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1 Introduction and background

1.1 Introduction to rural technology transfer

Rural technology transfer in Poland is traditionally identified with rural advisory services, beginning of which dates back to XIX century. The first centres emerged in the west lands which were under the influence of Prussian culture, then other centres appeared in the south and east. As an effect of those circumstances, different economic and educational development levels of rural areas in Poland are still observed. Therefore, modernisation of farms and rural areas through technology transfer has a different character regarding regional conditions. Generally technology transfer has been recognised as a means leading to improvement of technical and economic efficiency of farms. Recently technology transfer in Poland includes both, knowledge of technology used directly in agriculture and non-agricultural activities. Therefore, it serves not only farmers but whole rural society.

Taking the paths of information about technology to the moment when it is put into practice, there are three general models of technology transfer in agriculture. *Peer to peer* and *global information* models are dominating in Polish agriculture. What is characteristic in these models is that the farmer her/himself is implementing technology. Relatively low total cost of technology transfer in those cases (from possessing information to implementation) is a crucial factor for highly risk-averse family farms dominating in Poland.

Schema of transfer – model “peer to peer”

Direct information from other farmers – a farmer looks for detailed information from the adviser / producer / another farmer – purchases the technology and implements it on her/his own.

Schema of transfer – model “global information”

General information from public sources (the press, TV) – a farmer looks for detailed information from the adviser / producer / another farmer – purchases the technology and implements it on his/her own.

Schema of transfer – model “direct from supplier”

General information from public sources or (adviser, the press, TV, another farmer) – contact and information from the supplier of technology – purchase of technology and delivery of technical specification by the technology supplier.

The third model of technology transfers – *direct from supplier* is relatively new in Poland. It should be linked with opening of the Polish market for foreign agricultural technology suppliers. In this case advanced technology requires specialised services to implement it. That model of transfer is gaining importance with increasing numbers of large scale specialised farms.

Before transformation, agricultural technology transfer like the whole economy was centrally controlled. Domestic institutions responsible for developing agricultural technologies and Advisory services offering training, advisory and consultancy have special preferences. The new open economy offers much broader possibilities for technology transfer but has enforced restructuring of the “traditional” system, which is still an ongoing process.

1.1.1 Agricultural and rural training

Agricultural and rural training is run mainly by secondary schools located in rural areas, rural advisory services (RAS), Union of Farmers (UF), Agricultural Chambers (AC) and in limited level by Agency of Restructuration and Modernisation of Agriculture (ARMA - organisation responsible for implementation of the National Rural Development Plan) and Ministry of Agricultural and Rural Development (MARD). The most important factor that determines the way of gathering training is generally the low income of the rural population and especially of farmers. Consequently, training that is financed from public sources dominates in rural areas.

Organisation and conducting of training is one of the most important activities of the RAS. Reflecting the number of specific training courses provided by one of the RAS Centres, the most important ones are devoted to technology of production, farm management, CAP, ecology and environment protection and rural households. The venue for most of the training courses is located in advisory service buildings.

It must be stressed that in general, information on new agricultural production technologies is provided by national agricultural research centres such as the Research Centre For Cultivar Testing, Institute of Soil Science and Plant Cultivation NRI, Plant Breeding and Acclimatisation Institute and academic centres. Generally their role in technology transfer process is limited to diagnose demand, elaborating new technologies and providing information to advisory services. During transformation and accession to the EU, there is growing importance of training concerned with agricultural management (CAP instruments and accountancy). Introduction of new instruments supporting farms was accompanied with numbers of courses providing technical information and how to apply for specific support. Similarly, those courses are provided by national advisory services but with extensive support from ARMA. While this subject is relatively new for the agriculture advisory service advisers are obliged to take part in training organised among others by ARMA related to procedures for submitting application for financial support from public funds. ARMA is organising training for advisory services officers rather than for farmers and financially supporting the organisation of courses. In the case of farm management training, basic knowledge is mainly provided by the Institute of Agriculture and Food Economy NRI that also providing direct courses of farm accountancy and, to a lesser extent, by the Institute of Rural and Agricultural Development of the Polish Academy of Sciences.

1.1.2 Agricultural and rural advisory/consultancy services

Advisory services are run traditionally by national agriculture extension structures. Generally the structures use the administrative methods like marketing and in-coming groups, which complement each other. The first one concentrates on assignation of the size and the types of production needed and the market demand, while the second one aims at farmers' integration. On this occasion, the advisor is obliged to set up quite similar groups of the farmers with regard to the level of their rural economy and because of their potential influence on neighboring holdings. After identification of a farmer's demand issues, the advisor collects the necessary information and then transfers it to the farmers. This is the technology transfer known as "peer to peer", where the information is provided directly to the farmers, who use the Advisory services voluntarily. They are also responsible for their own economic decisions. In the national agriculture extension structure, advisors are obliged to improve their own qualifications as well as their knowledge. Especially during the first few years of the transformation period and membership of EU, this caused dynamic growth of the advisory services, particularly those which are financially supported by national and EU funds (within CAP and structural funds). In consequence, technology transfer provided by national advisory services was characterized by

more administrative than productive features. The changes of the characters of technology transfer were the consequence of (were effected by) the close connection between the national advisory system and MARD and ARMA, which are responsible for implementation of agricultural development programmes. As their principle interest of the two last ones is implementation of rural development instruments they were recommending advisory services to focus on helping farmers to apply for public money.

Gradual growth of rural support after accession to the EU caused more interest from the private sector service. Both sectors, national and private, are concentrating on helping farmers in obtaining the CAP support. While the farmers are not qualified to prepare required development projects they purchase specialized advisory services. We can also distinguish the specific example of the private advisory services, which include complete tender for purchase, assurance of help in obtaining supplementary funds from the national sector and implementing the investment in practice. This offer is accessible mainly for the biggest farms having suitable capital.

1.1.3 Role of farmers' groups, including national or regional farmers' organisations

Among the institutions that organize training courses are several institutions representing farmers like different farmers' unions, farmers organizations and foundations concerned with rural development. The most important ones concerning transfer of technology are Agricultural Chambers that directly represent farmers. Their role in transferring knowledge and technology is linked with advising the rural population on agricultural and non-agricultural activities and improving the educational level of the rural populationⁱⁱⁱ. They represent local farmers who are aware of local problems. They are directly supporting Advisory Centers by taking part in planning training and advisory activities and by organizing training courses for farmers, for agricultural school teachers and for advisory center staff. The scope of the courses is broad and from agricultural technologies (like organic farming) to non-agricultural activities on farms.

Training activities are among the main tasks of the Union of Rural Youth^{iv}. This Union is directly involved in organisation of courses for young farmers that enable them to raise their educational level to agricultural technician. Those are accompanied with seminars and exhibitions to present technological "news" especially to the young farmers.

Educational activities and promotion of modern technologies in rural areas and technical advisory support are in the scope of the National Union of Farmers, Agricultural Circles and Organizations^v. Agricultural Circles while cooperating with agricultural machinery suppliers in technological partnership – promoting concrete technological solutions. Simultaneously, they are involved in the programme for socio-economic activation of rural areas by providing training for local entrepreneurs and leaders. Particularly, they organize courses for rural leaders dedicated to activities to gain alternative and supplementary sources of income in development of agro-tourism and tourism enterprises. Nowadays, this institution runs on-line courses concerned with non-agricultural rural activities. Within the structures of Agricultural Circles are Circles of Rural Housewives that support education of rural families and develop rural women's capacities to undertake non-agricultural activities i.e. with the use of computer techniques^{vi}. Generally, the above-mentioned organizations provide training courses and information on agricultural and non-agricultural technologies while having direct contact with rural communities, thus providing information on their educational needs.

An organization that is traditionally concerned with transfer of western agricultural know-how to Polish agriculture is the Foundation for the Development of Polish Agriculture^{vii}. Recently, their

scope of activities includes transfer of technologies outside the agriculture and food sector. The main channels of the Foundation's technology transfer support are micro-credit services complemented with small business training and advice. The Foundation cooperates with the Union of Rural Youth by assisting their vocational and training course activities.

An important organization taking part in technology transfer is The European Fund for the Development of Polish Villages^{viii}. It has been carrying out credit lines and grant programmes that aim at development of technical rural infrastructure. It directly supports rural community primary and secondary schools, vocational agricultural schools and development of an information society infrastructure.

1.2 Agricultural and rural skill level

The population in rural Poland can be characterised with low educational level. That is a result of historical circumstances and generally low educational ambitions and need in acquiring knowledge by the rural population. There are generally low agricultural and rural skills in Poland. An extremely low level of spending on means of production like seeds accompanied with low yields indicate lack of crucial knowledge on how to improve productivity^{ix}. However, it must be stressed that the skill level differs depending on the farm size. Recently done research shows that large scale farmers are aware of new technologies and successfully applying them^x. Therefore, one of the reasons for the generally low level of agricultural skills is the majority of small farm in Polish agriculture.

The unfavourable differences in level of education for the rural population in comparison with the urban population are reflected by higher share of lower educated persons in rural areas, and a correspondingly lower share with higher education^{xi}. Another issue related with the level of education is quality of educational services in rural areas – generally lower than in cities.

Taking educational level of farmers as an indicator of the differences in their knowledge level, it must be underlined that each year the situation regarding education of the rural population gradually improves. Comparing years 2002 and 1988, the share of rural inhabitants with higher education doubled to 5.4%. Similarly, the share of the population with secondary education increased to 22.6%^{xii}.

According to a CSO survey on economic activity of the rural population (table CSO), the educational structure of the rural population appears to be better among those not connected with farming^{xiii}. In both groups, those engaged and not engaged in farming, there is a small number with only primary or without any education; on the other hand, there is a large number with secondary, vocational and higher education. Gradual improvement of education among the rural population engaged in agriculture is nevertheless caused by the natural process of ageing of the rural population and in smaller scale by increase of qualifications of new entrants. Former farmers who had primary or partial primary education retired and left a better-educated group of farmers. Therefore, the improvement in education appears by increase of share of the farmer population with the lowest category of the secondary education.

Research on agricultural families' characteristics done in the IAFE also indicates improvement in the educational level of the rural population. From 2000 to 2005, the share of the farming family population with higher education rose from 2% to 5%, and the share with secondary and post-secondary education from 17% to 23%^{xiv}. However, still 34% of the population have only primary education. The same survey findings suggest that non-agricultural rural activities are dominated by persons with secondary and post-secondary education (more than 45%) as well as vocational education (nearly 39%)^{xv}. As farming is less attractive, especially for young and better

educated rural people, they are seeking career opportunities outside agriculture. Automatically, the rural non-agricultural population is improving their educational structure.

Concerning gender structure of the rural population, women are better educated than men. The share of women with higher education is twice that for men (6.2% and 2.9%, respectively). Similarly, women with secondary and post-secondary education are 24.6% of all, while for men the proportion is 17.5%^{xvi}. The reasons for that include higher educational ambitions of women.

The percentage of persons who graduated from basic vocational schools increased eightfold, whereas persons who have secondary and higher education about threefold. A relatively higher rate of increase of persons with secondary and higher education in rural areas than in town led to some reduction in the educational gap between countryside and town. However, this gap is still very wide, especially in relation to higher education. The level of education of countryside inhabitants is still much lower compared with that in towns.

A positive phenomenon is the increasing number of youths from the rural communities who are studying. At present, 23.9% of all students doing higher courses are coming from rural areas. However, youths from the countryside usually select schools with lower prestige and quality of teaching, mostly not public colleges and they select traditional courses. Urban youths more often opt for public and well known colleges or universities and courses which are fashionable and promising for the future.

Small educational demand by farmers is documented by the fact that more than 70% of the rural population does not voice any educational needs and young countryside inhabitants who voice them would like to obtain skills outside farming. The preferred mode of obtaining (increasing) professional skills are vocational qualification courses and external forms of study.

Taking into account almost 2.2 million persons employed in individual agriculture, only 1% has higher agricultural education, another 15% has secondary and vocational agricultural education, and 26% graduated from specialized agricultural training courses. Almost 1.3 million farmers have no formal agricultural education.

2 Specific technology transfer issues

2.1 Training provision

2.1.1 Quality and suitability of provision

According to enquiries made among farmers after training, they were satisfied with the training quality and the topics. However, in the private interviews they complained of advisers' low qualifications and some of them even suggested that the advisory service's knowledge level wasn't higher than farmer's. They suggested that advisers should invite to the training courses the experts and representatives of companies providing technology.

The generally positive opinion of advisory services is related with aspects like traditionally good opinion of services, costless (free) provision and the enthusiasm of advisory personnel.

On the other hand, the range and variety of advisory and training services seems not to fully satisfy rural needs. With the introduction of new support schemes for rural development, new measures concerned with development other than agricultural activities appeared to be of less

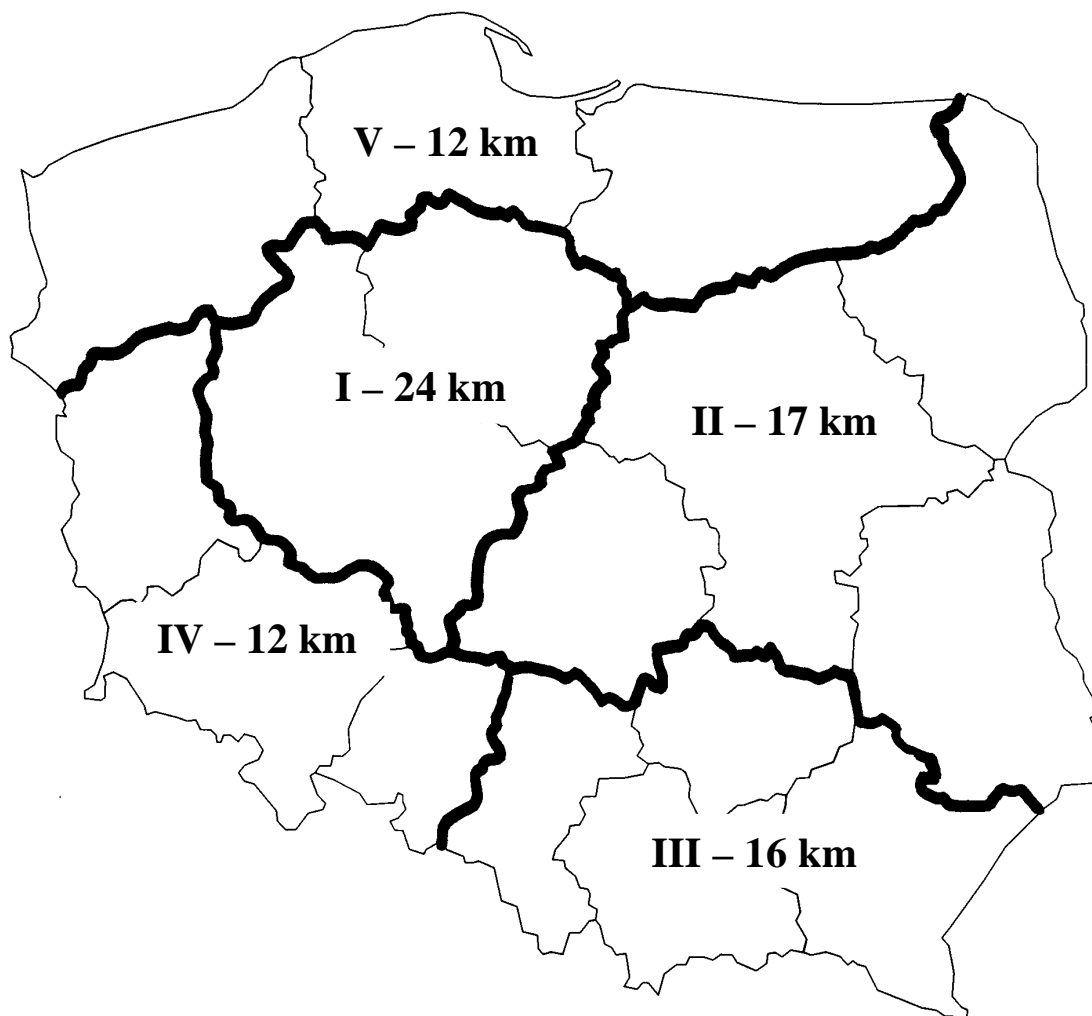
importance for advisory services. That is because non-agricultural activities are relatively new for advisors. This results in increasing polarisation of rural interest groups. Relatively big farms that are interested in investment in agriculture seem to be sufficiently served while there is a visible lack of interests in smaller farm owners who have more problems with adaptation themselves to the new circumstances.

2.1.2 Availability and spatial issues

Spatial issues can be described by the distance of rural citizens to administrative district capital city or by distance to the nearest advisory services offices. According to the research work done by K. Czapiewski and P. Sleszynski (2006)^{xvii}, the time to reach the administrative district capital by rural families in possession of a car is about 30 minutes. However, the families without a car need about 40 minutes. The average journey to the capital city of the voivodeship (region) where the rural advisory centres and higher education schools are located is twice as long. Having difficult, poor access to the town or even lack of this access, according to K. Heffner's research, is typical for 42% of Polish communes. On the other hand, the research by J. Banski (2005) showed that only every eighth farmer had a problem with access to the town, stressing insufficiency of public transport services^{xviii}.

One of the issues covered by research on structures of Polish villages done in IAFE NRI was an average distance of rural communes to the rural advisory service offices^{xix}. According to the results of that research, inhabitants of the central-west region where the relatively modern farms are located have a longer distance. On the other hand, the shortest distance can be observed in the south-west and northern regions. Those regions are characterised by problematic rural areas. In the case of the south-west region, the problems are connected with predominance of small farms that are not economically viable. In the north region, former State farms were located. With the collapse of the centrally-planned economy and termination of subsidies, most of them went bankrupt. Thus, a significant share of the rural population became unemployed. As low skilled workers, they were not able to find other jobs. The central-eastern and southern regions can be described as having relatively poorer access to the rural advisory services. However, they are also can be described as having structural problems of rural areas like predominance of small farms and high rates of unemployment in rural areas. Therefore, there might be a need to improve the access to rural advisory services by increasing the number of their offices. In Poland's remote areas, training courses are organised in local schools in order to shrink the distance between the training location and beneficiaries.

An average distance from surveyed villages to the rural advisory services offices.



Source: Alina Sikorska, Doradztwo rolnicze – opinie mieszkańców wsi o działalności ODR w Zagadnienia Doradztwa Rolniczego nr1, 2006 s.90.

2.1.3 Demand side issues

The farmers had a high opinion of their knowledge, particularly of technical matters, while their general knowledge, was estimated by them not very useful. A case study conducted in Mazowsze region (voivodeship) indicated that farmers are interested in increasing their skills but only from the area of their interest - mostly possessing funds for development. They have a low interest in information and knowledge such as crop production technology, sheep husbandry, breeding of sheep, horses and poultry, growing of vegetables, fruit-growing, agro-tourism services, and hygiene/food safety. However, despite the fact that farmers' believe their knowledge of crop growing techniques, animal production, rural mechanisation and accountancy to be quite high, 50% of them would like to improve it.

According to data, the farmers had a low opinion of their knowledge concerned with management, marketing, administration and preservation of the environment. They consider them very important issues after accessing the EU. Unfortunately, the educational demand

among the farmers is quite low. Over 70% of the rural community do not express any education needs. Such low educational ambitions and the small demand to acquire knowledge among the rural communities is historical^{xx}. Young people from rural society usually prefer to improve their non-agricultural qualifications, preferably with the use of short courses. Training services provided in the first years of accession reflected the demands of the Ministry of Agriculture to fully utilise CAP instruments and only after that to meet the farmers' demands. That is changed, and the farmers' representatives have become more important in the process of planning rural training.

2.1.4 SWOT analysis

Training provision

Strengths	Weaknesses
<ul style="list-style-type: none"> - Generally good opinion of farmers of training - Wide scope of training provided - Generally costless (free) for farmers 	<ul style="list-style-type: none"> - Low quality of training especially concerned with non agricultural rural economy issues - Themes of training are highly influenced by central government - Low connection with R&D institutions
Opportunities	Threats
<ul style="list-style-type: none"> - New sources of funds available - Increasing demand for training - Good conditions for the private sector to provide training 	<ul style="list-style-type: none"> - Lack of personnel for training other than agricultural training - Growing competition offering lower quality services

2.2 Extension and advisory services

2.2.1 Public sector services

The National rural advisory services in Poland have two levels:

- national: Central Agricultural Advisory service (CAA - Centrum Doradztwa Rolniczego)
- regional: consists of Agricultural Advisory Centres (ODR - Osrodek Doradztwa Rolniczego)

The Central Agricultural Advisory service is located in Brwinów (central Poland) and has three dependent branch offices located in Krakow, Poznan and Radom. This unit is under the Agriculture Ministry's authority and is financed by the national budget. The Agricultural Chambers authorities support CAA in the process of programming its activities. The major tasks of the Agricultural Advisory Centres include the improvement of the level of agricultural incomes, enhancement of market competitiveness of agricultural holdings, supporting rural sustainable development and improvement of vocational skills of farmers and other rural inhabitants^{xxi}. The most important activities of the CAA include:

- preparation and making accessible educational information material for rural advisers and training participants
- training management for the rural advice service's employees and for rural communities
- elaboration analyses, reports, prognoses about rural extension development, creation and management of the central information system

- dissemination of research outcomes and their implementation into practice
- improvement of technical knowledge of rural schoolteachers.

The education activity of the Central Agricultural Advisory service is done by organisation of seminars, conferences and internet courses (about e.g: standards in rural manufacturing, farm management and rural economy), intramural courses (methodology and organisation of agricultural advisers' work), training programmes (simplified accountancy, organisation of agrotourism). The CAA, together with academic institutions, organises postgraduate studies such as those concerned with agrotourism, agricultural management, mechanisation and other technologies of production. Among the important activities of the CAA is the publication of professional catalogues, hand-books and other training materials that are also accessible to the public via the internet. Similarly, the CAA promotes advisory services by organising mass events like seminars, fairs, open days, and by having a national extension information system web-site. The CAA as a national unit helps other extension centres without charge to improve the effectiveness and quality of their services, especially those concerned with non-agricultural rural businesses.

The second level of the national system of rural advisory services is represented by 16 Voivodeship (Regional) Agricultural Advisory Centres (VAAC) located in all voivodeships with 30 dependent district branches. The VAAC are financed by voivodeship budgets and directly take a part in implementation of development plans of their respective regions. The voivodeship authorities, together with the Social Board of Agricultural Advisory services approve the working plans of their VAAC. Representatives of Agricultural Chambers advise the directors of advisory centres on the specific needs for advisory and training services at local level. The national system of rural advice can be described as having a hierarchical structure. It prefers transfer of information from up to down. The roles of farmers and their organisations are limited to advising and giving recommendations to agricultural advisory centre directors.

Generally, the advisory and training services are free of charge. However, starting in 2007, some services - namely individual advising - are to be paid for by beneficiaries. The National system of rural advisory services activities are supported from EU structural funds, which help to improve quality and range of services.

2.2.2 Private sector services

After the 2004 accession, the number of private institutions giving advisory servicing dramatically increased. That is due to increased demand of groups of farmers for specialised services, coupled with access to public funds. Private advisory companies mainly help farmers to formulate plans and obtain resources for farm development from public and commercial institutions. They are also interested in advising rural communities in the process of preparation of development plans financed from regional policy funds. They also offer support for preparation of non-agricultural projects. Private advisory services are competing with the public sector, generally improving the quality of services. They are more flexible by temporarily employing professionals and offering high quality services.

Some of the private advisory companies are very narrowly specialized, collaborating directly with the suppliers of technology. Practically, they represent suppliers offering in their name complete services – not only delivering and implementing investment but also helping to obtain public support for financing it. Such a “direct from suppliers” transfer of technology is only affordable by a limited number of farms. It must be stressed that public services are afraid of private companies since they offer better conditions for professional advisers and are more flexible in accessing public money.

2.2.3 Demand side issues

The demand for advisory services is a relatively complex issue in Poland. That comes from very diverse types of farm in Poland and from the necessity to look for non-agricultural sources of income. Many farmers are interested in advice on how to apply for development funds, but there is little interest in looking for information on up-to-date technology. Of two million farms in Poland, only 300–500,000 are economically competitive in the EU market. These represent potential demand for agricultural advisory services while the number of farmers that directly benefit from advisory services are more or less 50,000 annually^{xxii}. These have relatively high levels of knowledge and represent groups of farmers that have rather moderate opinion on the level of professional knowledge of national the advisory service personnel, while they themselves are already aware of most modern technologies.

With the introduction of CAP instruments, the demand for “new” non-agricultural advisory services became high. This is mostly connected with possibilities to get public support for activities like agro tourism services. These are relatively new for public extension services while the traditional policy was mostly concerned with increase of agricultural production. The pre-accession and accession period has increased bureaucracy, which means more advisory activities on how to prepare and submit documentation to obtain aid from rural development measures.

2.2.4 SWOT analysis

Extension and advisory services

Strengths	Weaknesses
<ul style="list-style-type: none"> - Long experience and good opinion of national rural advisory services - Developed network of national advisory services - Good understanding of local problems 	<ul style="list-style-type: none"> - Generally low knowledge of the up to date technologies - Insufficient resources in comparison to the rural development needs - Weak connection with R&D sector
Opportunities	Threats
<ul style="list-style-type: none"> - CAP support for extension and advice - Growing incomes of farmers - Better access to foreign technology providers 	<ul style="list-style-type: none"> - Growing role of the “direct from suppliers” channel (without advisors) - Increasing shortage of high quality personnel - Growing demand for “new” non-agricultural technologies that are unknown by advisors

3 Overview and prospects

3.1 Training

Generally, the educational and knowledge level of farmers and the rural population in Poland is low. Transformation of the economy and accession to the EU highlighted the needs to improve the situation. Higher competition and rising production quality requirements stress the necessity of modernisation on Polish farms and improvement of farmers' knowledge on farm management in market economy conditions. However, opinion of farmers on their own technical knowledge is generally high so they demand more training related to farm management and particularly concerned with gathering support from the CAP.

Concerning the relatively large number of farms, and high employment in agriculture in comparison with other EU member States, there is a need to provide recent farmers with training concerned with non-agricultural activities, with respect to regional differentiation of Polish rural areas.

The National rural advisory services are predominant in Poland and they have long experience in providing training in rural areas and have a relatively well developed network of offices. However, their objectives appear to be more related with the objectives of the Ministry of Agriculture despite official participation of rural society representatives in programming their works. The role of rural representatives is rather limited while they are only advising during preparation of advisory centre work plans. It must be pointed out that there is a group of modern farms, relatively technologically advanced, that consider the training provided by extension services to be out of date. This is explained by weak connections and relatively low quality of work provided by the national R&D institutes. Thanks to accession to the EU, the level of resources and the frequency of training have significantly increased. However, training concerned with non-agricultural activities is still unsatisfactory.

3.2 Extension

Extension services in Poland are well developed concerning their participation in technology transfer in rural areas. The extension system in Poland has two levels: national, under the Ministry of Agriculture and regional, with local branches. While the national Central Agricultural Advisory service is concerned with the Ministry of Agriculture's development plans and their implementation, the regional branches focus on local needs. That may cause conflict of interest taking into account regional differentiation of rural areas.

The network of national rural advisory offices is relatively dense. However, concerning the regional accessibility it would be recommended to shrink the distance from potential beneficiaries in the most problematic eastern part of Poland. Owing to lack of resources, advisors from national services have to minimise numbers of on-farm visits. The problem of accessibility of advisory services is partly due to farmers self-belief in their high technical knowledge. Therefore, they are mostly interested in advice on how to fill out applications for development support. Recently implemented reform of the national advisory service allows it to charge for preparation of farm investments plans.

The general assessment of quality of the national advisory service is positive. However, the best farmers, already using up-to-date technologies have a rather moderate opinion of it. That is connected with "inactive" interrelations with R&D institutions and the limited ability and education of advisors.

Suppliers of most advanced agricultural technologies like seed and machinery producers in most cases offer direct advisory services. Such transfer of technology “direct from supplier” eliminates the traditional advisory services and is available to a limited number of farmers. In the future, the private sector can play a more important role while the public advisory services have already started to charge for particular services.

3.3 Linkages between technology transfer agencies

Linkage between agencies - R&D institutions, rural training and advisory providers - can be considered unsatisfactory. The system of evaluation of R&D institutes in Poland gives preference to strictly scientific publications and pays little attention to publication of training and advisory type materials^{xxiii}. Therefore, the R&D institutes have only a modest motivation actively to serve beneficiaries of their research outcomes. On the other hand, agricultural schools and institutions providing training and extension services should be more active in gathering information on technologies. Because of limited resources, they are based on free-of-charge information and mostly upgrade their knowledge by training and publications provided by the Central Agricultural Advisory service and, to a lesser extent by taking part in conferences and seminars. A good example of effective linkage between agencies is provided by the Central Agricultural Advisory service and the Institute of Agriculture and Food Economy NRI direct internet based courses for rural advisors. That indicates possible growth of the internet role in technology transfer.

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ANNEX

Training provision and use by the rural population

Approx. % of population that is rural by:	
(a) place of residence	38%
(b) place of work	40%
Approx. % of all workers in rural areas in:	
(a) agricultural employment	42%
(b) non-agricultural employment	58%
Number of universities and similar institutions with agricultural courses	10 – agricultural universities
Number of colleges and similar institutions providing agricultural training	
Number of other training providers:	
(a) publicly funded	%
(b) privately funded	%
Approx. % of agricultural personnel with:	
(a) degree or equivalent	
(b) diploma or equivalent	
(c) certificate or equivalent	
(d) full secondary education	
(e) less than full secondary education	
(f) little or no formal education	
Estimated level of demand for further training: (use A=high, B=moderate, C=low)	
Agriculture – arable/cropping production	C
Agriculture – livestock production	C
Business management	B
Other [please specify; add rows as necessary]	
Marketing and advertisement	A
Direct distribution	A
Non-agricultural rural activities	A

Advisory and extension services available to agricultural and rural businesses

<i>Public sector organisations by name</i>	Approximate number of advisors or consultants
National Extension Services	4500
<i>Private sector organisations by name</i>	Approximate number of advisors or consultants
<i>ABC Poland</i>	10 – permanent staff
Estimated % of farmers actually <i>using</i> advisory services of some sort	0,1% - 10%
Estimated % of NAE rural businesses actually <i>using</i> advisory services of some sort	.
Estimated demand for <i>new</i> advisory services - % of all farms and other rural businesses	10% - 50%