and information technology system. Thus the need of the hour is to emerge private – public partnership in Agricultural Extension for the gigantic task of providing a quantum jump to agriculture in this new millennium.

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THEME IV

HRD in Agriculture
SKILL-BASE FOR DEVELOPMENT AND BOON FOR PROSPERITY
M.R. Bhatt¹, P.M. Bhatt², S. R. Patel³

Sardar Samruti Kendra is “Heart of Farmers,” always working for all-round development of farming community of Anand Zone & Gujarat Agricultural University. It impart the training to farming community in the field & Agricultural, Animal husbandry, horticulture, home science, health and sanitation etc. with the help of training farmers & farmwomen perform their function very effectively and achieve their ultimate goal of increasing production, productivity and improve their standard of living.

Skill plays vital role in adoption of new emerged technology. Through skill one improve his competency and performance in using knowledge efficacy. Skill can acquired through various training methods. Among all methods of training “Method Demonstration” plays its important role in acquiring skills. Keeping this concept in mind during imparting the training to farmers at Sardar Samruti Kendra, Anand a special session for “Method Demonstration in Mango Softwood Grafting” was included. To measure skills of the farmers regarding softwood grafting was divided into eight steps. Each step was analyzed through the observation method. The respondents were requested to do all steps of softwood grafting. The performance was recorded for each step in three continuum. The weightage of each step was determined as average of the weightage given by expert and skill acquired by each participants were worked out.

During the training period i.e. from April. 03 to July 03, 90 (Ninety) farmers were trained in this regards. Majority of them were belong to middle age to young age having primary to H. Sc. level of education, posses 2 to 4 Acre of land, have above 15 years of farming experience and membership in almost one Organisation. Looking to the result of skill performance, majority of them gain skill up to medium level followed by higher level of skill gain. The trends of gain in skill was from M.L. to H.L. which showed that the positive attitude of farmers towards acquiring skills of upliftment of their standard of living.

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EDUCATING FARMERS TO FACE THE CHALLENGES OF GLOBALIZATION –
A NEED OF THE HOUR
M. Senthil Kumar¹, K. Chandrakandan², S.R.Padma³ and C. Padma⁴

In the globalized era, the world becomes a single entity for living and business, without any restrictions on people’s movement. Liberalization in an integral part of globalization, which calls for removal of trade barriers, tariffs and other regulatory measures, so as to move goods freely between countries. Under such conditions, the developing countries cannot compete with the developed nations in the international market in terms of production, quality and exports. Therefore, the farming community must not only be flooded with technological information but also be educated in the aspects of globalization, commercialization and agri-business, environmental concerns, bio-technology issues, and

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the use of Information Technology for information access and to understand market status around the world etc. This paper gives an overview on the areas the farmers need to be educated to face the challenges in near future to compete in the global market.

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 KRUSHIMANTRA: A DECISION SUPPORT SYSTEM FOR INDIAN FARMERS  
Sanjay Chaudhary1, Ashok Patel2, and B. V. Buddhadev3

State Agricultural Universities in India generates quite a large number of useful farm technologies for the farmers. Except a few technologies including good crop cultivars, not many technologies have reached to the farmers. Indian farmers are unable to receive the right type of information at the time when it is required. Further the complexity of agro-climatic and farming conditions obstructs the farmer to take precise decision at the right time. Indian farmers are the owners of small sized and geographical distributed farms. As such no generalized technological package can be applicable in such conditions.

Farmers make on farm decisions based on technological information about crop production along with information of farms owned him/her, past history of crops cultivated, agro-climatic conditions, availability of agro-inputs, economical condition, market prices, etc. The lack of availability of proper information restricts farmer to utilize his capability to become more innovative and productive in various aspects of farming.

An attempt has been made to develop ‘KrushiMantra: a Decision Support System for Indian Farmers’ to aid farmers to make correct and timely decisions regarding farm activities. The architecture of Krushimantra is structured to incorporate context based knowledge and information regarding farm production system. Such a knowledge-based system will support retrieval of required information pertaining to a relevant farm situation.

HUMAN RESOURCE DEVELOPMENT WITH SPECIAL REFERENCE TO DRIP IRRIGATION SYSTEM  
C.P. Desai1, M.R. Patel2, Arun A. Patel2 and J.C. Trivedi4

Nowadays extension education has become largest problem solving educational system of the world. It has become a powerful instrument of change for bringing about the change about socio-economic transformation of rural people utilizing the latest scientific and technological innovations and know-how. It is an applied behavioural science, the knowledge of which is to be applied for resource development is the process of increasing knowledge, skills and capabilities of all the people in a society. In economic terms, it would be described as the accumulation of the human capital and its effective

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investment in the development of an economy. Human resource development play its role in rural development by educating rural people so as to enable them to identify important farm problems as per their need which could be solved by the use of scientific knowledge and motivated to apply the scientific knowledge for desirable changes in behaviour. Use of improved technologies is a major contributing factor to increase productivity and consequently the income of the farming community. In Gujarat only 23 per cent of the total cultivable land of the state is under irrigation. Even with the fullest exploitation of the Sardar Sarovar Project, about 52 per cent of the State agriculture would be dependent of the mercy of monsoon, particularly erratic, inadequate and uncertain rainfall. Hence, it is necessary to economize the use of water for agriculture to bring more area under irrigation. This could be achieved by introducing the advanced and sophisticated method of drip irrigation.

Keeping in view HRD with special reference to drip irrigation system, this study only was conducted to measure the knowledge and attitude level of respondents about drip irrigation system. An effort was also made to study techno economic developments (changes) consequent upon adoption of drip irrigation system and to ascertain the extent of economic gain accrued by the respondents as a result of adoption of drip irrigation system. The study was conducted in six taluk as of Junagadh district. Four villages having maximum number of drip sets installed in mango orchards were selected from each taluka. A total of 175 respondents were selected with proportionate random sampling procedure, which constituted 24 per cent. The data were collected through personal interview technique.

A large majority of the respondents were found to have medium level of knowledge and moderately favourable attitude towards drip irrigation system. Majority of them were found to have medium level of techno-economic consequences as a result of drip irrigation system. The adoption of drip irrigation system had contributed a significant increase in area under fruit crops. Cropping intensity and cropping pattern in the farmers fields with the inclusion of several fruit and commercial crops has been changed. Farm machinery/farm implements and household possession had also been increased and many farmers had diverted their cropped area to orchards. The savings and investment, standard of living and self-sufficiency of majority of the respondents had been increased as a result of adoption of drip irrigation system.

Majority of the respondents had accrued medium level of overall economic gain of drip irrigation system. Majority of the respondents had benefited by saving of water, weed control expenses, labour for irrigation and inter culture operations. In addition to this, the respondents got the benefits of better yields, better fruit size, early maturity of fruits and higher market price of the produce by adoption of drip irrigation system.

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HUMAN RESOURCE DEVELOPMENT THROUGH GAMES
Arun, A Patel, M R Patel and C P Desai

Games are the part in the process of providing learning experience. Learning of course can take place at three levels: Cognitive, affective, and psychomotor. The acquisition of knowledge, attitudes or skills can be expedited through proper use of an appropriate game. It should be made clear that games are neither better than other approaches nor a replacement for them. There are different games but each having unique features. It facilitates the learning.

The facilitation of learning are, (1) Repetition (2) Reinforcement (3) Senses (4) Interest (5) Recreation (6) Useful to all ages (7) Motivation for concentration (8) Helpful to teach difficult points (9) Development of discipline (10) Development of the friendship.

The games are used (1) To create the learning atmosphere (2) To involve the participants (3) To retain the key points (4) As session icebreakers (5) As illustrations (6) To develop the skills (7) As session closings (8) To secure the feedback (9) To promote healthy competition.

The recommendations given are
1. At present useful literature on games, which could be used during training is scarce. Hence, it is burning need to have literature on games. It is expected that effective games are to be used during training for rural people and grass root extension workers in order to make training more effective.
2. It is also suggested to give intensive training to the extension functionaries for the use of the games in HRD in rural development.

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SIMPUTER - A TOOL FOR BRIDGING THE DIGITAL DIVIDE AMONG COMMON MAN
K Chandrakandan, N Balasubramani, M Senthil kumar, S R Padma and C Padma

A rapid growth of knowledge can only happen in an environment which admits free exchange of thought and information. The PCs and other information technologies are beyond the reach to the common man due to its high cost and require skill to operate. This created a digital divide among rich and poor. The Simputer is a low cost portable keyboardless handheld device with a (320x240) LCD panel which is touch enabled; a speaker, microphone and a few keys and soft-keyboard by which the benefits of IT can reach the common man. It has a special role in the third world because it ensures that illiteracy is no longer a barrier to handling a computer. The projected cost of the Simputer is about Rs 9000. But even this is beyond the means of most citizens. Hence, Simputer may be shared by a community at either Panchayath office, community center, SHGs etc. The impact of this feature coupled with the rich

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connectivity of the Simputer can be dramatic. Hence, Simputer, is not as an end product but as an evolving platform for social change. This paper highlights the applications of Simputer in diverse sectors such as micro banking, large data collection, and agricultural information and as a school laboratory etc.

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HUMAN RESOURCE DEVELOPMENT FOR EFFECTIVE TELEVISION MEDIA
Arun patel1, C.P. Desai2 and Mahesh Patel3

Doordarshan as well private channels like E.TV are telecast agricultural programmes regularly. The main source/roll for the production of this programmes are agricultural scientists/extension workers, who is neither mainly engaged for this job nor they are trained for production of video programmes. Similarly, the producer works at the end of Doordarshan/Private channels have not much knowledge of agriculture. Further, the production of agricultural programmes is rather more difficult, as it is location specific, seasonal, multi disciplinary and changing in nature. In such circumstances, it is essential to find out what are the mistakes usually committed while production of programmes and on that basis they should be trained.

EXPERT SYSTEM: AN EMERGING TOOL FOR TECHNOLOGY TRANSFER IN AGRICULTURE
N.Balasubramani1, K.Chandrakandan2, M.Senthil kumar3, S.R.Padma4 and C.Padma5

The continuing rapid development of telecommunication and computer-based information technology is probably the bigger factor for change in extension. There are many possibilities for the potential applications of these information technology and computers in agricultural extension. Computer technology has now advanced to the point where software programmes are available to assist in filling the knowledge of experts for analysis and design of complex problems. An expert system (Es) is a computer programme that is designed to emulate the logic and reasoning processes that an expert would use to solve a problem in his/her field of expertise, using artificial intelligence technology (Waterman,1986). The uses of expert systems are virtually limitless. It performs many functions as an expert does. They can be used to help diagnose, repair, monitor, analyze, interpret, consult, plan, design, instruct, explain, learn and conceptualize. The application of expert system technology to agriculture seems natural, considering widespread use of extension agents in the field. In reality, It is not practicable and feasible to provide scientists expertise when and where problem occurs at field due to many constraints. On the other hand, the extension personnel who have direct contact with farmers usually are generalists, may not be expertised on all the technologies, Hence, the expert system intends to helps farmers to make better decisions and provide useful advice, filling the knowledge gap between the expert and the user.

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This paper provided an overview of expert system concept and its various applications as a result of recent advances in computer system concept and its various applications.

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IMPACT OF CORRESPONDENCE COURSE ON ANIMAL HUSBANDRY WITH REFERENCE TO HUMAN RESOURCE DEVELOPMENT

Mahesh Patel¹, Arun A. Patel², C. P. Desai³, K. S. Patel⁴

A correspondence course on Animal Husbandry was conducted by the university for field assistants of Gujarat Sheep and Wool Development Corporation to improve their knowledge. The field assistants were involved in extension activities as well as first aid of sheep diseases and marketing of wool. They do not have any formal education in the field of Animal Husbandry earlier. Therefore, to improve scientific knowledge in the field, the course was designed in form of 34 lessons, self-study and evaluation apart from field training. Human resources development is the process of increasing the knowledge, skill and capabilities of all the people in a society. In economic terms, it would be described as the accumulation of the human capital and its effective investment in the development of an economy. Human resource development play its role in rural development by educating rural people as well as grass root level extension and technical person so as to enable them to identify important problems as per their need which could be solved by the use of scientific knowledge and motivated to apply the scientific knowledge for desirable changes in behaviour.

Keeping in the view HRD with special reference to animal husbandry, this study was conducted to know impact of correspondence course on animal husbandry organised by GAU with additional intention to know the difficulties faced by the participants along with their opinions and suggestions regarding the correspondence course. So that in future, the necessary planning and modifications may be made on the basis of the studies.

The results of the research revealed that respondents of middle age group having SSC and above education took advantage of this correspondence course. Majority of respondents perceived that this correspondence course is most useful and they acquired additional knowledge in various subjects/areas of animal husbandry. It is also reflected that majority (76.25%) respondents had highly favourable to favourable attitude towards this correspondence on animal husbandry and they had not faced any constraint during the said correspondence course.

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STRATEGY FOR TECHNOLOGICAL EMPOWERMENT OF WOMEN IN AGRICULTURE
Dhriti Solanki and Indra Ahlawat

Despite active involvement of women in agriculture, a gender analysis of development efforts indicate that farm women continue to be relatively disadvantaged in terms of their access to agricultural information, with the result that they are largely performing their roles with traditional knowledge and experience. Fruits of technological advancements hardly reaches them. Though considerable efforts are being made by the government for technological empowerment of women farmers however, their status could not be substantially raised. There are number of constraints identified in technological empowerment of farm women which includes personal constraints viz. illiteracy, lack of useful education for production oriented activities, psychological barriers; social constraints like traditional role of women, limited access to education and training, apprehension of social disapproval; organizational constraints i.e. non-availability of farm women centres, lack of facilities to look after young children and technical constraints viz lack of appropriate technology, improper communication system lack of need based programmes, etc.

In order to overcome these constraints effective information system is needed at various hierarchical levels. For building technical competency among farm women, location specific need based training modules need to be development by identifying technological gaps in specific areas. A system approach to information flow is needed which would include options like diversified use of communication channels, use of modern information technology, equipping grassroot level agencies with facility to get latest information and developing feedback mechanism. To facilitate easy communication female extension personnel are required at various hierarchical levels. Similarly to overcome social constraints, group approach by organizing women in the form of Self Help Group need to be promoted. There is a strong need to recognize multi-agency collaborative mode of managing public extension services which includes a wider role of NGO.

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EDUCATION FOR TECHNICAL AND MANAGERIAL SKILL DEVELOPMENT OF WOMEN IN AGRICULTURE
Indra Ahlawat and Dhriti Solanki

According to 2001 census of India 48.2% of over one billion population constitute females. About 46% of female population is still illiterate. The gap between male and female literacy rate is 21.70%. Globally also according to United States 1991 census women constitute about 48.3% of world population. Human work hours put in by women is two third of the total work hours whereas world’s income received by women is one tenth of total income.

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A critical analysis of the five plans of India over the years starting from independence reflect that women development has always been focused with high priority. Still there remains a big gap between targets of various government programmes for the development of women and their achievements. In order to equip women in general we should make special efforts for women in agriculture and those in rural areas as the latter constitute about three fourth of women population of India. We should reorient our strategies in the direction which can help women to gain confidence, competence and initiation for involving themselves in various familial, social, economic and political activities. The first and central step in this regard is educating women, improving their skills, enhancing their competence, making them realize their potential and dovetailing their entity in the main development process. For this it is necessary to identify various constraints inhibiting women education and removing them. Formulation of suitable strategies for effective women education and training for their managerial and technical skills and implementing those through formal and informal programmes should be ensured. In this paper, specific suggestions for the primary and higher education for women in agriculture and specific trainings suited for them have been proposed and discussed.

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ISSUES IN MANAGEMENT OF HUMAN RESOURCES IN PUBLIC EXTENSION ORGANISATIONS

B.U. Dupare

Effective management of an extension organization requires the three management tasks viz., decision making, management of resources and manpower and their efficient utilization to be carried out in a planned and systematic manner. This means each task must be evaluated and short and long-term plans prepared to ensure different decisions are well attuned to each other. Agricultural development depends not only on farmers and the extension organizations, but also on many other organizations such as departments responsible for irrigation, research, credit, input supply, public health, farmers' union etc. Hence, we must also pay attention to management of the joint efforts of all these organizations as well as to extension.

The extension organizations operate in an environment, which provides it with a budget and with manpower, which in turn influences its goal and those of farmers. This environment is changing rapidly. Hence, the extension organizations must be made aware of these changes.

The motivation of its staff is also have a great importance in order to make the communication effective. Supervision of extension staff is much more difficult because they work in many locations scattered in a large area.

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HUMAN RESOURCE DEVELOPMENT WITH SPECIAL REFERENCE TO POULTRY TRAINING
K. S. Patel1, Mahesh R. Patel2, Arun A. Patel3, C. P. Desai4

Poultry production has come up as an independent occupation and shown a tremendous growth in Surat, Valsad, Kaira, Anand and Ahmedabad districts of Gujarat. For such an important rural occupation, trained manpower is a basic requirement. In order to impart skill-oriented vocational training to practicing and prospective poultry farmers, poultry training centre has been established at Anand in 1963-64. During 10 weeks of training, important subjects related to farm poultry production viz., care and management, feeding, housing, marketing, etc. are covered and a certificate is given to successful trainees. Work experience for various operations is an integral part of this vocational training to develop confidence and necessary skill in the field of farm poultry production.

Human resource development play its role in rural development by educating poultry keepers so as to enable them to identify important poultry problems as per their need which could be solved by the use of scientific knowledge and motivated to apply the scientific knowledge for desirable changes in behaviour. Keeping in view HRD with special reference to poultry training, this study only was conducted to measure the effectiveness and practical utility of this training programme. Further, it is also necessary to know the opinions and suggestions of the trainees trained in this programme, so that in future, necessary planning and modifications may be made. In this context, the study was conducted with the following specific objectives.

The results show that youth with education up to or above higher secondary level took advantage of the training. Majority (61 per cent) of the trainees were from Kaira. Majority of the respondents perceived that all the theoretical as well as practical courses were useful and they acquired important skills required for poultry farming. Majority (78 per cent) of them had a positive attitude towards the training. After the training, the trainees were either self-employed (34 per cent) able to run their poultry farm more efficiently (23 per cent) or employed (10 per cent) on poultry farms.

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AGRICULTURAL HUMAN RESOURCE DEVELOPMENT FOR BUILDING COMPETENCIES TO MEET THE CHANGING SCENARIO
N. Balasubramani1, K. Chandrakandan2 and P.S. Swathilekshmi3

Of late, the outlook of agricultural sector in India is undergoing a shift towards market orientation. The future of agriculture sector in the country needs to ensure sustainable food and livelihood security and to take advantage of liberalized environment to reach pre-eminent position in the global agriculture trade.

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It is time that the agricultural universities need to shift their priorities from quantitative achievements. There is need to lay greater stress on practical field training to infuse confidence among the outgoing graduates. The newly emerging sub sector in agriculture need professionals specially trained in the sectors like, food processing, post harvest processing, value added technologies of fruits, vegetable, medicinal and aromatic plants, export of agricultural commodities, agribusiness management, information technology, IPM, biotechnology, application of remote sensing biodiversity, WTO, IPR, etc. There is need to strengthen student placement counseling, agri-entrepreneurship and agrimanagers. Updating the competency of faculty is another important requirement and creation of opportunities for consultancy services is essential inputs for HRD.

The extension functionaries in coming years is under changing scenario after operationalisation of GATT agreement and will have to play larger role as manager to discharge their responsibilities and require various skills like technology and technical skills, organizational skills, managerial and communication skills and business skills.

India can feed its people reasonably well in near future if the required competencies are built among agricultural graduates, extension personnel and farming community.

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**CONSTRAINTS FACED BY THE TRIBAL FARMWOMEN IN DERIVING BENEFITS THROUGH SELF HELP GROUPS PROGRAMMES**

K.L. Dangi and Rakesh Khajuria

The present study was conducted in Badgaon block of Udaipur district in Rajasthan. The sample comprised of 75 literate and 75 illiterate tribal farm women, drawn from 10 selected villages having maximum number of beneficiaries under SHG’s. Data were collected through interview schedule and interacting with the respondents (face to face). Findings indicated that the constraints viz. programme activities of SHGs are organized at odd hours, there is no facility like Aganwadi/Balwadi/Creche for small children, centre is far away from residence, illiteracy among beneficiary women, poor documentation of the work done by the SHG’s secretary, faulty planning of SHGs programme, programme activities get adversely affected during peak agriculture season and social relations cannot be maintained due to involvement in SHGs programmes were the most important constraints faced by the tribal farmwomen.

It is recommended that SHGs centres should be established at the nearest place of participating women. There has to be provision of Balwadi/Anganwadi/Creche for the children of women. The educational level of tribal farmwomen be improved through adult education, the documentation...
procedure of SHGs must be improved, planning of SHGs has to be well thought out and activities of SHGs be so organized that may not affect peak agricultural operations.

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ENHANCING EFFICACY OF SELF HELP GROUPS OF WOMEN FARMERS: FIELD REALITIES AND INTERVENTIONS

Premlata Singh 1, Anita Jhamtanl 2, Ruchi Srivastava, Chhaya Bhadauria 1, Rahul 5 & Dibyanshu Shekhar 6

Participation of women in agriculture has been silently appreciated without much recognition and recording of their contribution and preparing them for active involvement in the development process. In spite of their participation women farmers have been bypassed in the agricultural development process. The role of women in agriculture has changed dramatically in developed nations after the advent of the advances of science and technology in farming practices and calls for appropriate interventions. 36 Self Help Groups have been formed in Delhi Villages under the NATP project “Empowerment of Women in Agriculture” belonging to more or less similar social and economic backgrounds. Two or three members with leadership qualities have become office bears of the group. They have started savings and credit. They have taken up some agri-based activities, depending on the needs of the members and their abilities.

Capacity building of women farmers is required. This can be done through environment building campaigns like prabhat pheris, trainings etc. Under the project, 19 trainings were organized for 540 SHG members covering agri-enterprises, entrepreneurship development, drudgery reduction etc. According to feedback of women these trainings were effective as it motivated them, gave them a dream and developed confidence in them. Through trainings farm women have also developed skills for use of various tools and implements as well as for preparation of pulse making, rice milling, masala grinding etc. as the domestic and small scale operations. Improved agricultural implements introduced to farm women as technological intervention were appreciated and extensively used by them as they not only saved their time, energy, reduced drudgery and health hazards but also were technologically relevant to their needs, socially appropriate, economically accessible and could be used and maintained in the local environment. Moreover, they also felt the need for improved tools for drudgerous tasks like milking, feeding of animals etc. Field experiences under the project revealed that there is a need for training in conflict resolution. The main conflicts were over issues like collection of money, selection of place for keeping machine, cooperating with women etc. There is also a need to improve the technical and managerial capacity of women farmers as well extension and development professionals in order to improve the effectiveness of SHG leading to empowerment of farm women. The paper deals in detail with the field experiences and interventions under the project.

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USEFULNESS OF THE TRAINING PROGRAMMES AS PERCEIVED BY WOMEN SHG MEMBERS

D. Vengatesan¹ and Santha Govind²

Women are now coming out of their seclusion and are assuming greater responsibilities in national reconstruction activities. Women comprise of almost half of the world's population and nearly half of the available human resource is constituted by women. The Self Help Group concept is a silent revolution promoting women development in many parts of the world. The problem of rural unemployment and under employment is a massive one.

The study aims at analysing the perception of the respondents on the usefulness of the training programmes of women Self Help Group members offered by the NGOs. Three types of trainings were conducted for the SHG members viz., SHG members training, training on communication and activity based skill training. A sample size of 120 women SHG members organized by the NGOs under the Tamil Nadu Corporation for Development of women formed the sample of the study. The study was undertaken with six SHGs of Cuddalore district in Tamil Nadu. The results relating to the usefulness of the training programmes was seen against three training programmes offered for SHG members. The subject matter areas which were found to be useful under SHG members training were viz., group income generation programme, green village, health and nutrition and literacy. The subject matter areas under activity based skill training were perceived to be useful by a large proportion of the respondents.

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ORGANIZATION OF SELF HELP GROUPS OF RURAL WOMEN: STRATEGIES AND POLICIES

Premlata Singh¹ and V.G. Sunil²

A paradigm shift in the development policy is required in view of the changing role of private and public sector and the changing market forces. In the absence of socio-economic mechanisms that facilitate in meeting the ethical standards for social economic equality in a highly stratified Indian society, the deprived, especially the rural women, can effectively join together to create collective synergy and employ collective pressure to meet many of their unfulfilled needs and dreams. The Self Help Groups assume great importance in this context. In fact, benefits of technological change will be maximum when efficient and responsive SHG's of farm women are in place and these do have the potential to bring about a revolutionary change. The mushrooming SHG movement in our country is emerging as a powerful tool and vehicle for empowerment of women. In order to be really effective SHG's have to move forward from single focus on credit to wider transformative agendas like finding creative and innovative means to improve quality of life of rural women and strengthen their voice in public and political sphere.

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Inspite of the proliferation of SHG's the full potential of utilizing farm women SHG's remains untapped. The research component, especially on the social impact and systematic methodologies, is lacking. It is also essential to generate a data base on self help. SHG's need to be scaled up to form federations which need to be linked up at national level. We need critical studies on the functioning efficacy, successes and failures facilitating and hindering factors and impact on quality of life and empowerment. Empowerment framework/indices need to be developed and used which include personal indicators (Self confidence, self-esteem, attitude towards self-others, society, decision making abilities, coping strategies etc) and household indicators (improved homes, educated children, nutritional status, health etc). functioning variables also need to be researched (group cohesiveness, communication, participation, interdependence, leadership etc).

The paper deals in detail the strategies for effective organization of SHG's at Identification, Cognizance, Mobilization, Activation, Legitimization, Stabilization and Sustenance stages. Strategies are also enlisted for socio-psychological, technological, managerial and quality empowerment at individual Self Help Group and Federated Group levels. The paper concludes with a critical SWOT analysis of Self Help Groups.

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IMPACT OF SKILL TRAINING OF TRIBAL FARMERS
P. M. Bhatt¹, M. R. Bhatt², M. M. Padheria³

Tribal people all those who are still not full within the reach of fruits of freedom and struggle for development and prosperity required immense concentration for transfer of technology. It is a challenging task for India and agriculture. We have latest technology in agriculture but its accepting of innovations by the farmers is one of the main tasks before the nation. For adoption of any new innovation or technology, required the skill to perform particular technology in ones own situation. In this context the study was under taken in Gujarat for tribal population which is mainly located from Valsad district to Banaskantha district. Banaskantha district has 15 to 18% tribal population. So, this study confined only for Banaskantha district / The Krushi Vigyan Kendra Deesa which is importing training to the farmers and managed by Gujarat Agricultural University was the focal point for study. The participants of the KVK, Deesa were considered as respondents for this study. Totally, 80 tribal farmers were considered as respondents who availed the three days training programme at KVK Deesa.

This study covers main objective to assess the extent to which the training needs were full filled by the KVK training programme. KVK imparted the training in Maize production technology.
The data of the study reveals that majority of tribal farmers had high level of training need in all aspects of maize cultivation. After giving training, result showed that there was significant improvement in performing the operations of selected aspects of maize cultivation and statistically significant at 1 per cent level. The data for the skill performance showed the same trend. It proves that training improves skill performance in all aspects of technology.

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IMPACT OF SKILL TRAINING OF TRIBAL FARM WOMEN
P. M. Bhatt¹, M. R. Bhatt ², M. M. Padheria ³

Woman is playing vital role in family development. In agriculture more or less 80 per cent farm operations handled by woman. Also she plays very crucial role in home management practices. Irrespective of any cast or religious this observation follows. The economy of any agrarian family based on agriculture and other subsidiary occupation e.g. Animal husbandry poultry, etc. In tribal family economy is mainly based on agriculture, wood cutting and selling, handy crafts, cottage industries, dairying, poultry keeping, rope making and leaf cup making etc. The knowledge and skills of recommended practices of agriculture and allied enterprises is very poor. It is need to improve their knowledge, skills to improve their standard of living. This can be achieved by intensive training based on their needs. For the training, Government of India established Krushi Vigyan Kendra in each district to impart training to farming community to improve their standard of living.

The present study was taken in the Banaskantha district which comprises 15 to 18 per cent of tribal population. The Krushi Vigyan Kendra, Deesa, which is managed by Gujarat Agricultural University, impart the training to this tribal farmers and farm women in agriculture and allied field. The tribal farm women were given training in field of home science with a view to improve their district which will constitute their physical and mental health. Totally, 70 tribal farmwomen were given three days training on home science & economic aspects viz., 1) cooking of chapatti, 2) stitching and folk embroidery, 3) Milking procedure and 4) rope making.

The research data reveals that the that the knowledge level of the tribal women in all aspects of home science was low except in case of cooking chapatti, was at medium level. Their training need in these respect, were very high except chapatti making which was medium. After training imparted at KVK, Deesa the result showed that training needs of tribal women come down from high level to medium level in stitching and folk embroidery & milking procedure. In case of cooking of chapatti, it was reduced from medium to low level of training need. The differences in mean score of training needs

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were statistically significant at 1 per cent level. The same result was observed in skill performance, which shows that through training the individual can improve its own skill in performing any activity.

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**SELF-HELP GROUP -A STRATEGY FOR CAPACITY ENHANCEMENT OF RURAL WOMEN**

Sarita Vaish¹, Neelam Bhardwal²

After independence the Indian Government stressed on rural reconstruction by emphasizing on socio-economic justice and improvement in the quality of life for rural poor and weaker sections of the society such as women, at the grassroot level. Under different Five Year Plans various development programmes were initiated to ameliorate the conditions of women. The programmes were centered around welfare and beneficiary oriented approach. The objective of these programmes shifted towards women empowerment through self motivated efforts, during Ninth Five-Year Plan (1997-2002). Rural women’s development and empowerment projects were launched to promote the social and economic development of women and creates environment for social change to improve quality of life through Self-Help Group.

The Self-Help Groups have emerged in order to help the poor women in securing inputs like credit and other services. The formation of Self-Help Groups has enabled the women to become economically independent, break out of the vicious cycle of poverty and live with dignity and confidence (Times News Network 2003). Women have found a new identity through the Self-help Groups. Their involvement with the Self-Help Groups has made them discover their inner strength, gain self confidence, social and economic empowerment and capacity building (The Hindu 2001). Self-Help Groups enhance quality of life and improves status of women as participants, decision makers and beneficiaries in the democratic, economic social and cultural sphere of life. It inculcates great confidence in the minds of rural women to succeed in their day to day life.

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**EXTENSION STRATEGY FOR CAPACITY BUILDING OF SMALL AND MARGINAL FARMERS FOR SUSTAINABLE DEVELOPMENT UNDER W.T.O., REGIME**

S. K. Meti¹, Ravi M. Sambrani² and K.N. Doddamani³

The role of small and marginal farmers in food production is much recognised. But they are, in general, have not been able to participate fully in Agricultural development programmes. The research study was conducted in Tunga Bhadra Project area (during 2000) to study the awareness and knowledge of small and marginal farms on land management practices, Integrated pest management and subsidiary occupations (with random sample size of 240 small and marginal farmers). The study revealed that, large

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majority of small and marginal farmers (71%) aware of contour bunding, cultivating across the slop (62.95%) among land management practices. The other land management practices, IPM and subsidiary occupations were aware by less than 40% of small and marginal farmers which is considered to be a very serious lacuna. The main reason for unawareness of improved agricultural practices by majority of (60%) farmers might be their inability to achieve the average productivity and weak financial position. Hence, there is a need to build the technical and financial capacity of small and marginal farmers through the effective extension strategies.

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CAPACITY BUILDING AMONG EXTENSION PERSONNEL IN 21ST CENTURY  
S. R. Patel¹ , N. R. Patel² and A. C. Patel³

The importance of Human Resource Development for Agricultural Extension is increasingly being realized. It has assumed all the more significance in the context of changing agril. scenario from subsistence to surplus/commercial agricultural and from development centered production and productivity to that of efficiency and sustainable development. Under this situation, the extension system which has already been under criticism need to be modified and rebuilt. Capacity building among extension personnel is a dire need of the day. Capacity building in a holistic sense refers to making the extension personnel enough capacious so that he can serve his clientele to the fullest satisfaction.

a) For effective extension work, the extension worker in new millennium will require to develop his capacities in: Technology and technical skill such as location specific crop production technology, crop protection technology etc.

b) Organizational skill such as community organization, group formation etc.

c) Managerial skill such as Information management and its timely dissemination through appropriate means/media, man-management including self for team work, leadership, co-ordination etc.

d) Business skill/ Marketing skills such as cost/benefit analysis of production and its marketing, demand-supply analysis of commodities, value addition to agricultural produce etc.

e) Communication skill such as selection and treatment of the message, selection and use of a proper channel i.e. extension method, use of IT etc.

f) Developing psychological attributes such as innovativeness, achievement motivation.

The extension worker will require to develop his capacities in all these areas in the coming future but this will be possible only when “MISSIONARY ATTITUDE” is inculcated in him to serve his clientele.
PROBLEMS FACED BY THE EXTENSION PROFESSIONALS OF STATE DEPARTMENT OF AGRICULTURE IN KERALA
B. Shanmugasundaram, S. Helen and A. Prema

Human resources development is a process of helping people to acquire competencies. The work environment and professional rewards are very important for organizational effectiveness. It is seen that the extension professionals face a lot of problems in accomplishing their set target. A study was conducted to assess the management problems faced by extension professionals of State Department of Agriculture. Malapuram district of Kerala was purposively selected. About 25 problems faced by 50 Extension professionals were studied. ‘Too much office work’, ‘Lack of conveyance facilities’, ‘Lack of promotional opportunities’ and ‘Name sake programmes with nominal benefit to the clients’ were judged as the ‘most serious’ management problems faced by extension professionals.

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CAPACITY BUILDING NEEDS OF AGRICULTURAL LABOURERS FOR IMPROVING THEIR TECHNICAL SKILLS AND LIVELIHOOD POSITION
C.Karthikeyan, J. Venkata Pirabu, S.Amudha and G.Selvarani

Agricultural labourers constitute one of the vital inputs in the agricultural production process. But they are living under the subsistence level and not getting one full meal a day. Training can be used as one of the strategies to uplift their livelihood position. Realising the importance of training, identification of perceived training needs of agricultural labourers in farm related activities and non-farm activities was included as the objective of the study. The study was conducted in the selected villages in Erode district of Tamil Nadu with a sample size of 90 women and 90 youth agricultural labourers where sugarcane based production system is in vogue. The study clearly indicated that majority of the women and agricultural labourers needed training in farm related activities like mushroom cultivation followed by poultry rearing and dairying. Almost 90.0 percent of them needed training in non-farm activities like preservation of fruits and vegetables and preparation of masala powder and instant food mixes. More than three-fourth of them needed training in basket making, mat weaving, handicrafts preparation, preparation of snacks, pappad, soap nut powder, arappu powder and soap powder. Whereas youth agricultural labourers needed training in farm related activities like dairying, poultry rearing and mushroom cultivation. Further more than half of them needed training in non-farm activities like tailoring, coir making, preparation of soap powder, screen printing, book binding, mat weaving and preparation of juice, squash, jam and jelly.

Majority of the respondents needed training in own village for a duration of 3-5 days during the months viz., May, September, October and November. The respondents preferred demonstration method of training and they wanted to get trained in group by scientists of Agricultural University. Thus training
EMPLOYMENT STATUS AND OPPORTUNITIES FARM LABOURERS IN SUGAR CANE BASED FARMING SYSTEM

C. Karthikeyan, J. Venkata Pirabu, G. Selvarani and S. Amudha

The overwhelming population has created more labour force and the number of unemployed rural women and youth have been increasing. The dwindling monsoon and its failures, seemed to be a major reason for unemployment in Irrigated Agro Eco System, where the main source of irrigation is through canal. Keeping these facts in mind, the present NATP-PSR funded study was attempted with the objective of formulation of strategies to improve the employment status and potential of farm women and youth agricultural labourers. The study was conducted in the selected villages of Erode district of Tamil Nadu with a sample size of 90 women and 90 youth agricultural labourers where sugarcane based production system is in vogue. The results revealed that women and youth agricultural labourers were employed for 196 mandays and 219 mandays respectively in a year and remained unemployed for 4-5 months in a year. The agricultural labourers migrated to nearby places in search of employment opportunities during lean season because of the non-availability of scarce off seasonal avocations in their own village. The agricultural labourers had possessed a higher level of aspiration to work in non farming activities during lean season. Hence there exists potential to improve their employment opportunities by training them in farm related and non-farm activities. Policy measures were prepared to improve the potential capabilities and income of agricultural labourers by involving them in various need based training programmes. Self Help Groups should be formed based on the similarity in training needs to start up enterprises at small scale level. Credit assistance should be provided through various financial institutions. Awareness should be created for the agricultural labourers about the employment opportunities, credit support etc. These strategies can be used in the process of planning and development of women and youth agricultural labourers.

FARMERS TRAINING: AN INSTRUMENT FOR HUMAN RESOURCE DEVELOPMENT IN AGRICULTURE

B. S. Patel, N. B. Chauhan

Human Resource Development is the process of inculcating new behaviour among the human population in place of their traditional style of functioning in order to convert them from the state of...
burden into the most beneficial asset for the national development. Keeping in view, farmers’ training as an instrument for human resource development, the present study was undertaken to measure the impact of Institutional Training Programme on the knowledge and adoption of participant tribal farmers. The study was conducted in two talukas of tribal dominated Dahod district of middle Gujarat. A random sample of 100 respondents, out of which 50 trained respondents and 50 untrained respondents was selected for the study from the ten villages.

The findings of the study show that majority of the untrained farmers (78.00 per cent) had medium level of knowledge at the same time, 68.00 per cent trained farmers had high level of knowledge of modern practices of maize cultivation. As far as gram cultivation was concerned, comparatively higher number of the trained tribal farmers had high level of knowledge of modern practices of gram cultivation. It is also observed that majority of the trained tribal farmers (76.00 per cent) and untrained farmers (82.00 per cent) had medium level of adoption. It is interesting to note that higher number of trained tribal farmers had high level of adoption of improved maize cultivation technology. The slightly similar trend was observed in case of gram crop also.

The findings of the study have clearly shown that the Institutional Training Programme conducted by Tribal Training Centre played a significant role in developing tribal farmers’ knowledge and adoption of improved maize and gram cultivation technology leading towards enhancing their socio economic conditions.

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HUMAN RESOURCE DEVELOPMENT IN AGRICULTURAL SECTOR: CHALLENGES AND OPPURTUNITIES
T. Raj Pravin and H. Philip

After the inception of liberalization reforms in the early 1990's much changes has taken place in the farm sector of India. Many multinational corporations have started to explore India with a sense of emerging market to improve their share in global agricultural business. This process has resulted in many acquisitions, take overs, joint ventures with Indian partners on the business front. Many new technologies developed in different countries or reputed laboratories have started creeping the Indian market coupled with new marketing initiatives like contract farming, precision farming gaining inroads. No longer Indian farming community needs to satisfy the needs of domestic markets but also need to venture into international markets to be competitive. At this onset the human resource development plays an important role as 'quantitative characteristics of goods produced' coupled with 'qualitative characteristics' are going to decide to become a dominant force to gain access to foreign trade. Information technology, crisis management, development of quality products with the resources and infrastructure available, knowledge

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of institutional procedures involved in foreign trade, effective use of available indigenous resource are areas wherein farmers need to be trained by extension functionaries. This paper is an effort to highlight the human resource development areas to be explored to avail the opportunities offered by global trade along with its challenges in the millenium.

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JFM - AN APPROACH FOR CAPACITY BUILDING AMONG RURAL WOMEN
Neelam Bhardwaj and Y.D Mishra

Since ancient times forest are the source of human sustenance and livelihood. They were the source of wild life, timber, biodiversity, soil and water etc. Total forest area at present 74.6 million hectare i.e. (22.7%) and forests contributes to 1.1-1.5/to GNP. Irrespective of the ownership forests were treated as open or community resources of local population in the sense of traditional rights. A demographc pressures after 1950s, increased demands on forests and regeneration or conservation was ignored by the foresters due to consumerism. In order to reduce conflicts between local stakeholders and service providers under National Forest Policy (1988) Government formulated a policy of involving people in the development, conservation, protection and management of forests. Joint Forest Management emerged as a programme which emphasized participation of local communities in an equitable partnership with the forest department. The underlying philosophy is that the local communities and forests could co-exist in a mutually sustainable manner and people could become effective keepers of forests and their regeneration.

Women, although are the main stakeholders in forest resource consumption and according of JFM policy they won fifty per cent membership in Joint Forest Management Committee. As women’s dependency on forest resources and utilization in the form of fuel, fodder and minor forest products is more than men. Women can significantly contribute to rural economy and assist in rejuvenating forests resource if they are actively involved in JFM and be given priority over men folk. Women should be made to improve their own capacity and overcome their own problems by building self confidence, developing leadership and management skills. Various constraints which prevent them for participating should be removed.

Forestry can be made as an enterprise if women are made aware of the direct and indirect benefits of forest products. Niclas (1993) emphasized that extension and advisory programme must therefore be tailored to meet the gender specific problems of particular region. He also stressed that women could participate in forest management activities only if they had access to land and information. The present paper is an attempt to foresee the type of entrepreneurial activities women can initiate by

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utilizing forest resources for enhancing their economic capabilities for self development and growth. JFM therefore is required to establish symbiotic partnership between forest department and local rural women to share the benefits of forest products through participatory approach.

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NGOS- AN OPT AGENCY FOR PLURALISTIC EXTENSION APPROACH
C.Padma1, S.R.Padma2, M.Senthil Kumar3, and N.Balasubramani4

NGOs are the non-profit organizations primarily set up to reflect the needs and requirements of the grass root people. Now NGOs have increased their strength in numbers and activities world wide and more so on developing Countries. More than 50,000 NGOs are at present operating in developing countries. The impact, reach and influence of NGOs are more in the developing and third world countries than in the Developed countries. NGOs could be felt the needs of the layman, they can closely realize the class division, Gender-divide from various angles and can ensure the socio-economic justice to the common man. This paper emphasizes the genesis and role of NGOs in Extension activity, their stakes in welfare and developmental schemes, child welfare, health care, women empowerment, environmental conservation, rural development and policy implementation.

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HUMAN RESOURCE DEVELOPMENT OF AGRICULTURAL EXTENSION IN NEW MILLENNIUM: A PROSPECTIVE VIEW
K.M. Dakhore1 and K.A. Deshmukh2

People are the most valuable resource of any country. Many American, European and Asian countries has limited natural resources, but developed their economy through planned approach for human resources. The United Nations Development Project (UNDP) defines Human Resource Development (HRD) as the process of enlarging the range of people’s choices, increasing their opportunities for education, health care, income and employment and covering the full range of human choices from sound physical environment to economic and political freedom. HRD aims at development of the people, for the people and by the people. The concept of HRD relates to make work culture more conducive to organizational goal and emphasis over development, up gradation and refinement of total personality of individuals.

HRD in the organizational context is a process by which employee of an organization are helped in a continuous, planned way to acquired and sharpen capabilities to perform various functions associated with their and future roles, develop their general capabilities as individual and exploit their inner potential.
for their own and organizational development and develop an organizational culture in which superior-subordinates relationship, team work and collaboration among sub-units are strong and contribute to the professional well being, motivation and pride of employees.

The agriculture is now seen as a profit oriented enterprise and many new cash crops of commercial value are being increasingly taken up by the farmers. Under this situation, success will largely depend upon development of farmer’s capacity to absorb new knowledge of improved practices and technology. To develop these farmers, particularly small and marginal farmers as agripreneurs and making farming profitable enterprises, the state sponsored Extension machinery will have to take lead responsibility.

A new agenda for HRD for agricultural extension personnel in terms of required competencies in knowledge and skill such as technical, organizational, managerial, communicational and business skill will be required to meet challenges to new millennium. To emerge as leader in agricultural sector, HRD of extension personnel and farmers will be the most potential area for attention in new millennium.

ROLE OF PANCHAYAT RAJ SYSTEM IN HUMAN RESOURCE DEVELOPMENT

The crux of present world order situation of world’s population, they are still the most deprived and neglected segment of the society. The system of Panchayat Raj was initiated for people’s participation in political and economical process. But the process at national development would be incomplete and lopsided unless women are fully involved in it. India is perhaps the first country to recognize this social fact and have taken concrete measures to draw women into leadership positions and thereby into politics by giving them one-third reservation in grass root politics. The champions of Panchayat Raj system desired that rural women should not only become beneficiaries of development, but more importantly the contributors to it. We cannot make democracy meaningful in a traditional society like ours without the full involvement of women. Considering this our constitution (seventy third Amendment Act 1992 Article 243 (1) (5) empowered women politically. Hence a study was conducted in one panchayat union of Palani block of Dindigul District to know the extent of participation of elected women in panchayat Raj and the constraints for effect participation. Regarding the overall participation majority of the respondents had medium level of participation.

Considering the regularity of attending the panchayat meeting, one-fifth of the respondents attended almost all the meetings. Half of the respondents put forth opinions wherever possible followed by majority of the respondents were identifying the problems in the village and ward by themselves.

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The financial constraints, social taboo and political interferences were some of the constraints for effective participation of elected women. The findings of the study would be useful to planners, development workers and social scientists indulged in research and development activities in the grass root political arena.

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'WOMEN SELF HELP GROUPS' AS A MEANS FOR TECHNOLOGY TRANSFER: HOW TO GO ABOUT?

D. Puthira Pratap, N. Balasubramani, and K.A. Ponnusamy

Women, despite all the efforts made over the years, are still not on par with their male counterparts with respect to access to various farm technologies. Sociologists feel that information alone can empower rural women to participate in decision making, exchange ideas and improve their quality of life. History has shown that development projects that take women into account are more likely to succeed than those that do not involve them. The women self-help groups, thousands of which exist in the country, have been performing very well in terms of credit management. Such groups can be made to utilize the mass media including internet to get training, to obtain information and documents from afar, to communicate with exporters on new technologies and obtain market data, and to strengthen their families' welfare. However, for this to happen, the barriers that hamper information access to rural women have to be removed.

The paper suggests setting up of village media centres to impart informal training to the groups on utilization of modern ICT besides serving as information centers.

TRAINING TO YOUTHS AS AN INNOVATIVE TOOL FOR PROFITABLE FARMING IN SAURASHTRA REGION

B.N. Kalsaria, N.D. Bharad, M.N. Popat and B.R. Karkar

Impact assessment is generally regarded as an essential part of any project and is equally applicable to information of improved agricultural technologies. Training is a critical input for the farmers for quick transfer of technology and a way to improve their agriculture and uplift their socio-economic condition. Thus, the importance of training as an indispensable instrument for human resource development at any level cannot be ignored. In this regard, a study was conducted at Sardar Smruti Kendra, G.A.U., Junagadh with 46 young farmers from different talukas of Saurashtra region. The results of the study revealed that the gain in knowledge after training was 8.70 per cent in medium group and
2.17 per cent in high level of knowledge group of young farmers. Whereas decrease in case of low level group of knowledge is 10.87 per cent. That means, medium and high knowledge groups were dominant only after they underwent training.

The difference in mean score of knowledge of farmers was found to be significant at 1 per cent level. It is obviously stated that the training to youths is deemed to be an innovative tool for acquiring the technological know-how in agriculture.

The results reflected that the knowledge level before training was correlated with socio-economic characteristics viz., education, unirrigated land, cropping intensity and training received. While only education and training received were correlates after training of improved agricultural technology. Thus, education and training are utmost important to increase the knowledge.

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RURAL AGRICULTURAL WORK EXPERIENCE PROGRAMME (RAWEP) FOR AGRICULTURAL HUMAN RESOURCE DEVELOPMENT

N.B. Chauhan and D.J. Patel

Experiential learning is the basic approach towards problem solving and improving interaction with the outside world. The learning process imparts a direction to the students to think and act and eventually creates self-confidence. It offers a direction to the students to develop their competence, capability, capacity building, acquiring skills, expertise and a holistic development. However, it requires interest of an individual with total commitment and involvement, participation, reception, active interest dedication, skill, curiosity, vision and mission. Under the changing dynamics of economical and industrial growth, agriculture has to undergo changes with new approaches, therefore, experiential system in agriculture has strong potential for imparting better training of the agricultural technocrats with high level of skill in combination with the modern outlook and management capacity.

Agricultural education is evolving in a very rapid manner to meet the need of the society. However, they do not possess adequate self-confidence in starting own commercial farming. Under this situation, Rural Agricultural Work Experience Programme (RAWEP) is an important competence and confidence building programme introduced in some of SAUs in India. The Gujarat Agricultural University (GAU) has also accepted this concept and students of the final year B.Sc.(Agri) are being exposed during this year. This programme is a sequel of the recommendation made by the ‘Randhawa Committee’ constituted by ICAR. The committee recommended one full semester is to be earmarked for

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providing work experience to the students in rural setting. The experiential approach is a learner-centered approach and allows an individual student to manage and share responsibility for his learning with his teachers and hosts. Effective work experience training strategies incorporating rural agricultural experiential learning approach provide opportunities to a student of the final year to engage him in field work activity and to review and analyze critically this work experience activity so that they prove to be useful in their real-life situations. The experiences of the RAWEP of GAU as a HRD effort are illustrated in this paper which may serve as a model to other SAUs.

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TRAINING NEED ASSESSMENT FOR PROMOTION OF SUSTAINABLE PRODUCTION IN AGRICULTURE
S. Parvathy, Allan Thomas and Usha, C. Thomas

The study was conducted in Thiruvananthapuram district of Kerala state to assess the training needs of farm women in agriculture and allied activities. The data were collected from thirty rural women members of self-help group. Training need on areas like fruit and vegetable processing, bakery products, nursery management, mushroom production, medicinal plants cultivation and poultry management was assessed using the method of paired comparison. It was found that majority of the respondents needed training on fruit and vegetable processing.

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AGRICULTURAL HIGHER EDUCATION – NEED FOR CHANGE
Manish Kumar and Chitra Pathak

Higher education has been conceptualized, as an important means of reducing socio-economic gap, in addition to providing manpower for the development needs of society. It is acknowledged that education is a great equalizer in modern societies and it plays an important role in social change. It enhances the adaptive capability of the individuals. Thus, providing strength to cope up with the changing situations. University aims to give ideas, manpower and service for the furtherance of human equality, dignity and development. Hence higher education has been seen since long as a means to achieve quality development.

In India, agricultural education and manpower planning are not the outcome of the process based on any formal models. Planning is more empirical than conceptual. The growth of agricultural education in past four decades reflects the fact planning was based along the lines of the manpower requirements approach. There has been an increase in the number of Agricultural Universities and Colleges. This lead to a rapid expansion of postgraduate education, as it was designed primarily to meet the growing needs of the research and education sectors. The education system is now producing more than the required
number of postgraduates for these two sectors. But they are finding it difficult to get a job as per their qualifications. The educational system has failed to develop the competencies needed to compete with other professionals having specified job competencies. The content and teacher centered present curriculum further limit space for such innovations. With the changing global situation, it becomes more relevant for the agricultural education system to focus on developing individual capacity to understand and resolve a problem. Also expanding job opportunities through entrepreneurship development. These changes indicate the necessity for a more need based and demand driven educational curriculum. This paper will deal with some of the major issues facing Indian Agricultural Higher Education and the role of competency based curriculum in overcoming them.

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EVALUATION OF TRAINING PROGRAMME ORGANIZED BY CENTRE OF EXCELLENCE FOR TRAINING IN WHEAT PRODUCTION TECHNOLOGY

Vipan Kumar Rampal1 and Kanwal Mahindra2

Centre of Excellence for Training in Wheat Production Technology, Punjab Agricultural University, Ludhiana, organized number of training since its inception. The present investigation was undertaken to evaluate the training programmes with regard to gain in knowledge of the trainees, problems faced by the trainees and suggestions of the trainees and training organizers for making improvement in organizing future training programmes. It has been found that most of the respondents were having very poor or poor knowledge level before the training but after the training majority of the trainees (52.14%) were in medium level and 33.33 per cent in high knowledge category. It is very encouraging to note that above 85 per cent of respondents had never faced any problem regarding clarity of course content, language used and speed of presentation. However, all the respondents suggested that written notes of each lecture should be distributed before each lecture. Some of the respondents also suggested some improvement in physical facilities. The training organizers suggested for timely nominations of participants, availability of funds well in advance and increase in the duration of trainings.

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ACTORS PERCEPTION ABOUT PARTICIPATION IN THE ATMA PILOT PROJECT OF MUZAFFARPUR DISTRICT

Manish Kumar3

The perceptions of actors are relative rather than absolute. Perception of a message or intervention is also influenced by the surroundings of the actors and their past experiences. This means that the perception of similar project activities might differ. In this paper, findings describing perception
of different actors viz. farmers, extension workers, and researchers about participation in ATMA pilot project will be presented. The actors’ perception regarding participation has been explained in terms of each actors perception of others actors role and also about the information shared in the project context.

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ENTREPRENEURSHIP DEVELOPMENT OF RURAL WOMEN
Shobha Ran†

Women comprise about half of the Indian population and nearly 78% of them are actively involved in Agriculture and Agro-Processing Activities. The various past harvests and food processing activities done by women included primary, secondary and tertiary processing of farm produce. In the primary processing of cereals, pulses and oilseeds, major unit operations done by women are cleaning, drying, decorticating, milling, oil expelling, parboiling etc. Besides these, they are also involved in the processing of fruits and vegetables, spices, commercial crops, other plantation crops, value addition, storage and marketing. In general, the share of women in the labour force in the processing of major plantation crops varies between 20 to 80 percent. This aspect can clarify, the scope for women entrepreneurs for taking up of the activity of agro-processing on tiny scale for revenue and employment generation in rural areas and towns. Entrepreneurship development of rural women includes many aspects such as development of entrepreneurial behaviour of rural women, role of Extension Education in developing entrepreneurship among them, role of training and training needs of women entrepreneurs, Govt. support and linkage with other organisations and constraints in development of agri-entrepreneurship.

For development of entrepreneurship, technical and managerial abilities of the farm women need to be developed in a logical sequence each as entrepreneurial quality, capability for enterprise launching, ability for enterprises management and sense of responsibility to the society that promote/support them for which training has been accepted as an effective intervention.

Various constraints which come in the way include self sphere system constraints, socio-psychosphere system constraints, resource system constraint and support system constraint. In order to promote women entrepreneurship it is important to identify the technically feasible and economically viable agro-based technologies and support measures in the form of policy, finance infrastructure, training, raw material and marketing facilities to be taken by promotional agencies at the national and state level. Further, services like credit, technical advice, market, and other information have to be arranged for the sustainability of the enterprises. Success indicators are also to be developed for each enterprise for monitoring and evaluation of their performance. If such economic activities are planned and executed carefully, these would go a long way in providing self-employment and income generation opportunities to rural women.

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THEME V

Interventions and Implications
CONSTRAINTS FACED BY THE TRIBAL FARM WOMEN IN DERIVING BENEFITS THROUGH SELF HELP GROUPS PROGRAMMES

K.L.Dangi1 and Rakesh Khajuria2

The present study was conducted in Badgaon block of Udaipur district in Rajasthan. The sample comprised of 75 literate and 75 illiterate tribal farm women, drawn from 10 selected villages having maximum number of beneficiaries under SHGs. Data were collected through interview schedule and interacting with the respondents (face to face). Findings indicated that the constraints viz., programme activities of SHGs are organized at odd hours, there is no facility like Anganwadi/Balwadi/Creche for small children, centre is far away from residence, illiteracy among beneficiary women, poor documentation of the work done by the SHG's secretary, faulty planning of SHGs programme, programme activities get adversely affected during peak agriculture season and social relations cannot be maintained due to involvement in SHGs programmes were the most important constraints faced by the tribal farm women.

It is recommended that SHGs centres should be established at the nearest place of participating women. There has to be provision of Balwadi/Anganwadi/Creche for the children of women. The educational level of tribal farm women be improved through adult education, the documentation procedure of SHGs must be improved, planning of SHGs has to be well thought out and activities of SHGs be so organized that may not affect peak agricultural operations.

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CONSTRAINTS IN ADOPTION OF IMPROVED WATERSHED TECHNOLOGY

Manoj Kumar Singh1 and Neeta2

Watershed management implies the rational utilization of land and water resources for optimum production with minimum hazard to natural resources. The concept of watershed management in essentially adoption of soil and water conservation practices in the watershed area. The aims of these practices are proper land use, protecting land against all forms of deterioration, building and maintaining soil fertility, conserving water for farm use, proper management of local water for drainage, flood protection and sediment reduction and increasing productivity from land use. Considering these facts a study entitled "Impact of Integrated Watershed Development Project in Conservation of Natural Resources in Sub-humid Southern Plain and Aravali Hills of Rajasthan" was conducted with following objectives:

(i) To find out constraints as perceived by beneficiaries in adoption of improved watershed technology.

Major findings
1. Lack of provision for repair and maintenance of soil and water conservation structures, ultimately measures for SWC and unawareness of beneficiaries were the three fold core constraints as perceived by the respondents in the constraints category of soil and water conservation practices.

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2. The study indicated that a majority of respondents were deprived of benefits due to lack of knowledge regarding pasture development and its management.

3. It was found that lack of sufficient number of nurseries in the area and general unawareness about agro-forestry among the farmers were the major constraints in forestry development.

4. The study revealed that lack of motivation by extension personnel was perceived as a high intensity constraints in transfer of watershed technology.

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POST HARVEST MANAGEMENT OF FOOD GRAINS BY FARM WOMEN OF LUDHIANA DISTRICT OF PUNJAB STATE
Kanwal Kumar 1, S.K. Saini 2 and Rabinderjit Kaur 3

The women folk contribute much for agricultural development in the country. For information on the role of women in the post-harvest management of food grains, a study was undertaken in Ludhiana District with the objectives to study the profile of farm women engaged in grain storage practices and to find out the practices being followed by them for storage of grains. Farm women from two villages of Ludhiana district were the respondents of the study. It was found that majority of the respondents were in age group of 35-45 years and were educated up to matriculate followed by primary and middle educational level. Wheat was stored by all the respondents, followed by paddy, maize and pulses. Most of the respondents used metal bins followed by gunny bags and kothi and used celphos for the storage of grains. Some of the rural women used the traditional methods also for the storage grains.

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MEASURES TAKEN BY FARM WOMEN TO DECREASE/ELIMINATE THE PESTICIDE RESIDUES IN CEREALS, VEGETABLES, MILK AND MILK PRODUCTS
Rabinderjit Mahindra 1, Navdeep Kaur 2 and Ajit Randhawa 3

The study entitled, “measures taken by farm women to decrease/eliminate the pesticide residues in cereals, vegetables, milk and milk products” was undertaken to know the extent of awareness of farm women about pesticide residues, to find out the steps taken by farm women to decrease/eliminate the pesticide residues. A sample of 120 farm women was randomly selected from Shuttrana and Fatehpur Rajputan villages of Patiala district which were selected randomly. The data were collected with the help of structured interview schedule. Farm women had medium and high level of awareness about pesticide residues and use of pesticides respectively. Friends, family members, radio and television were the important sources while Gram Sevika and farm publications had a negligible role in creating awareness among farm women. Majority of farm women took the steps in order to clean dust from food commodities.

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Tips related to crop science and integrated pest management, soaking leafy vegetables in water before chopping, discarding ‘malai’ from boiled milk, pasteurizing milk for household use, not to put pesticide contaminated bedding material under milch animals were not followed by farm women. Higher the education, income, awareness about pesticide use, higher was the awareness about pesticide residues.

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TECHNOLOGY GAP IN SPICES CULTIVATION IN THE CONTEXT OF QUALITY PARAMETER

A.B. Sharangi 1, S.Acharyal, A.pariari3 and R. Chatterjee 4

Quality parameters are the structural components within which production processes are to be managed to generate quality harvest. The present study conducted in west Bengal explored the scenario wherein farmers need to learn quality parameters and to synchronize the production schedule accordingly. The gap between practices followed and the practices expected in terms of quality parameters had been the consequent factors to a score of causal factors, agro-economic and institutional-managemental in nature. The study was conducted to estimate the inter and intra level relationships between causal and consequent factors. The output of the study has rightly suggested to wield necessary strategic interventions in the said area.

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GROWER’S ADOPTION RATIONALE FOR PRODUCTION TECHNOLOGY OF ROSE

Meena. K. Trivedi 1, N.B.Chauhan 2, J.C.Trivedi 1 and A.K.Singh 4

Flowers are symbol of LOVE, BEAUTY and PASSION. Now-a-day’s flower cultivation among Indian farmers is becoming very popular as, flowers are integral part of our daily life and secondly, floriculture is a lucrative business, which generates much higher income as compared to other agricultural crops per unit area. Commercial flower cultivation opens new ventures for farmers of Gujarat. Keeping this in view, the present investigation was planned with the view to study the level of knowledge, extent of adoption and relationship of Socio-economic-Psychological characters with knowledge and adoption level of rose growers of Anand district of Gujarat State. The findings of the study revealed that majority of the rose growers were in medium level of knowledge and adoption of production technology of rose. Most of the economical and psychological variables were found significantly associated with the dependent variables of rose production technology. Efforts were also made to collect problems in adoption of rose production technology from the growers.

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APPLICATION OF TRADITIONAL ANIMAL THERAPY FOR VETERINARY INTERVENTIONS
V.G. Barad¹, P.R. Kanan² and B.A. Savaliya³

India ranks first in respect of milk production all over the world. Most of the rural population is engaged in agriculture and/or animal husbandry. They are intimately associated with the domestic animals. Livestock owners rear their livestock away from modern civilization, where the services of veterinarian can not be obtained easily. However, they have developed a number of traditional therapies, in harmony with their local resources to cure various ailments of their animals. It was found that farmers with certain rationale used various ingredients while treating ailments which were found to be in consonance with scientists' perception and views. They used pieces of banana stem for preventing abortion and jaggery solution for treating diarrhea. Mixture of asafoetida and leaves of mamejo are given to animals. For curing fever, mixture of buttermilk and gram floor is being smeared on calf's skin to control many skin diseases. Decoction of tea powder and pepper is given to animals to save them from cold. Flowers of datura are used to induce the heat in animals.

Traditional animal therapy has been developed by making good use of locally available natural resources. Besides, being cheaper, it is believed to be effective and free from side/harmful effects. It is also necessary to refine or modify these according to needs and resources of rural people. The knowledge, rationality, implications vis-à-vis the constraints of these animal therapies in the area under study are discussed in the greater deal in the paper.

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PRIORITIES FOR VARIETAL DEVELOPMENT OF RICE BASED ON FARMERS PERSPECTIVES
M.L. Sharma¹, M.A. Khan², A. L. Rathore ³ and P. K. Pandey⁴

In Chhattisgarh state, rice occupies more than 80% of the total Kharif cropped area. The productivity of rice in this region is less than 1.5 t/ha which is too low by any national or international standard. Besides many biotic and abiotic stresses responsible for low productivity, lack of suitable cultivars are also one of the prime factors. In-spite of continuous efforts of research and extension, no single variety shows sustainability in the farmers’ field. The major set-back of developing such varieties may be due the wide gap that exists between the researchers’ priorities and farmers’ need. Immediate attention is also required on extension strategy for providing feed-back pertaining to farmers’ perspectives and location specific requirements. In view of the above facts, on investigation was carried out the Raipur districts of Chhattisgarh state.

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The findings showed that Swarna was the most popular rice variety. It may be due to its yield potential, grain quality and suitability to low-lying fields. Among others, 1010, Mahamaya, Culture, Safri, IR-36, Mahsuri etc. were popular amongst the respondents due to various positive traits of respective variety. The preferences of big farmers were found to be good eating quality, market price and insect-pest resistance. Small farmers interested in the traits like grain yield, adaptability to different soil situations, milling recovery etc. Under irrigated condition, farmers were gave 51.25% weightage to yield, 10% to market value and about 9% to duration. While in rainfed areas, in addition to yield, farmers assigned 13, 11 and 9 per cent weightage to resistance, eating quality and quantity of straw, respectively. The perceptions of scientists were found to be quite different in obtaining weightages to different traits to be considered while developing rice varieties. While analyzing the extension efforts, it was concluded that intensive efforts should be made to advocate single technology rather than whole cultivation package for better dissemination and adoption by the farmers. The extension system is also expected to provide time to time feedback from stakeholders to the researchers for their consideration.

ADOPTION OF SUMMER PADDY CULTIVATION TECHNOLOGY

J.K. Patel

Rice is one of important staple food crops more than half of the world’s population. The rice is cultivated in kharif as well as summer seasons. But production and productivity of this crop is very low because of wide gap between available technology and its adoption. Keeping this in view, a study was conducted in Anand taluka of Kheda district of Gujarat state. 150 farmers. The summer paddy cultivation technologies were selected for the study.

Majority of summer paddy cultivators (60.00 percent) were found to be medium level of adopters of summer paddy cultivation technology, followed by low level adopters (27.33 percent) and high level adopters (12.67 percent). Village Level Workers (VLW) were the most important source of information for summer paddy cultivation technology, followed by friends, neighbours, progressive farmers, printed materials, cooperative society and relatives for getting information.

CORRELATES OF KNOWLEDGE ON DRIP IRRIGATION SYSTEM

B. N. Kalsariya, M. N. Popar and N. D. Bharat

A study was conducted in Gujarat state with 60 drip irrigation adopters. A teacher made knowledge test was used to know the level of knowledge regarding drip irrigation system. Majority of the respondents were in the middle aged. An equal number (37.00 percent) of them was illiterate and had
primary level of education. More than two-third of the respondents had medium level of knowledge about drip irrigation practices. The variables namely education and extension contact showed positive and significant relationship with the extent of knowledge on drip irrigation practices.

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STATUS AND PRONE FACTORS OF TECHNOLOGICAL GAP IN GROUNDNUT PRODUCTION

P.D. Verma, M.A. Munshi & M.N. Popat

The study was conducted in South Saurashtra agro-climatic zone of Gujarat during 1999. By using proportionate random sampling technique, a total number of 256 respondents were interviewed from 24 selected villages of 12 talukas. It was observed that the mean technological gap score was 39.44 per cent. It also indicated that overall technological gap in groundnut cultivation was of medium order. The disparity between recommendations and actual practices of the farmers is the pointer of technological gap. When the findings were looked in this context, the inference could be drawn that the groundnut growers have adopted most of the selected recommendations only to a partial extent. Unless the complete recommended package is adopted fully, one cannot expect the optimum yield of the crop.

The study also revealed that the technological gap was higher in case of soil testing (85.36 %), chemical fertilizers (79.24 %), plant protection (64.84 %), row spacing (54.95 %) and weed management (50.32 %). However, minimum technological gap was observed in case of tillage (4.80 %), improved variety (12.49 %) and harvesting (13.54 %). Whereas, in remaining technologies, the gap was in the range of about 20 to 40 per cent. The variation in farmers' yield is explained by all the independent variables to the extent of 58.41 per cent. The independent variables namely; knowledge and technological gap alone contributed maximum (54.36 %) to the pod yield of groundnut crop. It was also observed that the variables namely; knowledge, technological gap and education had the maximum direct effect on pod yield. The remaining variables registered trivial direct effect on the pod yield.

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FARMERS LED PARTICIPATORY RESEARCH ON VALIDATION OF TRADITIONAL METEOROLOGICAL PRINCIPLES IN SAURASHTRA; INDIA

P.R. Kanani, M.A. Munshi and M.N. Popat

The meteorology department makes long-range predictions for the nation as a whole. In the case of specific regions, the predictions are short ranged in nature i.e. for a period of three days only. As a result farmers in dry land regions of India rely mainly on indigenous meteorological beliefs and knowledge to
make predictions regarding monsoon. The traditional meteorologists use methods and principles evolved by eminent Astronomers and Astrologers such as Varahmihir (700-800 A.D.), Bhadri (1000-1200 A.D.), Poet Ghagh (1200-1300 A.D.), and Unnad Joshi (1350-1400 A.D.). In this paper, the experiences of participatory meteorological assessment and prediction with farmers of Saurashtra, based on traditional beliefs and principles of the regions are presented. The process initiated in 1990 has taken the form of an informal network of local experts and formal scientists that provides voluntary service to the people of Saurashtra by making predictions on the basis of collective assessment. Apart from validating these beliefs across the whole of the Saurashtra, the study has helped to restore the confidence of the people in their traditional knowledge and skill. Such a network helps individual experts to pool their knowledge and learn from each other. It enables the group as a whole to make a collective judgment and to provide the farming community, a valuable service for farmers to make their decisions.

The group has already acquired a high degree of credibility because of successful prediction made during the past eleven years. The network emerged spontaneously and has experienced an organic growth. The experimentation and prediction are likely to continue without the help of external support. In the process valuable meteorological data will be generated and additional beliefs will be tested. We believe that such a network can serve as a model for other dry land areas, which rely on traditional experts for prediction of monsoon.

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PREFERENCES OF THE TRIBAL WOMEN TOWARDS RADIO LISTENING IN RAJASTHAN
B.S Bhimawat*, V.P Sharma* and Kusum Mittal*

In our country variety of media are being used to communicate information and technology related to farm and home, viz. Individual, group and mass approach. The present situation of India calls for speedy dissemination of information, technological know how for total development of home and upbringing of the children. One of the ways of imparting knowledge to them is communication through Radio. This medium has a great potential as it can reach a large number of audience in limited time than any other medium of communication. Keeping in view the increasing importance of radio for bringing about desirable behavioral changes among the rural and tribal women through farm radio programmes, the Government of India in collaboration with UNICEF and different technical institutions broadcast 29 messages regarding nutritional and health status of children in age group of 0-5 years, from most of the radio stations. The message was relayed every Wednesday at 1-30 to 2 PM and every Saturday at 6.30 to 7.00 PM. As no systematic study has been conducted so far on the mother and child health broadcast by AIR, Udaipur, hence it seems worthwhile to find out the response of integrated Child Development Scheme (ICDS) beneficiaries towards radio listening in tribal areas. So the present study was undertaken to find out the preference of the respondents regarding various aspects of Radio listening. The results revealed that

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majority of the Radio group listeners as well as home listeners had preferred the repetition of message twice on Radio. One hour’s duration of Radio programme has been preferred by majority of the respondents form both the study groups. Conversation by two persons at a time on Radio was preferred by the listeners of both the groups.

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EVOLVING INSTITUTIONS FOR IRRIGATION MANAGEMENT IN SARDAR SAROVAR PROJECT COMMAND
Jayesh Talati

Sardar Sarovar Project (SSP) is the largest multipurpose irrigation system in India. After drawing lessons from national and international experiences, Government of Gujarat has introduced Participatory Irrigation Management (PIM), which is one of the operating principles for managing irrigation; in SSP. Unlike other irrigation projects, the government had envisaged farmer’s participation at the very outset of the programme implementation in the case of SSP. Sardar Sarovar Narmada Nigam Limited, which is an implementing agency of the project, has registered more than 800 Water Users’ Associations (WUA) prior to first irrigation season to manage irrigation.

A study was undertaken in the first phase command area of SSP to understand the socioeconomic and institutional dynamics evolving in the area with the introduction of canal water. The study found that though the Nigam had invited proposals from NGOs to facilitate the process of WUA formation and registration, it could not entrust the work to them due to high transaction cost. Formal training was organized to orient the Nigam staff and selected farmers’ representatives on PIM; however, they failed in motivating beneficiary farmers to actively participate in the development of WUAs. The Nigam has put more efforts on the registration of WUAs and has given less importance to institutional capacity building process.

Some of the issues identified were: (1) low level of awareness about the concept of PIM and its implementation strategy among beneficiary farmers; (2) departure between policy formulation and its implementation; (3) communication gap within the Nigam officials across the administrative hierarchy and between the Nigam and farmers. Factors such as homogenous group (caste composition), limited number of beneficiary farmers, quality of irrigation service, presence of village level economic institutions like dairy cooperative, etc, have positively contributed in the formation and functioning of a few WUAs.

Creating awareness through communicating right kind of messages to irrigators at the time of first irrigation season itself is necessary and most crucial to avoid misconceptions among them and also to make

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WUAs functional. If WUAs are to act as instrument of empowerment, then farmers need to be informed about the state water policies and changes made in these policies from time to time, and the support available from the principle implementing agency and other relevant government departments.

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HAMARA GAON WALL NEWSPAPER: AN EXPERIMENT IN PARTICIPATORY MESSAGE DESIGN

P. Sethuraman Sivakumar and R.N. Trikha

Message design is the core aspect of agricultural communication. Particularly in the print media, the message design is of paramount importance because the structure and arrangement of every word influences the comprehension of the reader. In the past decades, the message design efforts have been top-down, source-controlled and persuasive. The farm publications like farm magazines, farmers journals, newsletters and extension literature are employed to communicate research findings/technologies generated at the research stations to the farmers. Here, the scientist himself or by a group of scientists designs the publication by choosing content and format of his/their choice. In this process, very little attention is being given for identification and analysis of field realities on which the information/message is being disseminated. As a result, they fail to convince the farmers to facilitate adoption of improved technologies. In this context, this paper proposes a participatory approach for designing the farm publications with active participation of the farmers. It describes how this participatory approach was used to design a community wall newspaper, Hamara Gaon in a remote village in Uttaranchal state. It demonstrates that the ultimate effect of this process is the empowerment of the farmer, i.e. realisation of his abilities, expression of indigenous wisdom and his willingness to participate in the whole social process. Finally it presents an approach for institutionalization of this approach in the existing organisational structure.

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NGO-GO COLLABORATION FOR AGRICULTURAL DEVELOPMENT

Santha Govind, Vengatesan and P. Ramesh

Practical needs draw NGOs and government towards each other. NGOs seek collaboration with government for many reasons: to access technical or managerial resources, to gain legitimacy or recognition, to obtain appropriate solutions to development problems, to enhance people's participation in government programmes and to promote greater accountability and transparency and promote reforms in public system.

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Government agencies on the other hand work with NGOs to enhance people's participation in their programmes, to extend coverage of programmes to areas and groups that are poorly served by government staff, to test and replicate innovative approaches and to achieve greater cost effectiveness.

In recent years, many observers have suggested that rural development strategies would benefit from increased collaboration between government and non-governmental development organizations. This paper explores the potentiality of NGO-GO collaboration for providing technical advise and getting feedback, conducting trainings, group formation etc.

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IMPROVING THE EFFECTIVENESS OF COMMUNICATION SUPPORT SYSTEM FOR TUBER CROPS TECHNOLOGY TRANSFER: A CASE STUDY

P. Sethuraman Sivakumar¹, S. Ramanathan² and M. Anantharaman³

Development and transfer of appropriate technologies is the prime goal of any research organisation. The Central Tuber Crops Research Institute, located at Thiruvananthapuram, is one of the leading tuber crops institutes in Asia, which has developed many tuber crops production and utilisation technologies for the upliftment of the small and marginal farmers in the country. Over the years, the Institute has created a strong transfer of technology (TOT) system for dissemination of these technologies to the users groups viz. tuber crops researchers, extension workers, small scale entrepreneurs and farmers. A communication support system has also been developed with state-of-art media infrastructure to facilitate this process. With the recent policy shift towards sustainable resource management, the technology transfer system as a whole and communication support system in particular, has to be made sustainable, i.e. need oriented and cost effective. In this context, this paper attempts to present a framework for restructuring and reorienting the technology transfer system in general, and communication support system in particular, to meet the emerging challenges. This paper analyses of the existing TOT and communication support systems in terms of their relevancy and capacity to meet the changing needs. It extends the discussion on the appropriateness of various participatory communication approaches and techniques to improve the efficiency of the TOT system. Finally it proposes a comprehensive framework for institutionalisation of these participatory processes into the TOT system.

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WUAs functional. If WUAs are to act as instrument of empowerment, then farmers need to be informed about the state water policies and changes made in these policies from time to time, and the support available from the principle implementing agency and other relevant government departments.

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HAMARA GAON WALL NEWSPAPER: AN EXPERIMENT IN PARTICIPATORY MESSAGE DESIGN
P. Sethuraman Sivakumar¹ and R.N. Trikha²

Message design is the core aspect of agricultural communication. Particularly in the print media, the message design is of paramount importance because the structure and arrangement of every word influences the comprehension of the reader. In the past decades, the message design efforts have been top-down, source-controlled and persuasive. The farm publications like farm magazines, farmers journals, newsletters and extension literature are employed to communicate research findings/technologies generated at the research stations to the farmers. Here, the scientist himself or by a group of scientists designs the publication by choosing content and format of his/their choice. In this process, very little attention is being given for identification and analysis of field realities on which the information/message is being disseminated. As a result, they fail to convince the farmers to facilitate adoption of improved technologies. In this context, this paper proposes a participatory approach for designing the farm publications with active participation of the farmers. It describes how this participatory approach was used to design a community wall newspaper, Hamara Gaon in a remote village in Uttaranchal state. It demonstrates that the ultimate effect of this process is the empowerment of the farmer, i.e. realisation of his abilities, expression of indigenous wisdom and his willingness to participate in the whole social process. Finally it presents an approach for institutionalization of this approach in the existing organisational structure.

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NGO-GO COLLABORATION FOR AGRICULTURAL DEVELOPMENT
Santha Govind¹, Vengatesan² and P. Ramesh³

Practical needs draw NGOs and government towards each other. NGOs seek collaboration with government for many reasons: to access technical or managerial resources, to gain legitimacy or recognition, to obtain appropriate solutions to development problems, to enhance people's participation in government programmes and to promote greater accountability and transparency and promote reforms in public system.

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Government agencies on the other hand work with NGOs to enhance people's participation in their programmes, to extend coverage of programmes to areas and groups that are poorly served by government staff, to test and replicate innovative approaches and to achieve greater cost effectiveness.

In recent years, many observers have suggested that rural development strategies would benefit from increased collaboration between government and non-governmental development organizations. This paper explores the potentiality of NGO-GO collaboration for providing technical advise and getting feedback, conducting trainings, group formation etc.

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IMPROVING THE EFFECTIVENESS OF COMMUNICATION SUPPORT SYSTEM FOR TUBER CROPS TECHNOLOGY TRANSFER: A CASE STUDY

P. Sethuraman Sivakumar1, S. Ramanathan2 and M. Anantharaman1

Development and transfer of appropriate technologies is the prime goal of any research organisation. The Central Tuber Crops Research Institute, located at Thiruvananthapuram, is one of the leading tuber crops Institutes in Asia, which has developed many tuber crops production and utilisation technologies for the upliftment of the small and marginal farmers in the country. Over the years, the Institute has created a strong transfer of technology (TOT) system for dissemination of these technologies to the users groups viz. tuber crops researchers, extension workers, small scale entrepreneurs and farmers. A communication support system has also been developed with state-of-art media infrastructure to facilitate this process.

With the recent policy shift towards sustainable resource management, the technology transfer system as a whole and communication support system in particular, has to be made sustainable, i.e. problem/ need oriented and cost effective. In this context, this paper attempts to present a framework for restructuring and reorienting the technology transfer system in general, and communication support system in particular, to meet the emerging challenges. This paper analyses of the existing TOT and communication support systems in terms of their relevancy and capacity to meet the changing needs. It extends the discussion on the appropriateness of various participatory communication approaches and techniques to improve the efficiency of the TOT system. Finally it proposes a comprehensive framework for institutionalisation of these participatory processes into the TOT system.

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STRATEGIES FOR AGRICULTURAL DEVELOPMENT

N.B. Chauhan¹, K.F. Patel², and R.C. Patel³

Shortage of food is likely to be one of the greatest problems in the years to come. To achieve maximum results farmers will have to make best use of available modern high production oriented agricultural technologies. It is said that out of the available agricultural technologies with research system, only thirty to forty per cent have been transferred to the client system. Therefore, some remedial changes need to be initiated in the existing system of agricultural development to accelerate the rate of adoption of agricultural technologies. For this, purpose policy makes should think of appointing Agricultural Graduates in each village, bring improvements in agriculture related programmes of mass media, adopt simplicity in naming the agricultural technologies, develop practically adoptable new agricultural technologies, improve peoples’ participation in extension programmes, link SAUs with private agencies, establish input supply units at different centers of SAUs, use combinations of traditional and electronic extension methods, make available rural agricultural libraries and Internet facilities at village level, establish farm clinics and service centers in villages, motivate NGOs to change their role for marketing oriented work and encourage private extension services.

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ICT TOOLS TO SUPPORT EXTENSION SYSTEMS

Ashok A. Patel¹ and D. D. Patel²

A large number of farm technologies are generated by the agricultural research system in India. Efforts have been made to shorten the process of technology generation, assessment, refinement and dissemination. In view of market led farming and diversified agro-eco situations; agricultural extension system is becoming diversified, technology intensive and demand driven. This necessitates the extension workers at the cutting edge level to be masters of so many trades, which is nearly impossible for a less educated field functionary. Improved communication and information access are directly related to social and economic development of the farming community. The use of ICT can help the extension system to be more effective in meeting farmers’ information needs. Beyond traditional tools of radio, television and print media, efforts will be required to concentrate more on creation and effective use of newer ICT tools like satellite communication, multi-media, web-based communication, interactive video discs, video conferencing, etc.

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International Conference on “Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions”
The escalating fiscal deficits in developing countries like India and in many cases, problems of poor governance of public programmes over the last decade have increasingly redirected attention towards how to make extension services of animal husbandry more effective and responsive to animal owners. The ex post facto research design with two-stage simple random sampling was employed to select the twenty animal owners from Navsari district where as, ten researchers and ten veterinary extension workers were randomly selected from the Gujarat Agricultural University and Department of Gujarat State for the study. The data were analysed by using simple statistics.

Majority of respondents had medium level of favorable attitude towards privatisation of extension services of animal husbandry while, out of 13 extension services of animal husbandry, general information on animal husbandry, availability of financial aid for purchasing animals, information on selection of animals, services for natural/ artificial insemination, availability of cattle feeds, information on balanced feeding, availability of veterinary services, availability of drinking water, availability of milking equipment, services in milk marketing and guidance on technical problem were found successfully served by private extension services.

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IDENTIFICATION OF FARMING SYSTEMS AND THEIR RATIONALE AS PERCEIVED BY FARMERS IN MARATHWADA

R.R. Cholé and K.R. Nadre

The study was conducted in 20 villages in two districts of Marathwada region of Maharashtra State (India) by interviewing 80 adopters and 80 non-adopters of farming system with prime objective to identify the prevailing farming systems and rationale behind adopting them. The study leads to the conclusion that three farming systems namely agriculture + dairying, agriculture + goat keeping and agriculture + poultry were identified in selected villages as popular ones. However, annual income of adopters was significantly higher than non-adopters of farming system.

Getting additional income, getting byproducts useful for farming, proper utilization of time of family members and employment generation were the important points of rationale in adopting farming system as perceived by adopters. Moderate basic and secondary infrastructural facilities were available to the adopters of farming system. Almost all adopters of farming system used byproducts on farm as organic manure. The important constraints faced by adopters of farming system were lack of remunerative prices for produce, non-availability of proper technical guidance, inadequate capital and lack of knowledge.

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International Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions"
An empirical study was done to explore the current level of people’s participation in the village level milk cooperative societies. Tools like interview schedule, interview guide and observation method were used to collect the data from the respondents. The sample was decided as 12 village level milk cooperative societies of Kaira District Cooperative Milk Producer’s Union Ltd. and 10 members from each society. To ensure adequate geographical representation, the area was divided into four zones viz. North, South, East & West. Three societies were selected from each zone randomly. The data collected were analysed on the basis of the membership age i.e. less than or equal to 5 years, 5 years to 15 years & more than 15 years. Thus member’s participation was judged and interpreted according to their membership age in the village level milk cooperative societies.

In the present investigation, it was apparent from membership age linked to caste that weaker sections of the rural people are increasing their number. Weaker sections were zero percent as membership age above 15 years is concerned but 72.2 per cent in the newer group i.e. less than or equal to 5 years. The newer members were having minimal percentage (13.80 percent) of decreasing trend of milk pouring where as older members had a highest percentage (36.30 percent) for decreasing trend of milk pouring in village society. These newer members were having less erratic (2.8 percent) pouring status than older members. The older membership group was having land holdings larger than 3 bighas (78.8 percent). The newer members were having small land holdings (less than 3 bighas). Thus it is apparent that people having smaller land holdings i.e. weaker sections of the society has started to participate considerably in the village level milk cooperative societies as indicated by caste composition of newer members, their minimum percentage of decreasing trend of milk pouring and less erratic pouring status.

IMPACT OF RESULT DEMONSTRATION ON WEED CONTROL IN POTATO

Arvind Saxena

Result demonstration can be used as a method of motivating the people for adoption of a practice by showing its distinctly superior results. Potato is the major vegetable in the Chhindwara district of Madhya Pradesh. The yield level of potato is low at 160-200 qt./Ha whereas the potential yield is 260 qt./ha. The Krishi Vigyan Kendra, Chhindwara conducted Participatory Rural Appraisal (PRA) exercises in three adopted villages. During the PRA, the problem cause diagram clearly showed two factors for low yield, viz., socio-economic and biophysical factors.

The infestation of weed was ranked first among the major causes for low yield. To solve this problem totally 32 result demonstrations were conducted in selected potato grower’s fields of adopted
villages in about 16 hectare. Application of paraquat weedicide 5 % gave the highest yield of 310 qt./ha. The results of the demonstrations indicated that the productivity of potato under local practices (233.87 qt./ha.) could be boosted up by 19.20 % (278.78 qt./ha.) Through the use of weedicide paraquat at 5% germination @2.5 lit./ha. Additional cost of the improved technology was Rs. 925/ha, which resulted in additional yield of 44.90 qt./ha. With B.C. ratio of 9.70.

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IMPACT ASSESSMENT ON THE FARMERS DUE TO DRAINAGE PROJECT
O. D. Vanparia1, P. K. Shrivastava2, N. J. Ahir3 and S. Raman4

Impact assessment study to gauge the changes in farmer's perception about drainage technology was carried out in the two pilot areas after five years of implementation of drainage work. The survey revealed that farmers were convinced about the importance and benefits of drainage as a tool to reclaim waterlogged and salt affected soils, particularly in terms of land value and crop yield. They mostly opined that government should intervene in solving the menace of water logging and salinity and they are also willing to actively participate by sharing the cost of maintaining the drains adjacent to their fields.

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IMPACT OF DRAINAGE PROJECT IN GUJARAT
O. D. Vanparia1, P. K. Shrivastava2 and S. Raman3 and N.J. Ahir4

Indo Dutch Network Project was Implemented in two pilot areas Viz., Segwa and Sisodara of Gujarat by the team of scientists comprising of Engineers, Social Scientists, Economists, Agronomists and Soil Scientists. The activities included problem identification, creating awareness at state level and farmer’s level, recommending solutions and dissemination of knowledge through training and advisory services. To train the project staff trainings were organized both in India and abroad. Later the trained staff successfully executed the surface and sub surface drainage work in the two pilot areas. Several farmer’s trainings on drainage and water management were organized. The project staff also helped in installing drains in areas suffering from water logging and salinity problems.

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SOCIO ECONOMIC ASSESSMENT OF FARMERS OF SEGWA DRAINAGE PILOT AREA
O.D. Vanparia¹, P. K. Shrivastava² and S. Raman³

A base line survey was conducted to evaluate the socio economic status of farmers of Segwa drainage pilot area under Indo Dutch Network Project at Navsari. The questionnaire was prepared and farmers were personally interviewed to assess the socio economic status and irrigation and drainage know how available with the farmers. The survey indicated that most of the farmers are literate with large land holdings and fairly good economic background. It was also found that farmers were aware of the fact that canal irrigation have caused water logging and salinity problems but only 19 % of the farmers interviewed, think that improvement could be brought by shifting from the present cropping pattern of sugarcane – paddy.

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FIELD REALITIES AND STRATEGIES FOR THE ENHANCEMENT OF ONION CROP PRODUCTION THROUGH THE APPLICATION OF PSYCHOLOGICAL TRAITS.
N.B. Jadav¹, M.A. Munshi² and G. R. Gohil³

The gap between the know-how already attained and their field reality is still large despite of considerable advancement in onion production technology. Onion is the important vegetable bulb crop of the world. However, majority of the onion growers did not know and had not yet adopted recommended onion production technology, due to lack of technical know-how and several constraints experienced by them. The study was conducted in Bhavnagar district with two blocks leading onion production and productivity constituting 120 respondents. The field realities about recommended onion production technology are, a majority of the onion grower had medium level of knowledge followed by high and low level of the knowledge, as well as, more than one half of the onion growers had medium adoption index.

There was non-significant association of the knowledge and adoption of onion growers about recommended onion production technology with their size of land holding, while age and size of family of the onion growers were negatively and significantly associated with the knowledge and adoption of recommended onion production technology. Some important strategies expressed by more than one half per cent of the respondents were provision of irrigation water, remunerative price should be given to onion grower, sufficient and regular electricity should be available are in order. The implications, the psychological traits influencing the onion production are discussed in detail in the paper.
ADOPTION OF RECOMMENDED PACKAGE OF PRACTICES FOR RICE CULTIVATION IN TARAI REGION OF UTTARANCHAL

S.P. Gupta¹, Kushal Vir² and Amardeep³

Tarai belt of Uttaranchal state is major rice growing area in Uttaranchal state. Around 80 per cent of the total cultivable area of this belt is under rice-wheat crop rotation. The average productivity of rice in this area is about 60 quintal per hectare against the expected productivity of 65-75 quintals, which indicates that the productivity is lower then the expected productivity. If weather and geographical factors are considered neutral, it is the production technologies that can be manipulated for increasing productivity. The farmers of Tarai region grow two rice crops in a year, one in summer season and one in kharif season. It is also observed that there is a wide gap between recommended package of practices and the actual practices followed by the farmers. Keeping the above facts in mind a study was conducted in the Udham Singh Nagar district of Uttaranchal state with 150 farmers to identify the adoption level of improved rice cultivation practices. It was found that majority of respondents were with medium level of technology adoption. Plant protection measures was the major area in which gap was maximum, followed by seed rate, and method of planting, use of high yielding varieties, use of micro-nutrients, fertilizer application and weed control.

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CONSTRAINTS IN ADOPTION OF IMPROVED PRACTICES OF VEGETABLE CULTIVATION IN NAINITAL AND ALMORA DISTRICT OF UTTARANCHAL

S.P. Gupta¹, Kushal Vir² and Amardeep³

Vegetables, the main cash crops in Uttaranchal. Being short time they provide immediate income to the growers. The technologies evolved are largely meant for irrigated land with optimum supply of inputs, but in this region the growers in general could not adopt such technologies successfully because of limited resources and other constraints. Keeping this in mind a study was conducted in Nainital and Almora districts of Uttaranchal state with the objective to assess the socio-economic profile and status of adoption of vegetable production technologies by vegetable growers. The analysis of data revealed that adoption level of improved practices of vegetable cultivation was quite low. Furthermore it was found that growers faced several problems related to inputs, climatic condition and ignorance about improved package of practices. This paper also suggests appropriate communication interventions to overcome these constraints.

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ASSESSMENT OF BACKYARD POULTRY BREEDS IN HOMESTEADS - A CASE STUDY

S. Helen¹, S. Pradeep² and M.C. Narayanankutty³

As part of the National Agricultural Technology Project on Technology Assessment and Refinement through Institution Village Linkage Programme a case study was conducted in Pattisery and Mavundri villages of Palakkad Dt, Kerala during April 2003. The objective of the study was to analyse the performance of the intervention on improved backyard poultry breeds, assessment and adoption of the technology by the participating and non-participating farmers. Very few participating farmers spent on veterinary medicines and feed as input cost for improved poultry bird ranged from Rs.180/ to Rs.240/annum. They had utilized their own labour especially female members in the family contributed their labour during leisure time. They adopted the technology between the years 1996-2000. Majority of them tried the breeds like Gramalekshmi and Athulya. Improved poultry breeds gave an average yield of 146 eggs/bird/annum and local breeds yielded on an average of 100 eggs/bird/annum. Majority of them utilized eggs for their own family consumption. Net returns per annum was worked out to Rs. 200/bird in rearing improved poultry birds and Rs. 150/bird in the case of local breeds. The participating farmers were very much satisfied with the number of eggs laid by the improved poultry breeds, earliness in egg laying, egg laying pattern, the rate of weight gain, but not with the resistance to diseases, ability to escape from predators, egg laying habit in the places other than cages and the feeding of growing parts of plants in homesteads. They assessed the technology of improved poultry birds with an index of 60.6 and the local breeds with an index of 70.6. From the technology assessment indices, it can be concluded that the possibilities of incorporating desired qualitative characters of local breeds in the improved breeds may be probed in future research programmes. Non-availability of chicks of improved poultry breeds forced the farmers to discontinue the technology. Hence the extension agency may take care of the regular supply of chicks or a progressive farmer may be assisted technically and financially to take care of the regular supply of chicks of improved poultry breeds.

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PEOPLE’S PARTICIPATION IN IMPLEMENTATION OF SOIL AND WATER CONSERVATION PROGRAMME IN THE ANTISAR WATERSHED OF GUJARAT

G. L. Bagdi¹ and U. Joshi²

study was conducted during 2000-01 in the Integrated Wasteland Development Project (IWDP), Antisar watershed located in Kapadwanj Taluka of Kheda district in Gujarat. It was revealed that more than three fourth of the respondents (76.02%) showed moderate level of participation, nearly one fifth of them (19.64%) having less participation level and few of them with more participation level in implementation of the soil and water conservation programme. The overall extent of the male as well as female respondents’ participation in the programme at the stage of its implementation was calculated with the help

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of People’s Participation Index (PPI) and it was found 69.29 per cent and 71.66 per cent respectively. It means that overall extent of participation of male and female farmers in the implementation stage was near high level.

The variables socio-economic status, farm power, risk preference, knowledge and attitude were positively and significantly correlated with the participation of male farmers in implementation of SWC programme. Whereas, the variables socio economic status, education, family size, social participation, risk preference, knowledge and attitude were positively and significantly correlated with the participation of female farmers in implementation of SWC programme, and the variables age and income were negatively and significantly correlated with the participation of female farmers in implementation of soil and water conservation programme.

ISSUES IN IMPLEMENTATION OF PARTICIPATORY PROJECTS

Manish Kumar1 and Chitra Pathak2

Since the last decade of the 20th century, participation of local people in development projects has been considered to be the panacea for their constraints. This popular assumption has been contradicted by many researches (Pretty 1994, Chambers 1997, Pijnenburg 2002). They argue that the different actors involved in the participatory interventions are guided by their respective frame of reference. Further the theory of individual differences states that no two different individuals can perceive a situation in similar ways. This implies that the perception and extent of participation may vary depending upon the type and role of the actors and the kind of changes, which are introduced. The situation becomes even more complicated with government planned participatory interventions which assumes that participation will help to reduce infrastructural costs, organisational burdens and improve the accuracy of the research they carry out (Nelson & Wright 1995). The proponent of these planned interventions often blame the farmers, environment factors or the mysteries of distant commodity markets for failure, not the package or the activities of the agency itself (Long 1992). This paper discusses the major issues in the implementation of participatory projects with special reference to ATMA (Agricultural Technology Management Agency) pilot project in India.

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International Conference on “Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions”
The green, white, blue and yellow revolutions are the remarkable achievements of India during the past few decades. Despite this the paradox is that, India has the largest number of poor (around 250 millions) who lack access to square meals a day (Paroda, 2003). According to a recent study on the global poor, more than 1.2 million people are living in abject poverty (World bank, 2001). Approximately, one quarter of these global poor are estimated to be livestock keepers. In many developing countries, including India, livestock are one of the few means by which the poor can generate capital assets. Although new frameworks of development support a focus on rural poor old arguments about the strong livestock sectors and the secondary benefits to the improvised stubbornly remain. Moreover, livestock have been under utilized as a weapon against poverty reduction. The livestock projects and programmes have not had a pro-poor focus (LID, 1998). Nevertheless in India millions of rural poor depend on livestock as their only means of livelihood. A livelihood comprises the capabilities, assets (both material and social resources) and activities required for a means of living. A livelihood is sustainable when it copes with and recovers from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining natural resource base (Scoones, 1998). Livelihood (Pro-poor) extension is broader in scope than traditional agricultural extension. It must go beyond agricultural production and productivity. And should identify most suitable and feasible ways to reduce poverty and insecurity. SLA is a holistic approach and builds upon strength of poor people. It tries to capture and provide better understanding of vital causes and dimensions of poverty.

The focus is not limited to just few factors (e.g. economic issues, food security, etc). But attempts to determine relationships between the different aspects (causes and manifestations) of poverty, allowing far more effective prioritization of action at an operational level. Therefore, SL framework has implications for the role and scope of extension. Importantly, extension policy and practice must expand its focus not only on increasing agricultural production but also on tapping new employment opportunities and reducing the impact of shocks, trends and seasonalities. This paradigm shift in thinking from production research that leads to technology transfer to farmers, to a research on how to create social processes that enable poor farmers to develop solutions to their own problems. The paper will attempt to discuss the implications and applications of SL approach in rural areas.

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judgment that determines whether a new technology is good or bad. Hence there is need for involving farmers in problem identification and prioritisation. Problem in any farm production system will be unique to a micro farming system. Participatory action research is required to analyse the problems their causes and prioritisation, based on which interventions through research on bio-physical and socio-economic aspects of the problems can be done. This paper throws light on the participatory identification of problems faced by the rice farmers of Palakkad district of Kerala and the identification of appropriate technological intervention points for profitable rice cultivation. Various participatory tools and brainstorming sessions were used for the identification and screening of both problems and causes followed by participatory prioritisation exercise.

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USE OF CYBER EXTENSION FOR PEASANTRY
N.B. Jada\textsuperscript{1}, V.J. Savaliya\textsuperscript{2} and B. A. Savaliya\textsuperscript{3}

The process of change within the agriculture extension system should be accompanied by a serious analysis of the methods and means to increase the income from agricultural production and raise living standards in rural areas. Cyber extension will become important due to the need for higher precision in the use of chemicals and in the care of farm animals. Cyber extension is important to supply farmers and agricultural advisors with timely information and decision support. Information technologies are offering new ways for extension personnel to reach wider audiences. Knowledge of the latest innovations in cyber extension among agricultural producers in India is insufficient and so far not available to them. The situation is made more difficult by inadequate telecommunication system, less investment in cyber extension and low level of computer literacy. Successful implementation of agricultural information model is only possible on the basis of continuing fundamental research the overall development will require infrastructure and sufficient computer literacy among farmers and extension workers, for which government or non-government agencies need to, establish infrastructure and organise trainings for the same.

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RESEARCH PRIORITISATION ON FARMER BASED NEEDS - AN ANALYSIS
A. Janakirani\textsuperscript{1}, M. Manoharan\textsuperscript{2} and P.P. Murugan\textsuperscript{3}

The Indian Council of Agricultural Research (ICAR) in its report on agricultural teaching, research and extension reported that only 45 per cent of the derived technologies by the research system are utilized by the farming community. One of the reasons for poor adoption rate might be that the technologies developed by scientists are not in line with the need of the farming community.

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It was assumed that there exists difference between the priorities perceived by the researcher and farmers. Therefore a study with the objective to study the difference between farmers and scientists in the perception of research priorities was taken up with jasmine farmers and scientists of Madurai district in Tamil Nadu State. The researchers considered that the varietal improvement as the most important area for research. The social Scientists stated that agricultural polices, constraints analysis, market analysis and post harvest analysis were important criteria. The crop production and protection research were given third priority. Whereas the farmers first preference was the social research followed by biological research consisting of production and protection aspects. The farmers placed third priority to varietal research. The study clearly showed that farmer’s preference varied from the researcher’s perception. Hence, to make the farmers to fully utilize the technologies, researchers need to give priority for farmer’s preference.

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MAXIMIZATION OF NET RETURN BY NAA AND MULCHING IN OKRA,
(Abelmoschus esculentus (L.) Moench) var. GOH-1.
S.R.Patei and R.R.Shah

Okra is cultivated in more than 6000 hectares of land in Gujarat. It is one of the most profitable summer vegetables and has a vast potential as one of the foreign exchange earner crops. It is necessary to boost the production per unit area without affecting quality of the produce in order to maximize benefits to farmers as well as to enhance export potential. Investigation carried out at Main Irrigation Research Station, Gujarat Agricultural University, Navsari suggested strategies for higher profitable farming in okra var. GOH-1 during summer season. NAA at 50 mg/l sprayed twice (25 and 45 DAS) increased yield by more than 44 per cent with net ICBR of 1:134.6. Similarly, black plastic mulch treatment enhanced yield by 37.52 per cent over the control, the net ICAR for this treatment was 1:0.72. The combination of these two treatments registered nearly 80 per cent higher yield. However, net ICBR and combined treatment was only 1:14.10. Only NAA treatment gave net realization of Rs.1.57 lac/ha as compared to Rs.1.93 lac/ha in case of combination of NAA and black plastic mulch treatment. Based on two years data a recommendation has been approved for farming community to use either NAA or black plastic mulch with NAA to maximize net return in okra. The recommendation has been utilized by many farmers and feedback obtained from few farmers showed considerably higher yield and more net return.

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KNOWLEDGE LEVEL OF FARMERS ABOUT IMPROVED PRACTICES OF SUGARCANE CULTIVATION
Kushal Vir, Ummed Singh and B.S.Rohal

Uttar Pradesh has the largest area under sugarcane in India with 57 per cent of the area and accounts for 47 per cent of the annual production in terms of raw sugar. The challenge is to enhance the productivity of sugarcane from existing 72 tonnes per hectare to 100 tonnes per hectare by 2020 A.D. There is wide gap between the scientific knowledge and the knowledge possessed by the sugarcane growers about improved practices of sugarcane cultivation. Keeping above facts in mind a study was conducted in the area of Upper Doab Sugar Mills Shamli of Muzaffar Nagar district of Western Uttar Pradesh with the objective to ascertain the knowledge level of sugarcane growers about improved practices of sugarcane cultivation and to identify the technological gap therein. It was found that majority of respondents had medium level of knowledge about improved practices of sugarcane cultivation. The large farmers had high level of knowledge while medium and small farmers had medium level of knowledge. The paper also discusses in detail the appropriate ways to improve the knowledge level about improved practices of sugarcane cultivation.

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TECHNOLOGICAL GAP IN GROUNDNUT PRODUCTION
P.D.Verma, M.A.Munshi and M.N.Popal

A study was conducted in South Saurashtra agro-climatic zone of Gujarat with 256 groundnut growers. It was observed that the mean technological gap score was 39.44 per cent and the overall technological gap in groundnut cultivation was of medium order.

The study revealed that the technological gap was higher in case of soil testing, chemical fertilizers, plant protection, row spacing and weed management. However, minimum technological gap was observed in case of tillage, improved variety and harvesting. Whereas, in remaining technologies, the gap was in the range of about 20 to 40 per cent. The data also revealed that the variables: knowledge and technology gap were significantly associated with the pod yield of groundnut. Also, size of land holding, income and cropping intensity were significantly associated with the pod yield of groundnut. The negative relationship of technological gap with pod yield suggests that higher the yield lower the technological gap. An attempt was also made to correlate some important variables with each other and it was observed that the independent variables namely: size of land holding, income, extension participation and technology gap had significant negative correlation with each other.
The variation in farmers' yield was explained by all the independent variables to the extent of 58.41 per cent. The independent variables namely: knowledge and technological gap alone contributed maximum (54.36%) to the pod yield of groundnut crop. It was also observed that the variables namely: knowledge, technological gap and education had the maximum direct effect on pod yield.

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AWARENESS KNOWLEDGE OF TRIBALS ABOUT HORTICULTURE
B.G.Bagle¹, A.K.Singh² and Meena, K.Trivedi³

The Jaivigyan National Science and Technology Mission of Government of India provides Household, Food and Nutritional Security in tribal, backward and Hilly areas. Keeping this in view, an NATP project was implemented in tribal areas of Panchmahals district of Gujarat State during 2000. On the basis of a benchmark survey, it was observed that economic and social development of tribals was very low and they were orthodox in approach. More than 90 per cent of population depends on agriculture and allied activities, for their income. The results of the survey also revealed that tribals generally suffer from malnutrition. Intake of fruits and vegetables in their diet is negligible. Orchards are conspicuously absent in the area. However, stray plants of some fruit crops viz., mango, pomegranate, ber, lemon, chiku, guava were found as courtyard trees or along the field bunds. On these grounds it was felt necessary for popularization of Horticulture among tribals. It was considered essential to know the awareness of tribal farmers about horticultural crops, its importance from nutritional point of view and knowledge on its cultivation practices, which is a necessary prerequisite for adoption of innovations. Hence, in the present study emphasis was given to know the awareness of tribals about horticulture and to assess the awareness knowledge of horticultural crops cultivation possessed by the tribal farmers of the Panchmahals.

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CONSTRAINTS FACED BY MEMBERS OF PARTICIPATORY IRRIGATION MANAGEMENT SOCIETY IN GUJARAT
R.A.Dabhi¹, N.V.Soni² and J.C.Trivedi³

In Gujarat, only 23 per cent of the total cultivable land of the state is under irrigation. Even with the fullest exploitation of the Sardar Sarovar Project, about 52 per cent of the state agriculture will be dependent on the monsoon. On the basis of successive experience of Rotational Water Delivery System (RWDS), the concept of participatory irrigation management was introduced. Though participatory irrigation management is an accepted concept but operationalisation of this concept in a systematic manner has been a major weakness. Therefore the investigators felt necessary to find out the problems faced by the members of Participatory Irrigation Management Society (PIMS) and also to collect the suggestions to overcome their problems.

Abstracts

International Conference on "Agricultural Policies and Strategies for Profitable Farming: Field Realities, Needed Reforms and Interventions"
Anand district has taken a lead in introducing PIMS in the state. For the study, 100 members of
the PIMS were selected. Constraints were studied in terms of four categories i.e., economic, administrative,
technological and personal.

The most important economic problem faced by the members of PIMS was lack of financial
provision at the time of payment of irrigation charges and PIMS does not help for obtaining credit from the
any financial organization.

The major administrative problems faced by the members of PIMS were at night time trespassers
damage canal / field channel / water course; inadequate canal water supply to the tail-enders; irregular
supply of canal water; problems of water course from outlet to field; less coverage of irrigation area
compared to irrigation efficiency of PIMS; problems of cleanliness of channel and water course; inability to
provide irrigation water by the PIMS at critical stages or dry spells, problems of some dominant farmers in
distribution of irrigation water.

The important technical problems faced by the respondents were: deterioration of soil condition
due to continuous and over irrigation, high intensity of weed; literature on modern agricultural technology
and water management practices not provided by PIMS; training programmes pertaining to agricultural
technology and water management practices not arranged by PIMS and educational tour / field trips not
arranged by PIMS.

**LIMITED IRRIGATION TECHNOLOGY FOR WHEAT CULTIVATION IN CENTRAL INDIA**

A.A.Singh¹, P.K.Verma², S.V.Saiprasad³ and H.N.Pandey⁴

Wheat area in Madhya Pradesh (4.5 million hectares) is approximately 16 per cent of total wheat
area in the country, contributing 12 per cent (approximately 9.1 million tonnes in 1999-2000) to national
wheat production annually. Though average wheat productivity is lesser in M.P., the quality compensates
well for lower yields. Wheat productivity under limited irrigation, may easily be raised upto 25-30 qtl./ha in
Central India by adopting limited irrigation technology for wheat cultivation.

Major wheat cultivation in this region is either rainfed (20%) or limited (1-2) irrigations (50%).
Thus, majority of the farmers are forced to grow wheat with 1-2 irrigations only. In rainfed situations, the
survival of the crop largely depends on conserved soil moisture at the end of monsoon. Despite availability
of improved wheat varieties and cultivation practices, annual wheat production in M.P. is still staggering

**Abstracts**

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around 8 million tonnes, mainly due to: inefficient use of irrigation water, early sowing (first fortnight of October) of wheat with non-recommended varieties, limited availability of seeds of recommended varieties, imbalanced use of fertilizers, poor adoption of recommended wheat cultivation practices and erratic power supply etc.

IARI-Regional Station, Indore has evolved, refined and transferred "Limited Irrigation Wheat Cultivation Technologies" through "Wheat Frontline Demonstrations", in farmers' fields in M.P. These technologies include: dry field preparation and shallow sowing followed by come up irrigation, irrigation (by check-basin) in small square wheat beds, shifting the customary first irrigation (for limited irrigation wheat varieties only) from crown root initiation i.e., 20-25 DAS, to 40-45 DAS, application of balanced fertilizer (NPK in ratio of 4:2:1 i.e. 60:30:15 kg/ha) just before sowing at 2.5 to 3. inches depth, *durum* wheat cultivation for saving irrigation water, adoption of early heat tolerant durum as well as *aestivum* wheat varieties for October sowing, suitable organic amendments in soil with farm yard manure/poultry manure/green manure atleast once in three years, clean cultivation by regular weeding, and underground water recharging practices.

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Abstracts

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