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Chapter 1 - The history, development, and future of agricultural extension

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Agricultural extension work has a venerable, albeit largely unrecorded, history. It is a significant social innovation, an important force in agricultural change, which has been created and recreated, adapted and developed over the centuries. Its evolution extends over nearly four thousand years, although its modem forms are largely a product of the past two centuries. Today, the organizations and personnel engaged in agricultural extension encompass a diverse range of socially sanctioned and legitimate activities which seek to enlarge and improve the abilities of farm people to adopt more appropriate and often new practices and to adjust to changing conditions and societal needs.

The term "extension"

The use of the word "extension" derives from an educational development in England during the second half of the nineteenth century. Around 1850, discussions began in the two ancient universities of Oxford and Cambridge about how they could serve the educational needs, near to their homes, of the rapidly growing populations in the industrial, urban area. It was not until 1867 that a first practical attempt was made in what was designated "university extension," but the activity developed quickly to become a well-established movement before the end of the century. Initially, most of the lectures given were on literary and social topics, but by the 1890s agricultural subjects were being covered by peripatetic lecturers in rural areas (Jones, 1994). The growth and success of this work in Britain influenced the initiation of similar activity elsewhere, especially in the United States. There, in many states, comparable out-of-college lectures were becoming established by the 1890s (True, 1900, 1928). During the first two decades of this century, the extramural work of the land-grant colleges, concerned with serving the needs of farm families, was to expand dramatically and become formally organized; but the use of the term "extension" continued and has persisted as the designation for the work.

The overt use of the notion of "extending" relevant and useful information to the adult population at large, however, predates the university extension movement. Earlier in the nineteenth century, a British politician, Lord Henry Brougham, an influential advocate of formal eduction for the poor and of mass adult education, founded the Society for the Diffusion of Useful Knowledge in 1826. Its objective was "imparting useful information to all classes of the community, particularly to such as are unable to avail themselves of experienced teachers, or may prefer learning by themselves." The society sought to do this largely through producing low-priced publications and establishing local committees throughout the country "for extending the object of the Society" (Society for the Diffusion of Useful Knowledge 1827). During its twenty years' existence, agricultural topics were well covered in the society's publications. Similar, albeit short-lived, societies were also established before 1840 in several other European countries, India, China, Malaysia, and the United States (in Virginia) (Grobel, 1933; Smith, 1972).

The distant origins

The dissemination of relevant information and advice to farmers, however, has a long if chequered history prior to the emergence of modem forms of agricultural extension in the nineteenth century.

The first known example was in Mesopotamia (roughly, present-day Iraq) around 1800 B.C. Archaeologists have unearthed clay tablets of the time on which were inscribed advice on watering crops and getting rid of rats - important for mitigating any potential loss of taxation revenue from farmers (Ahmed, 1982, as quoted in Bne Saad, 1990). Some hieroglyphs on Egyptian columns also gave advice on avoiding crop damage and loss of life from the Nile's floods. An important advance was the beginning of agricultural writings. Though few have survived, the earliest were written during the ancient Greek and Phoenician civilizations, but some of them were adapted by Roman writers. From the second century B.C. to the fourth century A.D., several important Latin texts were written, frequently drawing on practical farming experience, which aimed to help Roman landowners to maintain and improve then-estates and their revenues (White, 1970, 1977).

At around the same period in imperial China, early forms of advancing and disseminating agricultural information also began. That landowners and their tenants should improve their production was a matter of concern to the state since, from the sixth century B.C. onwards, it relied heavily on land taxes for its revenues. The support of relevant agricultural research and the dissemination of information and advice had certainly begun by the late Han Dynasty (25-220 A.D.). The oldest fully surviving Chinese agricultural treatise, Essential Techniques/or the Peasantry, dating from 535 A.D., aimed to show landowners how to improve their estate management through the advice they gave to their tenants. The Sung and Yuan Dynasties (960-1368) with their firm local government administrations were notable in organizing and promoting agricultural research, extension work, and the teaching of agriculture and sericulture, much facilitated by the invention of woodblock printing, which allowed agricultural treatises and practical handbooks to be widely distributed. Similar activities continued during the succeeding Ming (1368-1644) and Chi'ing (1644-1912) Dynasties, driven not only by the growing population and periodic threats of famine, but also by the state's recognition of the importance of well-coordinated extension work on agricultural recommendations if the most benefit was to be achieved (Perkins, 1969; Elvin, 1973; Bray, 1984; Delman, 1991).

Necessary conditions for agricultural extension to evolve

Apart from the importance of farmers and agriculture in the society and economy concerned, several conditions appear to be necessary for the initiation and organized development of agricultural extension work.

The prime condition is that information has been assembled, systematized, and made available on good or progressive or new agricultural practices suited to a particular environment, and is based on either (or both) the accumulation of experience or findings from research (however rudimentary). Second, this information is used, among other things, to educate professional agriculturists who may further enlarge or refine this body of knowledge or become active promoters and disseminators of it. Third, an appropriate administrative or organizational structure exists by and within which the dissemination activities may be established and conducted. Fourth, there is a legislative or some other official mandate or influential proponent which prescribes or enables that agricultural extension work is desirable and must occur. Fifth, there are invariably a variety of antecedents which have attempted protoforms of agricultural information and advice dissemination. In addition, the incidence of critical situations, such as famine, crop failure, soil exhaustion, or altered economic conditions or relationships, may create an immediate cause for initiating the organization of extension work. All or several of these conditions have been present in the evolution of modem forms of agricultural extension.

Towards the Modern Era

The direct antecedents of organized agricultural research and dissemination of its results which occurred in nineteenth century Europe and North America can be traced back to the "renaissance" which began in the fourteenth century. Between 1300 and 1700, European society became transformed from its medieval feudal forms into recognizably modem social systems. It was a period of complex, multistranded development. Along with the growth of national states and European exploration and "discovery" of the rest of the world was the "new learning." This involved not only a fresh appreciation of rediscovered classical writings and art forms, but also many novel ideas and activities, a spirit of humanism, and rational enquiry. All of this was considerably facilitated by the invention of printing using movable type, usually attributed to Gutenberg around 1450, and the rapid diffusion over Europe of the printing press, for whose output there existed a ready market.

The earliest known renaissance agricultural text was written in Latin by Pietro de Crescenzi in 1304 and was translated into Italian and French. This became the first book on agriculture to be printed in the mid-fifteenth century. Others soon followed, often based on the old Latin texts or on the collected wisdom of farmers and their families. A well-known example, a compendium of helpful advice in simple verse and a bestseller in Tudor England, was Thomas Tusser's A hundredth goode pointes of husbandrie, published in 1557 and expanded in 1573 to five hundred good points with as many on "goode housewiferie" (Tusser, 1580). Less popular, but of greater significance, were Francis Bacon's writings early in the next century based on his observations and scientific experiments on his estate north of London - the beginnings of the application of science and scientific method to agriculture (Russell, 1966).

By the mid-eighteenth century, throughout much of Europe, progressive landowners (frequently aristocrats) and their agents and a few similarly minded farmers were being known as "improvers." These, along with some "men of science," were the main proponents of agricultural clubs or societies. At their regular meetings and demonstrations, locally and regionally, landowners and leading farmers exchanged ideas and information and discussed farming improvements. Two main forces underlay the movement. First, many landowners were eager to learn of ways to improve their estates and the production capabilities of their tenants so as to increase the value of their estates and their rental incomes. Secondly, progress was being made towards modern science and its application to agriculture, especially in agricultural chemistry and plant physiology (Russell, 1966). These societies sought to alter radically the traditional modes of farming by initiating experiments, arranging demonstrations, disseminating information, and advocating the adoption of innovations. It was considered almost a duty by their elite membership to make their initiatives and activities known to "the generality" of farmers through publishing their proceedings and reporting their meetings in newspapers (Hudson, 1972). Although such agricultural societies initially spread slowly - the first had been formed at Rezzato near Milan in 1548 (Coletti, 1900) - they had become common throughout much of Europe by 1800, and a small number had been established by that year in the young United States and eastern Canada.

It is not possible, here, to enter into detail on the interactions between a growing scientific knowledge of agriculture and its application in practice, the many examples of increasingly widespread agricultural improvement, and the numerous personalities involved in Europe and North America during the century or so after 1750. Reference must, however, be made to one figure whose ideas and activities were of pivotal significance to the developments of the time, and later. This was Philipp Emanuel von Fellenberg (1771-1844), who in 1799 purchased the estate of Wylhof, which he renamed Hofwyl, near Bern in Switzerland (Gray, 1952; Guggisberg, 1953). Over the next decade or so, he established agricultural schools at Hofwyl for the children of peasants and of the poor and for the aristocracy and their agents. Although not the first agricultural schools in Europe, those of von Fellenberg became a model for many more which were established before 1850, especially in Denmark, Germany, France, and the United Kingdom, thus assuring a cadre of trained agriculturists.

At Hofwyl, von Fellenberg also established an experimental-cum-model farm to test and develop suitable husbandry practices and technology. He publicised the work at this veritable "educational colony" through a journal and agricultural festivals (shows) at Hofwyl and by welcoming a large number of visitors from all over Europe and maintaining a voluminous correspondence with these and others. Many of his visitors became active proselytes of his methods, recognizing their practical value in disseminating useful information on agriculture - and other topics. One such notable visitor was Lord Henry Brougham, referred to earlier, who became the main publicist of von Fellenberg's work in Britain and whose Society for the Diffusion of Useful Knowledge was an early form of organized "extension."

By the 1820s, most of the elements for creating modem forms of agricultural extension were in being, although each was to develop considerably during the nineteenth century. A crucial missing element, however, was an effective means by which the "generality" of farmers could be directly given information, advice, and encouragement. This required itinerant agriculturists who could meet farmers in their home localities, give instructional talks and demonstrations, advocate superior or new practices, and have discussions with the farmers. The notion of "itinerancy" was not new: since late medieval times, tradesmen and proto-professional men had travelled through rural areas to serve their clients. The first examples of itinerant agricultural lecturers-cum-instructors were in parts of New England and New York in the 1820s (True, 1928) and in France, where a first migratory agricultural teacher was appointed in the Gironde in 1837, followed by nine more in various areas of the country in succeeding years (Boulet n.d.). During the 1840s, further sporadic developments also occurred in the United States, particularly in New York, Ohio, and Maryland (True, 1928), while in Württemberg, in southwest Germany, a pasture specialist (Wiesenbaumeister) together with a staff of eighteen technicians was employed by the state agricultural society to advise farmers, landowners, and town administrations on land drainage, irrigation, and improved pasture management (CLVS, 1845).

In Europe, agricultural science was evolving rapidly by the 1840s, with notable strides being made in Germany by Justus von Liebig at Giessen, and with the establishment of agricultural experiments at Rothamsted in England in 1843 by John Bennet Lawes and Henry Gilbert. Agricultural societies and their shows were flourishing. Numerous publications and periodicals were aimed at farmers. Agricultural schools, if not commonplace, had been established in most European countries. Thus a small minority of younger landowners and farmers had received a formal education in their calling, while purposely trained agriculturists were available to be engaged as estate agents or teachers. Many of the more progressive landowners employed agents to travel around their estates to urge improved methods on their tenants. The main element necessary to create modern agricultural extension services was for legitimate authorities to establish the necessary organizations - and the germ of this had already been present in France, Germany, and the United States.

The birth of modern agricultural extension services

The first agricultural extension service of a modem kind came into existence as the result of a crisis and the initiative of the occupant of a high office of authority. The crisis was the outbreak of potato blight in Europe in 1845. In Ireland its effects were particularly severe because the predominantly peasant population relied on potatoes in their diet, and "the potato famine" persisted until 1851. The new British viceroy appointed to Ireland in 1847, the Earl of Clarendon, soon after his arrival in Dublin wrote a letter (Jones, 1982) to the president of the Royal Agricultural Improvement Society of Ireland (founded in 1841), which acted as the central society for numerous local agricultural societies. This letter, no less than an official directive, urged the society to appoint itinerant lecturers to travel around the most distressed districts to inform and show small farmers, in simple terms, how to improve their cultivation and how to grow nutritious root crops other than potatoes. "Lord Clarendon's practical instructors in husbandry," as they became known, were centrally appointed, deployed, and paid and reported weekly to the society in Dublin, with some local control of their activities being exercised by the major landowners in their areas. Over the four years of its existence, the scheme was funded to about half its total cost by landowners and charitable donations, with the remainder coming from government-controlled funds (Jones, 1979, 1981).

The potato famine also led to consideration being given in Württemberg to employing itinerant farm advisers, but the proposal failed to gain approval (R. Bühler, personal communication). However, from the mid-1850s, first in Württemberg, Hesse, and western Prussia, itinerant agricultural teachers (Wanderlehrer) began to be appointed under the auspices of central agricultural societies. After some ten years, the system grew rapidly, influenced in part by the crisis among vine growers resulting from the devastation caused by phylloxera aphid infestations, and became formalized (Jones, 1981). Normally, the Wanderlehrer spent the summer half of the year travelling around their districts giving talks, demonstrations, and advice to farmers; during the remainder of the year they taught farmers' sons at winter agricultural schools. Although officially they were part of the activities of the agricultural associations, their work was in all cases supported heavily by state funds, and their advice was free to farmers. When the system was adopted in the kingdom of Bavaria in 1896, it was as an integral part of the state civil service; the extension workers were grandly titled Royal Agricultural Teachers (Königliche Landwirtschafts-lehrer) (Maier-Bode, 1910).

By the close of the nineteenth century, agricultural extension systems modelled to a considerable extent on the German Wanderlehrer had spread: to Denmark from 1870 onwards; to the Netherlands, where a few extension workers (wandelleraren) had been appointed by agricultural societies in the late 1840s and 1850s, but had then disappeared before being revived as a government system in the 1890s; to Italy, where the first itinerant agricultural teacher (cattedra ambulante di agricoltura) was appointed in 1886 at Rovigo, near the estuary of the River Po, with many others following in the next decade and funded largely by public donations, the church, and the banks; to Switzerland; to much of the Austro-Hungarian Empire; and to Russia.

Meanwhile, in France the first national, wholly state-funded agricultural extension service was established in 1879. The few itinerant agriculturalists appointed before 1848 (referred to earlier) had continued, but they served in only a very small minority of the country's departements. In 1874, the minister of public instruction in the reforming Third Republic issued a circular letter strongly commending the system and advocating its extension (J. d'Agric. Prat., 1874, p. 257-258). This resulted in an additional thirty-three itinerant agricultural teachers being appointed by departements over the next five years, and a law passed in 1879 officially instituted the office of a department-level itinerant agricultural teacher (professeur departmental d'agriculture). This law was given practical effect by a decree in 1880 and an explanatory ministerial circular early in 1881 (Min. de l'Agric., 1882, p. 8-9). From then on, each professeur was a state-appointed civil servant. His duties included giving agricultural instruction to trainee primary school teachers. Mainly, however, under the responsibility of the Ministry of Agriculture, he was to be "nomadic" within his departement, "to keep farmers informed regarding modem discoveries and new inventions which could be applied economically and with advantage," "to be a populariser (vulgarisateur) of progress," "to carry enlightenment into the heart of the countryside." The number of these extension workers grew rapidly, and by the end of the 1880s the whole of France was being served (Jones, 1981).

The growth of agricultural education and extension work in continental Europe was to have a strong impact on the emergence of comparable activity in the United Kingdom. An official commission on technical education in the early 1880s included a detailed review of the European developments (Jenkins, 1884). At the end of the decade, a cluster of enactment's, which established county-based local government, created a board of agriculture, promoted technical (including agricultural) education, and allocated funds for the purpose, enabled agricultural extension work to be initiated. It was to be part of the services provided by the local government authorities. They either employed their own agricultural officer or more commonly sponsored lectures and travelling schools on agriculture (especially dairying) as part of the university extension system. This meant drawing on the staffs of the agricultural departments which were being created in new institutions of higher education. Government funds were available to support these activities, but funding also had to be provided by the local county authorities (Jones, 1994). By the turn of the century, such work existed throughout Great Britain.

This system and its underlying legislation, however, did not apply to Ireland (then entirely a part of the United Kingdom). There, agricultural extension work became established in 1900 as a result of the initiative of Horace Plunkett, well known for his advocacy of agricultural cooperation. An official committee in 1896, chaired by Plunkett, reviewed the developments in Europe and North America (Report, Recess Committee, 1896) and set out to adapt the various systems to suit Irish conditions. In 1900, a Department of Agriculture and Technical Instruction was established in Dublin, governed by a board of representative Irishmen. This initiated itinerant agricultural instruction, organized within each county as in Britain and similarly resourced partly from local and partly from central funds. A vague recollection existed of Lord Clarendon's "practical instructors" half a century earlier, and the title "itinerant instructors" was applied to the new extension workers, who were expected to provide information and advice, each to be "the guide, philosopher and friend of the existing farmers" (Plunkett, 1901-02, p. 26).

Many visitors and several official delegations from North America to Europe, particularly from the mid-nineteenth century onwards, reported back on the progress in agricultural research and education, including the itinerant teachers. In the United States and eastern Canada, agricultural societies had become common during the first half of the century and, usually supported by their state or provincial legislatures, some had at times sponsored itinerant lecturers in agriculture. However, two other developments after 1850 were of more significance to the evolution of agricultural extension in the United States. First was the Morrill Act of 1862, signed by President Lincoln during the Civil War, which was seminal in the creation of state colleges "of agriculture and the mechanic arts" in the northern United States; its land-grant provisions enabled the states to establish and fund their colleges. Second was the beginning at about the same time of the farmers' institute movement. These institutes organized one-or two-day (and later longer) meetings, which became popular after 1860, arranged by and for farmers.

Both developments had been widely discussed during the previous decade, and their growth over the next half century was closely interwoven. The visiting speakers at the institutes were largely professors at the state colleges of agriculture, and both depended on the formal support of their state legislatures and of farmers, especially through their agricultural societies (True, 1895, 1928; Kile, 1921). Over the next forty years, these activities were influenced also by the university extension movement in Britain and the growing interest in adult self-improvement (inspired, for example, by the Chautauqua adult education institution in New York State). By 1890, when the second Morrill Act granted federal funds for the establishment of agricultural colleges in the remainder of the United States, the farmers' institutes had spread throughout and become a national institution with federal support and supervision, further stimulated by the formal establishment of experimental work at the state colleges of agriculture under the 1887 Hatch Act. A comparable development of farmers' institutes began in Ontario, Canada, in 1885. These were financially supported by the provincial legislature and spread rapidly with lecturers mainly from the Ontario Agricultural College at Guelph (founded in 1874). A somewhat similar system began in Prince Edward Island (Province of Ontario, 1900; Blackburn & Vist, 1984).

Thus, by the end of the last century, a system of agricultural extension work had become well established in a large part of North America. In the United States, the colleges and their leading professors, including several notable proponents of more practical extension work, progressively took over the initiation and organization of the activity. This culminated in 1914 with the passage of the Smith-Lever Act, establishing the Cooperative Extension Service - a tripartite cooperation of federal, state, and local county governments, with the state college as the extension agency - "in order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same."

In the Southern Hemisphere, extension work also became established along the wide coastal belts of southern and eastern Australia. Several agricultural ("show") societies were formed in the second half of the nineteenth century, although their effect was slight, but as the state administrations became more organized, departments of agriculture were established in the 1870s and 1880s with the aim of developing the potential of their territories. They recognized the importance of agricultural education, influenced by British, Irish, and some American examples whose activities were widely reported in the Australian press. Before the end of the century, under specific state legislation, the departments of agriculture had established agricultural colleges and experimental work in Victoria, South Australia, New South Wales, and Queensland (Black, 1976).

Associated with this development was the official appointment in these states of the first itinerant agricultural instructors in the late 1880s. At the same time, because of the potential importance of milk products, travelling dairy schools were begun, while state exhibitions, especially the Centennial Exhibition in Melbourne in 1888, showed what was possible and gave considerable impetus to farming improvements. The few "government experts," some from the United Kingdom or the United States, grew in number during the 1890s and the first decade of this century, developing the range of the extension work. Its impact and that of the agricultural colleges in their early years was probably slight, but the basis had been laid for further development (Logan, 1984).

Agricultural extension work had also started before 1900 in Japan. Following the Meiji Restoration in 1868, new administrative structures and various modernizing policies were adopted. Two agricultural colleges were established in the mid-1870s, staffed by Western (mainly European) teachers. At these colleges and government farms, experimental work was conducted and new practices were tested and developed. At the same time, agricultural fairs and exhibitions were begun, and progressive Japanese farmers gave talks and demonstrations at them. These led to the development of many agricultural societies from 1881 onwards, a "movement" formalized by legislation in 1899. In 1885, the government also initiated, at national and prefectural levels, a system of appointing experienced farmers as itinerant agricultural lecturers (because the Western "experts" knew little about rice husbandry). Supported by the work at government experiment stations, established from 1893, these farmers formed the basis of agricultural extension work. This activity, including the establishment of demonstration farms, was allocated in 1903 to the numerous agricultural societies which, with state funds, appointed agricultural technicians. In 1910, the 1899 law was strengthened; thereafter, farmers were required to belong to a village agricultural society which was linked to a national network and hierarchy of societies, and farmers were compelled to adopt the technical guidance and recommendations of the societies' extension workers - what became known as "forced extension" (Tajima, 1991; Ministry of Agriculture, 1993).

The development and organization of agricultural extension work was not entirely confined to temperate countries. In a variety of ways, it had also begun in tropical areas, especially in colonial territories. The European colonial powers looked to their overseas territories as a source of tropical agricultural products.

Despite a long connection with some of the colonial areas, the Europeans remained largely ignorant of many tropical agricultural plants. The solution was to establish experimental and demonstration "botanical gardens." The earliest was opened in 1821 at Peradeniya, Sri Lanka (Ceylon), and two others were established in the country later in the nineteenth century. Smaller ones were also created in several Caribbean islands and some West African territories. During the early years of this century, some of these developed considerably, although others were short-lived. Those which succeeded provided important sources of agricultural knowledge and innovation and formed the basis for an interest in agricultural societies and agricultural instruction. Some attempts were also undertaken to improve "native agriculture." This was often associated with the creation, as part of the administration, of departments of agriculture and the appointment of professional agriculturists as directors of agriculture.

A central department of agriculture was established in India after the 1866 Orissa famine, and the government of India soon after resolved to establish departments in each province. However, it was 1905 before a central government directive ordered every province to appoint a full time director of agriculture who should organize agricultural research and demonstration farms with staff who could advise farmers (Mook, 1982). The first British colony to appoint a director of agriculture was Zanzibar in 1896. Of more significance, however, was the creation in 1898 of the Imperial Department of Agriculture for the West Indies, with headquarters in Barbados. Before 1914, such departments of agriculture had been created in several African and Southeast Asian territories, as well as in several Caribbean islands (Masefield, 1950). In Sri Lanka, a few agricultural instructors had been appointed about 1880 to work alongside government agents. When in 1904 the Ceylon Agricultural Society was formed to promote experimental work, it also began an agricultural extension service with the objective of reaching native cultivators (Arasasingham, 1981).Along with school gardens (Willis, 1922), the extension workers were considered an effective way of demonstrating improved cultivation practices to villagers. Similar developments also occurred in the Caribbean.

In most tropical African territories, the European interaction with native agriculture was minimal before 1914. The "scramble for Africa" had been mainly in the late nineteenth century, and the young departments of agriculture, where they existed, were largely involved in administrative duties. Before 1914, however, agricultural instruction was given in most government-assisted schools and at four agricultural stations in Ghana (the Gold Coast) (Lucas, 1913). In addition, missionaries often undertook agricultural education, with demonstration and improvement activities, alongside their religious work. The church farms (fermes-chapelles) begun in 1895 by Jesuits in the then Belgian Congo (de Failly, 1970) were copied by missionaries of other persuasions in many other areas.

Modern agricultural extension

In the early years of this century, extension services were in their formative stage; they were relatively small in scale and limited in the scope of their work and contact with farmers, and their organization was often somewhat haphazard even though based on legislation. They were organized predominantly either by central or local governments, or by agricultural colleges, usually in close association with experiment stations, or by farmers' organizations (agricultural societies, cooperatives, farmers' unions, or chambers of agriculture), or combinations of these parent bodies. As the century has progressed, the organizations have matured. Changes have often occurred to their parent affiliations, government funding has become relatively more important, their objectives have become broader, especially in "the North," and the extension workers have become better trained and more professional. In addition, several other kinds of organizations have developed comparable work: agriculture-related commercial companies; agricultural commodity marketing boards, concerned to assure the supply and quality of their specific product; agricultural development projects, many of considerable territorial scale; and a variety of nongovernmental organizations (especially religious and charitable) involved in agricultural and rural development.

As agricultural extension organizations have grown and changed, they have invariably become more bureaucratic with distinct hierarchical structures. The work of dispersed extension workers had to be administered and controlled so that one or more levels of intermediary structure (for example, district, region) have been created between the field-level agents and their headquarters. Thus the management of extension activities has become a major preoccupation, and many organizations have been open to the criticism of being top heavy and top-down in their approach. However, with funding derived largely from national revenues (or international donors), senior managers have necessarily had to account for and justify their organization's activities. This has been equally pronounced in the North as in the South where, after colonial territories gained their independence, extension work has commonly been rein-vented and staffed by nationals under the aegis of their new administrations (usually ministries of agriculture).

During the past quarter century, the work of extension services has often become more diversified. In the less developed countries, the main focus remains on agricultural (mainly food) production, but there has been a growing recognition of the need to reach, influence, and benefit the multitudes of small, resource-poor farmers. Strong efforts have been made in this direction, notably through the training and visit system. Among the commercial farmers of the North, a major problem has become surplus production, with farmers facing economic and policy pressures to restrict it. Associated with intensive production methods, many issues and problems regarding environmental deterioration and livestock welfare have also arisen. Thus these have become important aspects of extension work, particularly socioeconomic guidance which focusses both on means by which farmers might maintain their income levels from their resources (for example, introduction of novel crops or livestock and involvement in various rural enterprises) and on the ways of assuring the longer term welfare of farmers and their families. Agricultural extension services are thus adding a strong social dimension to their activities.

Agricultural extension has now become recognised as an essential mechanism for delivering information and advice as an "input" into modem farming. Since commercial farmers can derive direct financial benefits from these inputs, there is a trend towards the privatization of the extension organizations, often as parastatal or quasigovernmental agencies, with farmers being required to pay for services which they had previously received free of charge. This trend is strong in the North, and there are examples of it beginning in the South.

The pace of change in the organization, functions, strategies, and approaches of agricultural extension is clearly accelerating.

The future

The need for agricultural and rural information and advisory services is likely to intensify in the foreseeable future. In much of the world, agriculture faces the challenge of keeping pace with rapidly increasing population with few reserves of potentially cultivable land. Farmers will have to become more efficient and specialized.

From government perspectives, whatever priority is given to production, extension will remain a key policy tool for promoting ecologically and socially sustainable farming practices.

Some of the most promising recent developments in extension methodology have occurred where the key agenda is environmental or is concerned with equity, for example in the need for the joint management of forests by professionals and local forest users and in integrated pest management. A consistent theme running through the innovative approaches being used, such as participatory rural appraisal (Chambers, 1993), is a fundamental change in what are the respective roles of extension agent and clients. The agent is no longer seen as the expert who has all the useful information and technical solutions; the clients' own knowledge and ingenuity, individually and collectively, are recognized as a major resource; solutions to local problems are to be developed in partnership between agent and clients. Since the scale at which extension support is required is thus often larger than the individual farm, extension workers need new skills of negotiation, conflict resolution, and the nurturing of emerging community organizations (Garforth, 1993; Smith, 1994).

The future is also likely to witness a reversal of recent trends towards bureaucratization within hierarchical extension services and a reduction in their levels of public funding. Moreover, a rapid increase can be expected in the use of information technology in support of extension. The forces for change in these areas (see Rivera & Gustafson, 1991) will come from four main directions.

Economic and Policy Climate

With the collapse during the past decade of socialist forms of economic organization, the (dominant) role of the public sector in national economies has become questionable, with a strengthening trend to reduce levels of public spending. Thus government extension services and those which are largely publicly financed are, and will continue to be, under pressure to become more efficient, to reduce their expenditure and staff, and to pass on (some of) the costs of provision to their clients who directly benefit financially. This is particularly the case in countries where the farm population forms a small minority and agricultural production is in surplus. The case is weaker, but not absent, in less developed countries where farming households form a high proportion of the total population and where increasing food production is still important. Thus charging clients for services is likely to become more widespread, while governments will find it attractive to contract out the operation of services to the private or the voluntary sector.

Social Context in Rural Areas

In the future, rural populations will undoubtedly be progressively better educated, while their exposure to the mass media will continue to reduce their isolation and detachment from information, ideas, and an awareness of their situation within a national and international context. However, this exposure will not reduce the need for extension. Rather, given the changing demands on agricultural producers from population growth, increasing urbanization, legislative changes, and market requirements, the more knowledgeable farming population will require different kinds of extension services. Social and economic trends within rural areas will therefore necessitate more highly trained, specialized, and technically competent workers, who also know where to obtain relevant information and problem solutions and various provision and organizational forms (Moris, 1991; Hayward, 1990) to replace monolithic government extension agencies. These agencies will need to recognize and serve different types of clients defined not in terms of "adopter categories" but of access to markets, degree of commercialization, and relative dependence on agriculture for family income and welfare.

Systems Knowledge

A recognition of the locale-specific nature of farming systems and the agricultural information systems which support them is an important source of the pressure towards the debureaucratization and devolution of extension services. This recognition also implies that extension workers and farmers be jointly involved in the verification and adaptation of new technology, and thus that the extension workers respect farmers as experimenters, developers, and adapters of technology and devote more energy on communication within their local areas. The devolution of extension services to become local organizations is a reasonable corollary of this. Developments in mass media technology, already apparent over a decade ago (Garforth, 1986), will continue to support this localization of extension effort.

Information Technology

The continuing rapid development of telecommunications and computer-based information technology (IT) is probably the biggest factor for change in extension, one which will facilitate and reinforce other changes. There are many possibilities for the potential applications of the technology in agricultural extension (FAO, 1993; Zijp, 1994). IT will bring new information services to rural areas over which farmers, as users, will have much greater control than over current information channels. Even if every farmer does not have a computer terminal, these could become readily available at local information resource centres, with computers carrying expert systems to help farmers to make decisions. However, it will not make extension workers redundant. Rather, they will be able to concentrate on tasks and services where human interaction is essential - in helping farmers individually and in small groups to diagnose problems, to interpret data, and to apply their meaning (Leeuwis, 1993).

The future will call for more able, more independent, more client-oriented extension workers. The emphasis will be on the quality of interaction between agent and client rather than on the movement of "messages" through a hierarchical system.

Flexibility and adaptability will be seen as virtues rather than aberrations. Paradoxically, these trends will bring us full circle to the early manifestations of modem extension in Europe. The itinerant agricultural teachers, unencumbered by large bureaucracies and tall hierarchies, will find their modem counterparts in the computer-carrying extension workers who are at ease helping farmers to identify the information they need in order to realize the potential of their farming operations. Looking back, we can regard the period from 1970 to 1995 as a necessary but expensive stage in the evolution of extension systems, after which extension agents were able to settle down to their main task - bringing together the expertise of farmers and the best available scientific knowledge to develop farms and local agricultural economies.

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