

Research on the agricultural economics in the 1970s and 1980s

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The objective of this study is to examine the main lines of research on the agricultural economics in the 1970s and 1980s. It is reasonable that the scope of this study also includes theoretical-methodological research and research concerning the solving of practical problems. The last-mentioned field is so extensive and has so many different levels that, in this work, it is possible to deal only with the key research topics still considered to be important.

The purpose of the agricultural economics is to deal with the economic problems encountered by people working in agriculture, the most common of which are problems of choice and the criteria used to make choices. A characteristic feature of economics is the attempt to develop models which can be used to compare the relationship between the advantage (often also the disadvantage) resulting from man's actions and the sacrifice required by such actions. These comparisons also involve problems concerning values. Choices are followed by decision-making. As human actions have become more complex, economists have had to pay more profound attention to the problems encountered in making decisions.

Owing to economic systems and language areas, the taxonomy and terms applied in the

agricultural economics are fairly heterogeneous. Consequently, giving a systematic picture of agricultural economic research is highly dependent on the choice of taxonomy and terms. The Germanic tradition predominant in the Nordic countries up till the 1950s has gradually been replaced by the Anglo-Saxon tradition. With only a few exceptions, the publications dealing with economics published during the last twenty years have been in Finnish, Swedish or English. The scientific terms and classifications have thus been given an Anglo-Saxon, principally American, form.

According to the old Germanic taxonomy, the agricultural economics comprised the business science of agriculture and agricultural policy. According to the Anglo-Saxon concept, the family is rather large. Modern marketing, the economics of land use, and rural sociology have been added to the business science of agriculture and agricultural policy. No doubt, the economics of land use and rural sociology cannot be considered solely as dimensions of the agricultural economics. In our hierarchy of science, the economics of land use is placed between the agricultural economics and forestry, on one hand, and environmental sciences, on the other. It is true that important aspects of the economics of land use and rural sociology are associated

with the agricultural economics and it is therefore appropriate that they are examined together with the traditional economic sciences. Marketing, management and decision-making apply behavioral sciences (psychology and sociology) in their research. Sociology, or what we call 'rural sociology,' is thus close to economic sciences.

Scientific research is usually divided into basic research and applied research. Another well-known division is made between research into the theory of science and applied research (BONNEN 1986, JOHNSON 1987). Both Bonnen and Johnson consider the theory of science, methodology and measurement techniques of basic phenomena to be part of disciplinary research, and they consider subject-matter and problem-solving research to be applied research. To a certain extent, this division helps in the classification of research findings, and therefore it is applied in this research on the agricultural economics which has produced numerous results in various disciplines during the last twenty years.

Theory and methodology research

During the last twenty years, the demand for scientific knowledge has increased throughout the world, and at a very rapid pace. In a multitude of disciplines, science has been harnessed to serve practical life. In this development, economic sciences have not been the last in line. One consequence of this development has been that theory-oriented science has been given less attention. Owing to the small number of researchers, especially agricultural economists in Finland have had to focus their research almost entirely on problem-solving studies.

Dissertations for higher degrees, however, have always required development of theory, methodology and measurement technology. It has always been necessary for teaching and research at universities to include the theoretical approach to their respective discipline. This has made it necessary for teachers to pro-

duce literary material based on theory and methodology.

Within the scope of the farm management, an important achievement having extensive practical implications was the importation and development of the new theory and methods for production planning (WESTERMARCK and MELEN 1962, RYNNÄNEN and PÖLKKI 1973, RYNNÄNEN and RYHÄNEN 1988). The planning systematics known as the gross margin method has completely replaced the earlier budget and relative calculation methods. The rapid advancement of computer-based planning has been possible because a multidimensional, flexible and logical planning method has now been available. Today, computer-based applications of the method are also used quite extensively for production planning in agriculture and forestry (WECKMAN et al. 1981). When connected with other knowledge, computer-aided economic planning will play a very important role in the planning and monitoring of future agricultural production activities.

The theory and systematics of planning have also been developed for the purposes of planning regional and economic structures. Planning of villages, municipalities and regions has been a major object of interest in both the agricultural economics and in regional geography (HAHTOLA 1977, KARLSSON and NEVALA 1979, KETTUNEN, L. 1981). The planning methods for individual businesses and for regions (gross margin method, Markov's chains, linear planning, Monte Carlo method) are well-known methods in market economy countries. Their further development and application to Finnish conditions and Finnish economic concepts have required much work and many different insights, in order for these methods to attain a form suitable for use here.

Owing to, among others, natural conditions, historical and social developments and the economic policy prevalent at the time, agricultural price, income and subsidization policies have been developed and applied, in part, according to our own (Finnish) objectives of principle. This has required the development of a theory and the creation of

models (SUOMELA 1972, IHAMUOTILA 1977, AALTONEN 1982). With respect to price and subsidization policy, development has been made easier by the fact that Nordic countries and other European countries have had theories and models for solutions similar to those in Finland; development of theory in Finland has thus been able to draw heavily from work carried out elsewhere.

Research on the input-output relationships in agriculture applying the production function analysis, began after the Second World War. Advances in computer technology in the 1960s made it possible to use this analysis to handle fairly large amounts of data. In Finland, production function analysis attained considerable importance in the '70s and '80s, when computer capacity no longer markedly restricted the handling even of large number of data. Furthermore, the increased diversity and availability of data sets and the development of computer programs have brought about an appreciable increase in the application of this research method. A considerable number of production function analyses have been carried out for practical agricultural data (RYYNÄNEN 1970, IHAMUOTILA 1972) and for specific purposes, using experimental data planned for that purpose (SIRÉN 1978, TURKKI 1978).

Owing to its logical approach, production function analysis has made a noteworthy contribution to scientific research in its field. Traditional research on plant and animal production starts out from tests performed in precisely restricted conditions and involving a few factors at one. In practice, production occurs under many kinds of environmental conditions with many, even dozens of factors affecting the results simultaneously. Production function analysis enables one to study these effects on practical materials being affected by many factors at the same time and/or undergoing fluctuations in the production environment. Thus it has been possible to determine the partial effects of production factors, substitution ratios, optimums, minimums and maximums. Methodological

development has proceeded far, but shortcomings in the materials (lack of specific observations, insufficiencies of indicators, deficiencies in measurements) restrict the reliability of research results, in particular, to practical agriculture.

Experimental livestock research with economic analysis has given a great contribution for solving practical problems in various fields, of the animal production. The corresponding achievements have not been reached in applying the experimental results of crop response to the practical crop production. In general, it is not possible in practical plant production to attain the same kind of exact application of experimental knowledge as is possible with livestock production. The heterogeneousness of the soil, the unpredictable-ness of meteorological conditions, unexpected occurrences of plant diseases and pests, and differences in applications cause variations in the results of agriculture in practice that are of the type which cannot be explained on the basis of inputs. The gap between the model derived from experimental materials and the practical results is great. Their research requires closer cooperation between plant production and economic researchers.

Trend-based and scenario-based predictions of the supply and demand of agricultural products, of food consumption, of the structure of farms, and of the future development of rural areas have been the focus of both methodological research and problem-solving research, particularly in the 1980s (ROUHIAINEN 1979, KETTUNEN, L. 1988, KETTUNEN, P. 1989, SUOKKO and LAAKSONEN 1981, HEIKKILÄ, T. 1982). Future phenomena of change are captivating research topics, but the results are highly uncertain. For this reason the techniques for compiling predictions are being developed intensively, e.g. through international cooperation, in which Finnish researchers, too, have participated. A very significant number of agricultural policy decisions affect the economy of agriculture and rural areas for a long time in the future. Research aimed towards the future therefore has occupied a

prominent place in the economic sciences of agriculture. Expanding international contacts make it even more essential to increase research cooperation in this field.

Research can deepen and expand only when based on sufficiently sound theoretical and methodological research. Such research increases the researcher's capacity. On the other hand, theoretical and methodological research is the most demanding aspect of research, however its influence on the development of science is of long duration. Small countries, in particular, must link such research to form international cooperation. In part, this has been the case in the economics of agriculture. In practice, cooperation has taken place by means of doctoral degree programs, foreign lecturers, seminars, joint studies and international publication.

Applied research

The primary task of research on the agricultural economics in Finland has been applied research, mainly problem solving. The radical change in our society, transformation an agrarian society into a post-industrial welfare society in the span of forty years, has meant an accumulation of continuously changing challenges for agricultural economists. Scarce resources have been used to a great extent to develop proposals to solve current practical problems. Clear evidence of this is the abundance of reports by numerous agricultural committees and working groups. Much expertise in the agricultural economics has been expended for these reports; very often the senior researchers in the field have had to act as committee chairmen, secretaries and expert members (Maatalouden rakennepoliittisen toimikunnan mietintö 1980, Maataloustuotteiden tuotantokustannuksia ja viljelijäväestön tulotason kehitystä selvittelevän toimikunnan mietintö 1975, Maatalous 2000, 1987). Committee work has formed a significant basis for legislation and for the agricultural policy implemented by society.

Development of agricultural income and subsidy systems, completion of calculations and income level studies have been important components of researchers' work (SILTANEN 1984, LAAKSONEN 1984, KETTUNEN, L. 1989, PUURUNEN 1987). 'Solidary' earnings and income policy and the development of social security systems have called for considerable research input from agricultural economists.

Throughout the post-war period, the structural development of farms and the location of production have been topics of intense research and lively debate. Research has deviated little from the idea of family farms. The superiority of family farms and their capacity for development vis à vis other forms of enterprise have been emphasized in many studies (TORVELA and MÄKI 1974, RYYNÄNEN and PYYKKÖNEN 1988). Study of other organizational forms in Finnish conditions would, in fact, have been purely theoretical, because these have hardly to exist in Finnish agriculture.

Studies of family farms have focused on agricultural business strategies, on the farm management, on the optimum size of farms (HEIKKILÄ 1987), and on the farm family's role in communities (KÖPPÄ 1979). Another important object of study has been the role of the farmer's wife, her contribution to agricultural firm, and her role in the community and in the family (SIISKONEN et al. 1982).

The effects of technological development on the structure of the family farm, on rural areas and on the structure of society have been paid much attention among agricultural economists, social scientists and agricultural sociologists. Technological progress has given the farmer of the 1970s and '80s enormous potential to increase and manage production. In almost every sector, the technology of production has improved the input-output ratio, and it has become possible to replace much human labor with capital. A special object of interest has been the fitness and profitability of introducing labor-saving technology (TORVELA 1977, HEMILÄ 1983, YLÄTALO 1987).

The rapid reduction in the number of farm-

ers and farms has had both positive implications and considerable disadvantages in rural areas. Not only agriculture but also many other functions integrated with agriculture and forestry have withered in rural areas. As a consequence, the population's age and sex distributions have become unfavorable, and the availability of services in rural areas has waned. Lack of appreciation for rural cultures and the great emphasis placed on urban cultures have enticed young people, in particular, away from the countryside. Research into these problems has been a challenging task for agricultural economists and sociologists in the 1970s and '80s. In fact, the Academy of Finland set up a research team for 1986—89, to study 'The vitality of the countryside'. It was one of the most comprehensive project studies dealing with agriculture, forestry and rural areas. The approach was multidisciplinary, and the study was carried out as a cooperation project between five research teams from universities and research institutes.

The research on rural vitality was primarily analytical, and directed its attention primarily to the properties, changes and goals of the subject (VARMOLA 1989, KETTUNEN, P. 1987 and 1989, SIPPOLA, H. 1989, SURVO 1989). The study confirmed the suppositions that human resources of rural areas have considerably diminished, that there is a lack of the entrepreneurship, and that rural development has been sporadic. Although the study pointed out important regional development centers giving life to their surroundings, the overall picture of isolated rural areas was quite bleak. Researchers face an enormous task in finding alternatives for developing a healthy and vital rural life and in studying the opportunities offered by various options.

Cooperative systems of various forms have been thought to be a factor which might promote rural development. In fact, in the early years of this century, rural and agricultural development in Finland was stimulated by a strong cooperative movement. Research on cooperative systems has consequently been revived in several areas. In the early 1980s,

the Nordic agricultural economists launched a 5-year joint study funded by the Nordic Council of Ministers. That study dealt chiefly with the original characteristics of the traditional cooperative movement, its membership democracy, its position in society, its decision-making, and its future potential and problems (Landsbrukskooperationen i Norden 1982 and 1985). As well as Nordic cooperation, research on the cooperative movement has been conducted together with Michigan State University. In this context, attention has been paid to the potential of cooperative systems in market management (OLLILA 1989).

Agricultural economic problem-solving research extends to most fields of practical farm management. The undisputable cornerstone of this research tradition is the agricultural profitability study (Maatalouden kannattavuustutkimus 75 vuotta 1987). Maintaining this research is still considered to be very important for the continuous monitoring of the economic state of farming. At present, this research comprises more than 1000 farms of different sizes, selected from various regions and representing each line of production. Because of its diversity, this material gives a good basis for examining the development of both individual farms and the entire scope of agriculture.

The farm accounting reports published annually (Kirjanpitotilojen tuloksia tilivuositain) give a good picture of mostly full-time family farms, their use of production inputs, yields and costs. The economic performance of agriculture is also described by several criteria.

Dozens of researchers use the data from bookkeeping farms, published in the farm accounting reports, in their studies every year. The most interesting topics have been the profitability of milk, meat, eggs and plant production, and changes in them for each region and farm size class. These data have also shed new light on the interrelations between the use of labor and mechanization on each farm, variations in the use of capital and loans, and the interdependences between

agriculture and forestry on each farm (JÄRVELÄ 1982, IKONEN 1985).

Research on the agricultural economics has also concentrated on studying the farmer's managerial ability and decision-making, and the flow of information, its reception and adoption. It has been noticed that this type of research needs more and more cooperation with scientists studying man and his behavior (WESTERMARCK, N. 1972). Being engaged in agriculture and forestry, the farmer must make long-term decisions that have a strong effect on economic performance. Such decisions include, e.g. operational strategy, the modernization of farm buildings, land purchase, forest regeneration and forestation of fields. Their effects extend over two or three generations. The reasoning used to make investment decisions and the weights of the contributing factors, in particular, have received attention from an ever-widening circle of agricultural researchers in this decade (SIPILÄINEN and RYYNÄNEN 1987).

Society and private organizations appropriate increasing amounts of funds for research and for adaptation of information. Research on the fruitfulness of this work, measured according to economic indicators, is in the beginning. Pioneering work in this field was made by SUMELIUS (1987) in his doctoral dissertation, in which he concluded that the resources invested in agricultural research and extension services have yielded a fairly high percentage of returns, significantly higher than the percentage of returns that could be given by the resources invested in the production itself. Good results, of course, are not achieved by means of research alone. Research must be supplemented with highly diverse information services. Monetary measurement of information services, and especially the division of the transfer of information between systematic extension services and general information (literature, the press, electronic mass media) has proved to be difficult to define. Advances in communications and information technology have opened up a new field of research, one in which agricultural

economists must also invest some effort (WESTERMARCK, H. 1987).

Conclusions

Research on the agricultural economics focuses mainly on finding solutions to practical problems. To some extent, problem-solving research has also involved the production of information about the object of research, i.e. research on the substance. Owing to the scarcity of resources, however, research on the theory and methodology of this discipline has been paid less attention; there have been relied on international results, with which Finnish researchers have become acquainted through various channels, and we have adapted them to the Finnish conditions.

Operating on limited resources, this kind of division of research is partly the consequence of prevailing conditions (applied research must yield results) and partly the result of a conscious decision. This procedure, however, has the disadvantage that little pioneering research in the field is generated. The theory or methodology of research may lag, and at the same time, researchers' capacity to do research may develop insufficiently.

To a great extent, the profound problems now facing agriculture together with issues pertaining to the development of rural areas are economic issues. Economic research and insight concerning development alternatives are needed on both the micro level and the macro level. The knowledge included in the basic university degree is no longer enough for the researcher, who needs a wider perspective and a deeper approach with respect to both theory and methodology. There is, however, a severe lack of such researchers. The great importance of research has been noted in various sectors of society. Demand is now sharply focused on individuals with good researcher education and cooperation skills, and on the things they produce. The economics of agriculture now has great challenges to meet:

- Researcher education must be deepened and expanded considerably.
- In the discipline of economics, the number of people given a post-graduate education must at least be doubled.
- The level of salaries, both during researcher education and for researchers, should be raised to correspond with the level of

salaries earned by those working in business.

- In the field of research, more should be invested in quality.
- Research units should be expanded markedly, either by combining units or by having units work in very close cooperation.

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