

## Reorienting Agricultural Extension Curricula in India

Rasheed Sulaiman V \* and Anne W. van den Ban \*\*

### Abstract

This article discusses how extension should be taught at the undergraduate, M.Sc. and Ph.D level in India. Major changes are needed to prepare students to work in a rapidly changing environment. Extension education is at present in a crisis, because it has not yet adjusted to these changes. As extension graduates are not prepared to perform the roles the market demands, they have difficulties to find a job. In order to prepare the students for the present needs, more training is needed in participatory extension approaches, organizing farmers' groups, planning extension strategies to meet farmers' needs, Human Resource Development and the use of Information and Communication Technologies. The students ought to learn how to apply theories in these areas in the field situation. For this purpose not only agricultural graduates, but also other social scientists should participate in teaching extension. It should become clear which students will be trained to become an extension field worker, and extension manager or an extension researcher.

*J Agr Educ Ext (2000, 7, 2, pp 69-78)*

### Introduction.

Extension was introduced as a subject in some Indian Agricultural Universities in the fifties to train students for the position of Agricultural Extension Officer in the Community Development Programme. This required not only training in agricultural technology, but also in extension methods. With financial support of the Ministry of Food and Agriculture, this training expanded rapidly in the sixties, but at that time it was difficult to find teachers, who were trained themselves in extension. The courses were often taught by economists and agriculturists with a one month training in extension. At that time, the USA started to support the development of Agricultural Universities in India. This included training of extension professors at US universities, (mainly Cornell and Wisconsin) and personal visits of US professors to India. The work of J. Paul Leagans of Cornell University still has considerable impact on extension courses at Indian universities.

However, in the universities, extension education has always had a hard time to be recognised as a

science and a discipline at par with other biological and social sciences. Choices extension professors made, in deciding on the content of their courses and their selection of research methods, influenced by the wish to gain more recognition (for instance by applying statistical methods), did not help much to gain a good understanding of the way of thinking of farmers and extension agents.

Since 1990, there have been major changes in Indian society and in particular in agriculture. Therefore the job market for extension staff now demand quite different competencies than were required at the time extension education was introduced in the agricultural universities. The extension curricula have changed somewhat, but much less than the market requires. Hence, it is not surprising that extension post-graduates are sidelined for many of the jobs that demand skills related to agricultural and rural development. In this article, we will discuss the development of agricultural extension curricula in India and give suggestions to make them more relevant for the present needs and for those needs we expect in the next decade. We are afraid that this situation

\* National Centre for Agricultural Economics and Policy Research (NCAP) PB No. 11305, Pusa, New Delhi 110 012, India

\*\* Gen. Foulkesweg 82A, 6703 BX Wageningen, the Netherlands

is similar to those in other countries and therefore we hope that this discussion will help readers in other countries also to decide what should be taught in their extension courses and how it should be taught, though it is beyond the scope of this article to discuss this in detail.

In recent years, there has been a lot of change in the thinking about extension education. We will not discuss these changes here, because of space limitations and because readers of this Journal have seen many articles contributing to these changes. See also Anonymous (2000), Christopolos and Nitsch (1996), Scarborough et al. (1997) and Zijp (1998). So far these changes have had only a limited impact on the extension curricula at Indian universities. One reason is that journals and books in industrial countries are that expensive, that Indian libraries do not have the budget to buy them. Another reason is that updating their courses or developing new courses would require a considerable investment in time by professors, who receive limited rewards for making this investment.

### **The present crisis**

The present crisis in the discipline of extension education, owes its genesis to many factors. The most important being the outdated curricula and inadequate training. The crisis is manifested in the following ways.

#### ***Preparing students for change***

Indian society is changing more rapidly than in the past. As a result, Indian agriculture is changing and agricultural extension will have to change. We know that long before the present generation of students retire, the extension system will have changed drastically, but we do not know what these changes will be. Therefore university education should contribute to increasing the flexibility of students to work and live in a changing environment. They can only be successful if they continue to learn during their whole career, partly because extension science is changing, partly because the environment itself is changing. Ten years ago the student may have learned little in a university about Participatory Rural Appraisal, but at present he can not do a good job in many extension positions unless he is able to apply this methodology. We should be prepared for many similar changes in the next 30 years. This makes

it less important than in the past that the students learn a lot of facts and more important that he learns how to learn, that he is able to find, perhaps on the Internet, information which is relevant for the problem on which he works, to evaluate this information and to integrate information from many different sources. This requires a teaching methodology which is very different from the methodology that is followed at present (Blum, 1996).

#### ***Increasing unemployment***

The agricultural graduates up to the end of 1980's, found employment mainly in the State Departments of Agriculture. With the nineties, opportunities in these public sector departments dwindled. The agricultural graduates are now competing for limited job opportunities that are presently emerging in development NGOs and agro-input and marketing companies. But now these organizations are looking for graduates or post-graduates with more rural management, communication and marketing skills. Many of these skills are generally not present in the graduates or post-graduates supplied by the agricultural universities.

Though the professed aim of the State Department of Agriculture (DoA) is agricultural development through extension, extension has been generally sidelined as the emphasis has been on implementation of schemes related to delivery of subsidized inputs. People with additional qualifications in extension (post-graduates) are not given preference for any position in the department. Those with additional training or qualification in extension are also not being preferred for any higher position. The situation is hopefully changing, though not exactly in State Departments of Agriculture. As the State Departments of Agriculture in many cases were found wanting in their implementation of many of the developmental projects, the governments have started creating new autonomous organizations having more administrative flexibility for implementing special programmes in specific crops and areas. Many of these agencies are now recruiting trained post-graduates in agriculture for its various positions. They are also looking for personnel trained in communication, training and management for positions such as Communication Specialist, Training Specialist, Project Manager etc. This new trend of

recognizing professionals needs to be welcomed, though post-graduates in extension who could have better capitalized these opportunities, are in many cases sidelined due to their inadequate training in these fields. For many jobs in the area of rural development, where the focus is on extension, general graduates with qualification/training in social work and rural management are being preferred now.

With the phasing out of T and V funding, many of the State Departments of Agriculture from the late 80's started giving more emphasis to group approaches in transfer of technology. These became much more important when these departments started implementing programmes such as Watershed Development and Integrated Pest Management. Increasing emphasis is now given to identification of farmers' needs at the grass roots level, bottom up planning, development of extension plans, etc. Many of these social science skills are lacking in the agricultural graduates and even post-graduates working in these departments. Lack of a practical orientation to the curricula based on the felt needs of the potential employers has been the main reason for this situation.

### ***Displacement***

Many senior extension management positions in the Indian Council of Agricultural Research and State Agricultural Universities, which were traditionally held by extension professionals, are presently going to members of other disciplines. Unfortunately, a consensus seems to be emerging that the work related to extension is anybody's job and special qualifications/training are not necessary for performing activities related to extension. Extension scientists are not even considered for many of the professional responsibilities such as designing, monitoring and evaluating of extension projects.

### ***Divergent role perception***

Those working as extension scientists in research institutes, have been generally used as public relations functionaries. Most of their time is being spent in organizing meetings and seminars, taking care of visitors and making arrangements for training. Their status has been generally inferior, their potential role as independent researchers or as a member of technology development teams are not given adequate importance. Seldom they play a role in

developing a strategy for two-way communication between researchers and farmers. Singh (1973) states that 'the role extension scientists can play as consultants, programme advisors, programme analysts and persons who are concerned with developing greater insight into the development process, is not yet fully understood.'

But are the extension scientists effectively trained to perform the above roles? To us, they are not. For instance, the research training in extension at the M.Sc. and Ph.D. levels have been highly inadequate. Much attention is given to the statistical analysis of data, but opportunities to understand and analyse the complex social realities and development processes are not there in the curricula. The programme also doesn't have the required orientation to develop these skills.

Historically these conflicting role perceptions for social scientists existed in the agricultural research institutions all over the world. But over the years the social scientists in the international agricultural institutes, comprising mainly economists, sociologists and anthropologists, have slowly established their identity and usefulness and convincingly earned the respect which they deserve. However this has not happened in India. Those at the helm of affairs, are still skeptical of the role, the social scientists (comprising mainly of economists and extension scientists) can play in the National Agricultural Research System (NARS).

The poor institutional support, divergent role expectations and the weak training in research methodology have adversely affected the morale of the extension scientists. Lack of a clear understanding of the role of extension professionals in the NARS have also contributed to this situation. Extension professionals also seem never to have articulated their potential contributions very effectively.

### ***Status of the discipline***

As a result of the poor status of the discipline, a bright agricultural graduate, who plans to follow an M.Sc. course in extension, will likely be advised by several of his teachers to follow another course with a higher status. Fortunately not all bright students follow this advice. Some of the best realize that in the present era,

successful agricultural development requires major changes in extension approaches and in extension organizations. This offers challenging opportunities for extension scientists and extension managers, who are able to play a role in designing new approaches and in changing organizations. But even the most committed students find the present programme highly uninspiring and it is not surprising that many of them are looking for better opportunities outside extension during their M.Sc. programme. Case studies in which students discover how extension principles can be applied to increase the effectiveness of an extension programme, might convince them that there are challenging opportunities in extension (Blum, 1996) as is done at the Rajiv Gandhi College of Veterinary & Animal Sciences in Pondicherry.

### **The evolution of curricula**

#### ***Undergraduate Curricula***

In the undergraduate programme in agriculture, 5% of the time is used for extension courses. This is insufficient as the major objective of this programme is to develop personnel for extension related responsibilities. In other undergraduate programmes, such as veterinary science and fisheries, only half as much time is spent for extension.

The course content in the agricultural programme comprises of basic concepts (mostly definitions) in sociology and educational psychology, principles and philosophy of extension, extension methods, audio-visual aids, programme planning and concepts of communication. The third Deans Committee Report recommended in 1995 to include the area of diffusion and adoption of innovations also in the UG curriculum. The programme is heavily loaded with lectures. Field based practicals are few in most universities. Many of the critical social science skills, essential for field extension work, are not provided through the existing courses. Exposure to practical farming situations is available mostly during the six month Rural Work Experience, wherein the concerns regarding extension and economic issues are restricted to a six-week period.

#### ***M.Sc. Curriculum***

The M.Sc. curriculum in extension has been discussed in many meetings, but it seems the objectives of the programme has never become

clear. An analysis of the M.Sc. curricula from 12 Indian universities (Sulaiman, 1996) revealed that what is available is a mixture of courses drawn from different areas. Post-graduate extension students in Indian agricultural universities are presently learning the fundamentals (mostly theory) of extension education, programme planning, extension methods, audio-visuals, training, fundamentals of sociology/psychology, leadership, etc., without developing expertise in any of these fields. About 50% of what is available in the M.Sc. curricula was found to be already a part of the undergraduate curriculum in agriculture, or ideally should have been a part of this curriculum. There have been proposals (UPSEERD, 1981) to give a different kind of training to students, who are aiming at a teacher/researcher career and for those who like to become a field worker or producer of mass media programmes or a public relations personnel, but these proposals have not been realized.

The workshop organized by the National Centre for Agricultural Economics and Policy Research (NCAP) in 1996 identified three major areas of specialization to be offered within extension education, namely (i) Extension Management, (ii) Development Communication and (iii) Human Resource Management and Training. This workshop found the development of following competencies as essential for a postgraduate in agricultural extension. I) Participatory extension methodologies, ii) Programme development, iii) Monitoring and evaluation, iv) Modern communication technologies, v) Media production, vi) Application of computers in extension, vii) Management of extension organisations, viii) Human Resource Management, ix) Modern training methods, x) Experiential learning methods, xi) Organisations and management of NGOs and xii) Entrepreneurship Development. It would be difficult to include these areas, unless the repetition mentioned above is deleted and a serious restructuring is done based on a clear identification of the programme goals and by developing real specialisation in this discipline. The recommendations of this workshop are yet to be implemented.

#### ***Ph.D Curricula***

Unlike conventional universities, the course load at the Ph.D level in most of the Agricultural Universities is relatively heavy. To meet the

minimum requirement, the student ends up spending half of his programme duration on course work. However, specific courses that would enrich his research related skills or understanding in the area of his thesis work, are not available at the Ph.D level. The student, to meet the minimum course requirements, ends up taking courses which are mostly exact repetitions of what he has learnt in his M.Sc. programme (either with the same name or with an 'Advanced' or Part-II attached to it).

### **Reorienting Curricula**

Orienting the present curricula to make it relevant to the present era is the greatest challenge before the profession. This would be possible only through a total restructuring of the curricula. The steps could be as follows :

1. Assessment of the challenges before the profession.
2. Analysing the changing job market.
3. An agreement on the goals of the programme to meet the above challenges and changing job market.
4. Decision on areas (knowledge, skills and attitudes) that are required to meet the agreed goals.
5. Designing the package-orientation, faculty and courses.
6. Selling the extension discipline.

### **Challenges before the profession**

Farmers presently require a different kind of support from agricultural extension than they received in the past. The conventional model (one way, top down) of Transfer of Technology is no more valid in most of the areas and enterprises. To become relevant, extension organizations have to undergo internal reforms and have to adopt new approaches for working with the farm families. They also have to integrate knowledge from more diverse fields to meet the needs of their clients and have to work with more diverse organizations. With increasing cost-consciousness and budgetary restraints, the organizations have to prioritize and plan their activities more carefully.

In the Indian context, more attention needs to be given to the generation and transfer of technologies for rainfed areas as it is from these areas, that most of the further increase in production has to come to meet the growing

demand of the population. As many of the technologies for rainfed agriculture are knowledge-based and need community action, farmers' groups have to be organized and sustained at the grass root level. New institutional arrangements in partnership with the private sector (input firms, farmers' associations, NGOs, etc.) for providing extension services are emerging. States are experimenting with new arrangements for providing better extension support to farmers. Adoption of participatory, approaches (in technology development and transfer), decentralized planning, managing common property resources, group approaches to technology transfer, wider use of mass media and Information and Communication Technology, etc. have made acquisition of many new social science skills essential for those engaged in extension.

### **Changing job markets**

As mentioned earlier, the job markets for agricultural graduates in general and post-graduates in particular have changed over the years. The newly emerging institutions are looking for experts who are competent to manage the various positions in their organization such as extension managers, media/communication specialists and HRD specialists. Extension specialists are increasingly being called to conduct special studies to analyze the demand for extension and to suggest new and relevant strategies to meet these needs. The changing job markets for extension demand professional extension managers (not extension workers), media planners/communication specialists (not audio-visual operators or communicators) and HRD managers/training specialists (not training organizers). Extension professors should listen carefully to (potential) employers on the criteria they use in selecting new staff members.

### **Agreement on the goals**

As discussed earlier, the goal dilemma faced by the extension discipline, from the beginning has hampered its growth. The objectives of teaching extension courses at the undergraduate level were to improve the students' understanding of the society where he is expected to intervene and to equip him with the technique of working effectively with people. The courses and orientation provided were but discipline based, which is not the ideal way to develop field based working skills.

At the post-graduate level, often this discipline was criticized for not having a field orientation. To many, field orientation meant, learning courses in production technologies, so that the extension post-graduate would be in a better position to extend technologies. However, little attention has been given to designing extension courses as a minor in post-graduate programmes in production technologies.

The basic question to be addressed here is on the exact objective of the masters programme in extension. Is it to produce extension workers or extension managers or extension researchers or a specialization for each of these jobs? This goal dilemma has not yet been fully resolved.

A close perusal of the present masters curricula in extension reveals that we are trying to produce a three-in-one product. Courses in technologies for a field extension worker, courses in extension (sociology, management, communication, training) for an extension manager and courses in scaling techniques and research methods for an extension researcher. In this process, we have failed to do justice to any of these roles. It should be borne in mind that the training at masters level is not meant for developing a better field functionary. A graduate in agriculture or its allied disciplines would suit that requirement. A graduate in agriculture is expected to acquire necessary background in technology in the UG programme. Moreover the masters level training in extension is not meant for increasing understanding of technology.

The first step in developing any course curricula for any programme should be the development of a consensus on the goals of the programme. In extension, the goal for the M.Sc. programme, according to us, should be creation of development professionals, trained in initiating and managing interventions to facilitate real rural change.

***Deciding on the knowledge and skills to be provided in the programme.***

Many of the practical social science skills, such as group formation, development of leadership skills, conflict resolution and negotiation between different interest groups, management of common property resources, data collection, use of various communication media, analysis and documentation are important for field level

workers. Integrated courses that can provide understanding in these areas need to be provided at the undergraduate level. Instead of teaching sociology and psychology as disciplinary courses, it would be ideal to provide understanding of the characteristics of the Indian rural villages, the power structure in villages and how farmers/farm families make their living. For example it would be ideal to develop a course on 'Farmer and his environment' integrating concepts from sociology and agriculture, instead of having a course in introductory sociology at the undergraduate level.

The extension post-graduate need knowledge of the intricacies of rural society; processes that bring about/hamper technologies and social changes; managing, monitoring and evaluating change in real life situations and approaches/methods for achieving the objectives by working with the people. The need for specialization is also more relevant than ever before.

Similarly, the training in research methods is required more at the Ph.D level. Even at the Ph.D. level, the training in this crucial area is very weak in extension with hardly any attention given to qualitative research methods. At the masters level, the training in research methodology should be oriented to provide more breadth on the different approaches and should focus more on research skills related to field studies (such as collecting field information, use of secondary data, participatory research approaches, monitoring and evaluation of programmes, etc.). Action oriented research will often be most useful, both to achieve change in extension programme and to help the students to gain a real understanding of the role of extension in a process of social change.

The Ph.D. programme needs a different orientation as it is meant for academic or research careers. This needs a heavy load of extension and research methodology training. Also important is the development of depth in the subject matter of his specialization and skills related to Project Management. Courses for providing these skills are virtually lacking in the Ph.D. curricula.

***Designing the Package Orientation***

The programme has to be problem and experience oriented with the appropriate mix of

theory and practical. The courses need to be taught as applied subjects and not mainly for its theoretical and academic values. Presently this distinction is not kept in view. For instance, the curriculum emphasises on definitions and concepts in management and organizational behaviour without developing expertise in administrative skills or tackling the real life management issues in a rural setting. Similarly while models, definitions and concepts of communication are being taught, the students are not trained to design a communication strategy for a given rural situation. Same is the case with courses from other social sciences such as sociology and psychology. Mere learning of the basic concepts of sociology or psychology would not in anyway help in understanding the intricacies of rural life or in working in rural areas.

Chowdhary (1973) while examining the post-graduate extension curricula commented that most of the course mentioned are for acquisitions of knowledge. According to her, 'these do not provide a methodology for a skilled diagnosis of a given situation and dealing skillfully with a multi-dimensional situation, what is needed in extension are courses meant for application of knowledge. Since the understanding and skills required in the application of knowledge are somewhat different from the understanding and skills required for the acquisition of knowledge, different teaching and learning methods, different types of courses and curricula would be necessary in each case' (See also Blum, 1996).

### **Faculty**

The faculty involved in extension teaching in India is fully dominated by extension teachers with their basic training in agriculture and allied discipline and post-graduate specialization in extension. There are few sociologists and psychologists at agricultural universities, but mainly for teaching courses in sociology/psychology. The relationship between the agricultural social scientists and the general social scientists from the very beginning have not been really cordial, though the contributions these general social scientists, like Pareek and Mulay, made in enriching the discipline of extension in the 60's and 70's could not be ignored.

There is considerable opposition among the

teachers to the entry of non-agriculture based teachers in all the faculties, including extension in the state agricultural universities. This has resulted in a lot of inbreeding with its subsequent impact on quality of curricula. This is also one of the reasons for lack of integration of the developments in other social sciences in the extension curricula in the last two decades. The Staff Appraisal Report of the World Bank Agricultural Human Resources Development Project says (1995:7) 'Major problems facing SAUs are academic inbreeding with a general academic isolation from both other Indian universities and from international institutions and information'. In this regard, Departments of Extension Education are no exception.

To remain relevant, the discipline needs to integrate the theories, perspectives and tools from a range of other social sciences such as sociology, psychology, anthropology, management, marketing and economics. This would become possible only by recruiting experts in these areas, especially those who have been working on issues related to agricultural and rural development. One of the recommendations of the ICSSR workshop in 1973 was to create two types of faculties, 'core' and 'adjunct' to address this issue. Core faculty to comprise of agriculture based social scientists and adjunct faculty to comprise of other social scientists selected on the basis of the potential role they could perform, based on their previous work, their training experience and interdisciplinary orientation.

Worldwide, it is increasingly recognised that for solving the real problems in agricultural development, knowledge from different disciplines and from the basic and applied sciences have to be integrated (Magrath, 1999, Csaki, 1999). Universities which only employ agricultural graduates may have difficulties to compete with universities, which employ staff members trained in different disciplines and where discussions among the staff members result in an integration of these disciplines. It would also be useful to employ in extension departments, staff members with field experience, e.g. social scientists, who worked with an NGO which has successfully introduced participatory or other new extension approaches and who have published (internationally) about these experiences.

### ***Developing Courses***

Instead of designing courses around specific discipline/area, it would be better to design courses around specific skills. The ideal solution would be to develop integrated composite courses to be handled by specialists in different areas. For instance, at the undergraduate level, some of the topics such as group action, community organizations etc., could be effectively and meaningfully taught by providing these inputs in a course on watershed management. At the PG level, research methodology courses could be better taught by integrating exposure from economics and sociology. Similarly a better way to design a course in Project Management would be to integrate expertise from the specialists in Management, Economics and Extension. Extension professionals have to initiate dialogue with other social scientists and have to integrate their expertise while revising the course contents.

### ***Selling the extension discipline***

Apart from redesigning the curricula, the professionals have to aggressively market the extension discipline to its potential consumers, i.e. all those agencies involved in agricultural and rural development. There are several organizations that would be willing to employ extension post-graduates, provided they suit their needs. The professionals have to initiate dialogue with media firms, agencies involved in rural development (state departments, semi-government organizations, farmers' associations, NGOs, input industries, agri-business firms etc.) to understand their professional demands. These needs to be incorporated in the curricula. A strategy to market the discipline at the national and state level should also be designed.

### ***Should gradual change be preferred?***

There is a dilemma. In our opinion it is urgent that extension curricula in India change. Otherwise there is a real danger that extension education will not be considered as a relevant agricultural discipline. Therefore we are advocating a total restructuring of the curricula. However, resistance to change is a well-known phenomenon. This resistance will be stronger for total restructuring than for a gradual change of these curricula. It is clearly not desirable to have no change at all as long as the total restructuring can not be realised. There are staff members in extension departments, who like to introduce

changes, but who only have the power to introduce minor changes. They should be supported in doing so. It may be easiest to start with changes not in courses for regular students, but with in-service courses for extension agents of state departments, NGOs or commercial companies. There are no rules what should be taught in these courses, which makes it easiest to offer a need based course. More important may even be that in these courses the teachers can learn a lot from the participants about which extension principles are useful to make extension more effective and how these principles can be applied in the field. This can increase the capabilities of the teachers to teach their students in a way which challenges them to think how they can become effective extension officers. Teaching by professors may be the most effective way to help them to learn, but sometimes this can be done more effectively by guiding the students to develop or find themselves the knowledge or skills which are necessary to solve an extension problem. If this kind of course is a success, this can increase the interest among the teachers in this extension department to introduce more change in the curriculum. A thorough evaluation of these experiments in changing the curricula could help to learn from them.

There are few examples of changes that were brought in the extension education curricula in universities. The experiences have been mixed. For instance, the Indian Agricultural Research Institute, New Delhi introduced a new course on Entrepreneurship Development and added new areas such as production and development of visuals in the communication courses. These have been very useful. Some universities introduced courses in Management and Organisational Behaviour. But these were essentially concept based, without contextualising it in the rural organisational environment and thus failed to contribute to the development of applied management skills essential for students aspiring for extension management positions. We think that such changes through individual initiatives, though desirable, may not often result in solving the real crisis, the extension discipline faces in the present juncture.

### **Conclusions**

The profession of extension is presently facing the greatest threats to its existence and growth.

The academic training in this discipline in Indian universities has lost its utility due to lack of periodic updating and integration with the development in other social sciences. Unless concerted attempts to revive this discipline through a total restructuring of its contents are contemplated, this discipline may get further professionally isolated. It would be a great loss to the cause of agricultural development, if a discipline such as extension, that can potentially create the quality manpower for technology transfer and rural development, loses its importance and eventually fades away from the development scene.

In order to prevent this it is proposed:

- to analyse in co-operation with all stakeholders how extension and rural development are changing and what implications this has for the

- job market for extension professionals,
- to agree on the goals of post-graduate teaching programmes in extension and the knowledge and skills, which students should acquire in these programmes,
- to introduce teaching methods, which help students to learn how extension principles can be applied in the field,
- to discuss with policy makers what are the roles in agricultural and rural development, which can be performed better by the new extension graduates than by graduates in other fields.

However, we should not wait with changing extension curricula until agreement has been reached on this total restructuring. Extension professors should start immediately to experiment with new extension courses and more effective teaching methods.

## Acknowledgement

The authors are grateful to the editor and the reviewers for important suggestions to improve this article.

## References

- Anonymous (2000) Agricultural knowledge and information systems for rural development (AKIS/RD). Rome, FAO and Washington D.C., World Bank.
- Blum, A. (1996) Teaching and learning in agriculture; A guide for agricultural educators. Rome, FAO.
- Csaki, C. (1999) Change in agricultural higher education, in: D.G. Acker, ed., Leadership for higher education in agriculture; Global Consortium of Higher Education and Research for Agriculture. Ames, Iowa State University.
- Chowdhary, K. (1973) Comment on Working Paper 1 – Social Sciences in Agricultural Education. In: Social Sciences in Professional Education (Agriculture, Engineering and Medical), Proceedings of the conference on the Role of Social Science in Professional Education. New Delhi, Indian Council of Social Sciences Research.
- Christoplos, I and U. Nitsch (1996) Pluralism and the extension agent; Changing concepts and approaches in rural extension. Stockholm, SIDA.
- ICAR (1995) Report of the Third Deans Committee on Agricultural Education in India, New Delhi, Indian Council of Agricultural Research.
- Magrath, C.P. (1999) Reforming U.S. higher education. In: D.G. Acker, ed., Leadership for higher education in agriculture; Global Consortium of Higher Education and Research for Agriculture. Ames, Iowa State University.
- Scarborough, V. et al., eds. (1997) Farmer-led extension; Concepts and practices. London, Intermediate Technology Publications.
- Singh, Y.P. (1973) Social Sciences in Higher Agricultural Education: An Impressionistic Commentary. In: Social Sciences in Professional Education (Agriculture, Engineering and Medical), Proceedings of the conference on the Role of Social Science in Professional Education. New Delhi, Indian Council of Social Sciences Research.
- Sulaiman, R.V. (1996) Post-graduate Curriculum in Agricultural Extension – A Synthesis, In Rasheed Sulaiman V and S. Selvarajan (Eds), Social Science Education in Agriculture: Perspectives for Future, Proceedings of the National Workshop on Post-Graduate Teaching in Social Sciences. New Delhi, National Centre for Agricultural Economics and Policy Research (NCAP).

UPSEERD (1981) Proceedings of the National Seminar on Orientation of Extension Education Curriculum and Strengthening of Functional Linkages (January,1981), Uttar Pradesh Society of Extension Education and Rural Development, India.

Zijp, W. (1998) Extension: Empowerment through communication, in: Rural knowledge systems for the 21st century; Rural extension in Western, Central and Eastern Europe. Reading, AERDD, the University of Reading.