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RURAL DEVELOPMENT IN POLAND THE ROLE OF POLICY, TOURISM AND HUMAN CAPITAL

SCIENTIFIC EDITORS   Piotr Bórawski, Agnieszka Brelik, Bazyli Czyżewski

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MAIN ABBREVIATIONS

AAC   –   Agricultural Advisory Centers

ARMA   –   Agency for Restructuring and Modernisation of Agriculture

CAP   –   Common Agricultural Policy

CSO   –   Central Statistical Office

EAFRD   –   European Agricultural Fund for Rural Development

EC   –   European Commission

ESCO   –   European Skills, Competences and Occupations

ESF   –   European Social Fund

EU   –   European Union

GAC   –   Good Agricultural Condition

GDP   –   Gross Domestic Product

GUS   –   Główny Urząd Statystyczny (Central Statistical Office)

ICT   –   Information and Communication Technologies

LAG   –   Local Action Groups

MO   –   Municipal Office

MRiRW   –   Ministerstwo Rolnictwa i Rozowju Wsi (Ministry of Agriculture and Rural Development)

NGO   –   Non Governmental Organisations

OECD   –   Organisation for Economic Co-operation and Development

PES   –   Public Employment Services

PGR   –   Państwowe Gospodarstwo Rolne (State Farm)

RAF   –   Rural Accommodation Facilities

RDP   –   Rural Development Programme

SAPARD   –   Sector Operating Program and Rural Development Program

SME   –   Small and Medium-sized Enterprises

WIG   –   Warszawski Indeks Giełdowy (Warsaw Stock Exchange Index)

INTRODUCTION

The problem of tourism function in the multifunctional development of rural areas has not been recognized and is gaining on meaning because European Union is focusing activities on natural environment preservation. However, little attention has been paid to the role of environment in the development of rural areas. Environmental function has an impact on nature preservation and quality of life of society development and requires capital outlays on nature preservation.

Agriculture and rural areas are the key elements creating public goods based on natural environment. Not only European agriculture is responsible for providing food and material to be further processed but also occupies around 40% of land. As a consequence it has a huge impact on the condition of the environment in the rural areas as well as capabilities to use the environment. **It is a specific feature of public goods related to rural areas that they can be an external effect of "regular" agricultural production, a purposive effect or a common supply that belongs to the society.** It must be noted that in the rural areas different interests compete mainly for two factors: the land and labor, because both production of private goods and provision of environmental public goods can be executed through them. However, in order to achieve a proper level of environmental public good supply it is necessary to create economic incentives for farmers to manage their land and other production factors in such a way that it is possible to generate them.

In that context an important issue is human capital which is especially important in periods of rapid change. Certainly Poland in the past two decades has experienced rapid change, with rural areas especially impacted. The changes in markets, agricultural policies, and opportunities have been so great in this period that the traditional approaches to economic activity were overwhelmed by changing circumstances. The ability to adapt in this instance is especially dependent on human capital, because everything is different.

The papers presented at the conference „Development of human capital" on 7th June 2014 at High Economic Social School in Ostrołęka were compiled into a monograph to promote the concept of tourism and human capital in the development of rural areas.

The publication has been structured to address the key elements of tourism and human capital. The first part discusses development of tourism functions and influence of selected economic factors on its development. Moreover, it focuses on ambient impact of institutional development on agritourism farms.

The second part concerns human capital. It describes its role in innovation opportunities, and theories describing human behavior. This part is also devoted to human capital in Polish agriculture. The monograph is enriched in papers from Pennsylvania State University in the USA and School of Agriculture & Food Science, University College Dublin.

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PART I
POLICY AND DETERMINANTS OF
TOURISM DEVELOPMENT
IN RURAL AREAS

DEVELOPING A MODEL OF SUSTAINABLY-COMPETITIVE AGRICULTURE

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1.1. Introduction

The crucial need for a radically new approach to agriculture was emphatically underlined in a seminal paper published in the prestigious journal Nature[2]. This forward-looking article states that: "*The challenges facing agriculture to-day are unlike anything we have experienced before and they require revolutionary approaches to solving food production and sustainability problems*". As Europe's agri-food industries are being radically re-shaped by the globalisation of markets, a diverse range of growing public concerns, including food security, climate change and energy supply, environmental sustainability, animal health and welfare, as well as human health, ethical foods and fair trade need to be addressed. As a result, food safety and country of origin are now foremost amongst the concerns of consumers[3].

The formidable challenges and uncertainties point to the need for development of new models of agriculture that are sustainably competitive[4]. The primary feature of

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[1] *Thanks are due to Abigail L. Miller, Research Associate at the Pennsylvania State University*

[2] **JA. Foley, N. Ramankutty, KA. Brauman, ES. Cassidy, JS. Gerber, M. Johnston, ND. Mueller, C. O'Connell, DK. Ray, PC. West, C. Balzer, EM. Bennett, SR. Carpenter, J. Hill, C. Monfreda, S. Polasky, J. Rockstrom, J. Sheehan, S. Siebert, D. Tilman. DPM. Zaks,** [2011]: *Solutions for a cultivated planet. Nature* ***478****: 337-342.*

[3] **Safefood,** [2009]: *Where does our food come from? Consumer Focused Review. Safefood, Cork, Ireland; 90 pp. (available at: URL: http://www.safefood.eu/en/Publication/Research-reports/Where-does-our-food-come-from/).*

[4] **G. Purvis, L. Downey, D. Beever, ML. Doherty, FJ. Monahan, H. Sheridan, BJ. McMahon,** [2012]: *Development of a sustainably-competitive agriculture. In Agroecology and Strategies for Climate Change, Sustainable Agriculture Reviews* ***8****; pp. 35-65. Ed E. Lichtfouse. Dordecht-Heidelberg-London-New York: Springer/Science+Business Media B.V*

this concept is that it recognizes the need for internationally competitive production systems within the context of increasingly globalised markets. The model of sustainably-competitive agriculture developed by an interdisciplinary group in University College Dublin in collaboration with colleagues from the UK, provides an appropriate strategic framework for considering the challenges faced, and the future knowledge requirements and supports, that will be needed for knowledge mobilisation to address these challenges. As the primary focus of this paper is the paramount need to stimulate innovation through knowledge mobilisation, only a brief outline of the concept behind the model will be presented here.

1.2. The Concept of Sustainable Competitiveness

In response to the unprecedented economic and social complexities that need to be addressed, and indeed what is seen as an emerging *Food Crisis*[5], Purvis *et al*. (2012) reason that priority needs to be given to the development of food production systems that meet the following design criteria[6]:

- Profitability at farm level,
- Market required products,
- Animal health and welfare needs,
- Environmental sustainability,
- Resilience to climate change,
- Energy efficiency.

Based on these criteria, a conceptual model showing the generic components of sustainably competitive agriculture is illustrated in Fig. 1.
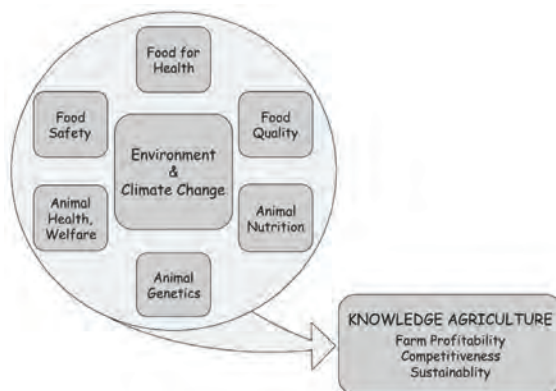
Figure 1. **The architecture of a sustainably-competitive agriculture** (Source: Purvis et al., 2012)

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5   **EU SCAR**., [2007]: *Foresighting Food, Rural and Agri-futures. First Foresight Expert Group Report; EU Standing Committee on Agricultural Research; 98 pp. (available at URL: http://ec.europa.eu/research/agriculture/scar/pdf/fore-sighting_food_rural_and_agri_futures.pdf).* **EU SCAR.,** [2008]: *New Challenges for Agricultural Research: Climate Change, Food Security, Rural Development, Agricultural Knowledge Systems. Second Foresight Expert Group Report; EU Standing Committee on Agricultural Research; 105 pp. (available at URL: http://ec.europa.eu/reserch/agniultae/ scarp/pdf/scar2ndforesiontexerciseenpdf*

6   **G. Purvis, L. Downey, D. Beever, ML. Doherty, FJ. Monahan, H. Sheridan, BJ.McMahon,** [2012]: *Development of a sustainably-competitive agriculture. In Agroecology and Strategies for Climate Change, Sustainable Agriculture Reviews 8; pp. 35-65. Ed E. Lichtfouse. Dordecht-Heidelberg-London-New York: Springer/Science+Business Media B.V*

This model specifically applies to livestock production systems. However, similar frameworks for crop production would feature basically similar components, with the emphasis on plant genetics/breeding, crop nutrition/husbandry and crop pest/disease/weed control. The relative importance of the components in such models will clearly vary between regions, farming contexts and enterprises. However, at its heart, the model comprises three basic dimensions pertaining to farming practice, food quality and environment.

In livestock farming, animal nutrition is the cornerstone of the model's Farming Dimension. A primary challenge in developing sustainably-competitive livestock systems is the achievement of the optimum balance between genetic potential and animal nutrition. For example in dairy farming, production related diseases are largely the consequence of the cow's inability to cope with the demands of the production system[7]. Within the Food Dimension of the model, addressing food safety issues[8] and achievement of consistent product quality[9] are key targets for market success.

The Environmental Dimension is, however, central to the model, and inextricably linked to both farm and food components (Fig. 1). Being fundamentally reliant on natural processes, agriculture is inherently dependent on the environment. Many of the difficulties facing current food production systems, stem from a basic failure to recognise this crucial fact. In designing new farming systems, opportunities exist to mitigate greenhouse gas emissions[10] and reduce energy costs, and particular attention needs to be given to ensuring protection of wider environmental quality. This can be most effectively achieved by utilising knowledge of natural processes, particularly with respect to the functional role and inherent value of biodiversity within production systems[11].

The quality of the environment in which food is produced has now become a central aspect of both food marketing and policy. Indeed, it has been argued that policy responses to increasing environmental concerns may in the future supplant traditional agricultural policy, as the key determinant of the agri-food sector's economic performance[12].

[7]   **EFSA.,** [2009]: *Scientific Opinion on the overall effects of farming systems on dairy cow welfare and disease. Scientific Opinion of the Panel on Animal Health and Welfare (AHAW). Journal of European Food Standards Authority* **1143**; *1-38.*

[8]   **B. Ilbery, M. Kneafsey, M. Bamford,** [2000]: *Protecting and promoting regional specialty food and drink products in the European Union. Outlook on Agriculture* **29**; *31–37.*
       LO.Barcos, [2001]: *Recent developments in animal identification and the traceability of animal products in international trade. Revue Scientifique et Technique de L'Office International des Epizooties* **20**: *640–651.*

[9]   **L.Downey,** [2006]: *EU Agri-Food Industries & Rural Economies by 2025 – Towards a Knowledge Bio-Economy – Research & Knowledge Transfer Systems. Report prepared for European Commission, Brussels, 41 pp. (available at URL:http://ec.europa.eu/research/agriculture/scar/pdf/scar_foresight_rural_economy_en.pdf).*

[10]   **P. Smith, D. Martino, C. Zucong, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, M .Howden, T. McAllister, G. Pan, V. Romanenkov, U. Schndider, S. Towprayoon, M. Wattenbach, J. Smith,** [2008]: *Greenhouse gas mitigation in agriculture. Philosophical Transactions of Royal Society B 363: 789-813.*
       A. Inglesias, S. Quiroga, D. Agustin [2011]: *Looking into the future of agriculture in a changing climate. European Review of Agricultural Economics* **38**: *427-447.*

[11]   **W. Buchs,** [2003]: *Biodiversity and agri-environmental indicators – general scopes and skills with special reference to the habitat level. Agriculture, Ecosystems & Environment, 98: 35-78.* **L. Brussaard, P. Caron, B. Campbell, L. Lipper, S. Mainka, R. Rabbinge, D. Babin, M. Pulleman,** [2010]: *Reconciling biodiversity conservation and food security: Scientific challenges for a new agriculture. Current Opinion in Environmental Sustainability* **2**: *34–42.*

[12]   **K. Hanrahan, T. Donnellan,** [2012]: *Productivity and Income. T-Research 7(4) 24-25. (available at URL: http://www. teagasc.ie/publications/view_publication.aspx?publicationID=1636).*

1.3. A Biological Model

A biological model of sustainably-competitive grass-based cattle production is depicted in Fig. 2. This illustrates the multi-functional benefits of an integrated production system approach. In particular, it provides a framework highlighting the key importance of two identified functional epicentres in the model, namely *Rumen Function* and *Pasture Function*. Both the agronomic and ecological efficiency of this production system are ultimately dependent on optimising the interaction in the *functional efficiency* of these inter-dependent epicenters. See Purvis *et al.*, (2012) for a more detailed exploration of both the model and its underpinning scientific basis[13].
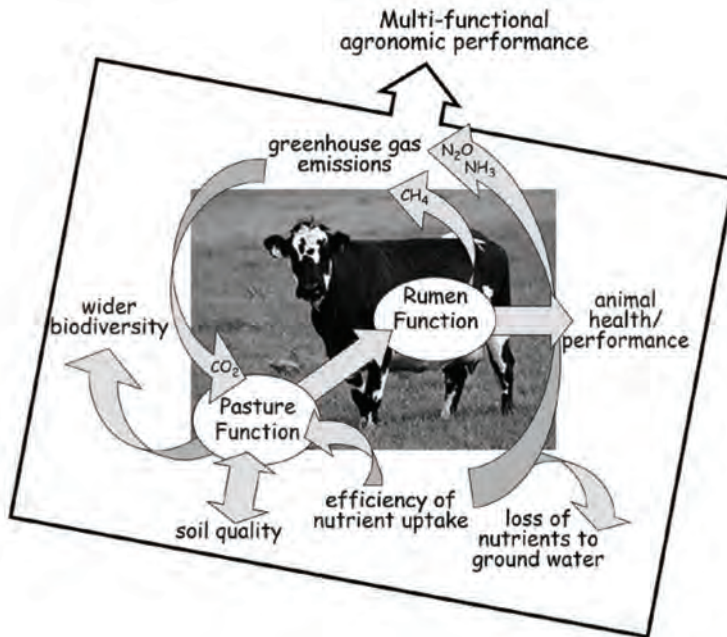
Figure 2. **Features of sustainably-competitive cattle production** (Source: Purvis.et al., 2012)

1.4. Knowledge Management

Much of the scientific knowledge and understanding needed to begin development of models like that illustrated in Fig. 2, already exist. However, this knowledge presently resides largely within the increasingly specialised, and therefore isolated disciplines of agriculture, food and the environmental sciences. This has led to a situation where the practical integration of research outputs into farm systems development has become

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13   **G. Purvis, L. Downey, D. Beever, ML. Doherty, FJ. Monahan, H. Sheridan, BJ. McMahon,** [2012]: *Development of a sustainably-competitive agriculture. In Agroecology and Strategies for Climate Change, Sustainable Agriculture Reviews 8; pp. 35-65. Ed E. Lichtfouse. Dordecht-Heidelberg-London-New York: Springer/Science+Business Media B.V*

significantly more difficult[14]. The lack of effective knowledge management (and not necessarily the lack of knowledge *per se*) is now the most significant obstruction to development of the sustainably-competitive approach. The primary requirement is for innovation in the organisational structures and processes of knowledge mobilisation that are needed to support and underpin the development and adoption of more economically and environmentally sustainable food production systems. A framework for thinking about the organisational structures, knowledge generation and mobilisation processes required is illustrated in Fig. 3.
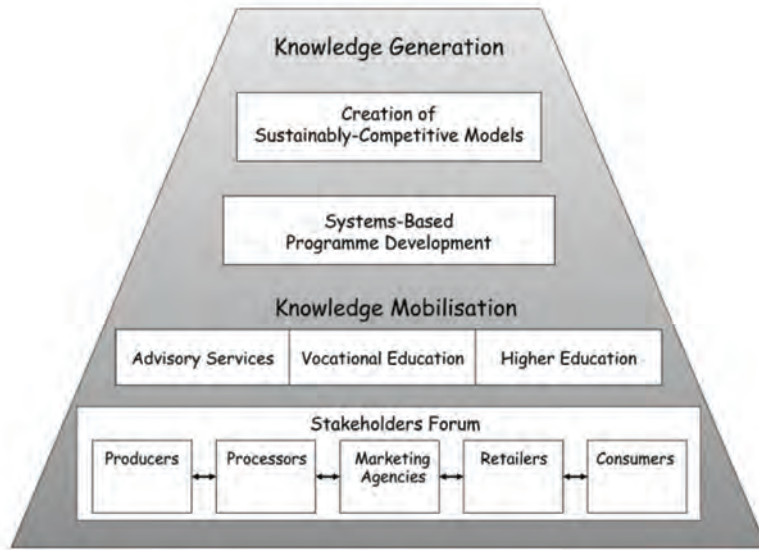
Figure 3. **A framework for thinking about innovation in organisational structures and knowledge mobilisation processes to support development of sustainably-competitive agriculture** (Source: Purvis & Downey 2013)

Knowledge Harvesting - Creation of Models

The first necessary step in knowledge management is a *Knowledge Harvesting* process that brings together the necessary sources of expertise from multiple relevant disciplines, to articulate the full perspective of scientific understanding in creation of a *Sustainably-Competitive Agri-Food Model*. An important outcome from the process of harvesting and integrating specialised knowledge, would be the creation of a strategic framework to guide subsequent practical development of the model(s) created, including the identification of key knowledge gaps that may often be at discipline interfaces. Such concerted knowledge harvesting would in principle, be similar to existing EU-level *Technology Platform* initiatives that have successfully integrated expert knowledge and catalysed stakeholder interests and engagement[15]. The models created by specific knowledge harvesting initiatives would provide a strategic template for longer-term, thematic Programme Development. At regional level,

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[14]   **W. Buhler, S. Morse, E. Arthur, S. Bolton, J. Mann,** [2002]: *Science, Agriculture and Research: A Compromised Participation? Earthscan Publications Ltd., London, 220 pp.*

[15]   **EU-Cordis,** [2013]: *About European Technology Platforms (EPTs) (web page available at URL: http://cordis.europa. eu/technology-platforms/about_en.html).*

thematic programme development would focus on adaptation and customisation of the articulated model to meet context-dependent needs, and on the evaluation and demonstration of the multiple, value-adding agronomic and environmental benefits to industry.

Knowledge Mobilisation – Translation & Communication

Knowledge mobilisation to bridge the increasingly evident gap between knowledge generation and its uptake and utilisation in innovation by farmers[16], is a process now widely understood to be critically important to the stimulation of innovation within Agri-Food systems[17]. Whilst recognising that knowledge transfer is not linear, Fig. 4 illustrates the salient features of the knowledge chain that links research activity to potential users of new knowledge in sectoral innovation.

There is considerable scope to consider the most appropriate alignment and integration of organisational components (Research, Higher and Vocational Educational and Advisory/ Extension agencies) within the overlapping continuum between knowledge generation and its mobilisation to end-users through the processes of *Knowledge Harvesting, Translation* and *Communication*. In widely varying circumstances within European agriculture, there can be no '*perfect*' way to ensure effective knowledge mobilisation. As illustrated in Figs. 3 and 4, the processes involved in the regional customisation and evaluation of *Sustainably-Competitive Agri-Food Models*, could play an important role in the *knowledge translation* process, whereby the specialised knowledge harnessed during model development, is subsequently converted into locally implementable, innovative and effective solutions. Even outside of this proposed approach, however, careful consideration needs to be given to the establishment of more effective links between research, advisory and educational agencies.
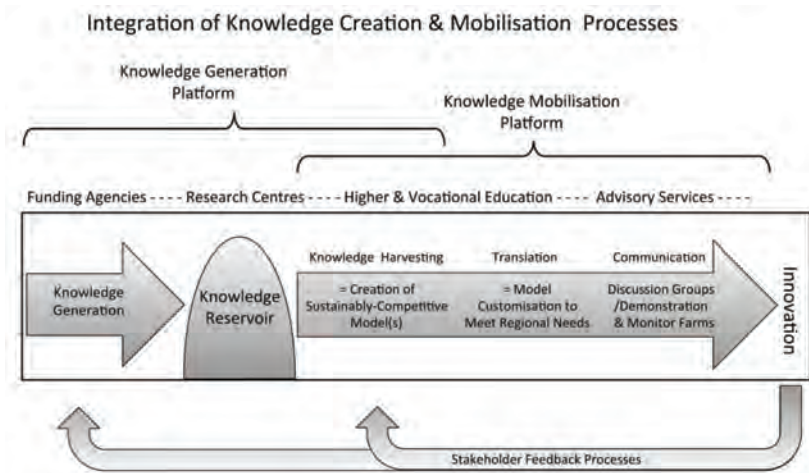
Figure 4. **A framework for thinking about the alignment of agencies and knowledge transfer processes necessary to achieve an integrated application of knowledge in Agri-Food** (Source: Purvis & Downey, 2013).

16   **EU SCAR.,** [2007]: *Foresighting Food, Rural and Agri-futures. First Foresight Expert Group Report; EU Standing Committee on Agricultural Research; 98 pp. (available at URL: http://ec.europa.eu/research/agriculture/scar/pdf/ foresighting_food_rural_and_agri_futures.pdf).*

17   **EU SCAR.,** [2012]: *Agricultural Knowledge and Innovation Systems in Transition – a reflection paper. Standing Committee on Agricultural Research, EU Publications Office, Luxembourg; 117 pp.*

1.5. New Opportunities at the European Level

To address the especially complex challenges facing the Agri-Food sector, and bridge the perceived 'gap' between knowledge generation and its successful uptake by industry, the EU has proposed the establishment of a European Innovation Partnership (EIP) for '*Agriculture Productivity and Sustainability*'[18], supported by linked *Operational Groups* functioning at Member State level. The re-formation of the Farm Advisory System (FAS), which plays the predominant role in *Knowledge Communication* (Fig. 4), is also proposed[19]. These developments are clearly motivated by the newly recognised need to address systematic deficiencies in the uptake of new knowledge, as the emphasis of the Common Agricultural Policy (CAP) shifts from a production, to a public good focus.

Reformed Advisory Services

In developing farm advisory services, particular attention is being given to the organisational landscape within the Agri-Food sector, which is increasingly seen as being at least as important as technological innovation[20]. New forms of organisational structures, including public-private partnerships, may be required to integrate and raise innovative capacity. A critical question is how might such partnerships best operate to achieve public-good goals?

The spectrum of farming within Europe ranges widely from large-scale, technologically flexible agribusinesses, to 'middle-sized' farmers seeking to support a full family-farm income, and part-time farmers often in productively marginal circumstances. There are significant 'public-good' dimensions across this spectrum relating to safe and efficient food production and the socio-economic and environmental sustainability of land management systems. To acknowledge and incentivise the multiple public good dimensions, it will be essential that the core-funding for reformed advisory agri-food services be provided from public sources. However, to ensure cost-effective delivery and uptake of new knowledge, it is likely that a proportion of the full cost of such services will fall to the main beneficiaries, whatever the farming system context. In reforming support services, however, the most fundamental question relates to the advisory capabilities that will be required for effective communication of knowledge across the agriculture, food and environment domains. It will be beneficial for advisors to be given dedicated training to increase the effectiveness of their specialized knowledge communication to citizens.

1.6. Educational Needs

Education for all those involved in agri-food businesses and services, including policy and decision-makers, and of course those engaged in the advisory and extension services will be a key requirement for the development of new models of food production.

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18   **EC.,** [2013]: *European Innovation Partnership 'Agricultural Productivity and Sustainability'. European Commission Webpage for Agriculture and Rural Development; available at URL: http://ec.europa.eu/agriculture/eip/).*

19   **EC.,** [2010]: *Report on the application of the Farm Advisory System as defined in article 12 and 13 of Council Regulation (EC) No. 73/2009. European Commission, Brussels, COM(2010) 665 final, 12 pp. (available at URL: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0665:FIN:en:PDF).*

20   **EU SCAR.,** [2012]: *Agricultural Knowledge and Innovation Systems in Transition – a reflection paper. Standing Committee on Agricultural Research, EU Publications Office, Luxembourg; 117 pp*

It will be essential that the farm, food and environmental dimensions of agri-food are fully integrated in educational innovation that shifts mindsets to '*think food quality*'. However, just as increasing depth of technical knowledge in agriculture, food and environmental sciences has led to increased specialisation and isolation in research, so it has created particular challenges for the delivery of integrated agri-food education. The often-complete separation of education programmes in '*Agriculture*', '*Food*' and '*Environment*' does not address the challenges faced.

Developing a more holistic understanding of agri-food systems will also require well-designed taught post-graduate education programmes that further integrate knowledge and wider understanding across the multiple relevant disciplines. A hierarchy of some indicative educational goals that will be necessary in meeting the challenges faced is listed in Table 1. Education is so fundamentally important in addressing the complex issues in Agri-Food, that *it warrants a European-wide initiative to reappraise the objectives of education systems at all levels*.

Table 1.: **Indicative goals for educational systems needed to address Agri-Food system challenges**

Theme	Understanding of
Integrated Systems	Production systems that are customised agronomically and ecologically to achieve optimised product quality and marketing advantage from local conditions.
Food for Health	The influences of production system methods on the food quality, nutritional and health value of the products produced.
Environment	Protection of unique natural and cultural heritage that is critical to establishing product quality and marketing advantage, and the major concerns relating to energy use, climate change and sustainable resource management.
Biodiversity	Protection and utilisation of all aspects of functional biodiversity, including the genes, species, communities and ecosystems that underpin the natural processes harnessed within production systems.
Crop & Animal Performance	Utilisation of the adaptations of crops and livestock, and interactions between genotype, nutrition and health to achieve optimal agronomic performance and consistent product quality.
Animal Health and Welfare	Achievement of integrated health and welfare management that reduces the incidence of production-related diseases and achieves optimal performance.
Pest and Disease Resistance	Development of enhanced natural resistance to crop and livestock pests and diseases through application of improved husbandry, systems management and the integration of advances in genetic and bio-molecular knowledge.

Source: (adapted from Purvis & Downey, 2013)

The Potential Role of Foresight

Foresight provides a means to engage in long-range strategic planning with respect to complex issues, and can help us in developing greater understanding of the educational needs indicated in Table 1 as they evolve over time. The open dialogue and real concern-sharing that characterise a well-conceived and properly conducted foresight project, provide a structured forum for developing a collective understanding of the complex interactions between global drivers of change, international policy developments and

vital national, regional and business prospects. A number of recent EU-level foresights have significantly contributed to meeting the challenges faced by the Agri-Food sector[21] resulting in a significant 'rethinking' of EU goals and adoption of significant new Agri-Food support initiatives[22]. However, the educational provisions required to deliver on these initiatives, by enhancing the capacity of advisory services, agriculturalists and farmers to respond to the new opportunities created, now requires priority attention. A new EU foresight initiative to consider future educational and training needs in Agri-Food would be most timely.

1.7. Summary Conclusions

As Europe's agri-food industries are radically re-shaped by the combination of international policy changes and a diverse range of growing public concerns, the development of resource efficient and sustainable food production becomes not just an ideal, but an imperative. The further development of sustainably-competitive agri-food models requires proactive engagement by all stakeholders, in applying the large reservoir of existing knowledge to the development of economically and environmentally resilient production systems. Above all else, it is now widely recognised that innovation in the design of support structures and processes to integrate the up-take of new understanding will be key to redesigning food production systems. This will challenge existing knowledge mobilisation processes and capacities in ways that are most likely to benefit from a targeted, systems-based approach. Meeting the challenges faced is increasingly viewed as a vitally important public good, and a priority within reform of the Common Agricultural Policy. However, the wider significance of agri-food education in meeting the challenges faced has yet to be formally recognized as a critical element of enabling plans at EU-level, that are currently seeking to stimulate the necessary innovation in farming systems.

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[21]   **EU SCAR.,** [2007]: *Foresighting Food, Rural and Agri-futures. First Foresight Expert Group Report; EU Standing Committee on Agricultural Research; 98 pp. (available at URL: http://ec.europa.eu/research/agriculture/scar/pdf/foresighting_food_rural_and_agri_futures.pdf).*
       EU SCAR., [2008]: *New Challenges for Agricultural Research: Climate Change, Food Security, Rural Development, Agricultural Knowledge Systems. Second Foresight Expert Group Report; EU Standing Committee on Agricultural Research; 105 pp. (available at URL: http://ec.europa.eu/research/agriculture/scar/pdf/scar_2nd_foresight_exercise_en.pdf).*
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[22]   **EC.,** [2010]: *Report on the application of the Farm Advisory System as defined in article 12 and 13 of Council Regulation (EC) No. 73/2009. European Commission, Brussels, COM(2010) 665 final, 12 pp. (available at URL: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0665:FIN:en:PDF).*
       EC., [2013]: *European Innovation Partnership 'Agricultural Productivity and Sustainability'. European Commission Webpage for Agriculture and Rural Development; available at URL: http://ec.europa.eu/agriculture/eip/).*

Buchs W., [2003]: *Biodiversity and agri-environmental indicators – general scopes and skills with special reference to the habitat level. Agriculture, Ecosystems & Environment, 98: 35-78.*

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EU-Cordis., [2013]: *About European Technology Platforms (EPTs) (web page available at URL: http://cordis.europa.eu/technology-platforms/about_en.html).*

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INNOVATION NETWORK OF RURAL TOURISM AS AN OPPORTUNITY FOR THE COMMERCIALISATION OF TOURIST SERVICES IN RURAL AREAS

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2.1. Introduction

Both the rural tourism and agrotourism from many years are strongly expanding, in particular through a single contract of tourist services in the countryside, where high quality services combined with the appropriate skills where the tourists would have rest in the countryside. However, despite of growing fashion for rural tourism, still does not constitute a significant share of domestic tourism. In the case of an individual's income from tourism activities in the countryside are still only for the addition and does not constitute the main source of income. It may provide for the fact that for a single bidder, it is difficult to provide such services related to potential customers in their area, to operate on the market separately and do not take cooperation. Therefore, the cooperation between service providers is critical in the rural tourism, especially if they want to develop their activities and have a serious competitor on the market of tourist services.

In the framework of the joint action tenders of tourist services should go in the direction of creating packages – network products and their commercialization, as well as offer professional business coaches. In particular, the importance of commercialization is in competition in the market of tourism more and more visible and obvious.

In the issue of network construction in rural tourism we should start with the nature of the tourism product, which can be defined both in a narrow, wide, and the spatial approach. In narrow terms of a tourism product are all services for which the demand on the part of the tourist, for example. accommodation services, transport, cultural etc. In wide terms the tourist product is the theme of both the needs and expectations of tourists and the amenities, facilities and services, they are using to meet their needs, referred

sensations, experience and keep satisfaction, a provider of tourist services develops its economic benefits. Due to the nature of space, the tourism product is defined as a complex product, because it consists of many items of similar or heterogeneous, but always complementary (mutually complementary). These elements are created by different entities, but their use is associated with the entry in the system of tourist companies in a specific region and become part of the offer, these office[1].

2.2. Rural Tourism as a Component of the National Tourism

Rural tourism is a "variety" of tourism, already existing for a long time. However, its importance started to grow several years ago in Poland. However, you cannot talk of only one form of rural tourism. There are at least three types of tourism: tourism in rural areas, tourism related with agriculture and agritourism.

Tourism is considered one of the main opportunities for rural development. In this case, the literature also provides many definitions of this form of tourism. One of them specifies the rural tourism as a form of recreation within the rural areas, which includes various types of recreational activity associated with nature, walking, health tourism, cultural and ethnic identity, using both the resources and amenities of the village[2].

According to Drzewiecki[3] rural tourism is a form of recreation within the area of the village in terms of functional "real" village and using its specific characteristics and resources, by which influences multifunctional development of rural areas. Many factors distinguished rural tourism from forms of recreation associated with large, countryside localities. Not only is it in rural areas, but this is a central value of the referenced. The concept of "size", is not recognized in a formal sense, but it takes into account features of the "peer" of the village, has a value different from the city and beneficial for the rest. The subject offers a sale is the world of nature, farm and rural culture that creates an authentic and traditional spirit.

Tourism in rural areas according to experts of the European Commission are all forms of tourism within the village. The main objective of the participation in this kind of tourism is next to the rural and the urban environment, rural and urban life style. Rural tourism in Poland may become peculiar, distinctive form of tourism in our country provided that the original character of the cultural and natural heritage of the Polish countryside. The objective of this study is an attempt to set up a network of rural tourism in the road to its commercialization. The world of agriculture is currently undergoing many changes including the number, size and characteristics of farms and ranches. A growing number of farmers, especially small-scale farmers, are moving away from the traditional methods and scale of crop and livestock production as this has become unprofitable. Instead, they are increasing their household incomes by incorporating non-agricultural enterprises into their farms or through off-farm employment, as has been reported[4]. Family farmers engaged in agrotourism gains new skills and learning entrepreneurship. Country is to provide not only agricultural products but also to develop, create new jobs, and thereby

[1]   **A. Panasiuk,** [2006]: *Ekonomika turystyki, PWN Warszawa*
[2]   **W. Musiał, J. Kania, L. Leśniak,** [2005]: *Agroturystyka i usługi towarzyszące, Wyd. MDSR, Kraków* .
[3]   **M. Drzewiecki,** [2002]: *Agroturystyka współczesna w Polsce, wyd. Wyższej Szkoły Turystyki i Hotelarstwa, Gdańsk.*
[4]   **G. P. Jóhannesson,** [2003]: *U.D. Skaptadóttir and K. Benediktsson (2003) Coping with social capital? The cultural economy of tourism. Sociologia Ruralis 43 (1) pp. 13–16.*

reduce unemployment. Job creation is an opportunity for others who do not want to be farmers, but their futures are associated with life in the countryside.

2.3. Network Product of Rural Tourism

Usually the product market is everything what you can offer the customer the consumption, use or further processing. In addition to physical things, products include all kinds of services, activities, people, places, ideas, projects, technological, organizational and ideas. Each buyer sees the product through the prism of benefits that may result from its purchase. The product is therefore a set of general, pleasure, satisfaction, satisfaction for the customer. Well prepared and sold the product gives satisfaction to its manufacturer[5].

The condition of product market success is its ability to fulfill specific needs. The purchase of the product shall therefore ensure buyers of certain benefits. For this reason it is sometimes defined in marketing as a set of benefits for the customer. The different ambitions, tastes and preferences are such that the objects of the transaction participants are variously seen. For the transferor's product is always something that simply benefit to sell. Motives of the buyer are very different. Mostly directs himself in the selection of the product, its features, which form the so-called core benefits. Today the company does not offer, therefore, "pure" product, but a set of services, consisting of information, the ability to purchase in a particular place and time, etc[6].

The individual components of the tourism product fulfill different roles, it therefore analyzed in terms of structural and functional. This means that the compositions meet the complementary need to refer to relatively constant for the home. Product planner should design service packages at three levels[7]:
— the core product,
— the actual product,
— extended product (enhanced).

Product concerned (the essence, the core of the product) is the primary benefit (but rather a set of benefits), faced by tourists, by choosing a specific location in order to meet specific requirements. This includes all the features that make up the services, the place (area attractions), that meet a specific kind of requirements (aesthetic experience of beauty and incontestable places, holiday in the place of sights, meeting interesting people, to improve the health, survival of the original experience cognitive, etc.).

The real product's forms characteristics which can be the proper consumption of the product. These are characteristics that make up the basic tourist services associated with reaching the location, meals, accommodation and provision of other basic conditions necessary for the consumption of the product properly.

Extended product consists of the features that make them more effective and the region, enhance the benefits and reduce disappointment. It was through them is to fight the competitive and looking for the customer, gaining the most distinguish your product from the other. These features include among others: the appearance and condition of the

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5   **Puchała J.,** [2011]: *Marketing zintegrowanego, sieciowego produktu turystyki wiejskiej w ramach działań PROW 2007-2013 – Poradnik dla LGD, wyd. CDR, Kraków.*

6   **J. Altkorn,** [2003]: *Podstawy marketingu, Wyd. Instytut Marketingu, Kraków.*

7   **J. Altkorn,** [1999]: *Marketing w turystyce, PWN, Warszawa.*

accommodation, the rooms, the quality of their equipment, cleanliness, order and beauty, culture, understanding and expertise of staff, the efficiency of the equipment, the culture, the purity and food-handling expertise, quality and choice of dishes, etc.[8]

The tourism product is a collection of both goods and services purchased by tourists and the tourist amenities, they are using, and which are of particular interest to them. The starting point for the design of the tourism product is primarily incentive travel. Explore these themes that people travel to meet the needs of[9]:

— rest in an attractive natural environment,
— explore the interesting phenomena of the natural use of cultural goods,
— improve health, participation in large events and gatherings,
— visiting friends and relatives, business and professional needs.

The tourism product is a package of tangible and intangible assets comprising:

a) attractions and destination: natural attractions, attraction created by the human, cultural attractions, attractions,
b) infrastructure and services destination: accommodation, catering, transport at the destination, vacation, a network of retail sale, other services,
c) the availability of overnight sheltered accommodation, including: infrastructure (roads, airports, railways), equipment (vehicles), operational factors (route, prices, etc.), governmental regulations,
d) images and perceptions of the destination,
e) the price to the consumer.

While innovation is most often understood as creating something new, or is defined as the process of the resource transformation, using the specified capacity and create new ideas, new products and their implementation. The most important characteristics of the innovative tourism product is: modern solutions, priority or departure from normal practice and the introduction of new, previously not known tourist services. With regard to rural tourism this new product can be, for example creation an attractive mark product of the region. This may be the transformation of the existing product to improve and enhance the quality and thus enhance its competitiveness on the market. This product should carry the characteristics of market stability, uniqueness, innovation, high quality.

Among the many trials and concepts define the network of tourism were taken, as a basis for agreement partners, operating in the area, whose purpose is to obtain results at scale: promotion, infrastructure development, human resources and the distribution system.

Farm Advisory Centre as a result of the carried out research and analysis determines the network product rural tourism as a ready-to-sale offer in rural areas, as shown in the tourist packages tailored to specific audiences, based on the dissipative structure of operators, attractions, locations, points of service, facility, functioning as a single coherent concept of the fulfill needs of the tourist and offers a guarantee of quality and uniqueness, which consequently leads to the creation of a network mark of rural tourism where the mark means the totality of the product, its design visualization and the identity and image of the manufacturer and of the emotions associated with the product or the manufacturer, the specific characteristics and values.

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[8]   **L. Mazurkiewicz,** [2002]: *Planowanie marketingowe w przedsiębiorstwie turystycznym, PWE, Warszawa.*
[9]   **W. Musiał, J. Kania, L. Leśniak**, [2005]: *Agroturystyka i usługi towarzyszące, Wydawca Małopolskie Stowarzyszenie Doradztwa Rolniczego w Krakowie, Kraków.*

2.4. Purpose and Methods of Construction of a Network of Rural Tourism

The concept of creating a network of rural tourism is based on the principles of packaging tourism products of the region (the area). The tourist product of the region allows for the creation of a coherent image-building the identity of the area and its positive image in the market. And the concentration of all actors in the implementation of the common objective is synergy, which means better results (multiple benefits) for the same cost, financial, than action on the individual entities.

A packet network of rural tourism requires that close collaboration and the services, and create groups of service providers for persons with special interesting. Such groups shall commence operation from organizing joint programs that may say, the adoption of the comprehensive visits, and then have the experience, take the joint marketing activities, to eventually become a professional organizer of tourism (travel agency) in the region.

In the case of a network of rural tourism construction if the success of its construction is primarily the belief that each of the inhabitants of the region can benefit from the development of rural tourism network.

Help for the construction and development of tourism network product is knowledge, and the information about region, including:
— awareness of the traditional tourist destinations existence (natural and created by man, including events and other attractions),
— knowledge about the available services in the region (young people, families, singles, etc.),
— understanding by local service providers benefits from the existence of territorial marketing,
— knowledge of forms of tourism which enjoy the most popular in your area (hiking, cycling, other),
— know the associations operating in the region, where we want to build a network product,
— knowledge of the tourist image of the city/region is the nature of space, history, cultural values, knowledge and application of methodologies for building the product for the construction of a network of rural tourism, taking into account local specificities, arrangement of simple intelligence questionnaire or survey, tools that direct tourists as customers in the region.

In general, the procedure of the a tourism network product construction consists of four basic elements: analysis of the attractiveness of the area/region, the initial selection of the tourism product variant, the survey of preferences of visitors tourists and tourism trends in national and international, to establish the final variants of the tourism product, together with the construction of their implementation.

2.5. Conclusion

A network of rural tourism can be an important economic dimension, not only through ad hoc benefits from ongoing projects, but also long-term. Network product of rural tourism can be the "new row of cards," a new chance to win a better future. The idea

of a tourism products network separate, but under the determined level of cooperation in the field of communication with the market, selling a package of products, trade mark and brand, is a real chance of improving the cooperation of residents of the village and is also at the level of agriculture[10].

The commercialization of rural tourism will be possible, if you will overcome the obstacles of collaborative, cooperative and partnership. In the case of the construction of a network of the product subject to the success of its construction is primarily the belief that each of the inhabitants of the region can benefit from the development of rural tourism. Cooperation requires departing from the competition and greater involvement in the operation, as well as compliance generally prevailing rules and responsibilities of all persons involved in the venture. Note that the modern concepts of rural development assumes that the local community actively takes part in the implementation of local development. The various social groups can achieve jointly elaborated objectives.

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Puchała J., [2011]: *Marketing zintegrowanego, sieciowego produktu turystyki wiejskiej w ramach działań PROW 2007-2013 – Poradnik dla LGD, wyd. CDR, Kraków.*

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[10]   **J. Puchała,** [2011]: *Marketing zintegrowanego, sieciowego produktu turystyki wiejskiej w ramach działań PROW 2007-2013 – Poradnik dla LGD, wyd. CDR, Kraków.*

AMBIENT IMPACT OF INSTITUTIONAL DEVELOPMENT OF AGROTOURISM FARMS

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3.1. Introduction

The Carpathians are the largest and most mountainous Polish tourist region, the only one that covers the alpine landscape. They enjoy a large attendance for most of the year because of the great opportunities for mountain hikes, and in the winter season skiing. Carpathians occupy a dominant position in mountain tourism and leisure holiday all year round, which is related to the length of the ski season. Significant is also part of the Carpathians in tourism sightseeing. The variety of landscape types of the Polish Carpathians is associated the occurrence within them both mountains high, medium and foothills, as well as various types of sculpture posing different conditions for the development of tourism. These areas are multifunctional tourist regions, due to the properties of natural sciences, are developing quite rapidly and ski mountaineering. Through varied terrain develops active tourism. In contrast, specific microclimatic and bioclimatic characteristics coupled with frequent varieties of mineral waters resulted in the development of a featured holiday and spa. The Carpathian region is also developing tourism itinerant and the residence. The western part of the Carpathians is extensively used for leisure and festive holiday, mainly by the inhabitants of the nearest urban and industrial - Upper Silesia and Cracow. Towards the east, traffic is decreasing, but increasing in the Bieszczady Mountains. Tourist development of the Carpathians is very diverse - from relatively over invested of Beskid Slaski and compacted building private Podhale, to almost completely undeveloped Low Beskid and Podgórze Przemyskie . Most registered agritourism farms located in the Malopolska province (1590) and in the province of Subcarpathian – 1074, much less (384) are registered in the province of Silesia. As the geographical distribution of the Polish Carpathians, which are covering most of the area of Malopolska province and podkarpacki region, located there are the largest number

of households, which certainly affect the conditions of nature and landscape of the Polish Carpathians. Map 1 presents the number of agritourism objects in individual provinces throughout the country, estimated on the basis of data from the Institute of Tourism in 2007 .

3.2. Purpose, Scope and Methodology of Research

The study attempts to assess the impact of the institutional environment in the development of agro-tourism in the area of the Polish Carpathians. The primary source of data used in the work was the information collected by the standardized interview. The paper was founded purposeful selection of the test area and facilities for research. Farms were selected on the basis of defined criteria: topographical, natural, temporal, personal fulfillment which allowed them to qualify for further analysis, and which are located in three regions, the boundaries of which are located in the geographical area of the Polish Carpathians. These were the provinces: Lesser, Subcarpathian and Silesian. Within each province conducted empirical research in 17 districts located within these regions. This choice was deliberately made in accordance with the assumption that more than 50% of the area of the county is located in the geographical borders of the Polish Carpathians. The study has covered 236 agritourism farms, ie about 10% of the total number of households in each district, registered in 2007 in the Institute of Tourism. Entities for the study were selected according to a number of well-defined criteria. The research was conducted in 2009-2010. Farms were selected on the basis of such selection criteria: location working farm in a rural area of the Polish Carpathians taking into account the varied natural and cultural conditions of the study area. Another criterion was to register and conducting agritourism activity lasting a minimum of three years.
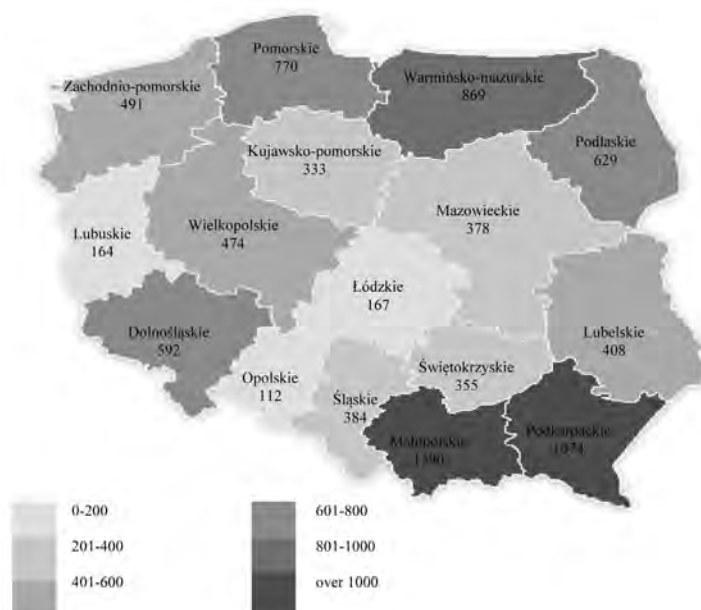
Map 1. **Total number of objects in the database of private accommodation (agritourism) - by province in 2007.**
Source: Institut of Tourism 2007

3.3. The Institutional Environment – Characteristics

The most important institutions supporting the development of rural tourism associations are mainly agritourism, agricultural advisory centers, the Agency for Restructuring and Modernisation of Agriculture and the local government.

Rural tourism associations[1] become the largest and most powerful form of non-governmental organizations operating in rural areas in Poland[2]. They should be a highly organized group that takes care of its own interests and motivates other non-members of the owners of agritourism farms to joint action[3]. The most important tasks of this type associations in the development of rural tourism include Poland[4,5]:

— conducting marketing services agritourism, particularly promotion (brochures, leaflets, catalogs, the Internet),
— cooperation with local governments and the state administration in order to develop a strategy for development of tourism,
— cooperation with travel agencies for sales offer
— promotion the methods and methods of producing healthy food,
— promotion of leisure on the farm,
— regional folk traditions,
— cooperation with the Polish Federation of Rural Tourism „Hospitable Farms".

Polish Federation of Rural Tourism "Hospitable Farms" is a non-profit organization with a legal personality. The origins of its activities date back to 1996. Brings together local and regional agritourism associations operate in Poland. In contrast, the association of individual farmers operate in the field of agro-tourism and rural tourism. The Federation will ensure that rural tourism and rural tourism developed not only intense, but mainly at the appropriate level of quality. The development of this course is not only dependent on the activities of the Federation, because each activity is also determined by the existing laws in the country[6]. The main objectives of the Federation are: organization, development and promotion of tourism, representing and protecting the interests of persons belonging to the Federation, to create, preserve and protect the values, the activation of the rural community, the promotion of rest in rural areas, promote environmental protection, research and market analysis. Federation pursues its objectives principally through[7]:

[1] *The Association is a voluntary, local government, a permanent non-profit association which your business is based on the work of its members, is assumed in order to improve professional qualifications of members and dissemination of knowledge about effective organizational or marketing. Law of 7 of April 1989 Law on associations with later changes.*

[2] **J. Sikora,** [2012]: *Agroturystyka. Przedsiębiorczość na obszarach wiejskich. C.H. Beck, p. 191.*

[3] **M. Karczewska, J. Sikora,** [2005]: *Działalność lokalnych stowarzyszeń agroturystycznych w opinii kwatero dawców. Turystyka wiejska a rozwój i współpraca regionów. Wydawnictwo Państwowej Wyższej Szkoły Zawodowej w Krośnie, Centrum Doradztwa Rolniczego w Brwinowie. Krosno, p. 202.*

[4] **W. Musiał, J. Kania, L. Leśniak (red.),** [2005]: *Agroturystyka i usługi towarzyszące. Wydawnictwo MSDR zs. w AR w Krakowie. Kraków;p. 115-116.*
P. Filip, M. Lechwarz, [1998]: *Rola lokalnych stowarzyszeń agroturystycznych w promocji turystyki wiejskiej. Marketing i produkty markowe w turystyce wiejskiej. Centrum Doradztwa i Edukacji w Rolnictwie w Poznaniu. Poznań, p. 141-142.*

[5] More about rural tourism development in Poland uou may find in; **Brelik A.,** [2009]. *Rural Tourism development in Poland. Stowarzyszenie Ekonomistów Rolnictwa i Agrobiznesu. Roczniki Naukowe tom XI zeszyt VI Warszawa-Poznań-Olsztyn s. 17-20*

[6] **M. Milewska, B. Włodarczyk,** [2009]: *Hotelarstwo: podstawowe. Polskie Wydawnictwo Ekonomiczne. Warszawa.*

[7] **B. Sawicki, A. Mazurek-Kusiak,** [2010]: *Agroturystyka w teorii i praktyce. Wydawnictwo Uniwersytetu Przyrodniczego. Lublin pp. 78-79.*

— creation of a nationwide system of categorization and standardization of rural accommodation facilities, and carrying out categorization;
— exchange of experience in the field of rural tourism, agritourism;
— cooperation with the authorities in the functioning of rural tourism;
— creation of a database of categorized farm tourism;
— promotion farms through the use of various tools, such as: folders leaflets Internet; trainings, trade fairs, exhibitions, etc.

Important role in the development of agritourism since Polish accession to the European Union, played by local action groups (LAGs) - non-governmental organizations, which are three-sectoral partnership, consisting of representatives of the public, economic and social sector. LAGs in the area of virtually the entire country as an association and are voluntary, self-governing, permanent associations of natural persons and legal entities, including local government units[8]. These groups care about preserving the cultural heritage of rural areas and the development of rural tourism and agritourism. LAGs developed and implement local development strategies (LSR) within the meaning of the Law of 7 March 2007 on support for rural development with the participation of the European Agricultural Fund for Rural Development, the implementing rules of this Act and the provisions of the Rural Development Programme (RDP) 2007-2013 sector. In developed LSR main priorities is to support agritourism and rural tourism[9].

Across delete the Poland the most popular institutions are agricultural advisory centers (AAC), which deal with the promotion of rural tourism by[10]:
— to assist farmers in preparing the documentation necessary to obtain assistance financed or co-financed with funds from the European Union to start or expand tourism activities;
— efforts to preserve cultural and natural heritage of rural areas and the ecological and functional furnishing the village;
— fairs, exhibitions, shows, conferences and other activities to disseminate knowledge about agritourism.

It should be emphasized that the agricultural advisory centers, in principle, were the first institutions that promoted the development of agritourism [11].

The largest payment institution which fulfills an important role in the development of entrepreneurship in rural areas is the Agency for Restructuring and Modernisation of Agriculture (ARMA). The Agency supports the making and development of tourism activities and rural tourism through the implementation of different programs financed from EU funds, such as [ARMA 2012][12]:

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[8]   **A. Brelik, M. Bogusz,** [2011]: *Wpływ otoczenia instytucjonalnego na rozwój gospodarstw agroturystycznych w Karpatach polskich. Krakowskie Studia Małopolskie. Kraków.*

[9]   **A. Brelik, M. Bogusz,** [2011]: *Wpływ otoczenia instytucjonalnego..op. cit., p. 19-24.*

[10]   *Małopolski Ośrodek Doradztwa Rolniczego 2012: http://www.modr.pl/sub.php?mid=2. Dostęp z dnia: 14.07.2012;*
       A. Brelik, [2002]: *Identyfikacja potrzeb doradczych jako baza doskonalenia doradztwa rolniczego w Polsce. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu, Warszawa-Poznań-Bydgoszcz 2002, tom 4, Zeszyt 6, s. 16-19.*

[11]   **B. Kutkowska,** [2003]: *Podstawy rozwoju agroturystyki. Wydawnictwo Akademii Rolniczej we Wrocławiu. Wrocław, p. 175.*

[12]   *ARiMR 2012: PROW 2007-2013. http://www.arimr.gov.pl/pomoc-unijna/prow-2007-2013.html. Dostęp z dnia 11.02.2012.*

— SAPARD - pre-accession program,
— SOP 2004 - 2006: Diversification of agricultural activities and activities close to agriculture to provide multiple activities or alternative sources of income,
— RDP 2007-2013: Diversification into non-agricultural activities.

Regardless of the role of each institution, they described the importance for the development of rural tourism and of agritourism are the activities at the local government level. For many communes the rural tourism is a factor of activation of the region, and for the villagers to generate additional income. Local governments may be the subject of managing the development of the tourism economy, including agritourism through various local management instruments. This allows most of all implementation tasks such as[13]:

— development and implementation of long-term tourism development programs (strategy), including agritourism
— development of guidelines and principles of tourism development the municipality,
— investment in infrastructure,
— the development of an information system and tourism promotion,
— develop guidance and training to support tourism and recreation.

According to A. Wiatrak [2005, p 162][14] local authorities have a crucial role to play in the development of rural tourism, agritourism by raising funds for the development, creation of tourism products and marketing activities. Both by organizing various events to promote the area, but also by funding information, and distribute folders and guides, and the use of local folklore, the introduction of permanent regional events can attract tourists. Above all, the local authorities care about the infrastructure of the area, which will benefit not only for residents, but visitors and tourists[15]. In summary, the development of agritourism throughout the country is also supported by a number of institutions. The owners of tourist farms may count on support at every stage of their business.

3.4. Results

The important role in the management of rural tourism and agro-tourism in Poland play regional associations of rural tourism. These local organizations simultaneous can more effectively address the problems of its members, and to work effectively with the government, local governments and institutions as a full partner. As shown in Figure 1, in the districts Brzozowski, Cieszyn and Strzyzow 100% of the respondents belong to the association agritourism. A high percentage of respondents who confirmed the membership of the association has also performed in districts Bieszczady (89%), Gorlice (78%). In contrast, over 50% of agritourism farms belonging to the associations reported in the districts of Jaslo, Lesko, Limanowski, Myslenice, Nowosadecki, Nowy Targ, Sanok, and Tatra. Only three counties the proportion was less than 50%, in Krosno (22%), Myslenice (40%) and Zywiec (38%).

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[13]   **H. Kiryluk,** [2003]: *Rola i zadania samorządów terytorialnych w rozwoju gospodarki turystycznej. Ekonomiczno – organizacyjne warunki rozwoju turystyki i rekreacji. Wydawnictwo Politechniki Białostockiej. Białystok, p. 39.*

[14]   **A. P. Wiatrak,** [2005]: *Turystyka wiejska w strategiach rozwoju regionalnego i lokalnego. Turystyka wiejska a rozwój i współpraca regionów. Wydawnictwo Państwowej Wyższej Szkoły Zawodowej w Krośnie. Krosno.*

[15]   **D. Knecht,** [2009]: *Agroturystyka w agrobiznesie. Wydawnictwo C. H. Beck. Warszawa, p. 120.*

It should be emphasized that the associations are examples of agritourism independent and democratic organization of the respondents. A high percentage of owners of agritourism farms belonging to the agro-tourism associations may result from various forms of activities offered regional associations of rural tourism and agro-tourism, which positively influence the development and improve the quality of farm tourism. Analyzing Table 1, have noted that the main benefits that arise from agritourism farm belonging to the association, mainly related to promotion (138 indications in total), which is used by tools such as advertising on the website or in the catalog of tourist leaflets or brochures. Another important aspect is to participate in specialized training, where the knowledge acquired, is used later by respondents in developing and improving the standard of services agritourism (138 indications in total). Respondents also mentioned the benefits of access to information (60 indications in total), and especially in the Malopolska province (20 responses) field trips to the fair agritourism. Also important is the exchange of experiences by members of associations (76 indications in total).
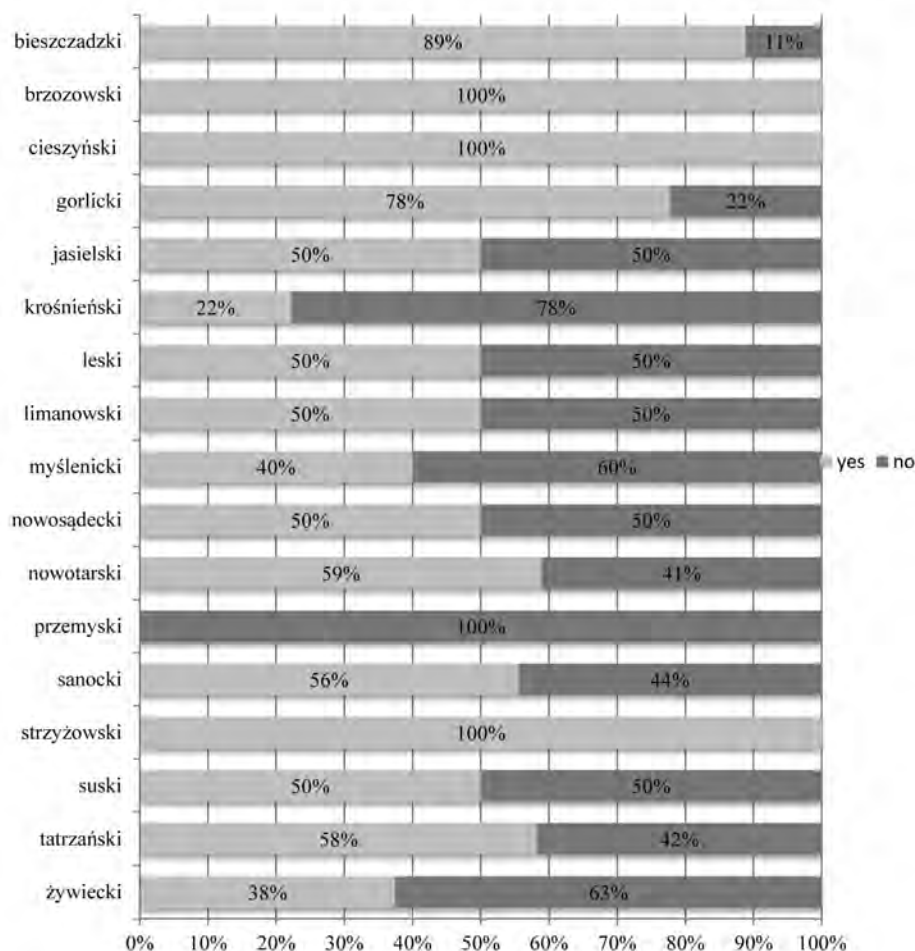
Figure 1. **Membership in the association of agritourism (N = 236)**

Source: own calculations

It was noted, however, that 68 respondents indicated a lack of benefits. As follows from the analysis of research, usually they were respondents who did not belong to any association, although there were also responses that they do not see the benefits, despite the fact that belong to the association, but it was a small number of cases. The activity of a growing number of local and regional associations of agritourism in Poland is definitely a factor that accelerates and strengthening rural tourism.

Table 1. **The benefits of belonging to the agritourism association (N = 457)**

Nb.	Specification	Type of benefit					
		promo-tion	Training	access to informa-tion	joint visits to the agritour-ism fair	exchange of expe-rience	no be-nefit
MalopolskieVoivodeship		78	52	27	20	26	40
1.	gorlicki district	8	6	1	1	3	1
2.	limanowski district	6	5	3	0	2	6
3.	myslenicki district	2	1	1	1	1	3
4.	nowosadecki district	9	5	3	4	4	3
5.	nowotarski district	24	18	9	6	8	15
6.	suski district	7	2	2	0	1	1
7.	tatrzański district	22	15	8	8	7	11
Podkarpackie Voivodeship		49	30	23	6	33	24
8.	bieszczadzki district	7	7	3	1	5	1
9.	brzozowski district	1	0	0	0	1	0
10.	jasielski district	4	3	4	1	6	3
11.	krośnieński district	3	1	3	0	5	0
12.	leski district	21	11	7	1	7	13
13.	przemyski district	0	0	0	0	0	0
14.	sanocki district	11	8	5	3	7	7
15.	strzyżowski district	2	0	1	0	2	0
Slaskie Voivodeship		11	5	10	2	17	4
16.	Cieszyński district	5	2	3	1	6	0
17.	Żywiecki district	6	3	7	1	11	4
	Total:	138	87	60	28	76	68

* it was possible to give more than one answer
Source: own research

One of the benefits of belonging to the association of agritourism, which named respondents had the opportunity to participate in courses tourism. Figure 2 has been shifted to the structure of interest rates agritourism completed by the respondents, the determination of what level they are completed.
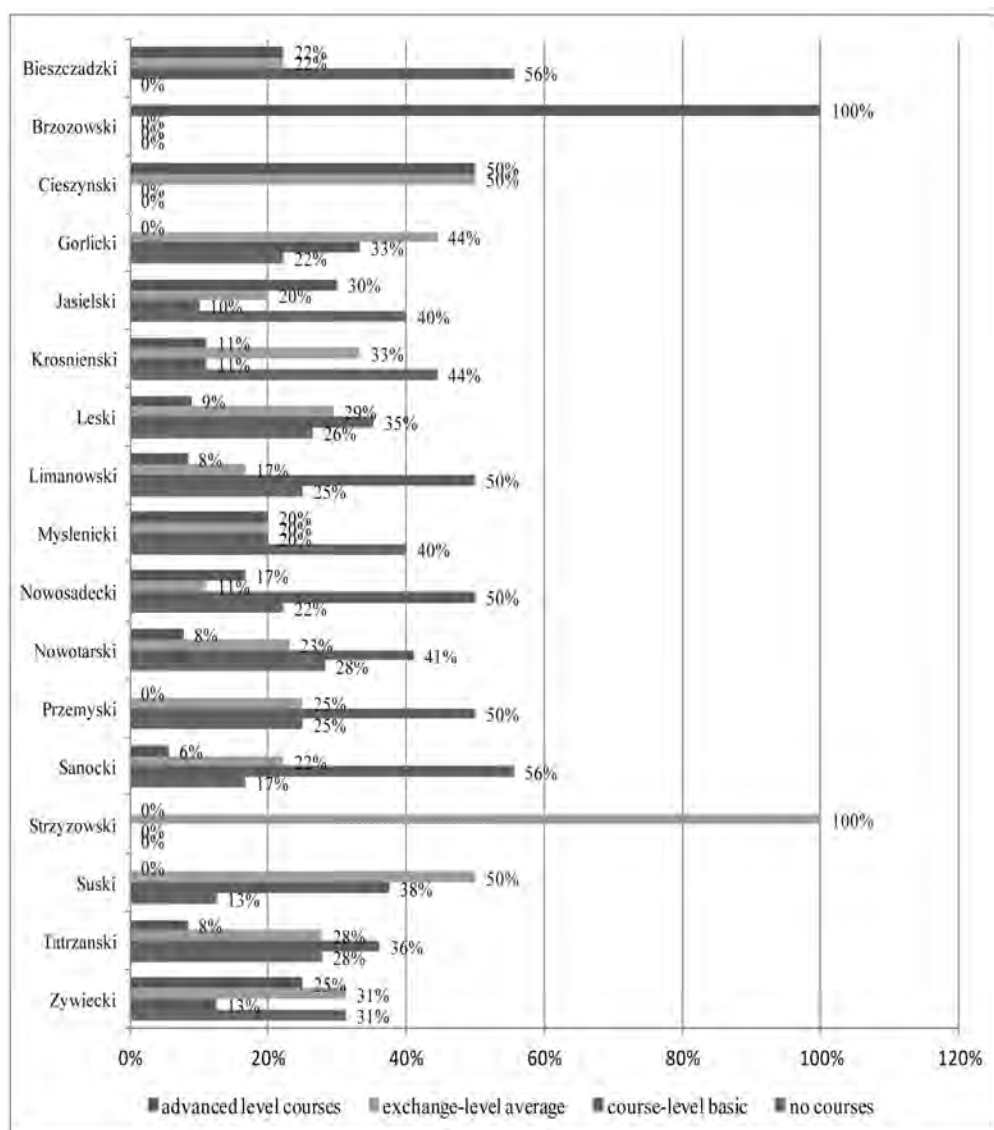
Figure 2. **Completed courses in agro-tourism and their level (N = 236)**
Source: own calculation

The presented data show that the vast majority of respondents have completed a course of tourism. The highest percentage of advanced level occurs in the districts Suski (50%), Gorlice (44%), Krosno (33%), Lesko (29%), Tatra (28%). Most courses in the field of rural tourism have been completed at the primary level, especially in the districts Bieszczady (56%), Sanok (56%), and 50% in the districts Limanowski, Nowosadecki and Przemysl. At the advanced level of 100% of the respondents completed the training in the county Brzozowski, and 50% in the district of Cieszyn. In contrast, a relatively small proportion was present in most counties among the respondents who had not completed any courses in tourism. Only three counties were approximately 40% (Jasło, Krosno and

Myślenice). Categorization RAF (Rural Accommodation Facilities) is based on providing individual accommodation facilities specific category of providing quality equipment and services. This process enforces and modifies the Polish Federation of Rural Tourism "Hospitable Farms". Categorization subject: living rooms, group rooms and independent living units. The validity of the categorization is performed two calendar years. After this period the accommodation provider must again be your object categorization procedures. About to get the category can apply to both the farmers associated in PFTW "Hospitable Farms" and in it is not affiliated. The difference is the size of the fees categorization is higher for farmers not belonging to the Federation [PFTW 2012]. Benefits of categorization can be viewed in two ways. First - the guarantee a high standard of service that attracts potential tourists, and second in the possibility of increasing promotional activities with the help of PFTW "Hospitable Farms". Categorized household has the right to place its products in publications of the Federation, on its Internet portal and participate in organized its markets and fairs tourism. Analyzing situations in the various regions regarding categorical objects agritourism, it was noted that in the Malopolska province only 32.5% were categorized of agritourism farms, but up more than two thirds (67.5%) of households do not have categorization.
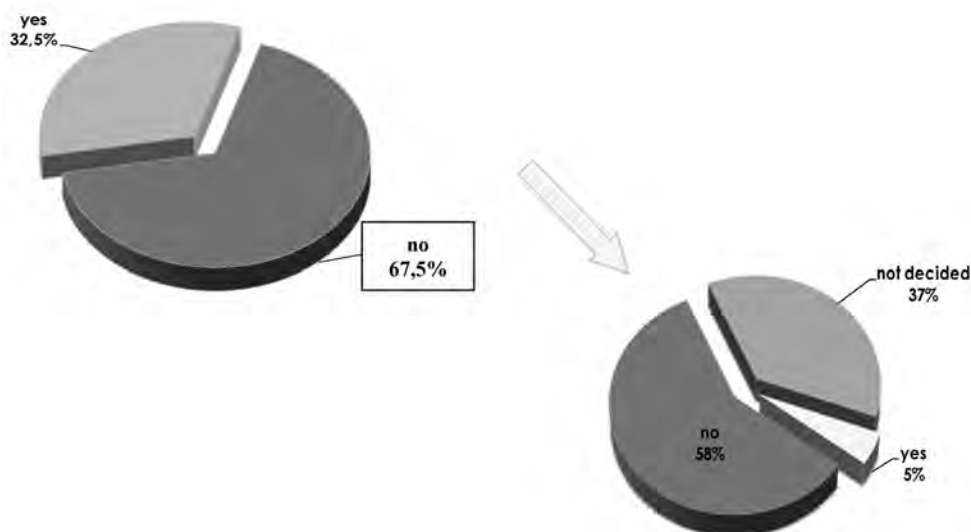
Figure 3. **The intentions of the respondents regarding the categorization agritourism farm in thefuture - Malopolskie voivodship (N = 126).**

Source: own calculation

Respondents whose premises have not been categorized, or take in the future categorization, 58% of owners of farms in Malopolska province responded that no, only 5% for yes and 37% has not yet decided (Fig. 3). Much more uncategorized agritourism facilities occurs, Subcarpathian voivodeship, as much as 80,2%, and only 19,8% were categorized. Half of the respondents of Podkarpackie voivodeship (50%) do not intend to in the future be their object categorization, 47% have not yet decided, and only 3%

is going to categorize your farm. An analogous situation, the categorization of objects agritourism is in the province of Silesia, as many as 86,4% of respondents did not adopt the categorization, and only 13,6% thinks about this process. But a high percentage of respondents, as many as 74% do not intend in the future to apply for a categorization of its agritourism facilities, and 26% have not decided yet. Owners of categorized objects most commonly reported that this is the category standard, or one sun, occasionally mentioned two suns. However, among respondents who do not have the facilities categorized and do not want to change that, as the main cause reported that tourists usually do not know what the categorization is and if the accommodation we care about the high quality of services, it is not needed them. An important obstacle that mentioned, is the fact that the categorization is payable and owners have to comply with the relevant requirements of the Federation, and it is associated with costs that landlords do not want to incur. Agritourism is a form of non-agricultural activities in rural areas of the Polish Carpathians, which is gaining more and more followers. Therefore, increasing at a fairly large rate of demand for recreation in the countryside is the driving force behind the emergence of more and more new listings tourism. However, not all individuals wishing and taking in agrotourism succeed. Some of them after a relatively short period of operation is forced to resign. The causes of failures and successes can look at many factors, both those relating to the person of the farmer, as well as occurring in the vicinity of the holding and improper action program. Often determines the success of a high level of rural tourism service, which includes: accommodation, catering, ancillary services and appropriate marketing strategy. If the agrotourism farm owners do not want to be eliminated by competitors, they must constantly raise the standard of his holding. If the agritourism farm fulfills the expectations of visitors, it is perceived that the quality will be good. It will shape a positive experience of agritourists gathered from rural tourism and the positive image of the working farm. To develop rural tourism in the Carpathian area is needed to support the institutional environment[16]. Analyzing figure 4, you may notice that in all provinces dominated provincial agricultural advisory centers, which support the development of tourism activities, especially in the Malopolska voivodeship (64 responses), and Podkarpackie voivodeship (53 responses). A large role in individual provinces also play the association. In contrast, in the Malopolska there was 23 indications for municipal offices. A small share is the Agency for Restructuring and Modernisation of Agriculture, the result is perhaps the fact that it is a payment institution and not advisory.

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[16]   **A. Brelik, M. Bogusz,** [2011]: *Wpływ otoczenia instytucjonalnego na rozwój gospodarstw agroturystycznych w Karpatach polskich. Krakowskie Studia Małopolskie. Kraków. pp. 19-24.*
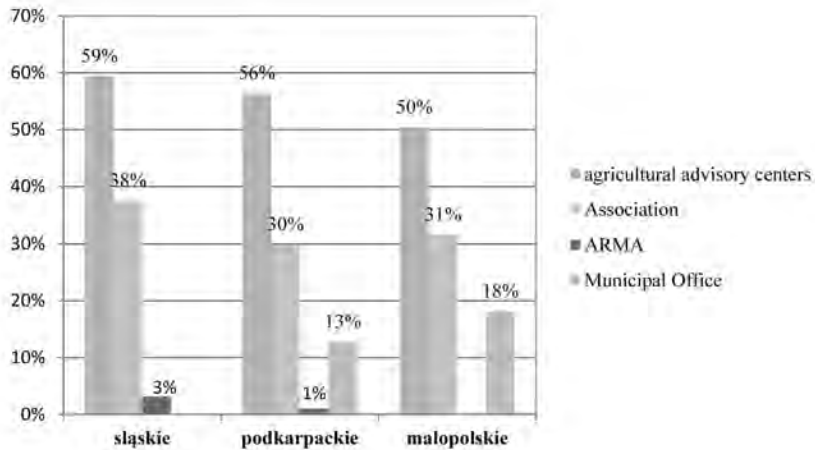
Figure 4. **Institutions that most support the agritourism development (N = 253)**

* it was possible to give more than one answer
Source: own research

Analysing the steps where the respondents used the aid selected institutions may be noted that in the Malopolska province was the most frequently Agricultural Advisory Centre. Respondents mentioned that the aid has been at each stage of rural tourism (24 responses), and mainly planning (17 responses), and starting in agritourism (17 responses). A major role was played by the associations, which help the farmers used primarily in crucial moments (15 responses), starting (13 responses), as well as at the stage of categorization of objects (10 responses). In contrast, community offices provided support primarily at the stage of starting a farm tourism (16 responses) (Fig. 5).
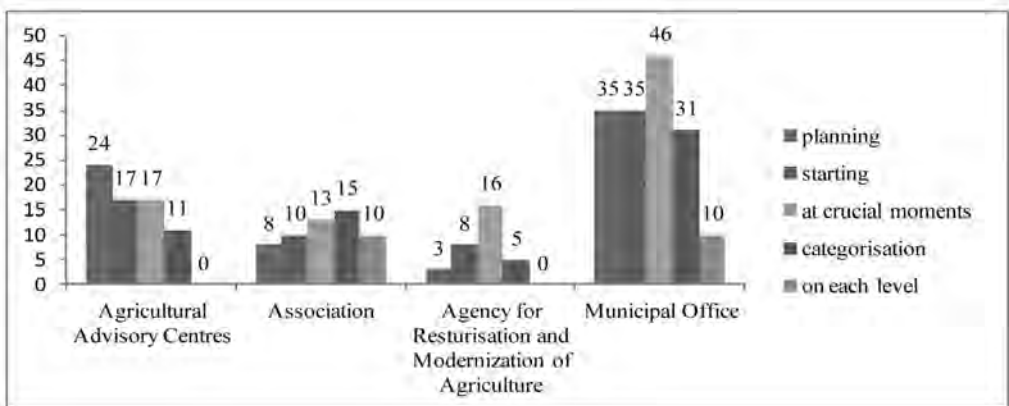
Figure 5. **Step enlist the help of the the Institution by the owners of agritourism farms – Malopolska voivodeship * (N = 157)**

* it was possible to give more than one answer
Source: own research

According to the data analyzed in Fig. 4, in the Podkarpackie voivodeship activity predominates Agricultural Advisory Centre, which supports the owners of agritourism farms at each stage (21 responses) as well as the planning (15 responses), and starting (18 responses) in agritourism activity. Major role played also local agritourism associations, where most responses pointed assistance at each stage of agritourism activity (13 responses). Respondents also mentioned that benefited from the advice at the planning stage (4 meter) starting (6 responses), in crucial moments (6 responses), and occasionally (2 answers) with categorization (Fig. 6).
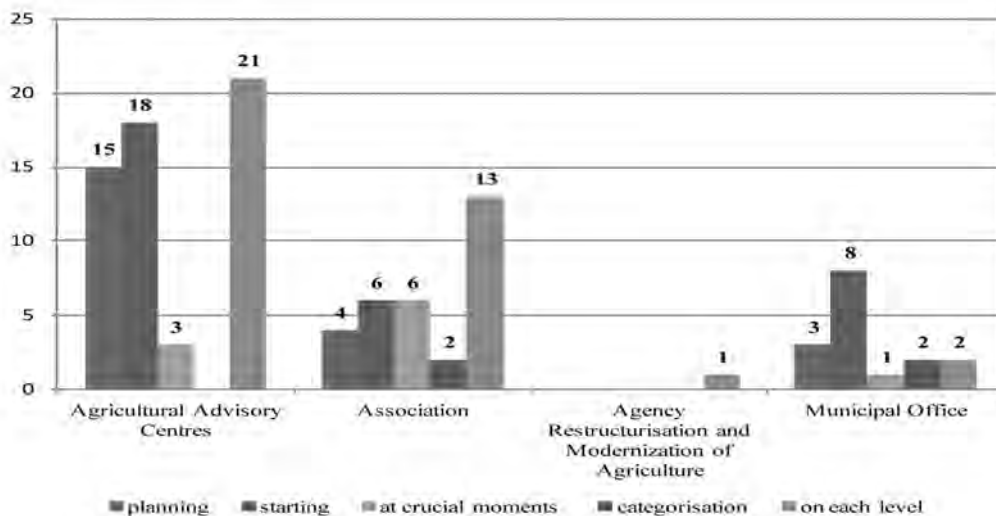
Figure 6. **Step enlist the support of the authority by the owners of tourist farms – Podkarpackie voivodeship * (N = 36)**

* it was possible to give more than one answer
Source: own study

Similarly, in the province of Silesia biggest role in supporting owners in the tourist farms played Agricultural Advisory Centre, 11 indications was to enlist the help of institutions at each stage of tourism, agritourism and associations that supported farms owners at each stage (8 responses), and planning and starting a business .

In summary, the owners of agritourist farms willing to use the assistance of institutions supporting the development of agritourism. Very important roles serve Voivodeships Agricultural Advisory Centres and agritourism association in area. As shown by the analysis, the accommodation benefit from the aid of the institution on virtually every stage of agritourism. Especially in the stages of planning and starting activities. The vast majority of respondents belong to local agritourism associations, within which are mainly used on stage to promote their holdings through published catalogs, brochures and leaflets, as well as participation in fairs and markets agritourism, and opportunities to participate in courses of a desk where the knowledge gained is used by the owners object to raising the standard of services and the better management of agritourism farm.

3.5. Summary

In summary, the owners of agritourism farms willing to use the assistance of institutions supporting the development of agritourism. Very important roles serve Voivodeships Agricultural Advisory Centres and agritourism association in area. As shown by the analysis, the accommodation benefit from the aid of the institution on virtually every stage of agritourism. The vast majority of respondents belong to local agritourism associations, within which are mainly used on stage to promote their holdings through published catalogs, brochures and leaflets, as well as participation in fairs and markets agritourism, and opportunities to participate in courses of a desk where the knowledge gained is used by the owners object to raising the standard of services and the better management of agritourism farm.

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ASSESSMENT OF IMPACT OF NATURAL VALUES ON DEVELOPMENT OF TOURISM IN DIFFERENT POWIATS OF ZACHODNIOPOMORSKIE VOIVODESHIP

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4.1. Introduction

Tourism is an important source of economic prosperity in the global economy, which includes the rapidly growing number of people taking up traveling in great distances. Natural, protected environment, beautiful landscapes and unique cultural values is the basis of the long-term development of tourism activity. Currently tourism is being developed in areas where nature is in a relatively natural state, hence it should be skillfully adapt each of its ecosystems to tourism activities[1]. Tourism is seen as a field of human activity that allows for close contact with nature, at the same time it is contributing to degradation of nature. Decline in quality of the environment, providing a tourist attraction, especially protected areas, it can also threaten the further development of tourism. Awareness of this fact as well as the dissemination of the environmental aspect in the political doctrines and commissions of international environmental movement contributed to the introduction of the concept of sustainable development in tourism[2].

Preservation of the countryside and improving the environment mainly require consistent implementation of sustainable agriculture, which includes the principles of good agricultural practices and the development of technical infrastructure. An important element here is the Natura 2000 network and the designation of rural areas with high natural values used for agricultural purposes (HNV)[3].

Activity of farms in harmony with the environment agriculture is extremely important, because in rural areas they are the greatest ecological threat. It is therefore required of all agricultural entities such conduct both production and social life that does not adversely affect nature. Among the analyzed farms, larger production areas

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[1]   **Z. Wnuk, M. Ziaja,** [2009]: *Turystyka w parkach krajobrazowych, Uniwersytet Rzeszowski, Rzeszów, p. 275.*

[2]   **P. Bohdanowicz,** [2006]: *Turystyka a świadomość ekologiczna, Wyd. Adam Marszałek, Toruń, p. 263.*

[3]   **J. Rakowska, A. Wojewódzka-Wiewiórska,** [2010]: *Zróżnicowanie przestrzenne obszarów wiejskich w Polsce–stan i perspektywy rozwoju w kontekście powiązań funkcjonalnych. Warszawa, MRR.*

encourage achieving higher economic performance. Also, these companies suffered the biggest outlays on production and investment. There may be a large expenditure on those farms for modernization and progress. However, the process of sustainable development in the surveyed farms is still too slow. Underestimating the need to increase spending on liming of soils can lead to degradation of soils used for agricultural purposes. At the same time insufficient facilities surveyed households in the sewerage system may lead to deterioration of groundwater[4].

Zachodniopomorskie Voivodeship includes 18 land powiats: białogardzki, drawski, kołobrzeski, koszaliński, sławieński, szczecinecki, świdwiński, wałecki, choszczeński, gryficki, łobeski, myśliborski, pyrzycki, stargardzki, goleniowski, gryfiński, kamieński, policki and city districts (city of Szczecin, Koszalin and Świnoujście). In the context of international cooperation on December 15, 1995 was created the Pomerania Euroregion, covering part of Zachodniopomorskie Voivodeship.

Characteristic of the terrain of Zachodniopomorskie Voivodeship includes numerous land of by lake, with a rich flora and fauna and a clear waters. 185-kilometer-long coastal strip of the Baltic Sea includes sand dunes, unique vegetation, and cliffs. The specific location of the voivodeship, as well as the resulting diversity of natural landscape contributes to the high tourist attractiveness of the area[5].

An important advantage of the whole voivodeship are forests (4th place in the country in terms of forest cover). Forest areas constitute 36% of the total surface of the voivodeship (8000 km^2); in some powiats (drawski, szczecinecki, koszaliński, wałecki) forest cover exceeds 50%. Distribution of forest area is not uniform. Large, compact forest complexes, called "keen walkers" are mainly in the South and central parts of the voivodeship (forests: Bukowa, Goleniowska, Drawska, Piaskowa, Wkrzańska, Koszalińska). The least forested seaside belt and it's mostly in his central part (the exception is the forests on the islands of Wolin and Uznam). In the forests of the predominant habitat boric, which handle about 63% of the area of forests, 28% are forest habitats and habitats which acts as about 4%. The dominant species in the forests are pine (it takes about 70% of the surface area of the forests), with other important are: spruce, beech, oak, birch. The average age of the stand is approximately 60 years. Protective Forests are about 27% of the total, and the forest reserves of 0,5%, the rest is multifunctional forests. Protective forests fulfill many valuable functions in the area of natural landscape, often touristic, as well as provide cover for protected species of fauna and flora. The health condition of forests of the Zachodniopomorskie Voivodeship is evaluated as significantly better than other national forests, healthier forests are located in the eastern part of the voivodeship. A characteristic feature of this voivodeship are surface water area by land and sea, internal waters, which occupy a total of 5,7% of the area (with the national average of 2,6%) and 15,7% of the country's waters. In this respect, Zachodniopomorskie Voivodeship ranks just behind Warmińsko-Mazurskie Voivodeship, which takes place first. In the area of the voivodeship is more than 1600 Lakes, covering an area more than 1 ha, mainly on

4   **P. Bórawski, A. Pawlewicz,** [2006]: *Efektywność ekonomiczna indywidualnych gospodarstw rolnych w aspekcie zrównoważonego rozwoju obszarów wiejskich na przykładzie województwa warmińsko-mazurskiego. Zeszyty Naukowe Akademii Rolniczej we Wrocławiu 540, Rolnictwo LXXXVII, s. 91-97..*

5   **D. Milewski, D. Szostak,** [2006]: *Ocena potencjału sektora turystycznego regionu zachodniopomorskiego w aspekcie powstania na tym obszarze klastra turystycznego. Raport nr 1, Szczecin, Zarząd Województwa.*

Lakeland: Drawskie, Wałeckie, Myśliborskie and Wełtyńskie. The largest are Dąbie Lake (5,5 thousand hectares - the largest lake in Poland), Miedwie (3,5 thousand hectares) and Jamno (2,2 thousand hectares). A characteristic body of water is the Szczecin Lagoon, which affects the Odra river. On both sides of the Szczecin Lagoon, which takes care of 687 km^2, there are many marinas and ports, which are conducive to the development of tourism and water sports. The seaside area of the voivodeship is characterized by the most favorable climatic conditions throughout the Baltic Sea. The specific microclimate, in conjunction with the health properties of sea water and the presence of groundwater sources and medicinal raw materials deposits, promotes the development of sanatorium and spa functions. In addition, Zachodniopomorskie Voivodeship is a well-developed network of following rivers: Odra, Drawa, Parsęta and Rega[6].

Zachodniopomorskie Voivodeship has 2 of the 23 national parks in Poland:

1.   Wolin National Park (109,37 km^2)
2.   Drawa National Park (113,42 km^2).

Zachodniopomorskie Voivodeship includes the following nature parks:

1.   Dolina Dolnej Odry Landscape Park (60,09 km^2)
2.   Iński Landscape Park (177,60 km^2)
3.   Drawski Landscape Park (414,30 km^2)
4.   Cedyński Landscape Park (308,5 km^2)
5.   Barlinecko-Gorzowski Landscape Park (239,83 km^2)
6.   Szczeciński Landscape Park (90,96 km^2).

There is also a beautiful Park "Valley of love" on the border with Germany in Zatoń Dolna and six dendrological gardens: Arboretum Przelewice, Arboretum in Glinna in the municipality of Stare Czarnowo, near Szczecin. This is one of the oldest Polish gardens. It was founded at the early nineteenth century; in the municipality of Bedzino near Koszalin. Moreover Arboretum in Karnieszewice (municipality Sianów), Botanical Garden in Szczecin, Spa Park in Polczyn Zdroj are Themed Gardens in Dobrzyca (Hortulus) [7].

The paper presents an analysis of spatial diversity of attractiveness of the Zachodniopomorskie Voivodeship powiats in terms of tourism development based on natural values. Strengths of specific areas are: diversity of landscape, associated with a variety of climatic and soil conditions, varied forms of terrain, diverse vegetation. Capital development of these areas is often unpolluted natural environment, landscape and traditions of the Polish countryside. For this analysis assumes that tourism has a positive impact on regional development, which is dependent on the occurrence of natural goods. For the variables adopted for the study was calculated basic descriptive statistics. Studies have highlighted presence in most of powiats stronger development processes. To indicate their reasons, it became necessary to create groups of a typological groups of powiats. Structured objects were divided into groups of similar levels of the studied phenomenon. To obtain results uses the following calculation: correlation coefficient matrix, basic statistical characteristics of the diagnostic variables, the term weights (meaning the specified characteristics of the studied phenomenon), TMR-standardization (ranking of powiats) and a breakdown of the typological groups.

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6   *Zachodniopomorska Regionalna Organizacja Turystyczna, Audyt Turystyczny Województwa Zachodniopomorskiego. Strategia Rozwoju Turystyki w Województwie Zachodniopomorskim do roku 2015, Szczecin 2005.*

7   **Urząd Marszałkowski Województwa Zachodniopomorskiego**: *http://morzeprzygody.eu/?page_id=751.*

4.2. Objective and Method

The objective of this study was to determine the impact of natural values on tourism development in various powiats of Zachodniopomorskie Voivodeship in 2011 using taxonomic method - measure of taxonomic development. The basis of the study were statistical data from 2011, collected in the CSO Regional Data Bank[8]. There was analysed available statistical information including variables concerning: environment, natural values of the area, population and population density and variables directly related to the tourist traffic: number of beds and number of nights. Created database contained 10 diagnostic features. Final set of variables hits 10 variables. Table 1 shows a list of variables that formed the database.

Table 1. **Variables forming database**

Symbol	Variable
X_1	accommodation in tourist facilities in collective accommodation establishments according to powiats
X_2	tourist accommodation in collective accommodation facilities provided by powiats
X_3	area of outstanding natural beauty protected (ha)
X_4	protected areas (ha)
X_5	nature parks (ha)
X_6	protected landscape areas (ha)
X_7	monuments of nature
X_8	total population
X_9	total forest land area (ha)
X_{10}	population per 1 km^2 - population density

Source: own study

From a set of potential diagnostic characteristics were eliminated variables that do not meet formal and substantive criteria adopted. The design of synthetic measure for determining attractiveness of powiats was based on 10 characteristics (indicators) which are characterized, on the one hand, the attractiveness of the environment of individual districts (stimulants), and, on the other hand, the population density of the districts on 1 km^2 (destimulants)[9]. A comparative analysis and arrangement of the analysed objects was made possible through the appointment of a synthetic (edited) measure[10]. The choice of variables from a particular groups used a parameterized Hellwig's method (1981)[11].

A measure of the development of Z. Hellwig is used as a reference method for the assessment of the socio-demographic and infrastructure-housing indicator in research to develop methods for assessing the municipalities[12]. To indicate the importance of

8   GUS, [2012]: *Rocznik Statystyczny Województwa Zachodniopomorskiego 2012. Urząd Statystyczny w Szczecinie.*

9   **K. Cheba**, [2011]: *Taksonomiczna analiza przestrzennego zróżnicowania wybranych wskaźników poziomu życia w ujęciu dynamicznym, Folia Pomer. Univ. Technol. Stetin., Oeconomica 285 (62), pp. 37–44.*

10   **A. Sompolska-Rzechuła,** [1999]: *Syntetyczny miernik jakości środowiska przyrodniczego, AR Szczecin , p. 213.*

11   **Z. Hellwig,** [1981]: *Wielowymiarowa analiza porównawcza i jej zastosowanie w badaniach wielocechowych obiektów gospodarczych. Warszawa, PWE.*

12   **M. Bednarek-Szczepańska,** [2010]: *Rola podmiotów lokalnych w rozwoju turystyki wiejskiej na wybranych obszarach Lubelszczyzny, Studia Obszarów Wiejskich, 23, 2010.*

social capital as one of the factors for the development of tourist features of the village, developed a ranking of the rural communities of Wielkopolskie Voivodeship in terms of social capital resources using the standard method of development Hellwig's (based on the available statistical data)[13]. An example of valorisation of the region of Wielopolska for their suitability for the development of agro-tourism and rural tourism is to assess by means of a specially constructed index of aggregate according to the methodology proposed by Hellwig (1968)[14]. Hellwig's method has been applied to the analysis of the suitability of the rural regions of Świętokrzyskie Mountains for the development of agrotourism. The analysis includes a variety of abilities of rural development of the region. It has also shown the division of Świętokrzyskie Mountains region having regard to the varied potential of their development[15]. The modified Hellwig's pattern method was used to conduct the research. Then the valorization and classification of administrative units by natural environment values were conducted. Finally correlation between the aggregate measure and the number of agritourism enterprises and the number of beds in agritourism enterprises in Poland was calculated. The conducted analyses indicates that the north-eastern and southern regions of Poland have better natural environment potential for the development of rural tourism and agritourism[16]. Hellwig's development of meter used to determine the level of socio-economic development of the municipalities of Rzeszowski Poviats. The meter includes a number of indicators of an economic, social, technical and technological and ecological development[17]. Considerations based on the results of empirical research carried out in 2008 in the communes of rural and urban-rural development of Warmińsko-Mazurskie Voivodeship and analysis of the level of socio-economic development of municipalities, was performed using the Hellwig's meter. Cross-section of municipalities according to the meter development Hellwig allowed to note the clear differences in expenditures on economic promotion of the municipality. Municipalities with a higher level of development were characterized by a more holistic approach to marketing entities, while the weakest municipalities have focused on marketing a minimalist[18]. The model of Hellwig was used to examine the communes competitiveness basing on the example of Lublin voivodeship[19]. TMR is a taxonomic measure of development proposed by Hellwig Z., enabling conducting comparative analysis of spatial objects. The meter is the amount of synthetic, which is the sum of all analyzed variables and allows for sorting objects according to their distance from one artificially constructed development pattern. Research conducted by Milewski show

13   **J. Kosmaczewska,** [2009]: *Kapitał społeczny mieszkańców wsi jako czynnik turystycznego rozwoju obszarów wiej-skich. Acta Scientiarum Polonorum, 87.*

14   **L. Przezbórska,** [2010]: *Waloryzacja obszarów wiejskich dla rozwoju turystyki wiejskiej i agroturystyki w Polsce (na przykładzie województwa wielkopolskiego). Uwarunkowania i plany rozwoju turystyki, 69.*

15   **E. Palka, P. Brambert,** [2013]: *Syntetyczna ocena predyspozycji obszarów wiejskich do rozwoju agroturystyki w świe-tle metody wzorca rozwoju Hellwiga na przykładzie regionu Gór Świętokrzyskich. Infrastruktura i Ekologia Terenów Wiejskich, 3/IV.*

16   **L. Przezbórska, J. Lira,** [2011]: *Walory środowiska przyrodniczego jako czynnik rozwoju turystyki wiejskiej w Polsce. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, (166), 568-579.*

17   **M. Kiczek, M. Pompa-Roborzyński,** [2013]: *Ocena rozwoju gmin powiatu rzeszowskiego (z wykorzystaniem metody Hellwiga). Humanities and Social Sciences, XVIII, 20 (2), pp. 65-76.*

18   **I. Pomianek,** [2011]: *Wykorzystanie instrumentów marketingu terytorialnego na obszarach wiejskich województwa warmińsko-mazurskiego. Studia Ekonomiczne i Regionalne, 2 (V), pp. 66-75.*

19   **P. Janulewicz,** [2011]: *Konkurencyjność gmin na przykładzie województwa lubelskiego. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, (166), 234-245.*

that all coastal municipalities in terms of attractiveness peaked at TMR higher than the arithmetic mean for the whole population. It follows from this that most municipalities of Zachodniopomorskie Voivodeship (coastal municipalities), and some municipalities of the areas of the lake district (Drawsko Pomorskie, Złocieniec, Czaplinek, Ińsko) has developed tourism infrastructure[20]. A synthetic socio-economic development Hellwig index was calculated for to determine the role of human capital quality of local authorities in the local socio-economic development[21].

After the appointment of the matrix of coefficients of correlation between the variables belonging to separate areas, variables were divided into groups that contain central variables (X_{10}), along with satellite variables (X_4, X_7) and isolated variables (X_9). The final collection of variables formed these features (central and isolated) whose frequency of occurrence throughout the analysis period was the biggest. For the final set of diagnostic variables, which became the basis for further empirical research, there were classified 9 variables. Extracted variables formed the basis for comparison and distribution of separate spatial units (powiats) into groups with similar levels of development.

4.3. Results

For the variables adopted for the study there was calculated the basic descriptive statistics whose values are presented in table 2.

Table 2. **Statistical characteristics of variables**

Variable	Average	Standard deviation	Coefficient of variation
X_1	5109.39	7506.02	68.07
X_2	455078.72	859643.37	52.94
X_3	26329.37	27883.38	94.43
X_4	703.68	848.93	82.89
X_5	13158.62	14589.74	90.19
X_6	32471.16	25878.60	125.47
X_7	150.89	114.34	131.97
X_8	64577.44	19916.43	324.24
X_{10}	54.89	21.72	252.74

Source: own study

When examining the impact of natural values on the development of tourism, the most important are the variables: X_8 and X_{10} while the variable X_2 in the slightest degree affects the studied phenomenon[22]. In this study, stimulants has been designated as the inverse of the destimulants variable. Conducting a comparative analysis of multiple

[20]   **D. Milewski,** [2005]: *Regional directing of tourism development on example of the western Pomeranian province, University of Szczecin, Debates and Studies T. (DXCII) 518, p. 135.*

[21]   **I. Pomianek,** [2010]: *Aktywność samorządów i partycypacja społeczna w kreowaniu warunków sprzyjających rozwojowi lokalnemu. Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Problemy Rolnictwa Światowego, 10 (4).*

[22]   *The collected of variables due to their relative importance.*

entities, described by many diagnostic features, there were encountered many difficulties. It seems a good idea to apply methods of multidimensional comparative analysis and other taxonomic methods[23]. Taxonomic measure of development determined on the basis of the normalized values of diagnostic features, according to the following formula[24]:

$$z_i = \frac{1}{K} \sum_{k=1}^{K} z_{ki}$$

where:

z_i - the taxonomic value of the gauge for development of the i-th object,

z_{ki} - normalized value of the k-th characteristics in the i-th object,

K - the number of considered characteristics.

Table 3. **Order of powiats in terms of taxonomic development measure**

Number of place	Powiats	Value measure
1	kołobrzeski	1.000
2	kamieński	0.367
3	gryficki	0.314
4	koszaliński	0.279
5	sławieński	0.278
6	wałecki	0.070
7	drawski	0.066
8	gryfiński	0.055
9	szczecinecki	0.055
10	stargardzki	0.053
11	myśliborski	0.051
12	choszczeński	0.049
13	świdwiński	0.034
14	policki	0.028
15	goleniowski	0.027
16	białogardzki	0.007
17	łobeski	0.002
18	pyrzycki	0.000

Source: own study

However, as the basis for standardization of each variables there were used average values determined using statistical information in 2011 for 18 analyzed powiats. The designated values of the taxonomic meter development allow arrangement of powiats in

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[23]   **A. Młodak,** [2006]: *Analiza taksonomiczna w statystyce regionalnej, Warszawa, Difin.*

[24]   **E. Nowak,** [1990]: *Metody taksonomiczne w klasyfikacji obiektów społeczno-gospodarczych. Warszawa, PWE.*

terms of the level of development in the area of natural values, which are shown in table 3.

Objects ordered by decreasing values of taxonomic meter development is divided into groups with similar levels of development of the studied phenomenon. In this study, a collection of all the analyzed powiats were divided into four groups, covering objects with the meter values with the following ranges:

— group 1 powiats $z_i \geq \overline{z} + S_z$,
— group 2 powiats $\overline{z} + S_z > z_i \geq \overline{z}$,
— group 3 powiats $\overline{z} > z_i \geq \overline{z} - S_z$,
— group 4 powiats $z_i < \overline{z} - S_z$.

The results of the grouping of powiats shown in table 4.

Table 4. **Classification of powiats according to taxonomic development measure**

Group	Range of measurement in a group	Powiats
I	more than 0.113	kołobrzeski
II	from 0.084 to 0.112	kamieński, gryficki, koszaliński, sławieński
III	from 0.010 to 0.083	wałecki, drawski, gryfiński, szczecinecki, stargardzki, myśliborski, choszczeński, świdwiński
IV	below 0.010	policki, goleniowski, białogardzki, łobeski, pyrzycki

source: own study

In the first typological group, the least numerous, there was found 1 county, representing 6% of the total number of powiats. This is a powiat that in the general characteristics of the studied powiats was the best, and the value was the highest 0.304. This county was characterized by the highest level of development in terms of accepted diagnostic features. This is a powiat with a very high level of tourism development, it can be concluded that tourism is a dominant sector of the economy, taking into account the natural source. The high level of taxonomic meter of development studied county affected the following factors: area of special natural values protected by law, protected landscape areas (in hectares), the occurrence of a significant number of natural monuments, natural parks and nature reserves. These factors overcome the importance of density of population per 1 km^2. Population growth confirms the role of the tourism industry as an engine of economic growth and improves the well-being of residents. Noteworthy it is also a large number of nights spent of tourists and accommodation. It is a starting point for the evaluation of the tourism of the area. In kołobrzeski powiat (town of Kolobrzeg) there is largest number of hotels with the highest standard in Zachodniopomorskie Voivodeship.

The second typological group consisted of 4 powiats (22%), which are characterized by a good level of development of the measure (the meter indicator is in the range from 0.084 to 0.112). These are the powiats with a high level of tourism development. It can be concluded that tourism competes with other sectors of the economy, in particular in the field of natural goods and natural. However, this is not an optimal model in terms

of the level of tourism development. This means that, in addition to the level of tourist attractiveness factors it also affects many factors not included in the study, even if the factors are difficult to quantify factors such as tourism opportunities, the number of tourism products. These includes the following powiats: kamieński, gryficki, koszaliński and sławieński.

The third typological group includes 8 powiats: wałecki, drawski, gryfiński, szczecinecki, stargardzki, myśliborski, choszczeński and świdwinski (44%). It was the largest group. According to the above results in the whole population dominated counies with a medium level of development.

The fourth typological group includes 5 powiats (28%): policki, goleniowski, białogardzki, łobeski, pyrzycki. These are the powiats with the lowest level of investigated diagnostic features, the very low level of attractiveness, in particular in the field of natural goods. The improvement in the condition of these powiats may affect the development of «green tourism» and increasing the size and number of natural goods and natural.

4.4. Conclusions

Studies have shown the presence of the all 18 powiats of Zachodniopomorskie Voivodeship which have the impact of natural values on development of tourism. The importance of natural values to make development of tourism (from most to least significant) was conducted using following variables:
1. total population
2. population per 1 km^2 - population density
3. total forest land area (ha)
4. monuments of nature
5. protected landscape areas (ha)
6. area of outstanding natural beauty protected (ha)
7. nature parks (ha)
8. protected areas (ha)
9. accommodation in tourist facilities in collective accommodation establishments according to powiats
10. tourist accommodation in collective accommodation facilities provided by powiats

Studies have highlighted the large differences in level of tourism development of the powiats of Zachodniopomorskie Voivodeship.

Studies have shown that tourist traffic in the Zachodniopomorskie Voivodeship is strongly correlated with the level of natural values of this region: higher number of natural resources causes higher levels of tourism development. Higher number of total forest land area, monuments of nature, protected areas, protected landscape areas, area of outstanding natural beauty protected and nature parks results a higher number of accommodation in tourist facilities in collective accommodation establishments according to powiats and a tourist accommodation in collective accommodation facilities provided by powiats. This affects the development of tourism. In this powiats more accommodation is provided for tourists. Tourists are more likely to opt for a place with a small total population and a small population per 1 km^2. Such a situation occurs in kołobrzeski poviat.

A bit worse situation occurs in four powiats: kamieński, gryficki, koszaliński, sławieński. Here, low number of natural values is compensated by other factors.

The lowest level of tourism development occurs in five powiats: policki, goleniowski, białogardzki, łobeski, pyrzycki. Development of tourism here is slow and low. This situation may be due to the small number of natural resources and a high degree of degradation of the environment as a result of industrial pollution. In this study the least favorably dropped pyrzycki powiat.

Water and forest are the basic components for determining the development of tourism and recreation, which Zachodniopomorskie Voivodeship having significant quantities. Water is one of the most important environmental used resources, which plays a significant role in shaping the tourist attractiveness of the region. Forests in Zachodniopomorskie Voivodeship perform an important ecological function and are a large tourist attraction of the region. Condition of environment in the voivodeship is an important element in building of tourism image of the region. It is the ecological conditions which are now becoming one of the elements that determine the perception of the region as an attractive tourist area. High investment in environmental protection and attitude of local governments conduct to the activities are the strengths of the region. The effects of these actions reduced the amount of emitted dust and gases, and improving the quality of surface waters. All this is conducive to the development of tourism and affect positively on the image of the region as an area attractive environmentally. The influx of tourists in the summer season should also mobilize the region›s authorities to introduce selective waste collection. Pollution of the coastal towns during the short holiday season is their main problem and require a rapid solution. These actions should not be temporary nature, but to be the consequence of a deliberate plan for the protection of the environment, which is the largest value of the region[25].

In Brelik research about sustainable development in the municipality of Wolin the respondents considered environmental protection (27.2%), social development (21.2%) and increased the quality of life (19.3%) as the most important objective of sustainable development. Despite the fact that most people have not met with the concept of sustainable development, but almost half of them believe that they care about the environment (48.6%). The population is also more than 28% group of people who are indifferent to the needs of the environment. A small part of the respondents declared very committed attitude in regard to its participation in the implementation of the concept of sustainable development, which manifests itself in popularizing the principles of sustainable development and learning to recruit others and search for new knowledge about how to reduce the negative impact on the environment at the municipal level. Only 16.2% of residents have knowledge about the environment and are aware that improving the environment depends on them and lead them to engage in environmental protection. Environment pressure and fashion are not a sufficient incentive to behave in accordance with the needs of social and natural environment[26].

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[25]   ***Zachodniopomorska Regionalna Organizacja Turystyczna***, *Audyt Turystyczny Województwa Zachodniopomorskiego. Strategia Rozwoju Turystyki w Województwie Zachodniopomorskim do roku 2015, Szczecin 2005.*

[26]   **A. Brelik,** [2012]: *Sustainable tourism development - case of the Wolin Region, Acta Scientiarum Polonorum – Oeconomia, Vol. 11 No. 2 pp. 19-27.*

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INFLUENCE OF SELECTED ECONOMIC FACTORS ON DEVELOPMENT OF TOURIST ACTIVITY IN DIFFERENT REGIONS OF POLAND

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5.1. Introduction

Development of tourism is conditioned by its attractiveness in terms of features, phenomena and unique objects, allowing to meet the needs associated with travel and stay in the area. Accession to the EU has improved political and economic image of the country - Poland has become in many ways more attractive to tourists for selected regions (Russia, Belarus, Ukraine)[1]. Development of tourism is a pure-linked with economic development.

Having recognized the importance of tourism to economic growth, most international organizations have begun to argue that tourism growth can influence, as well, the economic and socio cultural development of society. However, recently, a new approach that criticizes the relationship between both dimensions has begun to be developed; suggesting that this is not an automatic relationship[2].

In the empirical analysis, unit root and cointegration tests using panel data of European Union countries from 1988 to 2009 are performed to examine the long-run equilibrium relationship among tourism, CO_2 emissions, economic growth and foreign direct investment (FDI). Results from panel cointegration techniques and fixed-effects models indicate that a long-run equilibrium relationship exists among these variables. Furthermore, tourism, CO_2 emissions and FDI have high significant positive effect on economic growth. Economic growth, in turn, shows a high significant positive impact on CO_2 emissions while tourism and FDI incur a high significant negative impact on CO_2 emissions[3].

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[1] **E. Dziedzic, T. Skalska,** [2012]: *Ekonomiczne uwarunkowania rozwoju usług turystycznych w Polsce, Warszawa .*

[2] **P. J., Cárdenas-García, M., Sánchez-Rivero, J. I. Pulido-Fernández,** [2013]: *Does Tourism Growth Influence Economic Development?. Journal of Travel Research, 0047287513514297.*

[3] **J. W., Lee, T. Brahmasrene,** [2013]: *Investigating the influence of tourism on economic growth and carbon emissions: Evidence from panel analysis of the European Union. Tourism Management, 38: 69-76.*

Tourism is often purported to be a solution to economic decline arising from restructuring of other sectors of the economy. This is particularly true for remote places perceived as lacking alternative options for development. Thus, tourism development in peripheral areas is often triggered as a result of crisis in other sectors. Tourism development rarely, however, provides the solution which is supposed to – either by failing to deliver socioeconomic change or by simply replacing one mono-sectoral dependency (e.g., extractive industries) with another one (e.g., tourism). Therefore, it is necessary to explore whether tourism offers dynamic development or is destined to decline in the long-term[4].

Due to a dynamic increase of the number of tourists, to demand and supply changes, or – in short – to changes of paradigm, tourism has been recently considered as an important factor of regional development. Countries and regions attempt to encourage tourism development with modern planning. An overview of selected planning documents, mostly regional, leads to the conclusion that in spite of a declarative adoption of the new paradigm on the strategic level, the operational level is still dominated by the old approach, based on a number of myths[5].

Motivations making tourist activity are changing. The following factors such as: improving the quality of life of older people, sporting events of an international nature, such as Euro 2012, travel and trade unions, conferences and congresses have increasing importance. Some motivations remain the same, such as sentimental journeys. Economic motive to Polish arrivals are competitive prices and high quality services. A significant part of the tourism takes place within the borders. The paper presents an analysis of tourism based on tourism motivation. There were used in the calculations of basic economic indicators based on statistical data (Statistical Yearbook of the CSO, development of the Institute of Tourism, in the years 2010-2012) following variables: number of tourists in total, the number of beds, income per capita, the number of business travelers (seasonality), income from tourism.

Themes making tourist activity by domestic tourists are:
— Tourist resort - 51%
— Visiting relatives and friends - 23%
— Business - 16%
— Health - 4%
— Religious - 1%
— Other - 5%

Themes making tourist activity by foreign tourists are:
— Professional or business affairs - 26%
— Travel, explore the country, recreation - 21%
— Visiting relatives or friends - 19%
— Transit - 11%
— Shopping - 8%

4   **D. K. Müller, P. Brouder,** [2014]: *Dynamic Development or Destined to Decline?: The Case of Arctic Tourism Businesses and Local Labour Markets in Jokkmokk, Sweden.*
5   **M. Kozak,** [2010]: *Turystyka: niewykorzystana szansa rozwojowa regionów?. Studia regionalne i lokalne, 4 (42)* 43-59.

— Purpose of health - 4%
— Visits to places of origin - 3%
— Private arrival training - 2%
— Adoption of casual labor - 1%
— Religious purposes - 1%
— Other objectives - 5%[6]

Determinants of development of tourism demand are numerous various factors that affect the change in its size and structure. In the literature can be found many ways of grouping variables affecting demand phenomenon. For example V.T.C. Middleton divides main determinants of tourism demand into six groups: economic, demographic, geographic, legal and political influence of the media and psychosocial factors. There is also disagreement as to the grouping of economic variables, the most interesting from the point of view of this study. L. Dwyer (et al.), sticking on the foreground the importance of price, propose the division of economic factors on the price and non-price, among the latter stressing the importance of income and demographic variables[7]. In turn, S. Wodejko divides economic variables affecting tourism demand, at:

— General economic level of national income, real wages, unemployment, the structure of consumption.
— Profitable: a level of income, a level of development of social forms of tourism.
— Pricing: price levels of tourist products, their changes, relationships with respect to income and to prices of substitute goods and services.

General economic variables affecting tourism demand shall also be included, for example: the supply of money in the market, inflation, industrial production volume, the volume of business, affecting the intensity of business contacts (this factor plays a special role in foreign tourism - business tourism)[8]. Polish economic inclusion of these variables for the analysis seems to be correct, for example: low money supply inhibits the tourist demand; Polish accession to the European Union has contributed to the flourishing of international economic relations, and is therefore particularly important as a factor in the increase in international travel. It is quite commonly believed that among the factors of macro-tourism market economy most important determinant defining the demand, there are individual income households typically converted to a single person. In studies of the economics of tourism attention is drown to this that tourist needs are among the higher-order needs, and therefore tourism demand can be implemented within the framework of the so-called fund of free consumption. This fund is created only when the basic needs will be met. This means that the level of household income must be so large that the origins of this fund, and the factors affecting tourism demand must be so strong that in his part of the consumer has chosen travel products. Thus, it is believed that the consumption site appears only above a certain income threshold[9]. For non-price factors of economic tourism activity include:

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[6]   **W. Bartoszewicz, T. Skalska,** [2014]: *Zagraniczna turystyka przyjazdowa do Polski w 2012 roku, Instytut Turystyki, Ministerstwo Sportu i Turystyki, Departament Turystyki.*

[7]   **L. Dwyer, P. Forsyth, W. Dwyer,** [2010]*: Tourism Economics and Policy, Channel View Publications. Bristol, Buffalo, Toronto, s. 39 i nast.*

[8]   **V. Cho,** [2001]: *Tourism Forecasting and its Relationship with Leading Economic Indicators. Journal of Hospitality and Tourism Research, Vol. 25, No. 4.*

[9]   **S. Wodejko,** [1998]*: Ekonomiczne zagadnienia turystyki. Wyższa Szkoła Handlu i Prawa. Warszawa.*

— individual income households (for 1 person) - fund free consumption
— the distribution of income (divided by revenue earmarked for tourism and good to her substitute)
— the right to leave, the length of paid leave and capacity utilization
— purchasing power of currency
— tax policy and control of tourism expenditure
— price level
— competition in the market
— quality tourism products
— economic regulations in the tourism sector
— promotional activities undertaken by the tourist reception areas in the area sending
— relationship between prices in both areas
— exchange rates
— ratio of travel time to its cost[10].

Despite the increase in the number of arrivals, recorded between 2010 and 2011, Polish position on the international tourism market is not too high and has a downward trend in 2000. Poland was in twelfth place in the ranking of the most visited countries in 2011 - in the nineteenth. In 2011, the participation of our country in the European market accounted for approximately 2.7% of the number of arrivals and 2.3% of total revenues (for comparison: the share of the population was approximately 5.2%). In the global market shares were, respectively, 1.35% and 1.03%[11].

Tourism is one of non-agricultural activities type in rural areas with great possibilities of the development. However, in most rural communities and regions in the progress of its development is not sufficient and does not visibly affect their functional structure. Multiple benefits of tourism development of rural residents reached tourist services, as well as easing the local community at least part of the problems facing the country, to call for the dynamic of this process while not harming the natural environment. The development of tourism is seen as one of the effects of a significant improvement in the quality of life of different societies[12].

5.2. Objective and Method

The objective of this study was to determine the impact of several economic factors to make tourist activity in various regions of Polish in 2012 with use of taxonomic method. The study used statistical data available in the Central Statistical Office - CSO Data Bank and the Institute of Tourism.

The selection of variables for the model was beyond the substantive considerations, included in the analysis of literature, access quantitative data (Data Bank, Central Statistical Office, 2012[13] and on the development of the CSO in Katowice[14]). Making a

[10]   **A. Bull,** [2005]: *The Economics of Travel and Tourism. 2nd ed. Oxford Longman.*
[11]   **UNWTO** *Tourism Highlights, 2012 Edition, s. 13.*
[12]   **A. Brelik,** [2012]: *Sustainable tourism development - case of the Wolin Region, Acta Scientiarum Polonorum – Oeconomia, Vol. 11 No. 2 pp. 19-27.*
[13]   **Główny Urząd Statystyczny**: *Bank Danych GUS, Turystyka w 2012 r., Warszawa, 2013.*
[14]   **Główny Urząd Statystyczny**, *Urząd Statystyczny w Katowicach, Wstępne szacunki produktu krajowego brutto według województw w 2012 r.*

comparative analysis and ordering of objects analyzed in terms of the level achieved was made possible through the appointment of a synthetic (edited) measure[15]. The construction of synthetic measure to determine the attractiveness of the surveyed voivodeships was based on 12 characteristics (indicators) characterizing, on the one hand, financial inflows to individual voivodeships (stimulants), and on the other the level of unemployment in the individual voivodeships (destimulants)[16]. For the calculation there were used economic indicators affecting the tourist traffic in the area. The study was conducted in static terms for 2012. A set of diagnostic features (stimulant) included:

X_1 - average gross monthly salary

X_2 - the price index of goods and services (CPI)

X_3 - revenue budgets of voivodeships

X_4 - income regions from EU

X_5 - capital expenditures voivodeships

X_6 - total nominal GDP

X_7 - nominal GDP per 1 inhabitant

X_8 - the average expenditure of tourists in the voivodeships

X_9 - number of domestic tourists

X_{10} - number of foreign tourists

A set of diagnostic features (destimulants) included:

X_{11} - registered unemployed

X_{12} - unemployment rate (the active population) in%.

Conducting a comparative analysis of multiple entities, described by many diagnostic features, encountered many difficulties. A good solution seems to be the use of methods of multidimensional comparative analysis and other methods of taxonomic[17]. Selection of diagnostic features used a parametric method proposed by Hellwig[18]. For this purpose, a matrix of correlation coefficients were determined between potential characteristics of the diagnostic and central characteristics determined (X_{10}), satellite to them (X_4, X_5, X_8) and isolated (X_3), which formed the base system features. In this way, for further analysis classified the following variables:

X_1 - average gross monthly salary

X_2 - the price index of goods and services (CPI)

X_4 - income regions from EU

X_5 - capital expenditures voivodeships

X_6 - total nominal GDP

X_7 - nominal GDP per 1 inhabitant

X_8 - the average expenditure of tourists in the voivodeships

X_9 - Number of domestic tourists

X_{11} - registered unemployed

X_{12} - unemployment rate (the active population) in %.

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[15]   **A. Sompolska-Rzechuła,** [1999]: *Syntetyczny miernik jakości środowiska przyrodniczego, AR Szczecin, s. 213.*

[16]   **K. Cheba,** [2011]: *Taksonomiczna analiza przestrzennego zróżnicowania wybranych wskaźników poziomu życia w ujęciu dynamicznym, Folia Pomer. Univ. Technol. Stetin., Oeconomica 285 (62), 37-44.*

[17]   **A. Mlodak,** [2006]: *Analiza taksonomiczna w statystyce regionalnej, Warszawa, Difin.*

[18]   **E. Nowak,** [1990]: *Metody taksonomiczne w klasyfikacji obiektów społeczno-gospodarczych, PWE, Warszawa.*

Table 1. **Statistical characteristics of the diagnostic features.**

Variable	Average ($\overline{x}$)	Standard deviation $S(x)$	Coefficient of variation
X_1	3330.1	2506.8	132.84
X_2	742.3	844.4	87.91
X_4	355.3	98.3	117.11
X_5	99701.6	85135.4	368.94
X_6	37353.4	10124.6	240.03
X_7	133.5	55.6	475.29
X_8	14.6	3.1	930.77
X_9	3471.5	373.0	103. 74
X_{11}	103.7	0.2	191.57
X_{12}	952255674.4	534899397.3	252.62

Source: own study

In the set of diagnostic features are: the size, the greater the evidence of higher levels of the studied phenomenon (known as stimulants). These include, among other features talking about wages, GDP and measures of the EU. In addition, the collection features are indications of the level of unemployment (unemployed registered unemployment rate), the decline in the value indicates a higher level of tourist activity (destimulants).

Table 2. **Order of voivodeships in terms of level of development of the tourist attractiveness meter taxonomic in 2012**

Number of place	Voivodeship	Value measure (z_i)
1	mazowieckie	1.000
2	dolnośląskie	0.725
3	śląskie	0.561
4	małopolskie	0.427
5	wielkopolskie	0.385
6	podkarpackie	0.273
7	pomorskie	0.271
8	łódzkie	0.254
9	zachodniopomorskie	0.252
10	lubelskie	0.211
11	świętokrzyskie	0.176
12	kujawsko-pomorskie	0.168
13	warmińsko-mazurskie	0.147
14	podlaskie	0.045
15	lubuskie	0.010
16	opolskie	0.000

Source: own study

Among the selected features only two (X_{11}, X_{12}) are destimulants. For variable accepted for testing basic descriptive statistics were calculated, the values shown in Table 1.

When examining the economic factors of tourist activity, the most important are variables: X_8 and X_7, while the variable X_2 in the slightest degree affects the studied phenomenon[19].

Because when constructing measure of taxonomic diagnostic features are mutually summed and destimulants variables must be converted to variable stimuli, so that larger values characteristics of transformed testified about the higher levels of development of the phenomenon. This can be done in several ways. The study determined stimulant counting the inverse variable destimulants. Then, based on the standardized values of diagnostic features was constructed taxonomic measure of development:

$$z_i = \frac{1}{m} \sum_{k=1}^{m} z_{ki}$$, where:

z_i - taxonomic value meter for the development of the i-th object,
z_{ki} - normalized value of the k-th characteristic in the i-th object.

Table 2 shows the voivodeships ordered by decreasing values of the taxonomic level of tourist activity development meter.

5.3. Results

This study revealed the presence in parts of voivodeships stronger movements of tourist activity. To indicate their reasons, it became necessary to create a typological groups of voivodeships. Structured objects were divided into groups with similar levels of the studied phenomenon using different ways to create typological groups (Table 3)[20].

Table 3. **Distribution of Polish regions into groups according to the taxonomic level meter development of tourist activity in 2012**

Group	Range of measurement values in groups	Voivodeship
I	above 0.122	mazowieckie, dolnośląskie, śląskie, małopolskie, wielkopolskie
II	from 0.095 to 0.122	podkarpackie, pomorskie, łódzkie, zachodniopomorskie
III	from 0.005 to 0.094	lubelskie, świętokrzyskie, kujawsko-pomorskie, warmińsko-mazurskie, podlaskie
IV	less than 0.005	lubuskie, opolskie

Source: own study

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[19]   The set of variables due to their relative importance: {X_8, X_7, X_{12}, X_6, X_{11}, X_{10}, X_1, X_4}

[20]   In this paper the set of all voivodeships in the voivodeship were divided into four groups, including with the meter values in the development of the following ranges:

Group 1 voivodeships $z_i \geq \bar{z} + S_z$,

Group 2 voivodeships $\bar{z} + S_z > z_i \geq \bar{z}$,

Group 3 voivodeships $\bar{z} > z_i \geq \bar{z} - S_z$,

Group 4 voivodeships $z_i < \bar{z} - S_z$ . .

Structured objects were divided into groups with similar levels of the studied phenomenon.

In the first group there were 5 typological voivodeships (31.25 % of objects). These were the regions that the general characteristics of the studied voivodeships fared best, and the value was above 0.122. This group of voivodeships was characterized by the highest level of development in terms of accepted diagnostic features. These are regions with a high level of tourist activity. It can be concluded that tourism competes with other areas of the economy, particularly in terms of material goods. The high level of taxonomic meter development (surveyed voivodeships mazowieckie, dolnośląskie, śląskie, małopolskie, wielkopolskie) was affected by the following factors: the revenue budgets of voivodeships, regions of the EU funds, investment expenses of these voivodeships, as well as the average monthly salary manifested by a high total GDP and GDP per capita. These values were the highest among the surveyed objects and motifs influenced the making of tourist activity in these regions. In addition, lower unemployment (the number of registered unemployed and the unemployment rate) with increasing tourist traffic confirms the role of economic factors in its development. Noteworthy is also the number of nights spent by tourists. It is a starting point for the evaluation of tourism of the area, then the valuation of material goods. These voivodeships provide most accommodation to tourists.

The second group consisted of four typological region (25%), which have a good level of development of the meter (the meter indicator is in the range from 0,095 to 0,122). Some voivodeships in group II has a chance to move to group I, mainly by increasing investment regions for investment and wages. According to the above results in the whole population it is the dominated voivodeship with a good level of development. But this is not optimal model in terms of the level of tourist activity. This means that outside factors studied on the level of tourism activity is also influenced by factors not included in the study (non-economic), even if it is difficult to quantifiable factors such as entrepreneurship and ability to make accurate decisions, the ability to create tourist offer. These are the following regions: podkarpackie, pomorskie, łódzkie and zachodniopomorskie.

In Brelik research (2012) as the main source of income usually was: the wage work (53%), while income of self-employed 32%, a nonprofit sources of income 15%. Most people believe that the municipality of Wolin is not attractive to them and the main reason is lack of opportunity for professional development (76%) and low salaries (74%). The reason of negative assessment of the community in economic terms is high unemployment, with whom the community is still struggling. There is a lack of jobs but the development of tourism can contribute the reduction of unemployment and increase residents satisfaction. Studies have shown that respondents with work contract were more positive attitude to tourists (66.4% of responses). As the main cause of the involvement of citizens in environmental protection, respondents considered such economic factors as: the lower water (22.5%), electricity and gas bills (45.5%)[21].

In the third group of typological there were 5 regions (31.25% of objects). This group contains objects which are characterized by low level of taxonomic meter, from 0.005 to 0.094. It included following voivodeships: lubelskie, świętokrzyskie, kujawsko-pomorskie, warmińsko-mazurskie and podlaskie. This group has more of nights spent by

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21   **A. Brelik,** [2012]: *Sustainable tourism development - case of the Wolin Region, Acta Scientiarum Polonorum Oeconomia, Vol. 11 No. 2 pp. 19-27.*

foreign tourists, but less domestic. Total GDP was lower than in type I and II, but higher than in the fourth, while the GDP per capita was the lowest one among the study groups, and the unemployment rate - the highest.

Brelik studies show that agritourism as an alternative activity in the rural development process, which combinates agriculture and tourism, improves natural resources, contributes the rural area socially and economically. In many developing countries agriculture is vital for sustainable rural development and reorganized as a main means for reducing poverty and ensuring economic growth. Rural areas and agricultural fields are two concepts that usually used in lieu of each other. However, rural areas are multifunctional dynamic systems. They include different land use and activities such as settlement, transportation, industry, tourism and recreation[22].

Fourth typological group consisted of two voivodeships (12.5%): lubuskie and opolskie. These are regions with the lowest GDP, the smallest number of nights spent by tourists, both domestic and foreign. Budgets income of voivodeships, income of voivodeships from European Union and investment expenditure of these voivodeships were the lowest, and, of course, influenced the lack of making tourist activity in these regions. This group, however, was the least numerous.

5.4. Conclusions

Studies have shown the presence of the 15/16 regions, the impact of economic indicators on the making of tourist activity. The importance of economic indicators to make tourism activity (from most to least significant) includes:
1. average expenditure of tourists in voivodeships
2. nominal GDP per 1 inhabitant
3. capital expenditures voivodeships
4. unemployment rate (the active population) in % total nominal GDP
5. registered unemployed > average gross monthly salary
6. income regions from EU
7. number of domestic tourists
8. the price index of goods and services (CPI).

Studies have highlighted the large differences in level of tourism and economic development of the regions.

Studies have shown that tourist traffic in the region is strongly correlated with the level of economic development of this region. Higher level of economic development causes greater levels of tourism development. For high wages, low unemployment rate goes high GDP per capita and large capital expenditure voivodeships. These voivodeships receive more funds from the EU, because higher income budgets of the voivodeships are able to cover the required contribution to their own investments. This affects the development of tourism. In these voivodeships the average expenditure of tourists are higher and more accommodation is provided for domestic and foreign tourists. Lower than the number of registered unemployed, and the GDP of the voivodeships is larger. Such a situation occurs in five voivodeships: mazowieckie, śląskie, dolnośląskie, małopolskie, wielkopolskie.

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[22]   **A. Brelik,** [2009]*: Rural Tourism Development in Poland, Roczniki Naukowe Stowarzyszenia Ekonomist*ów Rolnictwa
     i Agrobiznesu*, 11(XI), z. 6, 17-20.*

A bit worse situation occurs in four voivodeships: podkarpackie, pomorskie, łódzkie and zachodniopomorskie. Here, low economic growth is compensated by access to the sea (Pomorskie and Zachodniopomorskie Voivodeship) or the presence of mountains (Podkarpackie Voivodeship). In the coastal area and mountain belt tourism development will always be bigger and will cause an increase in the economic development of this regions. However, not always a non-economical goods, such as natural are able to compensate for weak economic growth. An example is Warmińsko-Mazurskie Voivodeship, where the presence of Lakes (Great Lakes Region) is not able to attract tourists on such a massive scale as the coastal belt and mountain. The same situation exist in Świętokrzyskie Voivodeship. Here the presence of rocks and natural values does not compensate for economic factors.

The lowest level of economic development occurs in two voivodeships: lubuskie and opolskie. Development of tourism here is slow and low. The situation is slightly better in Lubuskie Voivodeship due to cross border. In this study the least favorably dropped Opolskie Voivodeship.

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PART II

THE ROLE OF HUMAN CAPITAL IN

AGRIBUSINESS DEVELOPMENT

STATUS OF HUMAN CAPITAL, ITS ROLE IN INNOVATION AND OPPORTUNITIES FOR STRENGTHENING THE ENTERPRISES OF THE FOOD INDUSTRY IN THE YEARS 2007-2011

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6.1. Introduction

Human capital in the company, often referred to as a whole of the production capacity of man, by D. Begg is accumulated by an employee expertise, experience and skills, so that it is possible to obtain a higher income by the company[1]. It is a kind of investment in the future and just as physical capital is about to contribute to generate revenue by the company. American neoclassical work by G. Becker *Human Capital,* published in 1964, develops the idea that for the same reason as technical capital, attained education is also a form of capital[2]. As noted by J. Hausner, decomposition of the innovation potential indicator shows that the only dimensions in which Poland does not place in the lowest positions among the countries of the European Union, are the quality of human capital (education), and - a bit lower - investment companies, and in all other dimensions (system quality research, funding of research, entrepreneurship and linkages, intellectual resources, economic effects) Poland is at the end, and the lowest place in the category of "innovators"[3]. Human capital in the enterprise is treated as a resource, as it focuses capital, labour and entrepreneurship. In other words, it is seen as knowledge, efficiency and human capacity, which determine the growth of its productive capacity. A worker creates his or her ability to work, which is the source of its future income and skilfully adapts to the changing environment, efficiently trying to solve the problems and obtains satisfaction. With human capital company receives income in proportion to its quality. Extremely important for companies operating in the field of agribusiness entrepreneurship is the ability to connect knowledge in the field with manufacturing processes. Employees working in food businesses prepare and implement strategic management, which is a

[1]   **D. Begg, S. Fischer, R. Dornbusch,** [2007]: *Mikroekonomia, Polskie Wydawnictwo Ekonomiczne, Warszawa: 340.*

[2]   **J. Bremond, J.F. Couet, M.M. Salort,** [2005]: *Kompendium wiedzy o ekonomii, Wydawnictwo Naukowe PWN, Warszawa: 322.*

[3]   **T. Geodecki, G. Gorzelak, J. Górniak, J. Hausner (red.), S. Mazur, J. Szlachta, J. Zaleski,** [2012]: *Kurs na innowacje. Jak wyprowadzić Polskę z innowacyjnego dryfu, Fundacja Gospodarki i Administracji Publicznej, Kraków, s. 24.*

compilation of strategic congruence juxtaposition of elements of intellectual capital to the practical needs and strategic competence of their executives[4]. Proper acquisition from the outside or their own generating the necessary strategic managerial competence translates into competitiveness and growth of enterprises[5]. Strategic competence of entrepreneurs has, in turn, a significant relationship with the intensity of the development of entrepreneurship in agribusiness which means strengthening the links between the various elements of food production and the inclusion of agriculture in the social division of labour, that is, to clarify its relationship with the industry[6]. To sum up, human capital and its main components determine the proper management of the company, which translates into market success of it. While studying the functioning of food businesses, will be aware of human capital, because the quality of the enterprise, its future and the market value is determined by the immediate impact of the competence of employees, intellect and personal predispositions, as well as gained certificates of people who play leadership roles. We should also do not forget that the Polish food industry still uses the structural funds of the European Union, and in 2007-2013, the entrepreneur could apply for funds from the following Operational Programmes: 5th National Operational Programme - Infrastructure and Environment, Innovative Economy, Human Capital Development Eastern Poland Technical Assistance; 16th Regional Operational Programmes; Programmes of European Regional Cooperation[7].

6.2. Aim and Methods of the Study

The main aim of the study was to determine the effectiveness of human capital in enterprises of the food industry in the years 2007-2011. Today, in the era of the operation of enterprises in the EU structures agro - food industry are trying to look for their export opportunities, win new allies, trade, create concepts of effective foreign investment and strengthen the human capital[8]. By investigation of these relationships it was possible to verify the claim that competition and competitiveness should be combined, and for the company, properly conducted business activity by effectively used human capital in the long term leads to growth of the market value.

Studies have been done with the help of a questionnaire, which was prepared in order to obtain primary data from respondents, who are employees of companies of the food industry. The study was performed in 2013, and the period covered the years 2006 to 2011. Questionnaire survey was summarized in several parts; each consisted of questions the most important areas of the company. One part of the research was devoted to human capital. The subjects of the study were the food industry enterprises that have been entered in the REGON register on 30.10.2012 r. To ensure a representative sample

4   **K. Firlej,** [2008]: *Rozwój przemysłu rolno-spożywczego w sektorze agrobiznesu i jego determinanty, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie, Kraków: 86.*

5   Ibid.

6   **K. Firlej**, [1999]: *Przedsiębiorczość w polskim agrobiznesie [w:] J. Targalski, [red.], Przedsiębiorczość a lokalny i regionalny rozwój gospodarczy, Wydawnictwo Akademii Ekonomicznej w Krakowie, Kraków, s. 119-127.*

7   **K. Firlej, D. Żmija,** [2014]: *Transfer wiedzy i dyfuzja innowacji jako źródło konkurencyjności przedsiębiorstw przemysłu spożywczego w Polsce, Fundacja Uniwersytetu Ekonomicznego w Krakowie, Kraków, s. 68.*

8   **K. Firlej,** [2010]: *Strategie adaptacji spółek z indeksu WIG – Spożywczy, Zrównoważony rozwój lokalny. Warunki rozwoju regionalnego i lokalnego, Stowarzyszenie Naukowe – Instytut Gospodarki i Rynku, Zachodniopomorski Uniwersytet Technologiczny, T. II, Szczecin, s. 14-15.*

survey technique probabilistic choice was used, so sufficient minimum necessary sample size was established. The total population of entities operating in the food industry by the registry was 33 662 companies, to study 267were chosen. Of the companies selected for the study, 30.7% worked in the market for at least 20 years or more, in the case of 20.2% of the companies their period of market operation covered the period 11 - 15 years, and the same in the range of 16 - 20 years. Approximately 16% of businesses were operating in the market in a period of 6 - 10 years, and the least of them in action does not exceed 5 years. Ten years after the accession, the food industry has diversified structure, which was formed under the influence of multi-directional transformations taking place and carried out economic reforms as well as privatization and modernization processes. Tests were carried out on the basis of deductive and inductive method, and their thorough analysis was performed using quantitative and qualitative methods. The procedures explaining the cause - effect relationship were mainly used. Also were used: an economic analysis, time series analysis (analysis of the dynamics, structure and indicators) and comparative analysis. This enabled the identification and critical assessment of previously introduced measures to enhance human capital and material, as well as their role in competitiveness and current functioning of companies[9]. There were also other factors enumerated, aimed to strengthen competitiveness, as well as related knowledge resources, which were: reduced costs, increased level of innovation of products and services, increased productivity, improved customer relations, human capital development, corporate social responsibility of the organization and its ethical aspects[10].

In 2013, there were performed studies of modern management paradigms that are used in the current activities of food businesses. For this purpose, there were used companies in the food sector of the Warsaw Stock Exchange. They are expressed in WIG-Food Index. The food sector in the Polish economy has always had a significant position, representing the diet of the nation, and now, when there is a continuous increase in the prices of food products, its functioning is even more interesting. In global financial markets is increasingly noticeable interest in the prices of food products, and their indexes are the subject of speculation since the last crisis[11]. The WIG Food consisted of 07.03.2013 of the 25 companies[12]. His companies are attractive to investors, although in 2012 accounted for less than 3% of the total stock market and 10% of the capitalization of companies in the industrial sector. The aim of the research was to identify and describe modern management paradigms that are used in the current activities of food businesses.

9   **K. Firlej, D. Żmija,** [2014]: *Transfer...s. 13.*

10   *Ibid.*

11   More about this: **K. Firlej,** [2008]: *Stymulanty konkurencyjności w zarządzaniu spółkami z indeksu WIG – Spożyw- czy [w:] Zarządzanie przedsiębiorstwem w warunkach konkurencji, Uniwersytet Warmińsko – Mazurski, Olsztyn, s. 141-149.*

12   *WIG-Food companies included on 3.07.2013: Agroton Public Limited w Nikozji, AB Agro will Group w Wilnie, Ambra S.A. w Warszawie, Astarta Holding NV z siedzibą w Amsterdamie, Colian S.A. w Opatówku, Polski Koncern Mięsny Duda S.A. w Warszawie, Graal S.A. w Wejherowie, Industria lMilk Company S.A. w Luksemburgu, Indykpol S.A. w Olsztynie, Zakłady Mięsne Henryk Kania S.A w Pszczynie, Kernel Holding S.A. w Luksemburgu, Kofola S.A. w Warszawie, Zakłady Tłuszczowe KRUSZWICA S.A. w Kruszwicy, KSG Agro S.A. w Luksemburgu, Makarony Polskie S.A. w Rzeszowie, Zakłady Przemysłu Cukierniczego MIESZKO S.A. w Warszawie, Milkiland NV w Amsterdamie, Zakłady Przemysłu Cukierniczego Otmuchów S.A. w Otmuchowie, Ovostar Union N.V. w Amsterdamie, Pamapol S.A. w Ruśćcu, PBS Finanse S.A. w Sanoku, Przedsiębiorstwo Przemysłu Spożywczego PEPEES S.A. w Łomży, SEKO S.A. w Chojnicach, Belvedere S.A. w Beaune, we Francji i Wawel S.A. w Krakowie.*

6.3. Results

Considering the problem of human capital in enterprises of the food industry in Poland, employment in those was analysed for the period of interest. Based on data from the Central Statistical Office, it was found that since 2007, employment in all enterprises in the Polish food industry underwent total reduction, which was also due to dramatic cost savings, as well as the actions of a restructuring and modernization, especially in modernizing the fleet of machines. In many cases, the machine effectively replaced human labour, by which human capital has been replaced by modern technologies.

Table 1. **Employment and average wages and their dynamics in the food industry in the years 2007-2012**

EMPLOYMENT/WAGES	2007	2008	2009	2010	2011	2012
FOOD INDUSTRY EMPLOY-MENT (NO. OF PEOPLE):						
- FOOD PRODUCTION,	466 216	458 555	416 328	421 767	406 960	371 522
- SOFT DRINKS PRODUCTION,	-	-	29 843	26 514	26 605	23 968
- TOBACCO PRODUCTION.	7293	6844	6 367	6 024	5 612	5 581
AVERAGE WAGES IN FOOD INDUSTRY (PLN): - FOOD PRODUCTION,	2 467.0	2 673.09	2682.99	2 809.09	2950.02	3021.92
- TOBACCO PRODUCTION.	4 838.81	4897.39	5209.47	5287.61	5730.29	5830.01

Source: Central Statistical Office data, *Employment in national economy 2009, 2010, 2011, 2012*; *Employment and wages in national economy 2009, 2010, 2011, 2012*.

Employment and average wages and their dynamics in the food industry in the years 2007 - 2012 are shown in Table 1, and it can be concluded that during the period employment has decreased not only in the food industry in general, but also in all its employee groups. Over the six years in the case of food production it was 25% decrease, manufacture of beverages (since 2009) also 25%, and manufacturing of tobacco products 31%.

Positive, albeit small, but growing trend can be noted in the case of average wages in the food industry, as in the case of total food production in the period can be noted an increase of 22.49%, and the manufacture of tobacco products 20.48%. In relation to changes in other indicators of economic growth is not satisfactory, but it should be noted a positive trend in the tested range.

6.4. The Role of Human Capital in the Innovation of Enterprises of the Food Industry in the Years 2007-2011

When trying to set the role of human capital in the innovation of enterprises of the food industry, the changes that have occurred as a result of the implementation of innovations were assessed. Respondents evaluated the importance of change and their impact on innovation company using the rating scale from 0 to 6, where 0 meant the answer is definitely not, 1 - no, 2 - probably not, 3 - I have no opinion, 4 - rather yes, 5 - yes, 6 - definitely yes. The results presented in Table 2 highlighted that the implementation of innovative actions brought the expected results, which were well received by entrepreneurs. They emphasized that in the modern food industry functioning high standards of production and quality standards are being applied, to which each company has to respond and to survive in the market, simply apply. Unfortunately, entrepreneurs still among the most important factors do not see human capital, which was confirmed by the results of the research. It is difficult to identify the reasons for this, though, say the entrepreneurs, the level of their degree of human capital is sufficient, and certainly protects their current needs. Given the level of ratings 4, 5 and 6, which was considered conducive to the occurrence of the positive effect associated with the implementation of innovations, it was noted that a large group of companies - 70.3% indicated that the most positive result of the implementation of innovation in their company is to raise the level of customers satisfaction, then productivity growth (68.4%), increasing the range of products (59.9%), entry into new markets (57.8%) and an increase in the level of innovation of products and services (55%). Half of the respondents indicated that implemented innovations have contributed to the streamlining of internal processes, and 49.8% indicated cost reduction.

Table 2. **Effects of innovation observed in the period 2007 - 2011 the enterprises of the food industry**

The effects of the implementation	Percentage of answers						
	0	**1**	**2**	**3**	**4**	**5**	**6**
Cost reduction	8.2	12.1	11.7	18.2	21.2	21.7	6.9
Increase in the level of innovation of products and services	9.5	8.2	6.9	20.3	23.4	23.4	8.3
Increasing the range of products	9.1	8.2	11.2	11.6	18.5	29.3	12.1
Entry into new markets	9.9	12.1	9.1	11.1	25.0	19.0	13.8
Productivity growth	9.1	5.6	7.4	9.5	27.3	25.5	15.6
Increased level of customer satisfaction	7.3	5.6	6.5	10.3	23.7	29.8	16.8
Development of human capital	7.8	11.6	13.8	26.3	22.4	15.5	2.6
Streamlining internal processes	9.5	8.6	9.9	22.0	27.1	16.4	6.5
Faster adaptation to changes in the company	8.6	10.3	9.5	34.1	20.7	12.1	4.7

Source: own study, Firlej K. Żmija D., 2014: Transfer...s. 135.

The presented data shows that the least number of respondents believed that innovation contributed to the rapid adaptation to changes in the company (37.5%) and the development of human capital (40.5%). A pooled analysis of responses 0, 1, 2 indicated that in the opinion of many respondents innovations did not affect the development of human capital (33.2%), cost reduction (32%) and the entry into new markets (31.1%)[13].

The study conducted among 267 (241 responded) companies of the food industry proved statement of the reasons for the lack of introduction of innovative activity to be interesting (Table 3). It turned out that the main ones are associated with very high costs of innovation, and also the lack of financial resources. At the same time, respondents noted that the lack of need for the implementation of the innovation involved the introduction of them in the previous years. Such causes were also highlighted, as there is no need to innovate due to market conditions, and excessive economic risk of the implementation of innovative solutions. As a less significant causes of this kind were observed: lack of information on the possibility of implementing innovative solutions, lack of skilled workers, obsolete machinery and regulations, standards and regulations.

Table 3. **Reasons for not undertaking innovative actions in the company in the years 2006-2011**

Causes	No. of answers
No need to implement innovations due to the introduction of the previous years	36
No need to innovate due to market conditions	29
Too high economic risk of implementation of innovative solutions	28
High costs of innovation	54
Lack of financial resources	44
Lack of skilled workers	14
No information on the implementation of innovative solutions	16
Obsolete machinery	12
Regulations, standards, legal aspects	8

Source: own study

In order to analyse the practical implementation of modern management paradigms, the holistic approach of managers in all companies of the WIG-index was analysed in the test and is presented in the table presenting selected, most involved in these activities entities. Sequentially were presented and analysed paradigms of conditioned current approach and the status quo in the area of internationalization activities, such as the conduct of operations, human capital approach to quality management, environmental protection, marketing and attention to technological development. As seen above, among them also human capital was identified, which should be treated as a resource in the organization, which must be protected, nurtured and developed. As part of in-depth interviews and accessible reporting of companies surveyed, it was stated that food companies in their business often underestimate the role of human capital, although

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13   **K. Firlej, D. Żmija,** [2014]: *Transfer…s. 135.*

consider it as an important resource that contributes to the generation of the company's profits. Managers of companies allocate part of the revenue to the training and skills of employees. Competence of employees begins to provide for the position of the company, earned income and its perception by the competition. Many companies are beginning to invest in student placement, which subsequently result in the acquisition of highly skilled workers. Do not forget also about enabling the professional development of people with disabilities (tab. 3)[14].

Table 4. **The approach to human capital - employees as a resource in organizations and individuals**

Company	Current activities	Directions of activities
AB Agrow-illGroup	The company is obliged to take care of her loyal staff - good and reliable employees should be motivated by rewards commensurate with the results achieved. We understand that every employee should take care of the measures, which works not only protect, but also increase the value of the assets.	Enhancing human capital by training and upgrading skills and competencies of employees.
Astarta Holding NV	One of the values is to work in a team where each employee is a professional. The company draws attention to the personal and professional development of employees, providing favourable conditions for the work environment. This all affects the attitude of creative professionals, high productivity and low staff turnover. The specialists of the company are involved in training, conferences, seminars, both in Ukraine and abroad. For example, experts from the agricultural sector participated in international conferences in Belarus, the countries of the Balkans and Egypt.	It is planned to further participation of professionals in European training courses and international conferences.
Confectionery Plant MIESZKO SA	Human resource management is one of the main principles of personnel policy of the company. The company aims to work with ambitious, competent people who wish to develop their skills and broaden the scope of knowledge. For a company it is important to attracting employees engaged and opened. To achieve these purposes, professional recruitment. Employees, as practitioners who know the reality of the company have extensive knowledge and practical skills.	The Company intends to continue to invest in employee development, leading an intensive training program. Focuses on internal training and offers a wide variety of external training.

Source: own elaboration on the basis of information contained on the websites of the companies surveyed, and their accounts http://www.agrowill.lt/pl; (accessed: 28.06.2013)[15].

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[14]   **A. Bargieł, K. Firlej,** [2014]: *Nowoczesne paradygmaty zarządzania, jako element podnoszenia wartości spółek przemysłu spożywczego, Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie, Wydawnictwo UEK, Kraków.*

[15]   *Ibid.*

6.5. Summary and Conclusions

The results of studies on the role of human capital in the surveyed enterprises of the food industry, made it possible to construct the following conclusions:

The enterprises surveyed were not interested in bearing the cost of human capital development, mainly due to the high innovation cost with the lack of financial resources at the same time.

The enterprises surveyed did not notice the need of employee reconversion, stating that their human capital level is appropriate to conduct current activities and there is no need to expand it.

The study based on the practical test of human capital role in food industry enterprises shown that it strengthens their current activities and increases their market value. The development of managers and employees with an individual approach aimed at growth and development are one of the most important aims and ways of future actions in the companies.

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HUMAN CAPITAL IN POLISH AGRICULTURE IN THE BACKGROUND OF EUROPEAN UNION

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7.1. Introduction

The limited number of factors of production brings the need for research on the importance of human labor. The human factor plays an important role in the development of agriculture and rural areas[1]. The importance of human capital means that it is the main driving force of competitive advantage, contributing to the shaping of the firm or farm on the market[2].

According to K. Makowski [2000] human capital has an impact on[3]:

— innovation in the economy and society and their absorptive capacity to grasp and
— implement the world's scientific, organizational, mentality,
— institutional transformation and modernization of various types of structures,
— promotion and dissemination of modern consumption patterns and quality of life, and the development of modern technical and organizational infrastructure, information technology and social structures.

Today the importance and dignity of human capital and its importance for the development of the company is stressed. Assigning the leading role of human capital to the competitiveness of the company is important because of current changes in the market. This refers primarily to a marked increase in the level of education and qualifications of employees, growth aspirations, creativity and willingness to participate in the development of the company. As a result of these changes, the perception of workers mainly as a business expense has changed to treat them primarily as human capital[4].

Human capital includes intangible resources that employees provide to their employers. According to A. Pocztowski it includes *"specific features and properties embodied in workers (knowledge and skills, abilities, health, and motivation) that have*

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[1]   **E. Cyrson,** [2002]: *Nowy paradygmat strategii konkurencji (w:) E. Skawińska (red.), Konkurencyjność przedsiębiorstw- nowe podejście, PWN, Warszawa, s. 28.*
[2]   **M. Łojko, E. Górka,** [2009]: *Uwagi o zarządzaniu kapitałem ludzkim (w:), „Praca Socjalna" marzec- kwiecień, nr 2, s. 3.*
[3]   **K. Makowski,** [2000]: *Kapitał ludzki w skali mikroekonomicznej, Monografie i Opracowania SGH, nr 470, Warszawa.*
[4]   **T. Listwan,** [2010] (red.): *Zarządzanie kadrami, Wyd. C.H. Beck, Warszawa, s. 23.*

a specific value, and are a source of future income for both the employee-owner of human capital, as well as for the company benefiting from the same capital under certain conditions"[5]. M. Armstrong describes human capital as *,,part of the intellectual capital, which is accumulated through the organization of knowledge"*[6].

Human capital can be described as a factor in human organization, linking the intelligence, skills and expertise that give the organization specific quality. The elements of human organizations include the ability to learn, innovate and create. Ensuring the proper motivation can have an impact on sustainability of the organization in the long term[7]. According to T. Oleksyn, human capital can be treated the same as the broad competence of the employees. Competencies include mainly: the knowledge of workers and skills, creative thinking, ambition, motivation, the ability to work, or all of these factors that build the brand of companies, affect the interests of customers, and production capacity[8]. Employee competence is also a set of behaviors and attributes that allow employees to effectively perform the tasks[9].

In the development of human capital investments are important. Their goal should be learning, developing of new skills, and better alignment of farmers and entrepreneurs to changing environmental conditions[10]. Therefore, there is a need for research in the field of human capital and its impact on the efficiency of economic actors.

7.2. Aim and Methodology

The aim of the study was to evaluate human capital in Polish agriculture compared to other EU countries. We analyzed the managers of farms by age and province. The paper presents the educational level of the rural population. The agricultural population in EU countries was analyzed. The analysis included also the fertility rate. The sources of data for analysis were studied literature and Statistical Yearbook of Agriculture. The study takes into account the role of human capital in economic theory, ways of defining and measuring it, as well as problems with its determination. The following test methods were used for data analysis: analysis of trends and cross-comparative analysis. The results are presented in a descriptive, tabular and graphical form.

7.3. Definition and Structure of Human Capital in Economic Theory

The concept of human capital was already introduced in the fifteenth century by W. Petty. Then it was discussed by A. Smith, who described it as the acquired skills of man in the learning process. It forms part of fixed capital, which consists of: machines

5   **A. Pocztowski,** [2007]: *Zarządzanie zasobami ludzkimi, PWE, Warszawa, s.4.*
6   **M. Armstrong,** [2005]: *Zarządzanie zasobami ludzkimi, PWE, Warszawa, s.323.*
7   **A. Baron, M. Armstrong,** [2008]: *Zarządzanie kapitałem ludzkim: uzyskiwanie wartości dodanej dzięki ludziom, Oficyna Wolters Kluwer Business, Warszawa, s. 20-21.*
8   **T. Oleksyn,** [2006]: *Zarządzanie kompetencjami. Teoria i praktyka, Oficyna Ekonomiczna, Kraków, s. 23.*
9   **W. Walczak,** [2009]: *Rola kapitału ludzkiego w procesie rozwijania gospodarki opartej na wiedzy [w:] D. Kopycińska (red.), Kapitał ludzki jako czynnik przewagi konkurencyjnej, Wydawnictwo Uniwersytetu Szczecińskiego, Szczecin, s. 184.*
10   **M. Kozera,** [2011]: *Kapitał ludzki jako składnik kapitału intelektualnego w rolnictwie, Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego 11(26), z. 1,, s. 105-111.*

and tools, buildings, investments in the development of the agricultural economy and the skills of the organization[11]. At the beginning of twentieth century it disappeared from the area of interest of economics after critics such as A. Marshall claimed that, although human beings are part of mathematical capital, the analysis of this capital would have to take place in isolation from the market[12]. Renaissance studies on human capital took place in the 1960s. Accurate expression was used by J. Samul, who claimed that human capital is both very theoretically and empirically discoverable. Other definitions put the emphasis on the value that human capital creates for the organization.

J. Grodzicki argues that human capital is the knowledge, skills and capabilities of individuals having economic value to the organization[13]. H. Król and A. Ludwiczyński defined human capital as the total of the specific features and characteristics embodied in employees that have a specific value, and are a source of future income for both the employee - the owner of human capital, and for the organization benefiting from the same capital under certain conditions[14]. According to M. Juchnowicz, human capital is the driving force of development, hiding in huge opportunities that are revealed only when the enterprise is effectively managed[15]. A. Baron and M. Armstrong argue that human capital includes intangible resources that workers provide to their employers, such as intelligence, skills and expertise. Human capital is entered into the company, and is developed through experience and training[16].

Human capital is a very broad definition and can be difficult to explain (table 1). The most important problems of cognitive concept of human capital are:
— examining a variety of levels of human capital,
— under many varied definitions,
— the lack of agreement by researchers about the structural elements of human capital,
— the development of management concepts related to human capital, such as knowledge management, talent management, and competent management, and
— different approaches taken by different scientific disciplines, such as social, economic, sociological, humanities, and technical.

[11] **G. Łukasiewicz,** [2005]: *Metody pomiaru kapitału ludzkiego (w:) M. G. Woźniak (red.) Nierówności społeczne a wzrost gospodarczy, Kapitał ludzki i intelektualny część 1, zeszyt 6, Uniwersytet Rzeszowski, s. 37-45.*

[12] **Z. Czajkowski,** [2012]: *Kapitał ludzki – pojęcie i miary, Wydawnictwo SGH w Warszawie, Warszawa 2012, s. 5.*

[13] **J. Grodzicki,** [2003]: *Rola kapitału ludzkiego w rozwoju gospodarki globalnej, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2003, s. 42.*

[14] **H. Król, A. Ludwiczyński,** [2006]: *Zarządzanie zasobami ludzkimi. Tworzenie kapitału ludzkiego organizacji, PWN, Warszawa 2006, s. 42.*

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[16] **A. Baron, M. Armstrong,** [2008]: *Zarządzanie kapitałem ludzkim. Uzyskiwanie wartości dodanej dzięki ludziom, Wolters Kluwer Polska, Kraków 2008, s. 21.*

Table 1. **Elements of human capital structure**

Author	Structure of human capital	Elements of human capital structure
J. Ross,	Attitudes	motivation, professed beliefs, behaviors
G. Roos,	Competences	knowledge, skills possibilities
N.C. Dragonetti	Intelectual skills	ability to analyze and synthesizing, adapting
Skandia Group	Relation	motivation, interpersonal relationships, the ability to share knowledge and confidence
	Competences	knowledge, skills, abilities, styles, actions, personality
	Values	system of values and norms recognized by co-workers, due to the culture of the organization
J. Fitzenz	Characteristics	intelligence, energy, attitude, commitment
	Skills	absorption of mind, common sense, creativity
	Motivation and know-ledge	information sharing, team spirit, goal-oriented
M. Bratnicki,	The competence	talents, knowledge, practical skills
J. Strużyna	Intellectual skills	innovation, the ability to imitate, entrepreneurship
	Motivation	willingness to act, personality traits, motivation, power, organizational, managerial leadership
E. J. Szymańska	Age, education, health, experience	age of farmers, level of education, experience, state of health, family traditions, acquire knowledge

Source: J. Samul, Pojęcie kapitału ludzkiego w opinii menedżerów personalnych, „Zarządzanie i Finanse" z 2012 r., nr 2, s. 195.

The different classifications of human capital are widely considered to be the main factor in increasing the value of the company[17]. Human capital, an intangible asset, together with material resources, are the economic value of the company. It is a non-financial capital, which constitutes the difference between the market value and the size of the book value.

Human capital is important in farms, too. One of the components of human capital is the education of farmers, and a low level can be a limiting factor for the development of rural areas. The importance of the farmers' education is particularly essential with farms in the common market of EU, because of the requirements of the Common Agricultural Policy and the new challenges of adapting to EU standards. Generally, the agricultural population has a lower level of education than the urban population, and the main causes of this phenomenon are: the smaller number of schools in the country, the high cost of commuting from rural to urban areas, or underestimating the importance of education by farmers and their families[18]. In addition, a higher level of education affects the scientific and technical progress in agriculture. The farmer is responsible for the introduction of progress on the farm, and his knowledge and skills allow him to achieve the benefits of management[19].

[17]   **P. Bochniarz, K. Gugała,** [2005]: *Badanie i pomiar kapitału ludzkiego w firmie*, Poltext, Warszawa, s.17.
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[19]   **R. Michałek, A. Peszek,** [2012]: *Wykształcenie rolnika a wskaźnik postępu naukowo-technicznego i wskaźnik efektywności postępu, Inżynieria Rolnicza Z. 2(36), t. 1, s. 241-248.*

7.4. Methods of Human Capital Measurement

The importance of human capital makes many economists attempt to measure it. One of the main tasks is to find an effective method of measuring human capital. The common methods for measuring human capital can be divided into two groups: income and cost. A third group of human capital measurement uses measures of quality. The first group of methods is based on discounting the expected income. There are connections between the capital value and the income generated by it[20]. The value of human capital can therefore be counted by discounting its future income. The second group of methods for measuring human capital use the cost approach. In this method, the value of human capital is calculated as the capitalized costs incurred for education and maintenance. A proposal for the measurement of human capital is given by cost methods. M. Dobija gives the possibilities of human capital measurement using following equation[21]:

$$H(T)=(K+E)(1+Q(t))$$

where:
H(T) – value of human capital,
T – number of years at work,
K – capitalized costs maintenance,
E – capitalized costs of education, and
Q(T) – value gained by experience.

On the other hand, human capital will be calculated as the sum of the costs incurred for the recruitment, employment and training[22]. The most common method of measuring human capital quality is to determine the level of public education. This can be done in two ways:

— in the person, it is calculated as percentages of those who completed their studies at various levels of the education system;
— in the population, it is calculated as the average number of years of education per unit.

So far, the most common approach to measuring the quality of human resources in farms was to determine the level of education for heads of these units[23].

Based on the literature review and reflection, E. Szymańska[24] prepared its own proposal in the form of a synthetic indicator of human capital. The procedure included the creation of four stages: selection of variables, their standardization, giving weight and measure of aggregate structure. Among the sub-variables the most important are: age of farmers, education level, number of years of pig breeding, health, reading specialist press, participation in training, visiting other farms, participation in shows and demonstrations, and family traditions. On the basis of this ratio human capital in a group of 80 farms specialized in the production of pork by large-scale production was determined in 2010.

[20] **R.S. Domański,** [1993]: *Kapitał ludzki a wzrost gospodarczy, PWN, Warszawa, s. 51.*

[21] **M. Dobija,** [2000]: *Human Resource Costing and Accounting as a Determinant of Minimum Wage Theory, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie nr 553, s. 39.*

[22] **G. Łukasiewicz,** [2005]: *Metody pomiaru kapitału ludzkiego (w:) M. G. Woźniak (red.) Nierówności społeczne a wzrost gospodarczy, Kapitał ludzki i intelektualny część 1, zeszyt 6, Uniwersytet Rzeszowski, s. 37-45.*

[23] *Human Capital Investment: an International Comparison. Centre for Educational Research and Innovation, Paris 1998: Organization for Economic Co-operation and Development (OECD).*

[24] **E. Szymańska,** [2011]: *Efektywność gospodarstw wyspecjalizowanych w produkcji żywca wieprzowego w Polsce. Wydawnictwo SGGW, Warszawa.*
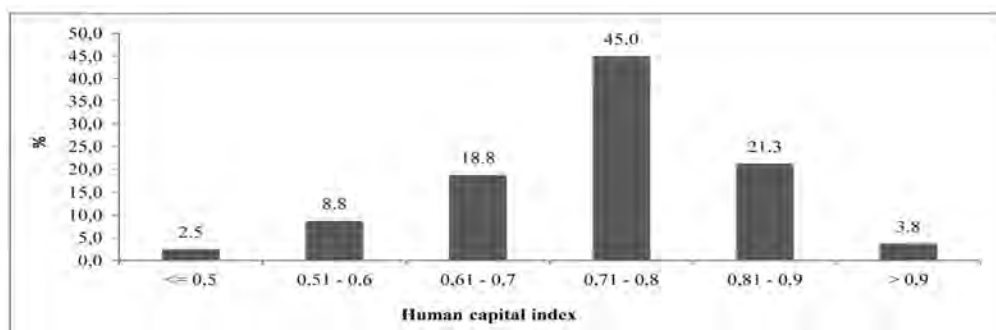
Figure 1. **Structure of farmers group according to human capital index**

Source: own study

Calculations show that the synthetic indicator of human capital in the study population ranged from 0.41 to 0.94 (Fig. 1). In 45.0% of farmers this ratio ranged from 0.71 to 0.80. Nearly 19.0% of the farmers represented at the level of human capital from 0.61 to 0.70. However, for more than one fifth of households the synthetic human capital index was high and ranged from 0.81 to 0.90.

7.5. Rural Population in Poland and Other Countries of European Union

It is important to recognize the percentage of the rural population living in the European Union. The data presented in figure 2 indicate a wide variation percentage of the agricultural population in % of total population in the EU. The three countries with the highest percentage of rural population in 2011 were: Poland (14.4%), Portugal (11.1%) and Lithuania (9.3%).
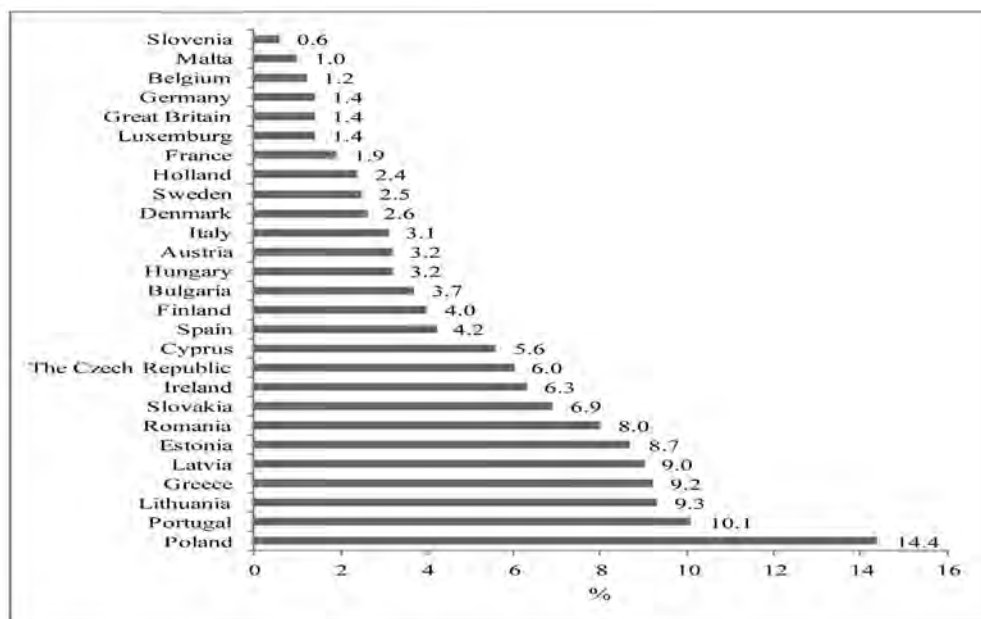
Figure 2. **Agricultural population in % of total population in 2011**

Source: Statistical Yearbook of Agriculture, Central Statistical Office, Warsaw 2013

In turn, the countries with the lowest percentage of agricultural population in 2011 were: Slovenia (0.6%), Malta (1.0%) and Belgium (1.2%). These data indicate a clear predominance of the rural population in the new EU members compared to the old EU countries, which are facing a strong economic crisis.

The situation is different for the proportion of the analysis of economically active population in agriculture in % of total population in 2011 in EU (Fig. 3). Slovenia has the smallest percentage of the population economically active in agriculture. In this analysis we can discover that, the economically active population in Poland accounted for 7.5% of the total population, Greece (5.4%), Latvia (4.9%). A large percentage of the rural population in the rural population in Poland and the Baltic states should explain the nature and traditions of family farming, where farms are transmitted to their successors. In addition, the agricultural population in Poland and the Baltic states has a large attachment to the land, and it is the residue of historical conditions where these countries lost their independence for many years.
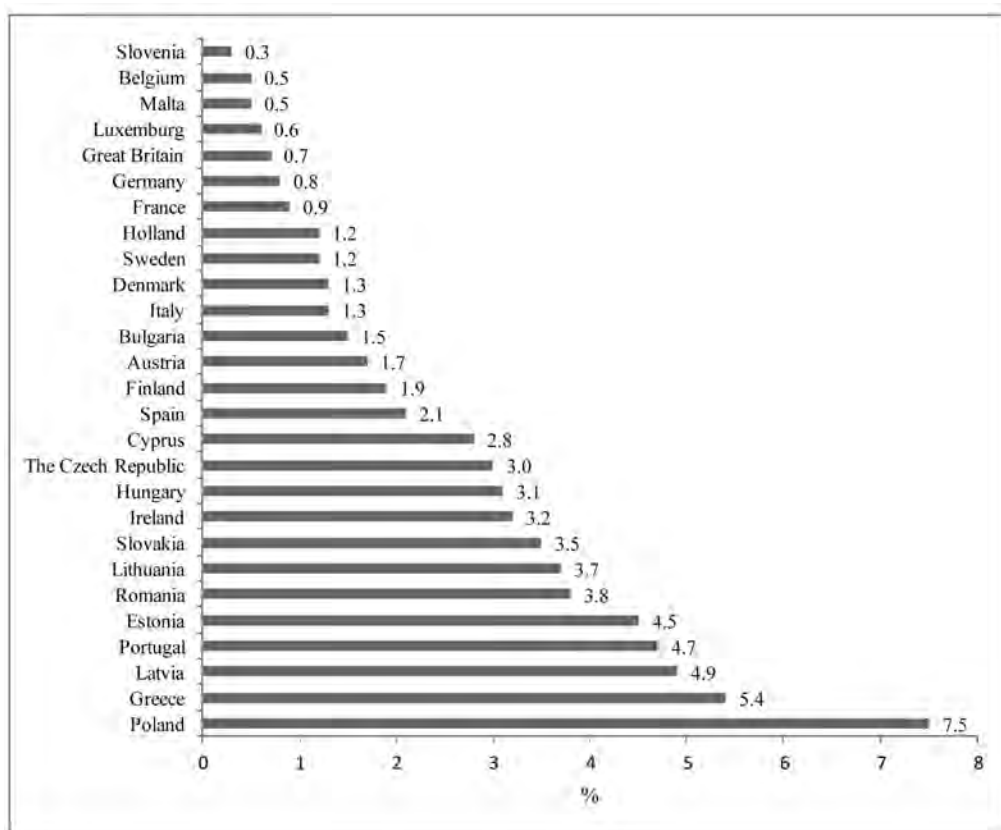
Figure 3. **Economically active population in agriculture in % of total population in 2011**

Source: Statistical Yearbook of Agriculture, Central Statistical Office, Warsaw 2013

7.6. Chosen Characteristics of Human Capital in Polish Agriculture

Human capital in rural areas in Poland shows large geographical differences (Figure 4). In general, human capital in rural areas has an average age of 40 to 65 years. The ratios are higher than the national average (64%) in the following provinces: Dolnośląskie, Pomorskie, Kujawsko-Pomorskie, Łódzkie, Oposkie and Podlaskie. The average rate of the population aged 65 years and over for Poland in 2010 was 11%. Its higher value reported in the following provinces: Dolnośląskie, Lubuskie, Podkarpackie, Śląskie and Świętokrzyskie. These provinces will have to deal with the fastest rate of aging of the heads of households, which can translate into problems in their development.
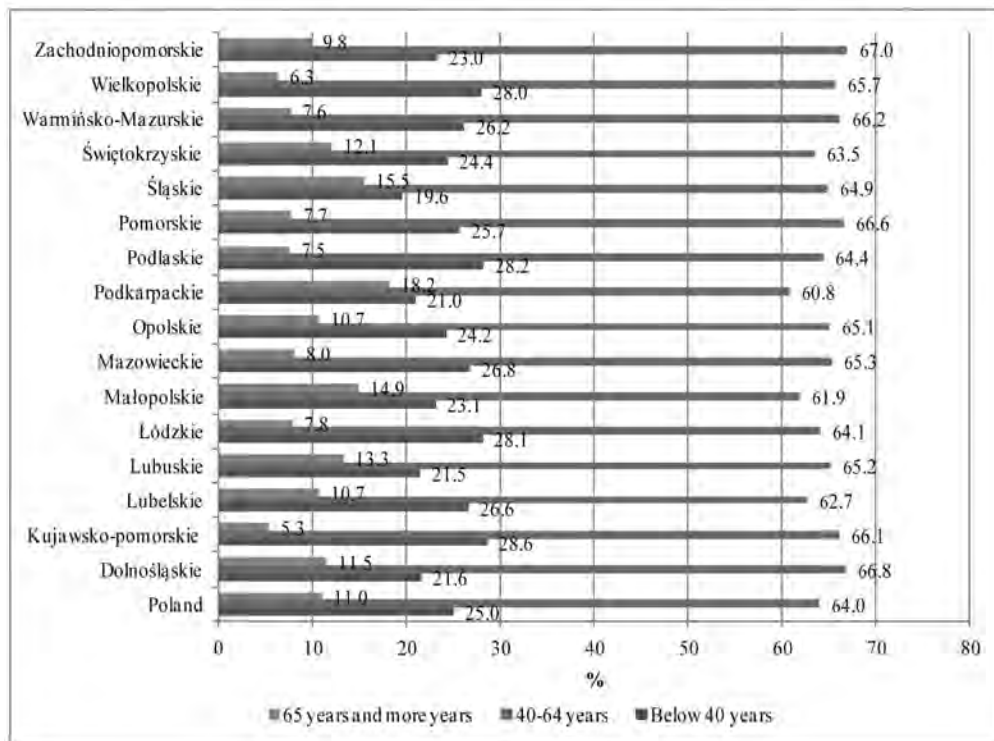
Figure 4. **Managers of farms by age and provinces in Poland in 2010.**

Source: Charakterystyka gospodarstw rolnych 2010-Wyniki PSR 2010, GUS

The extent to which society is reborn in the countryside and in the city is important. For this purpose, fertility rates were used. The fertility rate is a coefficient to measure the number of children born per woman of childbearing age (15-49 years). It is assumed that the total fertility rate between 2.10 ÷ 2.15 is the level that provides the replacement of generations"[25]. The collected data show that the total fertility rate in rural areas is higher than in urban areas (Figure 5). However, neither the city nor rural fertility rate exceeds 2.15. This means that in the future we should expect an aging population both in the countryside and in the city.

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[25]   **M. Porta,** [2008]: *A Dictionary of Epidemiology. Oxford University Press.*
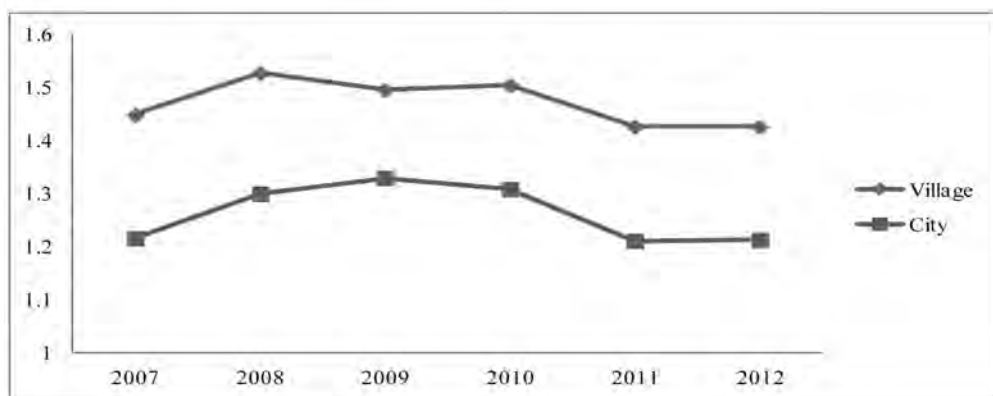
Figure. 5. **The fertility rate in Poland**

Source: Mały Rocznik Statystyczny, GUS, Warszawa 2012.

It was important to recognize the level of education of the rural population. For this purpose we analyzed the data from the Agricultural Census in 2002-2010 (Fig. 4 and Fig. 5). From these data it can be seen that both the number and percentage of people with higher education and secondary vocational education increased in the years 2002-2010. This trend may lead to more educated people settling down in rural areas, which may contribute to the multifunctional development of rural areas. Of course, people living in rural areas are not only farmers, but also their family members and a sizeable non-agricultural population.
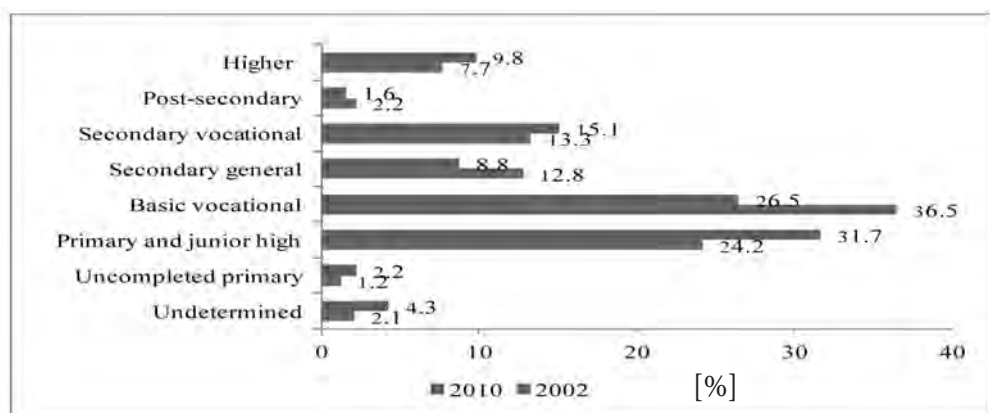
Figure 6. **Education of the population in rural areas (per cent)**

Source: PSR-Powszechny Spis Rolny 2010

The agricultural population in Poland is dominated by people with vocational and basic education. In the years 2002-2010 the percentage of rural population with vocational and secondary education has increased (Fig. 6).

7.7. Conclusion

Human capital has an important role in the development of business entities. Human capital has an impact on the development of farms and agriculture, too. It helps in the adjustment processes of farms to European Union standards and in implementation of new technologies of production.

Human capital in rural areas in Poland shows large geographical differentiation. Most managers of farms range in age from 40 to 64 years. Most farmers under the age of 40 years occur in regions of Wielkopolskie, Podlaskie, and Łódzkie. On the other hand the bigger percentage of farmers at the age above 65 occur in the Podkarpacie (18.2%), Śląskie (15.5%) and Małopolskie (14,9%) provinces. The collected data proved that the oldest farmers are in regions of small farms and with difficult conditions of development.

The lowest proportion of the rural population has professional education. Of the Polish rural population 9.8% had higher education. Given the fact that the village population is 41.1% of the rural population, the proportion of the rural population having a university degree is only about 4%. There is a low rate, which indicates the need for further education and skills of the agricultural population.

The agricultural population in Poland represents a significant proportion of the total. In other EU countries, this ratio is much lower, especially in Belgium, Germany, and Great Britain. The high proportion of the rural population in Poland and other Eastern European countries indicates the importance of agriculture. It also indicates the family character of farms, where successors are mostly family members of the farmers. At the same time, the high rural population requires action in order to develop the human capital associated with agriculture.

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OPTIMAL HEDGING WITH CUMULATIVE PROSPECT THEORY CONCERNING PEOPLE BEHAVIOUR

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8.1. Introduction

Cumulative prospect theory (CPT) is a leading alternative to expected utility and shares characteristics with rank dependent utility (Quiggin, 1982) and prospect theory (Kahneman and Tversky, 1979). It is designed to account for the divergences between how expected utility predicts people will behave and how people actually do behave. Cumulative prospect theory was pioneered by Tversky and Kahneman (1992) as an improvement over Prospect Theory. Ten years later, Kahneman won the Nobel Prize --"for having integrated psychological research into economic science, especially concerning human judgment and decision making under uncertainty" (Nobel Foundation).

8.2. Valuation Functions

In prospect theory and CPT the outcomes of lotteries are measured using a valuation function and a reference point. Outcomes below the reference point are called losses, and outcomes above the reference point are called gains. The agent is not so much concerned with the payoff but its deviation from the reference point. The shape of the valuation function is typically steep and convex in the domain of losses, while it is flat and concave in the domain of gains. At the reference point the function is kinked. Figure 1 depicts the shape of a typical valuation function.

Tversky and Kahneman (1992) argue that the shape of the valuation function depicted in Figure 1 has two desirable properties with respect to observed human behavior – diminishing sensitivity and loss aversion. If an agent's behavior exhibits diminishing sensitivity, then marginal changes relatively farther from the reference point are psychologically less important than marginal changes near the reference point. Diminishing sensitivity implies diminishing marginal utility right of the kink and diminishing marginal disutility left of the kink.
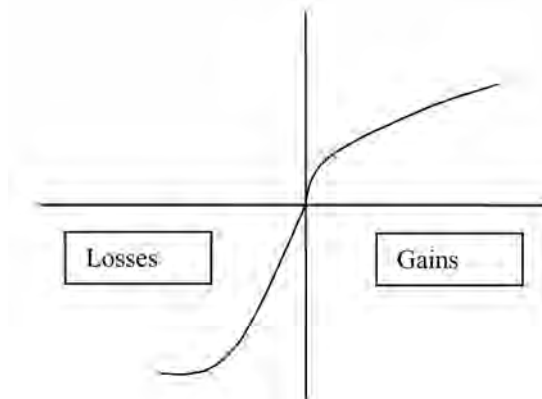
Figure 1. **Cumulative prospect theory valuation function**

Source own elaborations

To ensure diminishing sensitivity, the valuation function, $u(.)$, is concave above the reference point, and it is convex below the reference point. If 0 is the reference point, then $u''(x) \leq 0$ when $x \geq 0$, and $u''(x) \geq 0$ when $x < 0$. An agent who exhibits loss aversion will not be attracted to gambles that have a 50 percent chance of winning \$x and a 50 percent chance of losing \$x. Loss aversion is ensured by requiring that $u'(x) < u'(-x)$ for $x \geq 0$.

The valuation function used in this paper is the same one used by Kahneman and Tversky (1992). The function has the following form:

(1) $u(x) = u^+(x) = x^\alpha$,   for $x \geq 0$, and

(2) $u(x) = u^-(x) = -\lambda(-x)^\alpha$,   for $x < 0$,

where α and λ are preference parameters. Equation (1) is the valuation function for losses, and equation (2) is the valuation function for gains. The effects on the valuation function of changing α are depicted in Figure 2.
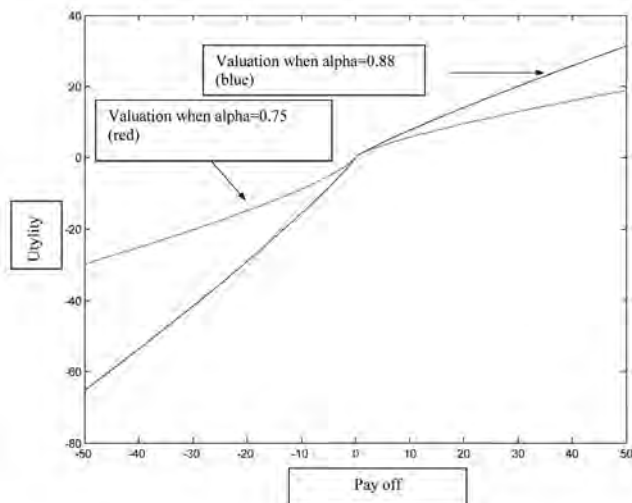
Figure 2. **Comparison of CPT valuation function for two different α values**

Source: own calculation

From Figure 2 it is clear that increasing the alpha value causes the valuation function to shift higher for losses and lower for gains, requiring that the two functions cross each other at the reference point. The net effect is an agent who is relatively less sensitive to the lowest and highest outcomes. If $\alpha = 0$ the agent gets the same utility from every payoff. Increasing the lambda value lowers the valuation function below the kink, in this paper the lambda value will not be changed. Kahneman and Tversky (1992) used 0.88 for alpha and 2.25 for lambda[1].

8.3. Probability Weighting

In CPT the probabilities of events are explicitly weighted to reflect the subjective beliefs of the agent. Because CPT treats losses and gains differently some additional notation is needed in order to understand how probabilities are weighted. The superscripts + and - reflect gains and losses: $x_i^+ = x_i$ for values above the reference point, and 0 otherwise, and $x_i^- = x_i$ below the reference point and 0 otherwise. Furthermore each outcome has an associated probability, which can be grouped with it and written as $\{ x_i^+, p_i^+ \}$ or $\{ x_i^-, p_i^- \}$.

Within each category, gains or losses, the prospects are sorted into ascending order. A nonlinear transformation function is then applied to the *cumulative* probabilities in the following manner.

(3) $w_n^+ = \pi^+ (p_n)$

(4) $w_{-m}^- = \pi^- (p_{-m})$

(5) $w_i^+ = \pi^+ (p_i + ... + p_n) - \pi^+ (p_{i+1} + ... + p_n) \quad 0 \leq i \leq n-1$

(6) $w_i^- = \pi^- (p_{-m} + ... + p_i) - \pi^- (p_{-m} + ... + p_{i-1}) \quad 1 - m \leq i \leq 0$

The w^- are the weights for losses and the w^+ are the weights for gains. The nonlinear transformation function, $\pi(.)$, will be discussed shortly.

Given (3) through (6), CPT requires maximizing $V(x)$, defined as follows.

(7) $V(x) = V(x^+) + V(x^-)$

(8) $V(x^+) = \sum_{i=0}^{n} w_i^+ u^+ (x_i)$

(9) $V(x^-) = \sum w_i^- u^- (x_i).$

$V(.)$ is the sum of the CPT for gains, $V(x^+)$, and the CPT for losses, $V(x^-)$.

For this research two different types of weighting functions will be used. The first and simplest is the power function:

[1]   **D. Kahneman, A. Tversky,** [1979]: *Prospect Theory: an analysis of decision under risk, Econometrica Volume 47 Number 2.*

(10) $\pi(p) = p^\delta$.

The parameter δ determines whether the agent is a pessimist or an optimist[2]. A pessimist has a subjective expected payoff lower than the actual expected payoff, and δ < 1.00 implies pessimism. An optimist has a subjective expected payoff higher than the actual expected payoff, and δ > 1.00 implies optimism. A subjective expected value is calculated using subjective probability weights instead of the actual probabilities. Higher subjective moments can also be calculated. Pessimists, as defined by (10), will tend to have higher than actual subjective variances while optimists, as defined by (10), will always have lower than actual subjective variances.

Gains and losses are modeled separately so an agent can have different subjective beliefs about gains and losses. For instance, an agent could be pessimistic about losses but optimistic in gains. This agent has different δ values for gains and losses. Therefore, $\pi^-(p) = p^{\delta_1}$, and $\pi^+(p) = p^{\delta_2}$.

The second type of probability weighting function is S shaped and has the following functional form:

(11) $\pi(p) = \dfrac{p^\delta}{[p^\delta + (1-p)^\delta]^{1/\delta}}$ $0 < \delta \leq 1$.

This weighting function over-weights low probability events and under-weights high probability events. Equation (11) also implies optimism, although S shaped weighting functions tend to yield higher than actual subjective variances than typical δ values used in power weighting functions.

8.4. Hedging Model

The two-period hedging model used in this paper is similar to the one used by Lapan, Moschini, and Hanson (1991)[3], with modifications by Frechette (2000 and 2001). It represents the decision faced by a natural long hedger (buyer in the spot market) using futures and options to hedge. The hedger's per-unit profits, $\tilde{x}$, are:

(12) $\tilde{x} = -\tilde{s} + (\tilde{g} - f)h_1 + (\tilde{v} - r)h_2 - t_1 \mid h_1 \mid -t_2 \mid h_2 \mid +c$,

where ~ denotes a random variable. The spot price at the time of the spot transaction is denoted $\tilde{s}$, the futures price today is f, the futures price at the time of the spot transaction is $\tilde{g}$, the option price today is r, and the option price at the time of the spot transaction is $\tilde{v}$. The proportion hedged in the futures market is h_1, and the proportion hedged in the options market is h_2. Associated transactions costs are t_1 and t_2. Markets are assumed to be unbiased.

The futures hedge ratio (h_1) is positive for a long hedger, and the options hedge ratio (h_2) is positive for an agent that buys call options. The spot price and the futures price

[2]   **J. Quiggin**, [1993]: *Generalized Expected Utility Theory: The Rank Dependent Model. Kluwer Academic Publisher, US: Norwell.*

[3]   **H. Lapan, G. Moschini, S. Hanson,** [1991]: *Production, Hedging, and Speculative Decisions with Options and Futures Markets. American Journal of Agricultural Economics 73.*

at expiration are random, and it is assumed that they are distributed bivariate normal. The option price is the expected value of holding the option for the whole period and is derived from the probability density of futures. The final term, c, is normalized to zero. It represents all other profits that are treated as fixed with respect to the hedging decision.

The hedger solves the following optimization problem.

$$(13) \quad \max_{h_1, h_2} \quad \sum_{i=1}^{I} \sum_{j=1}^{J} u^+(x) w^+(g_i, s_j) + \sum_{i=1}^{I} \sum_{j=1}^{J} u^-(x) w^-(g_i, s_j)$$

$$(14) \quad u^+(x) = x(g, s)^{\delta_2} \quad x(g, s) \geq 0$$

$$(15) \quad u^-(x) = -\lambda(-x(g, s)^{\delta_1}) \quad x(g, s) < 0$$

$$(16) \quad w^+(g_i, s_j) = \pi^+(F(g_i, s_j) - \pi^+(F(g_{i+1}, s_{j+1}))$$

$$(17) \quad w^-(g_i, s_j) = \pi^-(F(g_i, s_j) - \pi^-(F(g_{i+1}, s_{j+1}))$$

The discretized numerical support of $\tilde{g}$ and $\tilde{s}$ is indexed by i and j, between -6 and +6 standard deviations from their means. $F(.)$ is the bivariate cumulative density function. Two different types of weighting functions, $\pi(.)$, will be used, corresponding to equations (10), and (11). There is a weighting function for losses and a weighting function for gains, and consequently for each model there will be two δ values, δ_1 for losses and δ_2 for gains. The optimization was conducted in Matlab.

8.5. Data

Data from a specific application allow numerical results to be calibrated to a real situation. In this application, the hedger is a Pennsylvania corn buyer hedging weekly corn purchases. The agent can take a long position in corn futures and/or a long position in calls. The agent is also allowed to take short positions in both instruments although this would suggest speculative behavior. The spot prices are weekly corn prices in Southeastern Pennsylvania, a sub-sample of the data used by Frechette (2000 and 2001)[4]. They are collected by the Pennsylvania Department of Agriculture each week on Monday morning before the markets open. The corn futures prices are the previous Friday's closing prices from the nearby contract traded at the Chicago Board of Trade. The data are weekly for 1997 - 1998. The spot price variance and its covariance with the futures price are computed using the residuals from an ARIMA forecasting model. Summary statistics are presented in Table 1.

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[4] **D. Frechette**, [2000]: *The Demand For Hedging and the Value of Hedging Opportunities, American Journal of Agricultural Economics Volume 82.*

Table 1. **Descriptive statistics for spot and futures prices**

VARIABLE	MEAN (C/BU)	VARIANCE (C²/BU²)	COVARIANCE (C²/BU²)
LOCAL SPOT PRICE	291.4	31.31	38.66
CHICAGO FUTURES PRICE	255.22	60.27	38.66

(c: cents, bu: bushel)
Source: Pennsylvania Department of Agriculture.

Only the at-the-money call option is considered. Markets are assumed to be unbiased, so the options price is modeled as the expected value of the futures price minus the strike price, truncated at zero, that is $E[\max(\tilde{p} - k, 0)]$. The option price is 3.09 cents per bushel, and this value is fixed throughout the scenarios described below.

When transaction costs are included, they represent the marginal costs of trading, in cents per bushel. These costs include brokerage fees and opportunity costs. Some of the scenarios will not use trading costs, but otherwise they will be two cents per bushel for futures and one cent per bushel for options.

8.6. Results

There are two distinct sets of results to discuss. In the first section, power weighting functions like equation (10) will be used in conjunction with power valuation functions, like equations (1) and (2), to calculate CPT hedge ratios. The power weighting functions allow for different combinations of relative optimism and pessimism with respect to losses and gains. This setup permits a thorough analysis of the power weighting function because any variation in hedging behavior cannot come from changes in the valuation function.

The second set of results will use S shaped probability weighting functions, equation (11), and rely on parameters found in experimental CPT research. Power valuation functions, equations (1) and (2), will be used.

Within each section results will be presented for models that include only futures, and models that include futures and options on futures. Models with and without transactions costs will also be presented. In all the scenarios, the reference point is the undistorted expected spot price, 291.40 cents per bushel.

8.7. Power Valuation Functions

In this section there are 25 different combinations of weighting function parameters. The parameter values and a description of behavioral implications are shown in Table 2. When the weighting function parameter is 1.00 the relevant probabilities are not distorted. When it is 1.00 for both losses and gains then CPT is equivalent to expected utility.

Table 2. **Parameter values for CPT weighting functions**

Description	Parameter Value
Highly Pessimistic	0.30
Slightly Pessimistic	0.70
Undistorted	1.00
Slightly Optimistic	1.50
Highly Optimistic	2.00

Source: own calculations

8.8. Power Weighting Function - Futures Only Results

The first set of scenarios uses power weighting functions and limits the hedger to using only futures and not options. Table 3 depicts the optimal hedge ratios for an agent who is pessimistic in losses over the entire range of delta values used for gains. The reference point (-291.40 cents) has been included in the subjective expected payoffs. The normalization has no effect on the results.

The first row of the table is for the expected utility case. The expected utility hedge ratio (EUHR) can be calculated when $d_1 = 1.0$ and $d_2 = 1.0$. When there are no transactions costs the optimal hedge ratio is 0.6449. The reduction in variance is large, 31.31 to 6.51, and the subjective expected payoff is not affected by hedging.

For every case shown the optimal hedge ratio in the futures market (fhr) is essentially the same as the EUHR, at least up to the first two decimal places. When the agent is highly pessimistic in losses, $d_1 = 0.3$, the agent hedges the same amount for all values of d_2, and the optimal hedge is 0.6407. In every case the subjective variance is reduced, and all of the reductions are quite large.

When $d_1 = 0.3$ and $d_2 = 2.0$, the agent is highly pessimistic in losses and highly optimistic in gains. The greatest reduction in subjective variance is observed, from 130.24 to 27.09. It should also be noted that when $d_1 = 0.3$ and $d_2 = 2.0$ the loss mode and gain mode are the furthest apart and there is the greatest amount of dispersion in the overall subjective distribution. In every case the subjective expected value is increased after hedging.

Similar results are found when the agent is moderately pessimistic in losses, represented by $d_1 = 0.7$. The optimal hedge ratio is 0.6421 when $d_2 = 0.3$ and 2.0 and 0.6407 for the other cases. The subjective variances are consistently reduced and the subjective expected values are consistently increased. An exception occurs when the subjective expected value is reduced from -291.15 to -291.28 after hedging. This lone reduction in subjective expected value is observed in the only case where the subjective expected value is greater than -291.40 prior to trading.

Because the weighted density functions are not normal, variance may not be a very good measure of dispersion. Figure 3 shows the effects hedging has on the entire distribution of subjective weights when $d_1 = 0.3$ and $d_2 = 2.0$. In this case there is the greatest divergence between the hedger's subjective beliefs about losses and gains relative to the reference point.

Table 3. **Futures hedge ratios for agents pessimistic in losses with no transactions Costs**

Delta 1	Delta 2	Fhr	At optimal Hedge		Without Hedging	
			M_A	V_A	M_A	V_A
1.0	1.0	0.6449	-291.40	6.51	-291.40	31.31
0.3	0.3	0.6407	-294.84	14.59	-298.94	70.14
0.3	0.7	0.6407	-294.43	18.51	-298.05	88.97
0.3	1.0	0.6407	-294.16	20.97	-297.46	100.79
0.3	1.5	0.6407	-293.78	24.36	-296.61	117.11
0.3	2.0	0.6407	-293.45	27.09	-295.88	130.24
0.7	0.3	0.6421	-292.68	5.95	-294.20	28.60
0.7	0.7	0.6407	-292.27	8.12	-293.31	39.03
0.7	1.0	0.6407	-292.00	9.42	-292.72	45.28
0.7	1.5	0.6407	-291.61	11.13	-291.87	53.52
0.7	2.0	0.6421	-291.28	12.43	-291.15	59.78

Source: own calculations

Figure 3 clearly shows that this agent is trading to reduce risk. The upper and lower modes are pushed closer together towards the reference point. This also suggests that reductions in subjective variance can be used as proxies for hedging effectiveness in this case even though the distributions are multimodal.
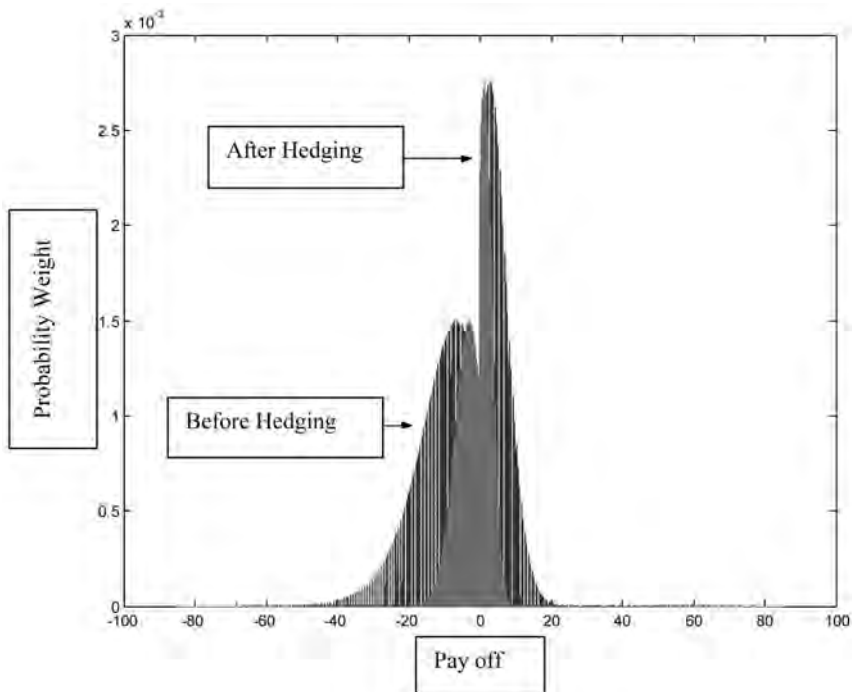
Figure 3. **Effects of hedging when highly pessimistic in losses and highly optimistic in gains**

Source: own calculations
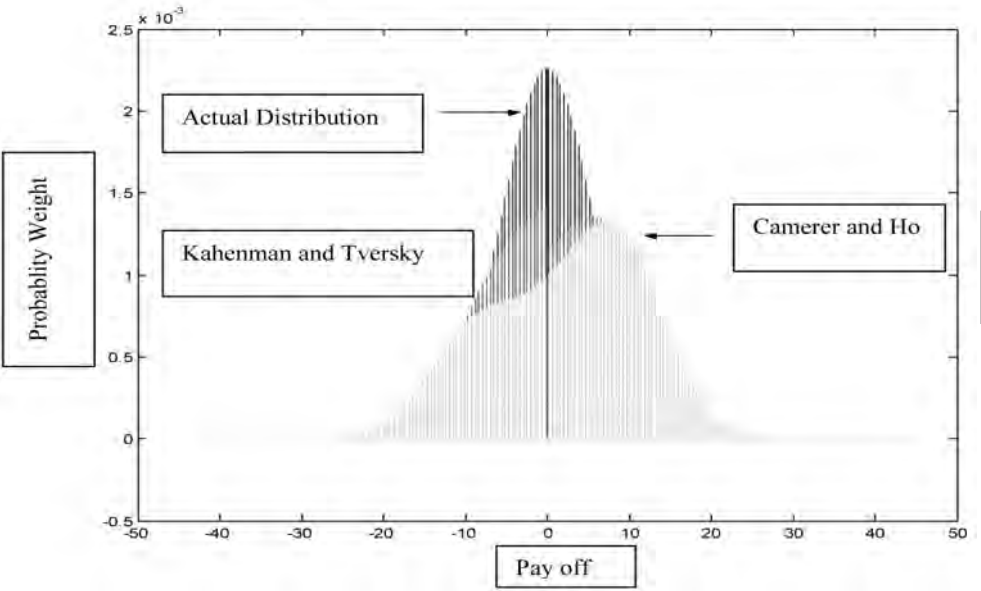
Figure 4. **Kahneman & Tversky and Camerer & Ho weight distributions**

Source: own calculations
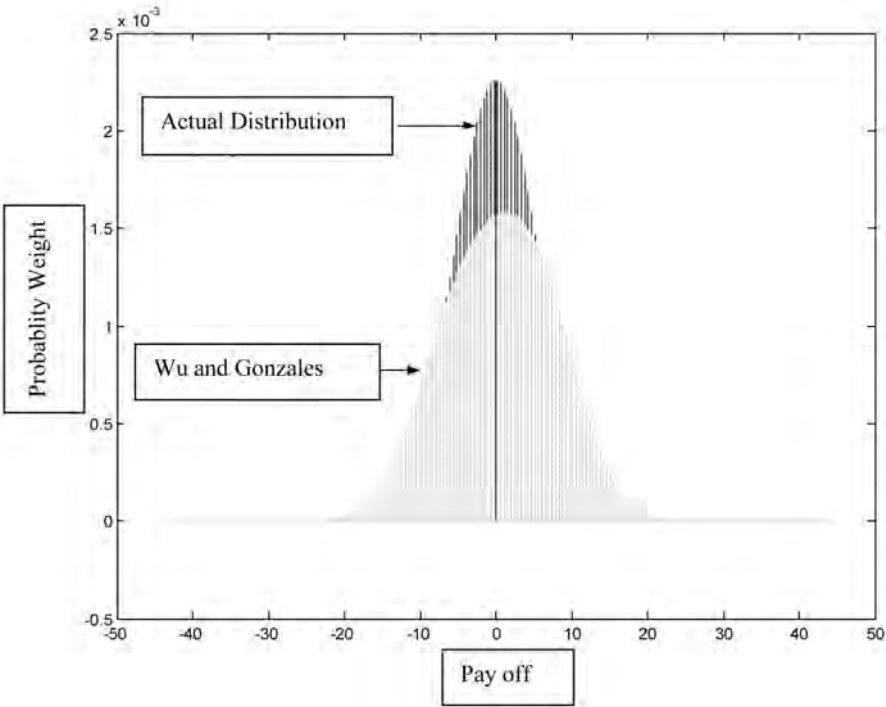
Figure 5. **Wu and Gonzales weight distribution**

Source: own calculations

The next table, Table 4, shows the optimal hedge ratios when the agent does not distort losses and when the agent is optimistic about losses. The first row of Table 4 corresponds to the expected utility case. These results are very similar to the results from the previous table. Across the entire range of d_1 and d_2 there is very little variation in the optimal hedge ratios, and the CPT hedge ratio is basically equivalent to the EUHR. The subjective variance is reduced in each case. The reductions in subjective variance are large. Before hedging the highest subjective variance, 41.63, is observed when $d_1 = 1.00$ and $d_2 = 2.00$. After hedging, using a hedge ratio of 0.6428, the subjective variance is reduced to 8.66. This agent is clearly hedging and, give or take a few tenths of a percent, is employing the EUHR.

Table 4. **Futures hedge ratios for optimists in losses when there are no transactions costs**

Delta 1	Delta 2	fhr	At Optimal Hedge		Without Hedging	
			M_A	V_A	M_A	V_A
1.0	1.0	0.6449	-291.40	6.51	-291.40	31.31
1.0	0.3	0.6428	-292.07	3.85	-292.87	18.53
1.0	0.7	0.6428	-291.67	5.53	-291.99	26,61
1.0	1.0	0.6449	-291.40	6.61	-291.40	31.31
1.0	1.5	0.6428	-291.01	7.76	-290.55	37.29
1.0	2.0	0.6428	-290.68	8.66	-289.82	41.63
1.5	0.3	0.6428	-291.58	2.30	-291.80	11.08
1.5	0.7	0.6449	-291.18	3.59	-290.92	17.26
1.5	1.0	0.6449	-290.91	4.30	-290.33	20.70
1.5	1.5	0.6447	-290.52	5.17	-289.48	24.85
1.5	2.0	0.6447	-290.19	5.75	-288.75	27.64
2.0	0.3	0.6449	-291.35	1.64	-291.30	7.89
2.0	0.7	0.6407	-290.95	2.74	-290.41	13.16
2.0	1.0	0.6407	-290.68	3.33	-289.82	16.01
2.0	1.5	0.6407	-290.29	4.01	-288.97	19.30
2.0	2.0	0.6407	-289.96	4.44	-288.24	21.35

Source: own calculations

The most interesting result from Table 3 is that hedging reduces the subjective expected value for every case. This result is noteworthy because many of these agents are optimistic in losses and gains, and it seems counter-intuitive that such an agent would engage in these transactions. Although somewhat counter-intuitive, this result does not violate any axioms and actually reinforces the conclusion that these agents are hedging. Risk aversion cannot easily be characterized using the Kahneman and Tversky valuation function because it is convex in losses and concave in gains. It appears that the concavity in gains is driving this result. An agent who is optimistic in losses and gains will hedge even if hedging lowers his subjective expected value.

In the next set of results, transactions of two cents per bushel are introduced. Table 5 depicts the results for an agent who is pessimistic in losses. The first row of Table 5 corresponds to the expected utility case. When there are transactions costs it is optimal for the expected utility agent to forgo hedging altogether, which implies that the valuation function parameters recommended by Kahneman and Tversky are for an agent that is relatively insensitive to risk – similar to an agent with low risk aversion. This result was not obtained in the cases without transaction costs because when there are no transactions costs any risk averse agent will hedge.

Table 5. **Futures hedge ratios for pessimists in losses when there are transactions costs**

Delta 1	Delta 2	fhr	At Optimal Hedge		Without Hedging	
			M_A	V_A	M_A	V_A
1.0	1.0	0.0000	-291.40	31.31	-291.40	31.31
0.3	0.3	0.5766	-296.06	15.16	-298.94	70.14
0.3	0.7	0.5683	-295.83	18.03	-298.05	88.97
0.3	1.0	0.5606	-295.67	20.13	-297.46	100.79
0.3	1.5	0.5491	-295.41	23.43	-296.61	117.11
0.3	2.0	0.5406	-295.17	26.40	-295.88	130.24
0.7	0.3	0.4906	-293.62	7.80	-294.20	28.60
0.7	0.7	0.4404	-293.30	11.15	-293.31	39.03
0.7	1.0	0.3896	-293.02	14.75	-292.72	45.28
0.7	1.5	0.2574	-292.38	26.16	-291.87	53.52
0.7	2.0	0.0000	-291.15	59.78	-291.15	59.78

Source: own calculations

Consider what happens when the agent is highly pessimistic in losses, when $d_1 = 0.3$. As d_2 is increased the agent becomes progressively more optimistic in gains and the hedge ratios decrease. The decreases are small but monotonic. When $d_2 = 0.3$ the optimal hedge is 0.5766 and when $d_2 = 2.0$ the optimal hedge is 0.5406. This is an intuitive result because as the agent becomes more optimistic in gains he hedges less. The same pattern is observed when $d_2 = 0.7$, or when the agent is only slightly pessimistic in losses. For these cases the decline is much steeper: when $d_2 = 0.3$ the optimal hedge is 0.4906 but when $d_2 = 2.0$ the optimal hedge is zero. When the agent is moderately pessimistic in losses and highly optimistic in gains the agent does not hedge at all. For a given d_2, the hedge ratio for an agent with $d_1 = 0.7$ is always less than or equal to the hedge ratio for agents with d_1 values of 0.3. An agent who is more pessimistic in losses hedges more for a given level of relative optimism/pessimism in gains.

In every case discussed above the agent manages to reduce his subjective variance. Because there is more variation in the hedge ratios across parameter values, the magnitudes of the reductions in risk are not as large. For instance, an agent who is highly pessimistic in losses and highly optimistic in gains has a hedge ratio of 0.5406 and reduces his subjective variance from 130.24 to 26.40, about a five-fold reduction. But an agent that is moderately pessimistic in losses and moderately optimistic in gains has a hedge

ratio 0.2574 and reduces his subjective variance from 0.5352 to 0.2616, only a two-fold decrease. An agent who is highly pessimistic in losses increases his subjective expected values, but the magnitude of the increases becomes smaller as the agent becomes more optimistic in gains.

The next set of results, in Table 6, is for an agent who does not weight the probabilities of losses or who is optimistic in losses, when there are transactions costs. When the agent does not distort the probabilities of losses, the optimal hedge ratios decrease as the agent becomes more optimistic in gains. When $d_2 = 0.3$ the agent has a hedge ratio of 0.3901 but when $d_2 = 1.5$ and 2.0 the optimal decision is to not hedge at all. This is the same pattern that emerged for agents that were pessimistic in losses.

Table 6. **Futures hedge ratios for optimists in losses when there are transactions costs**

Delta 1	Delta 2	fhr	At optimal Hedge		Without Hedging	
			M_A	V_A	M_A	V_A
1.0	1.0	0.0000	-291.40	31.31	-291.40	31.31
1.0	0.3	0.3901	-292.80	6.61	-292.87	18.53
1.0	0.7	0.2060	-292.21	15.31	-291.99	26.61
1.0	1.0	0.0000	-291.40	31.31	-291.40	31.31
1.0	1.5	0.0000	-290.55	37.29	-290.55	37.29
1.0	2.0	0.0000	-298.82	41.63	-289.82	41.63
1.5	0.3	0.0414	-291.83	10.01	-291.80	11.08
1.5	0.7	0.0000	-290.92	17.26	-290.92	17.26
1.5	1.0	0.0000	-290.33	20.70	-290.33	20.70
1.5	1.5	0.1628	-290.17	16.12	-289.48	24.85
1.5	2.0	0.2847	-290.25	12.69	-288.75	27.64
2.0	0.3	0.0000	-291.30	7.89	-291.30	7.89
2.0	0.7	0.0950	-290.64	10.19	-290.41	13.16
2.0	1.0	0.2588	-290.68	7.61	-289.82	16.01
2.0	1.5	0.3852	-290.68	6.28	-288.97	13.30
2.0	2.0	0.4569	-290.66	5.84	-288.24	21.35

Source: own calculations

When agents are optimistic in losses a different pattern emerges. First consider what happens when the agent is moderately optimistic in losses, $d_1 = 1.5$. When the agent is highly pessimistic in gains, $d_2 = 0.3$, the agent hedges a small amount, 0.0414. For $d_2 = 0.7$ and $d_2 = 1.0$ the agent does not hedge at all. But when the agent becomes optimistic in gains he starts hedging again. When $d_2 = 1.5$ the hedge ratio is 0.1628 and when $d_2 = 2.0$ the hedge ratio is 0.2847. This result is rather perplexing - the more optimistic in gains the agent becomes, the more he hedges for d_2 greater than 1.0. Why?

Before the above question is addressed, consider the last set of cases at the bottom of the table, when the agent is highly optimistic in losses. The results when $d_1 = 2.0$ are equally perplexing. As d_2 is increased, as the agent becomes more optimistic in gains, the

agent hedges progressively more. When $d_2 = 0.3$ the agent does not hedge at all but when $d_2 = 2.0$ the optimal hedge ratio is 0.4569. If any of the agents who are optimistic in losses were to hedge, one might expect that it would happen when these agents are pessimistic in losses. But this is not the case when there are transactions costs. It is not so much that optimists hedge; it is that they are hedging more as they become more optimistic in gains for a given level of optimism in losses.

The reason for higher hedge ratios as the degree of optimism is increased is as follows. For a given level of d_1 the distribution becomes more disperse as d_2 is increased. Increasing d_2 moves the distribution of gains to the right. If d_1 is fixed, then the distribution of losses is not changing. Even though the agent is becoming more optimistic overall the distribution is becoming more disperse, providing incentive to hedge. Note that the subjective variance without hedging is increasing in d_2 when $d_1 = 2.0$. There is more subjective risk to reduce, so the agent hedges more.

8.9. Power Weighting Function – Futures and Options Results

This section is identical in structure to the previous section except call options are available to the agent in addition to futures. Tables 7 and 8 show the futures hedge ratios (fhr), optimal hedge ratios (ohr), and total hedge ratios (thr = fhr + ohr) when there are no transaction costs. The first row displays the optimal hedge ratios for an agent who maximizes expected utility (EU) and does not weight probabilities. The optimal hedge ratios remain very close to the EUHR when agents are moderately optimistic in losses. There is variation over the cases but the differences are confined to the third and fourth decimal places. The optimal futures hedge ratios are all slightly higher than 0.64 and the optimal option hedge ratios are for all practical purposes zero.

Table 7. **Futures and options results for pessimists in losses with no transactions costs**

Delta 1	Delta 2	fhr	ohr	thr	At optimal hedge		Without Hedging	
					M_A	V_A	M_A	V_A
1.0	1.0	0.6417	0.0052	0.6469	-291.40	6.51	-291.40	31.31
0.3	0.3	0.6407	0.0000	0.6407	-294.84	14.59	-289.94	70.14
0.3	0.7	0.6407	0.0000	0.6407	-294.43	18.51	-298.05	88.97
0.3	1.0	0.6407	0.0000	0.6407	-294.16	20.97	-297.46	100.79
0.3	1.5	0.6407	0.0000	0.6407	-294.78	24.36	-296.61	117.11
0.3	2.0	0.6407	0.0000	0.6407	-293.45	27.09	-295.88	130.24
0.7	0.3	0.6417	0.0016	0.6433	-293.68	5.95	-294.20	28.60
0.7	0.7	0.6407	0.0018	0.6425	-292.27	8.12	-293.31	39.03
0.7	1.0	0.6409	0.0027	0.6436	-292.00	9.42	-292.72	45.28
0.7	1.5	0.6408	0.0028	0.6436	-291.61	11.13	-291.87	53.52
0.7	2.0	0.6415	0.0018	0.6433	-291.28	12.43	-291.15	59.78

Source: own calculations

Table 8. **Futures and options results for optimists in losses with no transactions costs**

Delta 1	Delta 2	fhr	ohr	thr	At optimal Hedge		Without Hedging	
					M_A	V_A	M_A	V_A
1.0	1.0	0.6517	0.0052	0.6469	-291.40	6.51	-291.40	31.31
1.0	0.3	0.6419	0.0013	0.6432	-292.07	3.85	-292.87	18.53
1.0	0.7	0.6419	0.0013	0.6432	-291.67	5.53	-291.99	26.61
1.0	1.0	0.6417	0.0052	0.6469	-291.40	6.51	-291.40	31.31
1.0	1.5	0.5419	0.0015	0.6434	-291.01	7.76	-290.55	37.29
1.0	2.0	0.6407	0.0081	0.6487	-290.68	8.66	-289.8	41.63
1.5	0.3	0.6428	0.0079	0.6429	-291.58	2.30	-291.80	11.08
1.5	0.7	0.6407	0.0000	0.6487	-291.18	3.59	-290.92	17.26
1.5	1.0	0.6451	0.0000	0.6451	-290.91	4.31	-290.33	20.70
1.5	1.5	0.6406	0.0000	0.6406	-290.52	5.15	-289.48	24.85
1.5	2.0	0.6407	0.0081	0.6407	-290.19	5.75	-288.75	27.64
2.0	0.3	0.6407	0.0000	0.6487	-291.35	1.64	-291.30	7.89
2.0	0.7	0.6410	0.0000	0.6310	-290.85	5.49	-290.41	13.16
2.0	1.0	0.6406	0.0000	0.6406	-290.95	2.74	-288.82	16.01
2.0	1.5	0.6407	0.0000	0.6407	-290.68	3.33	-288.97	19.30
2.0	2.0	0.6407	0.0000	0.6407	-290.96	4.44	-288.24	21.35

Source: own survey

The reductions in subjective variance are large for each case. For example, in Table 8, when $d_1 = 1.5$ and $d_2 = 0.3$ the reduction is from 11.08 to 2.30 and when $d_2 = 2.0$ the reduction is from 27.64 to 5.75. The ratios of the reductions in subjective variance are 4.8 for both cases. Except when $d_2 = 0.3$, all of the scenarios have subjective expected values greater than the undistorted mean, before hedging. In each case, the subjective expected value decreased as a result of hedging.

The previous two tables indicate that CPT agents trade to reduce risk – they hedge. They also make scant use of options when there are no transactions costs. The next table, Table 9, summarizes results for agents who are pessimistic in losses when there are transactions costs.

Table 9. **Futures and options results for pessimists in losses with transactions costs**

Delta 1	Delta 2	fhr	ohr	thr	At Optimal Hedge		Without Hedging	
					M_A	V_A	M_A	V_A
1.0	1.0	0.0000	0.0000	0.0000	-291.40	31.31	-291.40	31.31
0.3	0.3	0.5375	0.0625	0.6000	-296.05	15.21	-298.94	70.14
0.3	0.7	0.5032	0.0939	0.5971	-295.81	18.40	-298.05	88.97
0.3	1.0	0.4633	0.1349	0.5982	-295.63	21.02	-297.46	100.79
0.3	1.5	0.3288	0.2719	0.6007	-295.26	27.92	-296.61	117.11
0.3	2.0	0.0000	0.6112	0.6112	-294.48	48.84	-295.88	130.24
0.7	0.3	0.4603	0.0544	0.5147	-293.62	7.77	-294.20	28.60
0.7	0.7	0.3604	0.1258	0.4862	-293.28	11.49	-293.31	39.03
0.7	1.0	0.2550	0.2114	0.4664	-292.95	15.80	-292.71	45.28
0.7	1.5	0.0000	0.4119	0.4119	-292.11	30.39	-291.87	53.52
0.7	2.0	0.0000	0.0000	0.0000	-291.15	59.78	-291.15	59.78

Source: own calculations

Transactions costs have a significant effect on the results. An agent who is highly pessimistic in losses hedges considerably more than the EUHR, which is zero. While the total hedge ratios stay close to 0.6, the mix of futures and options changes substantially. The futures hedge ratios decrease as the agent becomes more optimistic in gains. When d_2 = 0.3 the futures hedge ratio is 0.5375 and when d_2 = 2.0 the futures hedge ratio is 0.00. However, the options hedge ratios follow an opposite pattern. As the agent becomes more optimistic in gains, his options hedge ratios increase. When d_2 = 0.3 the options hedge ratio is 0.0625 but when d_2 = 2.0 the options hedge ratio is 0.6112.

So, as an agent becomes more optimistic in gains he prefers options to futures although the total hedge ratio does not vary as much. A less pessimistic agent prefers using options to reduce risk because they are cheaper to trade, but also his subjective variance is higher than the undistorted variance. Options seem more valuable to him than their value in the market, which is based on the undistorted variance. He is still pessimistic in losses so he wants to reduce risk, but his optimism in gains leads him to use more options.

When d_2 = 0.3 the agent reduces his subjective variance from 70.14 to 15.21, using primarily futures. When d_2 = 2.0 the subjective variance is reduced from 130.24 to 48.84, using only options. The ratio of the reduction is much higher for the more pessimistic agent. The subjective expected values increase as a result of hedging, although in each case the subjective expected value after hedging is still less than the undistorted mean.

The next table, Table 10, shows the optimal hedge ratios for an agent facing transaction costs, who does not distort losses and who is optimistic in losses. The futures and options EUHR are both zero with transactions costs. An agent who does not weight the probabilities of losses (d_1 = 1.0) hedges with futures when he is pessimistic in gains. When d_2 = 0.3 the futures hedge ratio is 0.3901 and the options hedge ratio is zero, and when d_2 = 0.7 the futures hedge ratio is 0.2060 and the options hedge ratio is zero. A small

hedge using only futures is placed when he is pessimistic in gains, and he does not hedge at all when optimistic in gains.

Table 10. **Futures and options results for optimists in losses with transactions costs**

Delta 1	Delta 2	fhr	ohr	thr	At Optimal Hedge		Without Hedging	
					M_A	V_A	M_A	V_A
1.0	1.0	0.0000	0.0000	0.0000	-291.40	31.31	-291.40	31.31
1.0	0.3	0.3901	0.0000	0.3901	-292.80	6.61	-292.87	18.33
1.0	0.7	0.2060	0.0000	0.2060	-292.21	15.30	-291.99	26.61
1.0	1.0	0.0000	0.0000	0.0000	-291.40	31.31	-291.40	31.31
1.0	1.5	0.0000	0.0000	0.0000	-290.55	37.29	-290.55	37.29
1.0	2.0	0.0000	0.0000	0.0000	-289.82	41.63	-289.82	41.63
1.5	0.3	0.0414	0.0000	0.0414	-291.83	10.01	-291.80	11.08
1.5	0.7	0.0000	0.0000	0.0000	-290.92	17.26	-290.92	17.26
1.5	1.0	0.0000	0.0000	0.0000	-290.33	20.70	-290.33	20.70
1.5	1.5	0.1453	0.0268	0.1721	-290.16	16.47	-289.48	24.85
1.5	2.0	0.0000	0.4968	0.4968	-290.01	18.27	-288.75	27.64
2.0	0.3	0.0000	0.0000	0.0000	-291.30	7.89	-291.30	7.89
2.0	0.7	0.0000	0.3202	0.3201	-290.87	9.76	-290.41	13.16
2.0	1.0	0.0000	0.3799	0.3799	-290.52	7.39	-289.82	16.01
2.0	1.5	0.3474	0.0655	0.4129	-290.67	6.56	-288.97	19.30
2.0	2.0	0.4158	0.0707	0.4928	-290.65	6.04	-288.24	21.35

Source: own calculations

When the agent is moderately optimistic in gains, $d_1 = 1.5$, the hedge ratios are somewhat perplexing initially. When $d_2 = 0.3$ the agent takes a small position in futures, and the hedge ratio is 0.0414. For $d_2 = 0.7$ and 1.0 the agent does not hedge at all. But, when the agent is optimistic in gains the agent begins trading again. The agent that is moderately optimistic in losses and gains has a futures hedge ratio of 0.1453 and an options hedge ratio of 0.0268. The agent that is highly optimistic in gains has a futures hedge ratio of 0.00 but an options hedge ratio of 0.4968.

It may seem perplexing that the agent hedges more as he becomes more optimistic. Perhaps the agent is speculating? Perhaps not, since the agent is reducing his subjective variance and his subjective expected value. Before considering this issue further, the results for an agent who is highly optimistic in losses will be discussed.

An agent who is highly optimistic in losses also exhibits unusual hedging behavior. His total hedge ratios consistently increase as he becomes more optimistic in gains. When the agent is highly pessimistic in gains, both hedge ratios are zero. When $d_2 = 0.7$ or 1.0 the agent hedges, using options exclusively, with hedge ratios of 0.3202 and 0.3790. As the agent becomes optimistic in gains, the total hedge ratios increase but he uses mostly futures contracts. For $d_2 = 1.5$ the futures hedge ratio is 0.3474 and the options hedge

ratio is 0.0655; for d_2 = 2.0 the futures hedge ratio is 0.4158 and the options hedge ratio is 0.0770.

In every case, except when no trading occurs, the agent reduces his subjective variance and his subjective expected value, clear indications that the agent is not speculating. The results for an agent who is optimistic in losses, when d_1 = 1.5 or 2.0, are rather perplexing. Why would an agent hedge more as he becomes more optimistic in gains? He is already optimistic, so as d_2 is increased he is becoming more optimistic overall. Also note that the subjective variances before hedging become higher as d_2 is increased.

The reason for increasing hedge ratios is that there is more subjective risk to reduce. As d_2 is increased, the gain mode of the subjective density function is moved further away from the loss mode, increasing the distance between them. The agent is hedging more as d_2 is increased because he is trying to reduce the distance between the two modes. Subjective variance is not a reliable measure of risk reduction because the distribution is bimodal.

8.10. S Shaped Weighting Functions

In the experimental literature it is common to fit parameter values to experimental data. These parameters serve little use if they are not applied to other more general economic models which would permit a broader analysis of the merits of the theory. The primary aim of this section is to draw upon the relevant CPT literature and discuss optimal hedge ratios based on the parameter values identified in previous research. The three models discussed here use S shaped weighting functions.

Neilson and Stowe (2002) analyze various parameterizations of CPT obtained experimentally. The purpose of their paper is to examine the behavioral implications that result from the leading parameterizations of CPT. Although not the topic of this research, their primary finding is that none of the leading parameterizations are completely satisfactory. However, they single out three prominent parameterizations, which are displayed in Table 11.

Table 11. **Parameters for agents with S shaped weighting functions**

Authors	Delta 1	Delta 2	Alpha	Lambda
Tversky and Kahneman (1992)	0.69	0.61	0.88	2.25
Camerer and Ho (1994)	0.56	0.56	0.32	na
Wu and Gonzales (1996)	0.74	0.74	0.52	na

Source: own calculations

All of these models use the functional form favored by Kahneman and Tversky, a power utility function with an S shaped weighting function for losses and gains. The parameters are derived using experimental methods, in which subjects are presented with various gambles and asked to state their preferences. From these results the relevant parameters are estimated statistically. The second two papers did not estimate λ, so Tversky and Kahneman's value of 2.25 will be used.

Given these parameter specifications, how different are these models from one another? How large is the effect these parameters have on the shapes of the relevant functions? Figures 4 and 5 compare the three S shaped weighting functions before hedging. Figure 4 superimposes the Tversky and Kahneman's and Camerer and Ho's (1994) weighting functions over the actual normal distribution of payoffs. If Wu and Gonzales's (1996) weighting function were included it would not be visible. It is obscured by the Camerer and Ho weighting function.

The Tversky and Kahneman distribution is jagged because there are different parameters used for losses and gains, meaning there is an abrupt change in the probability weights at the reference point. The Camerer and Ho distribution has the same parameters for losses and gains and does not become jagged at the reference point. Both distributions have lower modes than the undistorted normal distribution and are much more widely dispersed. The Camerer and Ho distribution places more weight on relatively larger outcomes compared to the Tversky and Kahneman distribution.

Figure 5 compares the Wu and Gonzales subjective weighting function to the actual distribution of payoffs. The Wu and Gonzales weighting function uses relatively high λ values, compared to the other two S shaped specifications. As a result, the Wu and Gonzales weighting function is not multimodal and has a bell shape, although it has a lower mode than the undistorted normal distribution, and it is more dispersed.

Table 12 summarizes the various subjective descriptive statistics. M_A is the overall mean value, which combines the loss and gain weight distributions. V_A is the overall variance, S_A is the overall skewness, and K_A is the overall kurtosis. All of the subjective distributions are considered optimistic because their subjective expected values are greater than the undistorted mean. Smaller δ values yield higher subjective expected values. The highest subjective payoff is observed using the lowest δ values, those specified by Camerer and Ho. The subjective variances are higher than the actual variance for every specification. The highest subjective variance is 90.15, almost three times the actual variance, and again the Camerer and Ho specification yields the most extreme value. All of the distributions are negatively skewed. All of the subjective distributions display thin tails.

Table 12 **Subjective values for alternative weight specifications**

Distribution	M_A	V_A	S_A	K_A
Actual	0.00	31.31	0.00	3.00
Tversky and Kahneman (1992)	1.61	73.01	-0.06	2.41
Camerer and Ho (1994)	2.09	90.15	-0.25	2.45
Wu and Gonzales (1996)	0.51	54.45	-0.04	2.68

Source: own calculations

8.11. S Shaped Weighting Function – Futures Only Results

Table 13 compares the futures hedge ratios using the parameters discussed above. The top two rows correspond to the optimal Tversky and Kahneman CPT hedge ratios with and without transactions costs. When there are no transactions cost the optimal hedge ratio is 0.6428, very close to the EUHR. The agent reduces his subjective variance

from 73.01 to 15.19, but he decreases his subjective mean from -289.79 to -290.67. When transactions costs are introduced, the hedge ratio drops to zero and hence does not affect the subjective distribution of payoffs. Recall that when a power weighting function was used in Table 5 the EUHR was also zero when there were transactions costs. In that table the Tversky and Kahneman parameters were used, and it was concluded that the parameters described an agent with qualitatively low risk aversion. The same conclusion can be reached using Tversky and Kahneman's S shaped weighting function.

Table 13. **Futures only models for agents with S shaped weighting functions**

Delta 1	Delta 2	fhr	t0	At Optimal Hedge		Without Optimal Hedging		Authors
				M_A	V_A	M_A	V_A	
0.69	0.61	0.6428	0	-290.67	15.19	-289.79	73.01	Tversky and Kahneman
0.69	0.61	0.0000	2	-289.79	73.01	-289.79	73.01	Tversky and Kahneman
0.56	0.56	0.6449	0	-290.45	18.76	-289.32	90.15	Camerer and Ho
0.56	0.56	0.6310	2	-291.71	18.77	-289.32	90.15	Camerer and Ho
0.74	0.74	0.6449	0	-291.17	11.32	-290.89	54.44	Wu and Gonzales
0.74	0.74	0.7253	2	-292.61	12.06	-290.89	54.44	Wu and Gonzales

Source: own calculations

The next two rows display the results obtained using Camerer and Ho's parameters. They use the same value (0.56) for losses and gains in their subjective weighting function. The value is lower than the ones used by Kahneman and Tversky and indicates that the cross-over point of the weighting function is further to the left, yielding a higher subjective expected value and a higher subjective variance before hedging. Their α parameter is also much lower, 0.32, compared to Kahneman and Tversky's 0.88. A lower α reduces the slope of the function in losses and gains, although it is still kinked at the reference point.

When there are no transactions costs the agent's optimal hedge, using the Camerer and Ho parameters, is the same as the EUHR, which is 0.6449. The agent reduces his subjective variance from 90.15 before hedging to 18.76 after hedging, and he reduces his subjective expected value from -289.32 to -290.45. Including transactions costs lowers the optimal hedge ratio slightly to 0.6310. Camerer and Ho's agent hedges more than Kahneman and Tversky's agent.

The last two rows were obtained using Wu and Gonzales's parameters. When there are no transactions cost the optimal hedge is 0.6449, very close to the EUHR. The agent reduces his subjective variance and subjective expected values, as in the other two cases with no transactions costs. When transactions costs are included the optimal hedge ratio *increases* to 0.7253.

8.12. S Shaped Weighting Function - Futures and Options Results

Table 14 shows the optimal hedge ratios when the agent has access to both futures and options, with and without transactions costs. When there are no transactions costs the Tversky and Kahneman parameters yield an agent who appears to be speculating.

Table 14. **Futures and options models for agents with S shaped weighting functions**

Delta 1	Delta 2	fhr	ohr	thr	t0	t1	At Optimal Hedge		Without Hedging	
							M_A	V_A	M_A	V_A
0.69	0.61	0.6822	1.4883	2.1704	0	0	-287.26	156.23	-289.79	73.01
0.69	0.61	0.0000	0.3794	0.3794	2	1	-290.06	49.22	-289.79	73.01
0.56	0.56	0.6326	0.0081	0.6407	0	0	-290.45	18.76	-289.32	90.15
0.56	0.56	0.6170	0.2200	0.6390	2	1	-291.70	18.80	-289.32	90.15
0.74	0.74	0.6407	0.081	0.6488	0	0	-291.17	11.33	-290.89	54.44
0.74	0.74	0.6830	0.1259	0.8089	2	1	-291.14	12.66	-290.89	54.44

Source: own calculations

The futures hedge ratio is 0.6822 and the options hedge ratio is 1.4883, for a total hedge ratio of 2.1704. These positions increase the subjective expected value, from -289.79 to -287.26 and the subjective variance, from 73.01 to 156.23. For a modest increase in subjective expected value the agent more than doubles his risk. This agent appears to be speculating instead of hedging.

When transactions costs are introduced, the agent appears to hedge. He does not use futures contracts but has an options hedge ratio of 0.3794. This position lowers both the subjective expected value and the subjective variance. Collectively, the results with and without transactions costs are intriguing. They imply that introducing transactions costs, keeping everything else the same, induces different types of behavior. Speculation and hedging are observed for the same preference parameters.

The hedge ratios obtained using the Camerer and Ho parameters are 0.6326 and 0.0081 when there are no transactions costs. This position is not speculative because it reduces the first two subjective moments. The inclusion of transactions costs slightly reduces the futures hedge ratio to 0.6170 and slightly increases the options hedge ratio to 0.0220, when options are relatively cheaper than futures the agent substitutes a very small amount of options for futures. The net effect is a slightly lower total hedge ratio which makes sense since both instruments are now costly.

Once again the Wu and Gonzales parameters yield unusual results. When there are no transactions costs the hedge ratios are consistent with the Camerer and Ho results, 0.6407 for futures and 0.0081 for options. But when transactions costs are included both hedge ratios *increase*, to 0.6830 and 0.1259 respectively. With and without transactions costs, the subjective expected values and subjective variances are lowered. The Wu and Gonzales parameters obviously describe some unusual behavior. No rational agent would increase his hedge ratio just because transaction costs were imposed.

Among the three specifications, the Camerer and Ho hedge ratios seem plausible. Their specification uses the lowest δ and α values. The futures-only results using the Kahneman and Tversky parameters also seem plausible and reinforce the idea that their parameters represent an agent that hedges in a manner similar to that of an EU agent with low risk aversion. The Camerer and Ho futures-only hedge ratios are very close to the EU hedge ratio observed for an agent with high risk aversion. In the futures-only models the

Wu and Gonzales hedge ratios do not make sense because the agent increases his hedge ratio when transactions costs are introduced.

The futures and options results tell the same kind of story. The Kahneman and Tversky parameters yield the widest variety of results. When there are no transactions costs the agent speculates, but when there are transactions costs he hedges with options exclusively. A Kahneman and Tversky agent with fixed preference parameters might switch from being a speculator to a hedger, depending on transaction costs. The Camerer and Ho futures and options models yielded plausible results similar to those of a highly risk averse EU agent. The Wu and Gonzales futures and options hedge ratios exhibited an anomaly - the agent hedged more *after* the introduction of transactions costs.

8.13. Conclusion

These results are indicative of the behavior implied by various parameterizations of cumulative prospect theory, under various scenarios. They use real data to calibrate the models, and an exhaustive set of results was compiled for comparing different parameter sets. Results were compiled for hedging with futures only and with futures and options, with and without transaction costs.

As exhaustive as these results may be, they still pertain to just one market. The same procedure could be applied to other commodity markets, to currencies, or to equity markets – any hedging markets at all. It is possible that one or more markets may yield results that differ markedly from the results presented here. However, the results presented here embody a wide variety of behaviors. It is possible that they represent the set of all possible behaviors adequately.

Based on these results, the main conclusions from this research are as follows.

The valuation function parameters recommended by Kahneman and Tversky describe an agent that is relatively insensitive to risk, similar to an agent with low risk aversion.

CPT agents may choose to reduce risk by hedging. They make scant use of options when there are no transactions costs.

Optimistic agents may hedge if their subjective variance is high.

As an agent becomes more optimistic in gains he prefers to use more options because his subjective variance increases.

Variance is not always a reliable measure of risk because the subjective distribution of payoffs is sometimes bimodal.

Using S Shaped weighting functions determined experimentally,

Camerer and Ho's parameters describe an agent who hedges more than one described by Kahneman and Tversky's parameters.

Kahneman and Tversky's parameters describe an agent who may hedge or speculate, depending on the scenario.

Wu and Gonzales's parameters describe an agent who hedges more when transaction costs are imposed than when they are not imposed.

The importance of these results reaches beyond the academy. Cumulative prospect theory is one of the best methods known for modeling the way people think about uncertain outcomes. If cumulative prospect theory really represents the way most people think, then it is the relevant benchmark for modeling hedging behavior and measuring hedging

effectiveness. Little is known about the implications of cumulative prospect theory for business decision-making and financial markets. This article aims to build up a body of knowledge around what is known and stimulate future research into what is unknown.

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NEW AND BEGINNING DAIRY FARMERS: A CASE STUDY APPROACH

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9.1. Introduction

Getting started in dairy farming is very difficult. Often new farmers take over the family farm, but certainly not all. This paper presents the results from interviews with some new and beginning dairy farmers in Pennsylvania and draws some inferences from their experiences about lessons for the new dairy farmer anywhere.

Transferring a dairy farm on to the next generation is difficult. The farm often is too small to support two families and the equity of the farm is usually the retirement wealth for the parents. The subsequent generation usually does not have a credit record, so it is difficult to borrow money to buy out the parents. The challenges of starting require a variety of skills, generally described broadly as human capital. These include technical skills, financial skills, interpersonal skills, and the ability to adjust to changing circumstances.

Baker, et al. (2001)[1], in a study of Iowa farms, found that farmers often are slow to involve their successor in the decision making, and quite often the successor works off the farm. As the average age of farmers rises, the challenges of a smooth transition increase. In Pennsylvania, many farms have been in the family for generations, and failing to plan for succession may mean that the farm will be sold to a non-family member and often go out of agriculture altogether. In Poland, and Europe more broadly, the farm family may have been on the land for centuries. Mishra, et al. (2009)[2] found that new and beginning farmers had poorer financial performance, purportedly because they are undercapitalized. A somewhat counterintuitive finding is that better educated farmers had poorer financial performance, perhaps because they have better off-farm opportunities. Mishra, et al. also discovered that tenants outperformed owners, probably because the returns to agriculture often do not support the capital required to be an owner, at least at current land prices.

1   **J. Baker, M. D. Duffy, A. Lamberti,** [2001]: *Farm succession in Iowa. Working Paper, Beginning Farmer Center, Iowa State University, accessed 13/10/11 http://www2. econ. iastate. edu/faculty/duffy/pages/farmsuccession. pdf.*

2   **A. Mishra, C.Wilson, R. Williams,** [2009]: *Factors affecting financial performance of new and beginning farmers. Agricultural Finance Review, 69(2), 160-179.*

They also found that farmers with business plans showed better financial performance. Sumner and Leiby(1987)[3] examine human capital for dairy farms and find that greater human capital is associated with greater productivity and flexibility. More educated farmers and those who have more experience have larger farms. They also discovered that more experienced farmers were less likely to grow. Hill, et al. (1963)[4] interviewed 240 New York beginning dairy farmers and asked about the performance of the farms in terms of milk per cow, cows per man, and hours worked. Particular challenges for these farmers were breeding the cattle, herd health, increasing milk production, and rations. Also mentioned was repairing machinery and crop management. A particular issue not directly tied to farm operations was planning credit needs. Although this study was long ago, their entire list of challenges is still relevant. In Pennsylvania, the Center for Dairy Excellence is a non-profit organization created to enhance the profitability and viability of Pennsylvania's dairy industry. This organization was started by the Pennsylvania Department of Agriculture to provide educational programs and other efforts to help the industry do better. Many of the Center's program concentrate on the management issues identified in the literature.

Few countries have seen the changes that Poland has experienced in the past 25 years. The end of communism and the transition to a market economy involved the creation of a completely new set of economic institutions with an increased emphasis on individual decision making. Although private farms existed before on a very small scale, market opportunities were very limited and market institutions were virtually non-existent. With the end of communism came the opportunity and necessity for individual farmers to be much more entrepreneurial and market driven. One carry-over was the widespread practice of rural families to have one or two cows, without on-farm refrigeration for the milk, and no quality standards for milk going onto the market. The milk was comingled without testing of the individual farm's production, so bacteria counts were high and shelf life of milk processed was short. The period before EU accession forced the industry to improve to meet EU dairy standards, although many farms and factories were not ready when the time came. The neighboring states faced the same challenges, although agriculture in many of these countries was structured differently than in Poland, especially compared to those Polish regions where many of the very small, mostly independent farms survived.

Getting started in dairy farming is difficult. The work is hard and complex, a lot of capital is required, and prices are generally volatile. Figure 1 shows the variation in operating margin for dairy production in Pennsylvania since 2000. This data, reflecting the difference between the milk price and the cost of the feed to produce this milk, is the amount per hundred pounds of milk that remains from the gross milk revenue to pay any remaining expenses and allows family living expenses and returns to invested capital. In 2009, in particular, the margins were especially low and no dairy farmers earned a profit, while so far in 2014, virtually all dairy farms have been profitable. However, the future of the industry requires new generations of dairy farmers. Fortunately, there are many potential entrants. This paper is an attempt to identify some of the challenges that new

3   **D.A. Sumner, J. D. Leiby,** [1987]: *An Econometric Analysis of the Effects of Human Capital on Size and Growth among Dairy Farms:. American Journal of Agricultural Economics, Vol. 69, No. 2 (May), pp. 465-470.*

4   **C. W. Hill, J. P. Bail, H. R. Cushman, F. K. T. Tom, F. C. Pearee,** [1963]: *Educational Needs of Beginning Dairy Farm Operators in New York.*

farmers have faced and things they have done to get started. There is no easy answer to becoming a successful dairy farmer and no single approach fits everyone. However, what follows are some insights gained from farmers who have started in the recent past. We interviewed four new farmers to learn from their experiences. What follows are some lessons from their early years.
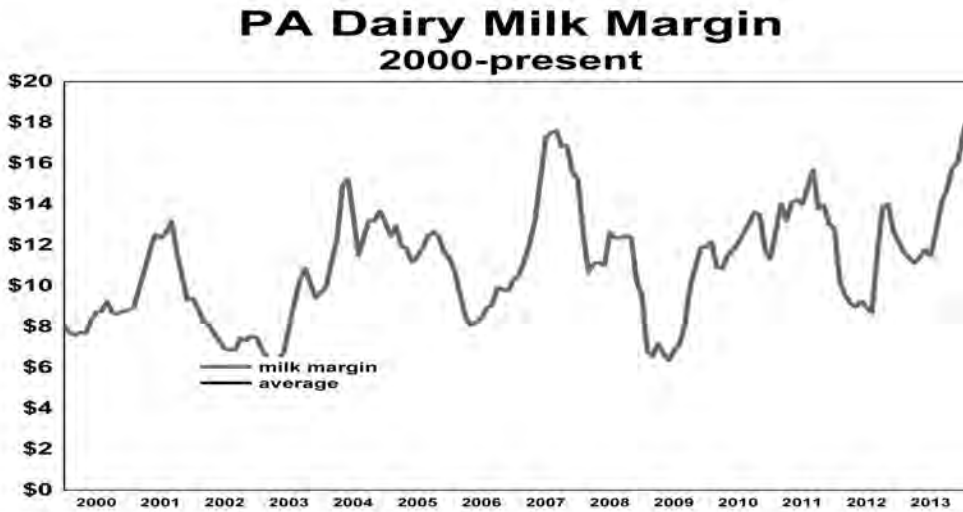

Figure 1. **Pennsylvania Milk Margin**

Source: own calculations

9.2. Family ssues

One important issue that affects the success or failure of the beginning farmer is his relationship with his family. This includes his spouse, parents, and any other relatives involved in the process. One young farmer we interviewed was married recently and works well with his wife. He loves working with her and considers his recent marriage to be an essential key to his successes. She is supportive of his program to succeed in dairy farming. Another farmer has been married longer, but like the first farmer, his wife is a strong partner and a good thinker. She is savvy with numbers and complements some of his weaker areas. In these two instances, the farmer believes that the support and help from his spouse is very important to his future as a dairy farmer.

A second family issue is the relationship of the farmer to parents or other relatives involved in the farm. The relationship with the current or previous owner of the farm is especially complex. Among the issues here are (1) how will ownership be transferred, (2) how will payment be made during the rental period, (3) how do the parties agree on the appropriate price for the farm, (4) who will make the decisions in the interim, and (5) can the father and son work together? Our interviews found a variety of techniques and a variety of problems. Lobley and Whitehead [5] offer some very sobering examples

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5   **M. Lobley, I. Whitehead,** [2012]: *Perspectives on Rural Policy and Planning: Keeping it in the Family : International Perspectives on Succession and Retirement on Family Farms. Ashgate Publishing Group, Farnham, Surrey, GBR (06).*

from their experiences working with families and these findings stress the importance of starting early on the specifics of the agreement for passing ownership and decision making to the next generation. Good communication is essential in this process. One potentially contentious issue is how will other children that will not be actively involved in the farm be treated?

Each farm had its own story. For the first, during the transition the parents and the son shared the milk check. Initially it was 40% for the son and 60% for the parents. Later the percentages were reversed with 60% for the son. The arrangement was switched to cash rent later. The problem was the farm was not really big enough to support two families. The price for the farm was set after 5 years, and the son bought the farm in 2007, although the last two years rent went toward the purchase. In this instance the transition was very lengthy because the farm was not big enough. The relationship between the families was good, but the operation was just too small. The family members that received the smaller share of the milk check struggled economically.

In the second farm, the new farmer worked for his uncle for 10 years, starting at age 12. At that point, the men switched roles. The uncle is still involved, but only as a laborer and consultant. The nephew and his wife make the decisions. The uncle offers advice if asked, but otherwise allows the nephew to make the decisions. The nephew bought the farm from his grandmother, who gave him a family discount, essentially asking a below-market price to keep the farm in the family. Grandma also holds a mortgage and the uncle holds a note on the cows.

Our third farmer worked with his father for seven years. However, the two of them could not manage the transition. The father always viewed the son as the junior partner. Furthermore the parents had trouble agreeing on the purchase price for farm. They didn't want to sell it too cheaply and didn't see any hurry. The father's view seemed to be "Someday this may all be yours, and, until then, I'll make the decisions." The father didn't see urgency in formalizing the transfer arrangement. The father didn't get paid, but bought too much machinery - all used, but too much in the son's view. In retrospect, the son realizes he should have communicated with his father sooner, especially about buying machinery and about his (the son's) personal goals. Ultimately they split up and the son is now farming independently elsewhere, but views the time working for his father as time lost.

Our fourth farmer rents his farm from his grandfather. The grandfather helps with the crops, and a bit in the barn. In the first year the young farmer had to purchase a lot of feed, in part because grandfather had planted wheat and soybeans the year before, not realizing the grandson would need the feed for the cows.

9.3. When to Start

One farmer wished he had started when the milk price was lower because his cows would have been cheaper. The other farmers didn't mention this point, perhaps because they took over in a period when milk prices were less volatile. However, since milk prices and returns to dairy farming vary widely, starting in a bull market will be particularly costly.

9.4. Buying Cows

Our first farmer had 15 head and a few heifers and bought 34 head from his father, a few of which he wished he had not bought, looking back on the decision. Our second farmer bought the young stock from his uncle, and then bought cows. He now has 44 cows producing milk. He also has 20 young animals. He bought 3 cows from another farmer. Our third farmer who worked with his father learned a tough lesson. They bought cows, but all were actively milking. They had problems with culling and lack of replacements. When he started over he bought cows on the market. He was careful about getting good cows and having a mix of ages. He considers the best decision he made was the careful effort he made when choosing cows to buy. Our last farmer bought 8 cows from his grandfather, in this case the 8 best cows. This worked out well. He also bought some other cows, but 6 were no good. He culled 11 cows in year one. In retrospect, he decided that he was not picky enough. He is now milking 45 plus he has 12 dry cows. He wished he had bought better cows in the beginning. He now is convinced that better cows pay off, despite the higher cost.

9.5. Debt Management

Our farmers all commented on the importance of debt management. Some learned the hard way and others had anticipated the issue well for various reasons. Our first farmer stressed the need to control debt. Over time, his equity has grown and now he has more cows and will have replacements to sell. His net worth grew in the last 4 or 5 years after a decade of struggle. Now he has good cow numbers, but needs to pay down his debt. His goal in five years is to be able to sell a few animals each year, to have less debt, and to have more free time.

Our second farmer has an operating loan for crops, and long-term debt. His equity has grown, although he is not sure how much. In five years he would like to have a different barn, but does not want to overreach. It will depend on his balance sheet. He is worried about controlling debt.

The third farmer is also trying to control debt. After splitting from his father, he had a good amount of capital to start anew. His cash flow estimates when he started were pretty accurate. He gets more milk than the banker used in his forecast, but the prices were especially low when we interviewed him. He would prefer to minimize the amount of equipment owned.

Our last farmer was surprised how fast the milk price could drop. He was naive about how good a year 2008 was and bought some stuff he didn't need. He took a vacation, for example. He is just realizing he may not need such a fancy truck. He recently bought a feed mixer, perhaps paying too much. He may not even need it, since he probably has too few cows for the size mixer that he bought. He has lengthened the term of his loan to help his cash flow.

9.6. Other Issues

One farmer in retrospect realizes he should have made the transition differently. He would just do cows if he did it again. He would rent a good barn. The man also has a dairy

team[6] and thinks it really helps him make better decisions. He believes a farmer need to keep his sense of humor. If not, he will pay the price in stress.

Our second young farmer found breeding his cows to be a challenge. He had watched his uncle do it, but apparently not closely enough. He feels he is doing a good job of paying attention to nutrition and cow comfort and therefore has increased his milk production and now it is more than what his uncle got.

Our third farmer plans to finish paying for his cows and buy a small farm. He may do it sooner if the opportunity looks good. At this point he is only milking. He has no crops, but he is still short of time. He has no help. It is just him. If he bought a farm he would try to have 50 acres and buy much of his feed, while partially keeping his cows on pasture. The big surprise for him was how much time it takes him to milk. He really needs help from time to time. It sometimes is a challenge to get the dry cows out of the barn. He works with a nutritionist and has a monthly checkup of his herd's health.

9.7. Conclusions

The conclusions to be gained from these new farmers are that entry into dairy farming is difficult and a few bad decisions can make the experience much worse. Your relationship with your family can be a challenge. Tough economic times cause stress and may strain even the best family relationship. If things were bad before, low milk prices or excessive debt can cause increased problems. Getting the next generation started in farming requires family support - moral support, financial support, and good judgment about when to offer advice and when to remain silent.

Buying cows is an important early decision. Knowing which cows not to buy also can save a lot of money. Having a range of ages in the herd also helps. Having a lot of cows exit production at the same time is disruptive and expensive. One important lesson is that what worked in the past may not be economical in the future. Certainly the returns per cow go down over time in the United States, and the costs of complying with government regulations are especially costly for small operations. In Pennsylvania, herds smaller than 50 cows are becoming unusual, and only the Amish, who live very simply, can survive economically with a small herd. Most farms try to have 75 cows or more when starting and expect to grow over time. This requires a lot of money, especially when coupled with buying expensive land.

Good debt management is essential. A frugal approach toward new equipment is required, but some items are a good investment, especially good cows. However, wise decisions regarding new equipment and equipment appropriate for the operation are important for debt management. Few start-up farmers can afford an affluent lifestyle. Most of the newer farms in our area are Amish, where the son buys about 40 hectares of land, which costs about $1 million, and the father will buy new buildings, which often cost another $500,000[7]. Of course, in Poland the expenditure would be less, but so would the family resources.

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[6]   *A dairy team is a group of advisors that the farmer meets with once each month. It usually includes a banker, a nutrition consultant, and a veterinarian.*
[7]   *Personal interviews with agricultural bankers, December 2013.*

Many little things add to the work and can decrease profitability. Whether they be breeding cows, moving dry cows, or juggling the time requirements for crops and the cows, often things take longer than the novice farmer expects. Without help, it is difficult to manage the time required for the cows and the crops, especially during planting and harvest.

A plan to proceed from phase one to phase two is important. Two of our farmers have yet to get there, but the other two struggled: one because of challenges with family relationships, and the other because the farm didn't generate adequate revenue. Phase two is financial viability.

In total, the new dairy farmer needs to have a careful plan before he begins, and should consult widely with others who have done this before. Having a good relationship with your family and having a banker that can help and understands the process are essential. Having a dairy team can help with decision making.

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EVALUATION OF HUMAN CAPITAL IN DAIRY FARM OWNERS IN POLAND ACCORDING TO THE LEVEL OF EDUCATION

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10.1. Theoretical Consideration about Human Capital

Human capital can be described as a source of knowledge, skills, health and energy involved in society. Human capital is an intrinsic part of a human being and is linked with physical, sociological, intellectual and moral characteristics. Human capital at the micro level can create future satisfaction, quality and value. The term human capital at the macro level refers to a source of knowledge, health, and vital energy included in society[1]. The investment in human capital is important for the development of technology and increases the demand for skilled and educated worker[2].

Knowledge accumulation is the social capital that helps enterprises run and use information, including: transaction costs, resource dependence, industrial theory, and other[3]. There is a close link between inter-organizational relationships and social capital because entrepreneurs can gain useful information that enhances their knowledge[4]. Social capital development plays an important role in business culture[5].

The quality of human capital can be improved by the following investments[6]:
— Trainings offered by the education system,
— On the job training,
— A program of permanent training of adults,

[1] **S. R. Domański,** [1993]: *Kapitał ludzki i wzrost gospodarczy. Wydawnictwo Naukowe PWN, ISBN: 8301106476, 1993, 55p.*

[2] **X. Song, J. B. Jones,** [2013]: *The effects of technology change on Life-cycle human capital investment. 2006http://www.sole-jole.org/827.pdf, Access 15.11.2013.*

[3] **B. R. Barringer, J. S. Harrison,** [2000]: *Walking a tightrope: Creating value through inter organizational relationships. In Journal of Management, ISSN: 1557-1211, vol 26, 2000, no. 3, 367–403.*

[4] **R. B. McNaughton, J. D. Bell,** [1999]: *Brokering networks of small firms to generate social capital for growth and internationalization. Research in Global Strategic Management, ISSN: 1064-4857, vol. 7, 63–82.*

[5] **M. A. Hitt, H-U. Lee, E. Yucel,** [2002]: *The importance of social capital to the management of multinational enterprises: Relational networks among Asian and Western Firms. In Asia Pacific Journal of Management, ISSN: 1572-9958, vol. 19, 2002, 353-372.*

[6] **S. R. Domański,** [1998]: *Kapitał ludzki. Stan i perspektywy, RSU-G przykładzie Ministrów, Warszawa.*

— Services linked with health preservation which influence length of life, strength and vigor,

— Migration and scientific research.

Investment in human capital:

— has an impact on the innovativeness of the economy and society,

— has an impact on institutional changes and structure development,

— supports new patterns of construction and quality of life,

— creates modern organizational, and social infrastructure[7].

There is also social capital. Social capital represents confidence, cooperation and connections between people creating an organization that works better if the relations between people are better[8]. Many authors point out barriers to social capital development, which decreases network creation. The most important problems include a lack of entrepreneurs, poor competence in business activities, and a poor understanding of a company's goals by its owners[9]. Social capital can be described as linkages between people, but also a set of values and norms that improve behavior of societies[10].

Human capital can be described as values, which include:

— skills held by the employee: energy, intelligence, honesty, etc.

— skill for learning: creativity, and the ability to think creatively,

— motivation for the employee to give information and knowledge: working in groups, skills, a goal focus[11].

One of the most important elements of human capital is the level of education. A low level of the farmer's education is essential barrier to adoption of new production methods. These skills are essential to the adaption to functioning within the Common Agricultural Policy[12].

On the other hand, a lack of education by farmers makes adoption of new technologies and means of production more difficult. It is particularly important in using new machines and technology, which are essential in modern agriculture[13].

Human capital can be improved using a variety of actions, such as increased possibilities to learn, and changing conditions for social and economic environment[14].

7   **E. Lipiński**, [1971]: *Karol Marks i zagadnienia współczesności. PWN, Warszawa, s. 272.*

8   F. **Fukuyama,** [1997]: *Zaufanie: kapitał społeczny a droga do dobrobytu, przekł. z ang. Anna i Leszek* Śliwa. *Warszawa: PWN, ISBN: 8301124881, 1997, 27p.*

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10   **A. Rudzewicz,** [2013]: *Zaufanie jako podstawa kapitału społecznego. Zeszyty Naukowe WSES w Ostrołęce 11, s. 7-13.*

11   **B. Wyrzykowska,** [2008]: *Pomiar kapitału ludzkiego w organizacji. Zeszyty Naukowe SGGW w Warszawie. Ekonomika i Organizacja Gospodarki Żywnościowej 66, p. 159-170.*

12   **M. Zajdel,** [2010]: *Ocena wykształcenia ludności rolniczej w województwie kujawsko-pomorskim. Folia Pomerania Universitatis Techmologiae stetinensis 282(60), s. 185-192.*

13   **I. Hamerska, S. Roczkowska-Chmaj,** [2008]: *Wykształcenie i wiek rolników a wskaźnik postępu naukowo-technicznego. Inżynieria Rolnicza 11(109), s. 75-82.*

14   **M. Kozera,** [2011]: *Kapitał ludzki jako składnik kapitału intelektualnego w rolnictwie. Problemy Rolnictwa Światowego 11(26), z. 1, s. 105-111.*

10.2. Changes in Polish Countryside

The Polish countryside has many different levels of socio-economic development. According to Michna (2009), there are changes in the Polish countryside involving the relocation of much of the population, leaving work in agriculture and relocating to achieve a better income[15]. A typical European country today has a high level of urbanization and development. Michna gives the example of France, where only 27 % of the rural population is employed in agriculture, while the others work in processing plants and other enterprises. The situation is similar in Austria, where only 25 % of those living in rural areas work in agriculture. The Polish villages will grow rapidly if more jobs are created outside agriculture. The process must be supported by well-educated farmers. The non-agricultural rural economy is especially important. In Poland, most farms are small or medium. Despite the small size of semi-subsistence farms, these farms play an important role because they are the source of modest income for a resident population without sufficient qualifications to work outside agriculture[16]. In addition to the benefits mentioned above, the small holdings are important for the preservation of the natural environment and cultural heritage[17]. Poland has a bipartite structure of farms. The essential part is that the smaller holdings give small farmers some place to work. The larger farms group are more competitive[18]. A negative feature of the subsistence farmers is the underutilization of productive resources, while the low level of education of these farmers limits their options[19].

The limiting factor in the development of rural areas is the passivity of their citizens in the search for new solutions, work or other activities, which is the result of limited qualifications of farmers. Accelerating changes in rural areas and employment growth of the population is a priority of the European Union, as seen in the implementation of the Lisbon Strategy[20]. The economic inactivity rural residents has many causes. Most often mentioned: the reluctance of people to take a new job, reluctance to change, mismatch between workers' skills and employers' needs and the lack of initiative to make create their own business and, most of all, the low level of education of the rural population[21]. Economic inactivity is a drawback of the labor force in Polish agriculture and manifests itself most often in the small-area farm and the lack of search for alternative sources of income.

The Polish countryside must introduce changes that depend on the amount of income earned by farmers. A special role is played here by entrepreneurial farmers who raise both agricultural but also non-agricultural revenue[22]. In order to adapt agriculture

[15]   **W. Michna,** [2009]: *Źródła wzrostu i rozwoju wsi tkwią głównie w tworzeniu nowych miejsc pracy. Roczniki Nauk Rolniczych Seria G T. 96, z. 4, s. 139-146.*

[16]   **E. Majewski,** [2009]: *Dochody i jakość życia w gospodarstwach niskotowarowych w wybranych regionach Polski. Roczniki Nauk Rolniczych Seria G T. 96, z. 4, s. 122-129.*

[17]   **W. Józwiak,** [2006]: *Funkcjonowanie i role społeczne najmniejszych gospodarstw rolnych. Wieś i Rolnictwo nr 2.*

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to the requirements of the European Union, it is also essential to development a more modern market infrastructure (launch commodity, wholesale markets, market information systems, marketing options in agriculture, export promotion). This process is connected with the necessity of concentration of agricultural production in Poland and the development of greater organization of agricultural producers. Changing agricultural policy should encourage the creation of conditions for the development of rural areas as a place that supports multifunctional rural development. There is clear support for this in the allocation of an increasing proportion of EU structural funds for these purposes and the improvement of the qualifications of the rural population[23].

10.3. Objective and Methods

The main objective of this study was to identify human capital development in dairy farms. The data were collected from 100 farms from the regions of Mazowsze and Podlasie, including the following provinces: Podlaskie, Mazowieckie, Łódzkie and Lubelskie. The research method used in the survey was questionnaires and interviews. The descriptive methods were used to analyze the research results. Farmers engaged in milk production agreed to take part in the survey.

It was recognized that the level of education impacts the human capital and organization of dairy farms. That is why we divided the surveyed group of farms into four subcategories according to educational level, i.e. primary (5%), vocational (41%), secondary (47%), higher (9%).

To measure the human capital the quality and financial indicator were measured. The quality measure can be described by following equation:

$$QM = \frac{E+AA+T+Noch+Nop+NAE+ANY+NoPF+NPEF}{9}$$

Where:
QM-quality measure,
E-education (1-4),
AA-average age (number),
T-trainings (%),
Noch-number of children (number),
Nop-number of people in family (number),
NAE-non agricultural employment (%),
ANY-average number of years at school (number),
NoPF-number of people in family (number),
NPEF-number of people employed in a farm (number).

The financial measure can be described by following equation:

23   **K. Wierzbicki, K. Krajewski,** [2004]: *Zagrożenia konkurencyjności gospodarstw rolnych wobec niedorozwoju infrastruktury technicznej wsi polskiej, (w:) Realizacja ustawy o kształtowaniu ustroju rolnego. Wyd. Fundacja Program Pomocy dla Rolnictwa, Warszawa, s. 129-162 (materiały pokonferencyjne).*

$$FM = \frac{ASIF+CES+IpFE}{3}$$

where:

FM-financial measure,

ASIF-agricultural Social Insurance Fund,

CES-cost of school education,

IpFE-income per fully-employed person.

10.4. Methods of Human Capital Measurement

The methods of human capital evaluation can be divided into two groups:

— Financial methods where capital is measures in finance,

— Quality methods where quality changes are be described.

In the first method human capital is measured as discounted value of future incomes or the cost of education capitalization[24].

The second group of methods called quality measure the quality of society education. We can measure it by: percentage of population with different educational level or we measure the average number of year at school[25].

Quality methods describe the state of different levels of education. First of all the age of farm owners were analyzed (tab. 1). It can be concluded that farmers having higher education were the youngest (40 years), whereas those only having primary education were the oldest (53 years).

Table 1. **Quality methods of human capital of dairy farms evaluation according to level of education**

Specification	Level of farmers education			
	Higher	**Secondary**	**Vocational**	**Primary**
Share of male (%)	100.0	89.4	85.7	100,.
Average age	40	46	49	53
Trainings (%)	33.3	23.4	23.8	0.0
Extension (%)	66.7	48.9	59.5	100.0
Number of children	2.3	2.1	2.4	0.7
Number of pensioners	0.77	0.49	0.3	1.3
Non-agricultural employment (%)	33	28	31	7
Average number of years at school	17	13	11	8
Number of farms	9	47	41	3
Average number of people in family	6	4.9	5.2	4.7
Number of people employed in a farm	2.8	2.3	2.1	2.0

Source: own calculation based on research

[24]   **R. S. Domański,** [1993]: *Kapitał ludzki i wzrost gospodarczy, PWN, Warszawa, s. 51.*

[25]   *Human capital investment, an international comparison, Centre for educational research and Innovation, OE CD, 1998, s. 16.*

Farmers having the higher education in the analysis took part in more extended training, mainly within RDP 2007-13.

The next analyzed characteristic was number of children. Farmers having more education had the highest number of children.

Finally we have found that more farmers with higher education had non-agricultural employment (33%), whereas few having primary education did (only 7%).

Financial methods were used to evaluate the human capital development of dairy farm owners.

First of all the costs of education spent by Poland's national budget were analyzed. The average cost of a year of education at nursery school was 5,792 USD, at primary school 4,855 USD, secondary school 4,424 USD and higher school 4,613 USD. These costs of education are proposed by Sztanderska who used OECD data to measure the costs of education in Poland and other countries[26]. The value of farmer having higher education was evaluated at 96,975 USD (approximately 291,985 PLN). This is national government spending. It does not include money spent by parents. The cost of education varies widely between EU countries and Poland. The smallest difference can be observed at nursery school education (about 10,4%), but the difference is increasing with higher level of education and in higher school is about 100%. Most of the expenditures for education are dominated by current spending dominated by pensions 65,5% and investment outlays 6,2%. In all OECD countries the highest component of educational spending were current spending (average 92% in 2008), about 70%. Of which is for salaries.

Table 2. **Financial methods of human capital of dairy farms evaluation according to level of education**

Specification	Level of education			
	Higher	**Secondary**	**Vocational**	**Primary**
Agricultural Social Insurance Fund, insurance of family (PLN)	2466.7	2821.6	2122.6	4466.7
Incomes (%): Only from agriculture	44.4	57.4	54.8	66.7
Mainly from agriculture	33.3	40.4	42.9	33.3
Partly from agriculture	22.3	2.2	2.3	0.0
Cost of education spent at school in 2009 (USD) (PLN)	96975 290925	73910 221730	69488 208464	56216 168648
Agricultural income (PLN) per farm	202525.6	252937.0	188856.9	146579.0
Per 1 fully employed	86208.33	102247.2	84797.4	73288.0
Per 1 ha farmland	4950.8	5137.8	4598.8	3969.7
Per 1 man-hour	29.0	52.5	23.3	10.4

Source: own calculation based on research

The second measure used in the paper was agricultural income achieved by farmers. The effect of this measure was less striking. However, farmers having primary education

26   **U. Sztanderska,** [2012]: *Koszty edukacji od przedszkola do gimnazjum. Instytut Badań Edukacyjnych, Warszawa 2013.*

achieved the lowest economic results measured by agricultural income. But it can be safely assumed that farmers having primary education achieved the lowest incomes calculated by farm, 1 fully employed, 1 ha farmland and 1 man-hour.

The farmers were asked to describe sources of their incomes. Of farmers having higher education 22.3% described their incomes as partly from agriculture, which means that more than on fifth earn more money from outside agriculture than from farming. Such opportunities are more limited for farmers having limited education.

We also asked farmers for Agricultural Social Insurance Fund. These spending were the highest for farmers having primary education. It means that these farmers have limited possibilities of finding a job outside agriculture and had to pay the highest insurance.

10.5. Synthetic Quality and Financial Measure

To measure the human capital the synthetic quality measure was elaborated (Fig. 1). First, we can observe the synthetic growth of the value of the measure according to education level. However, farmers having secondary education achieved a little bit lower index than those having vocational education. It is difficult to explain the logic for this result. Of course, people having only vocational education are more prepared to begin work in particular job. It is the same with farmers. If people who are vocationally focused, the knowledge achieved in vocational education level may be sufficient. But, to go much beyond the entry-level knowledge, they should spend more time at school. This level of education will provide them with better possibilities to advance.

Figure 1. **Synthetic quality measure of human capital of dairy farms owners (points)**
Source: own calculation on the basis of research

Next we elaborated synthetic financial measure of dairy farm owners (Fig. 2). This measure was calculated as an average spending on education, achieved incomes per 1 fully employed and average yearly insurance. This measure confirms the fact that the value of farmers having higher education was the highest.
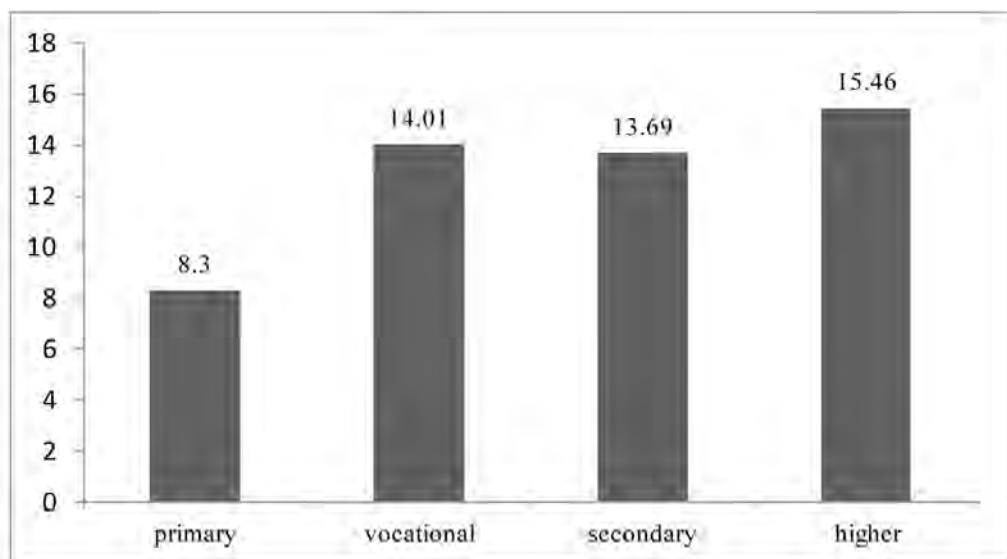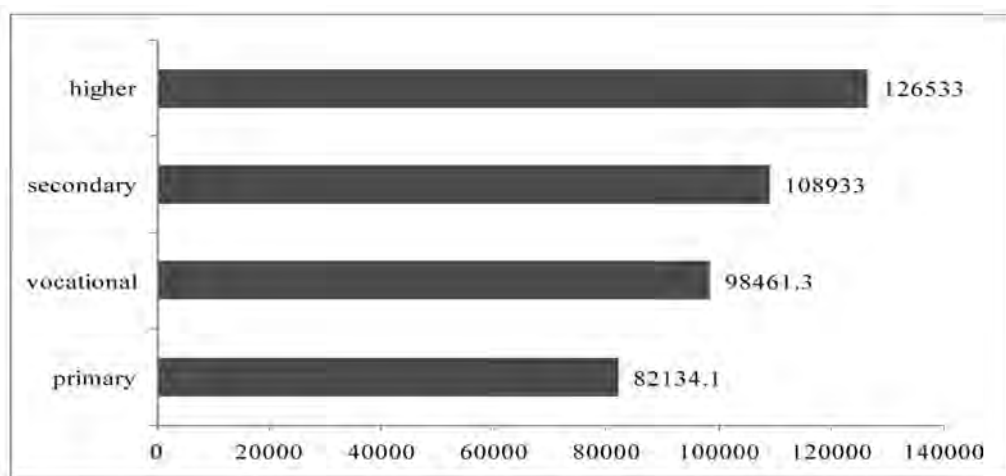
Figure 2. **Synthetic financial measure of human capital of dairy farms owners (PLN)**
Source: own calculation on the basis of research

This measure calculates the spending on education during all levels of schooling. It has informative meaning and is useful in estimating human capital. However our research proved that this measure is enlarged by two characteristics: the spending on education and achieved incomes per 1 fully employed. The insurance spending helps only in preserving the good health of farmers when they need treatment.

10.6. Conclusions

Human capital is particularly important in the era of knowledge-based economy. Human capital can be measured at micro and macro level.

The methods of human capital measurement can be divided into two groups: financial and qualitative. Financial methods try to measure the value in future income for educational costs, whereas quality methods can be measured as the education level in the society or group of people.

Financial methods proved the differences in value of human capital between different levels of education of dairy farmers. The highest value had human capital of farmers having higher education. The value of human capital was evaluated at 96975 PLN, whereas in group of farmers with primary education 56216 PLN.

Well-educated farmers have better possibilities for gaining off-farm employment. They may have possibilities to work as local leaders, entrepreneurs or local councilor, whereas the possibility to obtain off-farm employment for farmers with only primary education is very limited.

People having higher education level achieved the highest synthetic quality measure. This result proves that higher education gives farmers more off-farm employment. They can be councilors, work in local government, be local leaders and run the farm. A higher education level helps them to introduce new machinery, technology and different activities on the farm. They can have multiple sources of income, which has an impact on the quality of life of their families.

Finally, we wanted to assess the value of human capital by creating a synthetic financial measure. The research confirmed the general principle that farmers having higher education achieve the highest return on their human capital. This measure has an informative function about money spent on education. However, farmers having higher education should know that they have the highest possibility to bring new solutions to agriculture, building on what they learned during their studies. They have the highest knowledge about how to create multifunctional development in rural areas.

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"EUROPE 2020" STRATEGY BASED ON HUMAN CAPITAL DEVELOPMENT

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11.1 Introduction

Europe faces a moment of transformation. The crisis has wiped out years of economic and social progress and exposed structural weaknesses in Europe's economy. In the meantime, the world is moving fast and long-term challenges – globalization, pressure on resources, ageing – intensify. The EU must now take charge of its future. Europe can succeed if it acts collectively, as a Union. We need a strategy to help us come out stronger from the crisis and turn the EU into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. Europe 2020 sets out a vision of Europe's social market economy for the 21st century[1]. Europe 2020 puts forward three mutually reinforcing priorities:

— Smart growth: developing an economy based on knowledge and innovation.
— Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
— Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

The EU needs to define where it wants to be by 2020. To this end, the Commission proposes the following EU headline targets:

— 75 % of the population aged 20-64 should be employed.
— 3% of the EU's GDP should be invested in R&D.
— The „20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).
— The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.
— 20 million less people should be at risk of poverty.

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[1] **EC.,** [2010]: *Europe 2020, A strategy for smart, sustainable and inclusive growth, Communication from the Commission, Brussels, 3.3.2010, COM (2010) 2020 final, 5 p.*

These targets are interrelated and critical to our overall success. To ensure that each Member State tailors the Europe 2020 strategy to its particular situation, the Commission proposes that EU goals are translated into national targets and trajectories. The targets are representative of the three priorities of smart, sustainable and inclusive growth but they are not exhaustive: a wide range of actions at national, EU and international levels will be necessary to underpin them[2].

11. 2. Seven Flagship Initiatives in Frame of "Europe 2020" Strategy

The Commission is putting forward seven flagship initiatives to catalyze progress under each priority theme:
— "Innovation Union" to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs.
— "Youth on the move" to enhance the performance of education systems and to facilitate the entry of young people to the labor market.
— "A digital agenda for Europe" to speed up the roll-out of high-speed internet and reap the benefits of a digital single market for households and firms.
— "Resource efficient Europe" to help decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources, modernize our transport sector and promote energy efficiency.
— "An industrial policy for the globalization era" to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally.
— "An agenda for new skills and jobs" to modernize labor markets and empower people by developing their of skills throughout the lifecycle with a view to increase labor participation and better match labor supply and demand, including through labor mobility.
— "European platform against poverty" to ensure social and territorial cohesion such that the benefits of growth and jobs are widely shared and people experiencing poverty and social exclusion are enabled to live in dignity and take an active part in society[3].

These seven flagship initiatives will commit both the EU and the Member States. EU-level instruments, notably the single market, financial levers and external policy tools, will be fully mobilized to tackle bottlenecks and deliver the Europe 2020 goals. As an immediate priority, the Commission charts what needs to be done to define a credible exit strategy, to pursue the reform of the financial system, to ensure budgetary consolidation for long-term growth, and to strengthen coordination within the Economic and Monetary Union. Stronger economic governance will be required to deliver results. Europe 2020 will rely on two pillars: the thematic approach outlined above, combining priorities and headline targets; and country reporting, helping Member States to develop

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[2]   **EC.**, [2010]: *Europe 2020, A strategy for smart, sustainable and inclusive growth, Communication from the Commission, Brussels, 3.3.2010, COM (2010) 2020 final, 5 p.*
[3]   *http://ec.europa.eu/resource-efficient-europe/pdf/resource_efficient_europe_en.pdf (accessed 27th July 2014).*

their strategies to return to sustainable growth and public finances. Integrated guidelines will be adopted at EU level to cover the scope of EU priorities and targets. Country-specific recommendations will be addressed to Member States. Policy warnings could be issued in case of inadequate response. The reporting of Europe 2020 and the Stability and Growth Pact evaluation will be done simultaneously, while keeping the instruments separate and maintaining the integrity of the Pact[4].

11. 3. Main Priorities of "Europe 2020" Strategy

Three priorities should be the heart of Europe 2020[5]:
— Smart growth – developing an economy based on knowledge and innovation.
— Sustainable growth – promoting a more resource efficient, greener and more competitive economy.
— Inclusive growth – fostering a high -employment economy delivering economic, social and territorial cohesion.

These three priorities are mutually reinforcing; they offer a vision of Europe's social market economy for the 21st century. To guide our efforts and steer progress, there is a large consensus that the EU should commonly agree on a limited number of headline targets for 2020. These targets should be representative of the theme of smart, sustainable and inclusive growth. They must be measurable, capable of reflecting the diversity of Member States situations and based on sufficiently reliable data for purposes of comparison. The following targets have been selected on this basis – meeting them will be critical to our success by 2020:
— The employment rate of the population aged 20-64 should increase from the current 69% to at least 75%, including through the greater involvement of women, older workers and the better integration of migrants in the work force;
— The EU currently has a target of investing 3% of GDP in R&D. The target has succeeded in focusing attention on the need for both the public and private sectors to invest in R&D but it focuses on input rather than impact. There is a clear need to improve the conditions for private R&D in the EU and many of the measures proposed in this strategy will do this. It is also clear that by looking at R&D and innovation together we would get a broader range of expenditure which would be more relevant for business operations and for productivity drivers. The Commission proposes to keep the 3% target while developing an indicator which would reflect R&D and innovation intensity;
— Reduce greenhouse gas emissions by at least 20% compared to 1990 levels or by 30%, if the conditions[6] are right; increase the share of renewable energy sources in our final energy consumption to 20%; and a 20% increase in energy efficiency;

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4   **EC.,** [2010]: *Europe 2020, A strategy for smart, sustainable and inclusive growth, Communication from the Commission, Brussels, 3.3.2010, COM (2010) 2020 final, 6 p.*

5   *These themes have been widely welcomed in the public consultation carried out by the Commission. For details of the views expressed during the consultation see: http://ec.europa.eu/eu2020/index_en.htm (accessed 27th July 2014)*

6   *The European Council of 10-11 December 2009 concluded that as part of a global and comprehensive agreement for the period beyond 2012, the EU reiterates its conditional offer to move to a 30% reduction by 2020 compared to 1990 levels, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities.*

— A target on educational attainment which tackles the problem of early school leavers by reducing the dropout rate to 10% from the current 15%, whilst increasing the share of the population aged 30-34 having completed tertiary education from 31% to at least 40% in 2020;

— The number of Europeans living below the national poverty lines should be reduced by 25%, lifting over 20 million people out of poverty[7].

These targets are interrelated. For instance, better educational levels help employability and progress in increasing the employment rate helps to reduce poverty. A greater capacity for research and development as well as innovation across all sectors of the economy, combined with increased resource efficiency will improve competitiveness and foster job creation. Investing in cleaner, low carbon technologies will help our environment, contribute to fighting climate change and create new business and employment opportunities. Meeting these targets should mobilize our collective attention. It will take strong leadership, commitment and an effective delivery mechanism to change attitudes and practices in the EU to deliver the results which are summarized in these targets. These targets are representative, not exhaustive. They represent an overall view of where the Commission would like to see the EU on key parameters by 2020. They do not represent a "one size fits all" approach. Each Member State is different and the EU of 27 is more diverse than it was a decade ago. Despite disparities in levels of development and standards of living the Commission considers that the proposed targets are relevant to all Member States, old and newer alike. Investing in research and development as well as innovation, in education and in resource efficient technologies will benefit traditional sectors, rural areas as well as high skill, service economies. It will reinforce economic, social and territorial cohesion. To ensure that each Member States tailors the Europe 2020 strategy to its particular situation, the Commission proposes that these EU targets are translated into national targets and trajectories to reflect the current situation of each Member State and the level of ambition it is able to reach as part of a wider EU effort to meet these targets. In addition to the efforts of Member States the Commission will propose an ambitious range of actions at EU level designed to lift the EU onto a new, more sustainable growth path. This mix of EU and national efforts should be mutually reinforcing.

11. 4. Smart Growth – an Economy Based on Knowledge and Innovation

Smart growth means strengthening knowledge and innovation as drivers of our future growth. This requires improving the quality of our education, strengthening our research performance, promoting innovation and knowledge transfer throughout the Union, making full use of information and communication technologies and ensuring that innovative ideas can be turned into new products and services that create growth, quality jobs and help address European and global societal challenges. But, to succeed, this must be combined with entrepreneurship, finance, and a focus on user needs and market opportunities. By drawing on the Europe Strategy for smart, sustainable and inclusive growth, the emphasis on raising educational outcomes is line with the desire to raise

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[7]   *The national poverty line is defined as 60% of the median disposable income in each Member State.*

employment rates which lies at the core of the European Strategy and more particularly to guidelines 7 'Increasing labor market participation of women and men, reducing structural unemployment and promoting job quality'[8]. Europe must act:[9].

— Innovation: R&D spending in Europe is below 2%, compared to 2.6% in the US and 3.4% in Japan, mainly as a result of lower levels of private investment. It is not only the absolute amounts spent on R&D that count

— Europe needs to focus on the impact and composition of research spending and to improve the conditions for private sector R&D in the EU. Our smaller share of high-tech firms explains half of our gap with the US.

— Education, training and lifelong learning: A quarter of all pupils have poor reading competences, one in seven young people leave education and training too early. Around 50% reach medium qualifications level but this often fails to match labor market needs. Less than one person in three aged 25-34 has a university degree compared to 40% in the US and over 50% in Japan. According to the Shanghai index, only two European universities are in the world's top 20.

— Digital society: The global demand for information and communication technologies is a market worth € 2 000 billion, but only one quarter of this comes from European firms. Europe is also falling behind on high- speed internet, which affects its ability to innovate, including in rural areas, as well as on the on-line dissemination of knowledge and on-line distribution of goods and services.

Action under this priority will unleash Europe's innovative capabilities, improving educational outcomes and the quality and outputs of education institutions, and exploiting the economic and societal benefits of a digital society. These policies should be delivered at regional, national and EU level.

11. 4.1. Flagship Initiative: "Innovation Union"

The aim of this is to re-focus R&D and innovation policy on the challenges facing our society, such as climate change, energy and resource efficiency, health and demographic change. Every link should be strengthened in the innovation chain, from 'blue sky' research to commercialization[10].

At EU level, the Commission will work:

— To complete the European Research Area, to develop a strategic research agenda focused on challenges such as energy security, transport, climate change and resource efficiency, health and ageing, environmentally-friendly production methods and land management, and to enhance joint programming with Member States and regions;

— To improve framework conditions for business to innovate (i.e. create the single EU Patent and a specialized Patent Court, modernize the framework of copyright and trademarks, improve access of SMEs to Intellectual Property Protection, speed up setting of interoperable standards; improve access to capital and make full use of

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[8]   **J. Vero,** [2012]: *From the Lisbon Strategy to Europe 2020: the Statistical Landscape of the Education and Training Objectives Through the Lens of the Capability Approach Social Work & Society, Volume 10, Issue 1, 2012, 9p.*

[9]   **EC.,** [2010]: *Europe 2020, A strategy for smart, sustainable and inclusive growth, Communication from the Commission, Brussels, 3.3.2010, COM (2010) 2020 final, 12 p.*

[10]   *http://ec.europa.eu/research/innovation-union/index_en.cfm (accessed 27th July 2014).*

demand side policies, e.g. through public procurement and smart regulation);
— To launch 'European Innovation Partnerships' between the EU and national levels to speed up the development and deployment of the technologies needed to meet the challenges identified. The first will include: 'building the bio-economy by 2020', 'the key enabling technologies to shape Europe's industrial future' and 'technologies to allow older people to live independently and be active in society';
— To strengthen and further develop the role of EU instruments to support innovation (e.g. structural funds, rural development funds, R&D framework programme, CIP, SET plan), including through closer work with the EIB and streamline administrative procedures to facilitate access to funding, particularly for SMEs and to bring in innovative incentive mechanisms linked to the carbon market, namely for fast-movers;
— To promote knowledge partnerships and strengthen links between education, business, research and innovation, including through the EIT, and to promote entrepreneurship by supporting Young Innovative Companies.

At national level, Member States will need:
— To reform national (and regional) R&D and innovation systems to foster excellence and smart specialization, reinforce cooperation between universities, research and business, implement joint programming and enhance cross-border co-operation in areas with EU value added and adjust national funding procedures accordingly, to ensure the diffusion of technology across the EU territory;
— To ensure a sufficient supply of science, math and engineering graduates and to focus school curricula on creativity, innovation, and entrepreneurship;
— To prioritize knowledge expenditure, including by using tax incentives and other financial instruments to promote greater private R&D investments[11].

11. 4.2. Flagship Initiative: "Youth on the Move"

The aim is to enhance the performance and international attractiveness of Europe's higher education institutions and raise the overall quality of all levels of education and training in the EU, combining both excellence and equity, by promoting student mobility and trainees' mobility, and improve the employment situation of young people.

At EU level, the Commission will work:
— To integrate and enhance the EU's mobility, university and researchers' programmes (such as Erasmus, Erasmus Mundus, Tempus and Marie Curie) and link them up with national programmes and resources;
— To step up the modernization agenda of higher education (curricula, governance and financing) including by benchmarking university performance and educational outcomes in a global context;
— To explore ways of promoting entrepreneurship through mobility programmes for young professionals;
— To promote the recognition of non-formal and informal learning;
— To launch a Youth employment framework outlining policies aimed at reducing

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[11]   **EC.,** [2010]: *Europe 2020, A strategy for smart, sustainable and inclusive growth, Communication from the Commission, Brussels, 3.3.2010, COM (2010) 2020 final, 13 p.*

youth unemployment rates: this should promote, with Member States and social partners, young people's entry into the labor market through apprenticeships, stages or other work experience, including a scheme ("Your first EURES job") aimed at increasing job opportunities for young people by favoring mobility across the EU.

At national level, Member States will need:

— To ensure efficient investment in education and training systems at all levels (pre-school to tertiary);

— To improve educational outcomes, addressing each segment (pre-school, primary, secondary, vocational and tertiary) within an integrated approach, encompassing key competences and aiming at reducing early school leaving;

— To enhance the openness and relevance of education systems by building national qualification frameworks and better gearing learning outcomes towards labor market needs.

— To improve young people's entry into the labor market through integrated action covering i.a guidance, counseling and apprenticeships.

11. 4.3. Flagship Initiative: "A Digital Agenda for Europe"

The aim is to deliver sustainable economic and social benefits from a Digital Single Market based on fast and ultra fast internet and interoperable applications, with broadband access for all by 2013, access for all to much higher internet speeds (30 Mbps or above) by 2020, and 50% or more of European households subscribing to internet connections above 100 Mbps[12].

At EU level, the Commission will work:

— To provide a stable legal framework that stimulate investments in an open and competitive high speed internet infrastructure and in related services;

— To develop an efficient spectrum policy;

— To facilitate the use of the EU's structural funds in pursuit of this agenda;

— To create a true single market for online content and services (i.e. borderless and safe EU web services and digital content markets, with high levels of trust and confidence, a balanced regulatory framework with clear rights regimes, the fostering of multi-territorial licenses, adequate protection and remuneration for rights holders and active support for the digitization of Europe's rich cultural heritage, and to shape the global governance of the internet;

— To reform the research and innovation funds and increase support in the field of ICTs so as to reinforce Europe's technology strength in key strategic fields and create the conditions for high growth SMEs to lead emerging markets and to stimulate ICT innovation across all business sectors;

— To promote internet access and take-up by all European citizens, especially through actions in support of digital literacy and accessibility.

At national level, Member States will need:

— To draw up operational high speed internet strategies, and target public funding, including structural funds, on areas not fully served by private investments;

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12   *http://ec.europa.eu/digital-agenda/about-our-goals (accessed 27th July 2014).*

— To establish a legal framework for co-coordinating public works to reduce costs of network rollout;
— To promote deployment and usage of modern accessible online services (e.g. e-government, online health, smart home, digital skills, security).

11. 5. Inclusive Growth – a High-Employment Economy Delivering Economic, Social and Territorial Cohesion

Inclusive growth means empowering people through high levels of employment, investing in skills, fighting poverty and modernizing labor markets, training and social protection systems so as to help people anticipate and manage change, and build a cohesive society. It is also essential that the benefits of economic growth spread to all parts of the Union, including its outermost regions, thus strengthening territorial cohesion. It is about ensuring access and opportunities for all throughout the lifecycle. Europe needs to make full use of its labor potential to face the challenges of an ageing population and rising global competition. Policies to promote gender equality will be needed to increase labor force participation thus adding to growth and social cohesion[13]. Europe must act:

— Employment: Due to demographic change, our workforce is about to shrink. Only two-thirds of our working age population is currently employed, compared to over 70% in the US and Japan. The employment rate of women and older workers are particularly low. Young people have been severely hit by the crisis, with an unemployment rate over 21%. There is a strong risk that people away or poorly attached to the world of work lose ground from the labor market.
— Skills: About 80 million people have low or basic skills, but lifelong learning benefits mostly the more educated. By 2020, 16 million more jobs will require high qualifications, while the demand for low skills will drop by 12 million jobs. Achieving longer working lives will also require the possibility to acquire and develop new skills throughout the lifetime.
— Fighting poverty: 80 million people were at risk of poverty prior to the crisis. 19 million of them are children. 8 per cent of people in work do not earn enough to make it above the poverty threshold. Unemployed people are particularly exposed.

Action under this priority will require modernizing, strengthening our employment education and training policies and social protection systems by increasing labor participation and reducing structural unemployment, as well as raising corporate social responsibility among the business community. Access to childcare facilities and care for other dependents will be important in this respect. Implementing flexicurity principles and enabling people to acquire new skills to adapt to new conditions and potential career shifts will be key. A major effort will be needed to combat poverty and social exclusion and reduce health inequalities to ensure that everybody can benefit from growth. Equally important will be our ability to meet the challenge of promoting a healthy and active ageing population to allow for social cohesion and higher productivity[14].

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[13]   **J-M. Bonvin,** [2012]: *Individual working lives and collective action. An introduction to capability for work and capability for voice, Tranfer, 18(1) pp 9-18.*

[14]   **EC.,** [2010]: *Europe 2020, A strategy for smart, sustainable and inclusive growth, Communication from the Commission, Brussels, 3.3.2010, COM (2010) 2020 final, 17 p.*

11. 5.1. Flagship Initiative: "An Agenda for New Skills and Jobs"

The aim is to create conditions for modernizing labor markets with a view to raising employment levels and ensuring the sustainability of our social models. This means empowering people through the acquisition of new skills to enable our current and future workforce to adapt to new conditions and potential career shifts, reduce unemployment and raise labor productivity[15].

At EU level, the Commission will work:
— To define and implement the second phase of the flexicurity agenda, together with European social partners, to identify ways to better manage economic transitions and to fight unemployment and raise activity rates;
— To adapt the legislative framework, in line with 'smart' regulation principles, to evolving work patterns (e.g. working time, posting of workers) and new risks for health and safety at work;
— To facilitate and promote intra-EU labor mobility and better match labor supply with demand with appropriate financial support from the structural funds, notably the European Social Fund (ESF), and to promote a forward-looking and comprehensive labor migration policy which would respond in a flexible way to the priorities and needs of labor markets;
— To strengthen the capacity of social partners and make full use of the problem-solving potential of social dialogue at all levels (EU, national/regional, sectoral, company), and to promote strengthened cooperation between labor market institutions including the public employment services of the Member States;
— To give a strong impetus to the strategic framework for cooperation in education and training involving all stakeholders. This should notably result in the implementation of life-long learning principles (in cooperation with Member States, social partners, experts) including through flexible learning pathways between different education and training sectors and levels and by reinforcing the attractiveness of vocational education and training. Social partners at European level should be consulted in view of developing an initiative of their own in this area;
— To ensure that the competences required to engage in further learning and the labor market are acquired and recognized throughout general, vocational, higher and adult education and to develop a common language and operational tool for education/training and work: a European Skills, Competences and Occupations framework (ESCO).

At national level, Member States will need:
— To implement their national pathways for flexicurity, as agreed by the European Council, to reduce labor market segmentation and facilitate transitions as well as facilitating the reconciliation of work and family life;
— To review and regularly monitor the efficiency of tax and benefit systems so to make work pay with a particular focus on the low skilled, whilst removing measures that discourage self-employment;

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[15]   **EC.,** [2011]: *Youth Opportunities Initiative, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, 20.12.2011, COM(2011) 933 final, 13 p.*

— To promote new forms of work-life balance and active ageing policies and to increase gender equality;

— Promote and monitor the effective implementation of social dialogue outcomes;

— To give a strong impetus to the implementation of the European Qualifications Framework, through the establishment of national qualification frameworks;

— To ensure that the competences required to engage in further learning and the labor market are acquired and recognized throughout general, vocational, higher and adult education, including non formal and informal learning;

— To develop partnerships between the worlds of education/training and work, in particular by involving social partners in the planning of education and training provision.

11. 5.2. Flagship Initiative: "European Platform Against Poverty"

The aim is to ensure economic, social and territorial cohesion, building on the current European year for combating poverty and social exclusion so as to raise awareness and recognize the fundamental rights of people experiencing poverty and social exclusion, enabling them to live in dignity and take an active part in society[16].

At EU level, the Commission will work:

— To transform the open method of coordination on social exclusion and social protection into a platform for cooperation, peer-review and exchange of good practice, and into an instrument to foster commitment by public and private players to reduce social exclusion, and take concrete action, including through targeted support from the structural funds, notably the ESF;

— To design and implement programmes to promote social innovation for the most vulnerable, in particular by providing innovative education, training, and employment opportunities for deprived communities, to fight discrimination (e.g. disabled), and to develop a new agenda for migrants' integration to enable them to take full advantage of their potential;

— To undertake an assessment of the adequacy and sustainability of social protection and pension systems, and identify ways to ensure better access to health care systems.

At national level, Member States will need:

— To promote shared collective and individual responsibility in combating poverty and social exclusion;

— To define and implement measures addressing the specific circumstances of groups at particular risk (such as one-parent families, elderly women, minorities, Roma, people with a disability and the homeless);

— To fully deploy their social security and pension systems to ensure adequate income support and access to health care[17].

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[16]   *http://ec.europa.eu/social/main.jsp?catId=961 (accessed 27th July 2014).*

[17]   **EC.,** [2010]: *Europe 2020, A strategy for smart, sustainable and inclusive growth, Communication from the Commission, Brussels, 3.3.2010, COM (2010) 2020 final, 19 p.*

11. 6. Human Capital Development in Frame of National Development Strategy 2020

One of the key factors determining the development of the country and its competitiveness is the quality of human capital. Development (quantitative and qualitative) of human capital is understood as the development of national and local labor markets as well as productivity growth of employees, and - consequently – as growth of production and services, development of innovation, increase in the productivity of the economy, and raise in the level and standard of living of all citizens[18].

Factors that will adversely affect the quantitative development of human capital, especially in the long-term, and that should be taken into account in advance by the active policy of the state, are mainly the demographic factors. The following factors are of major importance for the development of human capital in the context of demographic challenges: low fertility, increasing share of post-production age group in total population, negative migration balance, low professional activity of the senior generation. According to available demographic forecasts, the number of Polish population will decline steadily. The dynamics of this decline will increase after 2015, when the proportion of the population of working age will drop significantly[19]. CSO forecasts predict a loss of working-age population of about 2 million people in the period 2010-2020.

Moreover, territorial diversification of the existing demographic trends will become more noticeable, also in terms of population density and of changing population density in individual Polish areas (areas of depopulation, areas of concentration of the population). These phenomena will constitute a significant risk for the development and a challenge over the coming years. Among the main barriers to growth in Poland, two should be distinguished, namely a low rate of employment (64.6 %, 20-64, 2010)[20] and the mismatch of education to labor market needs. Poland is a country with one of the lowest in the EU levels of economic activity. The workforce is characterized by poor mobility, mismatch of the supply and demand structures for labor by qualification, low labor market flexibility, early age of professional deactivation, diverse employment age for men and women, low profitability of work in relation to social benefits, low female employment rate, low employment of the disabled, and poor adaptation of curricula to the needs of labor market. An active policy of the state will, therefore, be focused on the areas constituting a barrier to growth in employment.

The most important features of human capital that increase its employability are: knowledge, qualifications and professional skills. The level of human capital is largely determined by the quality of education, including higher education and scientific research. Knowledge is becoming an essential factor in the development of society, and, consequently, of the state and the economy. It is, therefore, important to invest in the wider education policy and research, with the highest rate of return, although it is postponed.

According to forecasts of the European Centre for the Development of Vocational Training (CEDEFOP), until 2020 Poland will face a growing demand for highly skilled

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[18]   **PCM.,** [2012]: *National Development Strategy 2020 – Active Society, Competitive economy, Efficient state, Warsaw, September 2012, 72 p.*
[19]   *CSO, Eurostat 2014.*
[20]   *CSO.*

workers, while demand for medium- and low-skilled labor force will drop[21]. In this context, the promotion of adult learning becomes particularly important, especially in the form of short courses and at work. The rate of the lifelong learning in Poland is significantly lower than the EU average. The creation of a cohesive system, under which the labor market and education policies will be developed, will be accompanied by the development of lifelong learning and learning in all of the life roles.

Identifying the barriers and territorial potentials properly is essential for the activities supporting the development of human capital to be successful. Specific features of individual areas, resulting from, i.a., their socio-economic functions, such as urban areas, rural areas and interactions between them, determine the directions in which regional labor markets as well as skills and competencies of human resources develop. Also the increased awareness of entrepreneurs in the field of human resource management will positively affect the development of human capital. The entrepreneurs, knowing how to manage their personnel, will use human capital better and more effectively.

11. 6.1. Increasing Labor Force Participation

Tasks of the state will focus on reducing disincentives to employment or to undertaking and maintaining a professional activity. Efforts are needed to support and stimulate labor participation by creating solutions that enable and facilitate the reconciliation of work and family life. One of the major activities in this area is to increase the availability of various forms of institutional care for children and to build an effective system of care for dependents and the elderly. Simultaneously, efforts will be taken to increase the attractiveness of working as a source of income in comparison to alternative sources, especially to social benefits, so that the system would be aimed at promoting active job search and would increase the motivation to take up legal employment. Special focus will be put on actions aiming to enable a proper career start of young people entering the labor market (promotion of the transfer between education and employment, so that graduates would quickly undertake work or return to employment, improvement of the profitability of the first job – changes in the system of social benefits, flexibility of employment and stability of employment conditions, renewable seasonal contracts). Simultaneously efforts will be supported to improve the quality of higher education, to promote undergraduate studies as sufficient to take up and pursue activities on the labor market, and to promote short forms of training.

Conditions will be created to increase the number of people with disabilities employed in the open market, including, i.a., gradual increase in the participation of disabled children in public education (school infrastructure, qualified teachers), modernization of protected labor market and of its role, ensuring universal access to high quality rehabilitation, changes in the funding of support for employment of disabled people, adaptation of public transport for persons with disabilities.

The progressive aging of the population makes it necessary to extend the working life of the Poles. Systemic reforms will be introduced in the system of social benefits (including social security), resulting in postponing the retirement age (including the

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[21] *Skills supply and demand in Europe: medium-term forecast up to 2020, publication of Cedefop 2010, pages 63-67.*

limitation of specific entitlements in the sector pension sub-system) and in equalizing the pensionable age between men and women. These measures will be accompanied by promoting older employees among employers (for example, showing strengths of older employees and breaking old stereotypes) and by system solutions to promote employment of older people. Support measures will be introduced to enable people aged 50+ to gain new knowledge and to supplement the knowledge they have in educational institutions, including institutions of higher education; this will allow for keeping older people in the labor market. Such measures will contribute to the activation of this group of people, both on the labor market and in social debate.

Actions favoring flexible forms of employment will aim to increase labor force participation. Increasing labor market flexibility should be accompanied by ensuring security in the framework of flexicurity in its four pillars - flexible and predictable conditions of contracts, concept of learning throughout life, active labor market policies, and modern social security system. These efforts will be very important because analyses show that Poland has one of the worst record among the European Union countries in implementing flexicurity.[22] Also the elimination of barriers associated with establishing, conducting and developing own businesses will promote the increase in labor market participation.

An integrated approach to development implies that - in addition to systemic changes – measures should be introduced to respond to the challenges of regional labor markets, in compliance with the nature and the needs of individual voivodeships and accounting for the differences between urban and rural areas. Guidelines for public intervention will take into account the situation and potentials of regional diversity, including the condition and quality of human capital and the needs of the regions.

Moreover, changes in the model of operation of Public Employment Services (PES) are necessary, consisting principally in a departure from registration and payment of benefits related activities as the basic function of PES towards active recruitment. Activation services should be separated from those responsible for the registration of the unemployed and for the redistribution of benefits. This requires a redefinition of the rules and a development of a new model of cooperation with employers, who have the most reliable information about the demand for labor, as well as with other labor market institutions, both public and operating in the private sector. An important element of the system changes will consist in synchronizing the activities of public employment services and social assistance services.

The objective pursued in state policy by 2020 is to increase the employment rate to 71% (this objective is also included in the National Reform Programme – a document implementing directly the EU 2020 objectives).

11. 6.2. Improvement of Human Capital

The challenges associated with intelligent, sustainable and inclusive growth, including the need to increase employment, faced by modern states and by their citizens, are conditioned to a large extent by the quality of human capital. What determines the

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[22]   *Compare Flexicurity in Poland: diagnosis and recommendations. Final Report of Research, Ministry of Labor and Social Affairs, Labor Market Department, Warsaw 2009.*

quality of human capital, in turn, is the level of competence and skills of the citizens[23]. Improving the quality of human capital refers to the situation where citizens gain skills and qualifications to respond to the needs of socioeconomic and personal development - from the youngest to the oldest years of life and in different ways - in schools and in other institutions of formal education, but also in their jobs and thanks to community involvement, learning on their own and from each other.

It is important in this context to make a transition from the education model based primarily on school training and on transferring encyclopedic knowledge to a wide education model, combining school teaching with learning other than formal, i.e., lifelong learning and learning hands-on (accounting for the specific needs of employers and the needs resulting from living in the information-driven society). In this model, education is not only associated with teaching in schools and institutions of higher education, but also with training, which is ubiquitous and organized by a wide spectrum of entities active in the economy and in civil society, and whose status is equivalent to formal education. In this model, it is not only ministries and government departments that are responsible for educating citizens but also the social partners operating in the economy and in civil society. This broad approach to education may contribute to solving faster the problem of mismatch in labor supply and demand in its qualification and professional dimension, which can be observed on the Polish labor market. It can also increase the attractiveness of graduates as employees.

These changes would involve the need to adopt a new, more effective direction of investment in education (education and training), including the following: organizing and developing the system of recognition of qualifications acquired outside the system of formal education (validation system); implementing systems for storing and transfer of information on educational achievements, consistent with European systems; implementing national qualifications framework[24]; incorporating individuating mechanisms in education and training programmes; adjusting educational offer to the specific needs of learners of all ages and of the needs of employers; expanding the use of information and communication technologies (ICT) in education and training; developing "distance" learning and training; developing educational and vocational counseling; reforming the scoring in competence examination systems; promoting new forms of adult education based on a system of validation.

These activities will be complemented by a new approach to the organization of early childhood education and care - not oriented to replace parents, but to support them in bringing up young children using more diverse forms of education and care that currently available, including in particular those exploiting the potential of small flexible initiatives organized locally without major investment.

In such an approach, the new investment trends in education and training will be supported by the implementation of the national system for forecasting labor demand, integrated with a system of information about the offer and the quality of schools, colleges and courses as well as with a career guidance system, to allow the learner to choose his/

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[23] *State of competence and qualifications of people in Poland and the priorities for improving their levels are presented in more detail in the strategic document arising from commitments in the European Union; The prospect of learning throughout life.*

[24] *Organizing and defining levels of qualifications regardless of the place, manner and time of learning.*

her educational investment wisely. With no such system in place, the anticipative actions, as well as the immediate actions to balance the market – will not be very effective. Measures to improve the quality of human capital need to respond to the challenges of regional labor markets, matching their specific characteristics and needs. It is important, in particular, to improve the quality of schools offering vocational training and at the same time to promote vocational training among young people and other stakeholders, and also to encourage the development of practical training in higher education. Rationalizing the selection of educational path will result in a better match between supply and demand sides of the labor market, raising the growth potential of the economy.

In the context of the changing needs of the labor market, a priority task of the state will be toprovide equal educational opportunities at all stages of education and training, and to improve of the quality of educational services. The reform of education and training will be focused on enhancing their quality and efficiency to respond to the needs of knowledge-based economy.

Support provided in this area will contribute to an effective management of education, to improved training curricula supplemented with innovative elements, and to strengthening the effectiveness of training and education personnel. At the same time, changes will be introduced in the system of evaluation, remuneration and promotion of teachers that will support remaining in the profession of the best teachers and their relevant motivation, and will increase the attractiveness of the teaching profession to young people. It is necessary to enrich the curriculum with competencies and skills needed in the future work. It is also important to make changes in the functioning of schools accounting for the development of civilization - on the one hand – the increased economic activity of parents / careers, on the other - the need to include modern elements in the curriculum, such as civic education, development of creative thinking and the ability to cooperate, engagement in important local issues, and development of digital literacy and social skills. Developing these competencies should also be an important element of higher education[25].

It is important for the state policy to encourage having children, ensuring at the same universal access to quality education, including early childhood education. Investment in human capital of the youngest translates in the long-term into tangible benefits in the form of a higher level of prosperity. Citizens should have universal access to quality education throughout life – from various forms of early education until the old age (such as universities of the third age), and the task of Polish schools should not only include general education but also preparation of graduates to meet the needs of the labor market. Hence there is a need to adapt curricula accordingly, to introduce a new model of vocational training based to a greater extent on practical learning, on flexible learning paths, and on promotion of vocational and technical education; and in the area of higher education – to introduce practical training profile, raising the skills and knowledge of students in the sciences of key importance for the economy, to promote cooperation between the institutions of education and the business, as well as with the R&D sector and with the civil sector (NGOs).

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[25]   **PCM.,** [2012]: *National Development Strategy 2020 – Active Society, Competitive economy, Efficient state, Warsaw, September 2012, 77 p.*

Efforts will also be taken to better exploit the potential of universities, in particular, to support education in the fields of mathematics, natural sciences and engineering (due to their priority for the competitiveness of the economy). In addition to equal educational opportunities in regional terms (ensuring equal access to education), it is important to extend additional support for and stimulate the development of leading research centers (for example, National Scientific Leadership Centers) in order to increase innovation and competitiveness of Polish science on the international arena (strengthening the position of Polish universities in international rankings).

Improving the quality of education (teaching and training) will also be enhanced by the introduction of the so-called European reference tools - national qualifications framework, consistent with the objectives of the European Qualifications Framework, including the system of validation, as well as quality assurance systems in higher education and vocational education and training (EQAVET), systems for the collection and transfer of educational achievement (ECVET and ECTS), and systems for classification and forecasting the supply of skills for the lab our market (ESCO, Skills Panorama).

Taking into account the fact that health is a significant element conditioning the activity on the labor market and having a decisive impact on the quality of human capital, pro-health and preventive activities will be promoted and supported with a view to prevent diseases which nowadays are the major cause of premature labor market exit and of making use of social security resources (i.e. occupational diseases and lifestyle diseases). Projects for improving health are horizontal. Their implementation, however, should account for territorial diversity - such as health and social factors conditioning health, anticipated trends in this field, and access to health services.

11. 6.3. Increasing Labor Mobility and Spatial Mobility

The policy creating conditions for flexible forms of employment, enhancing the mobility of the work force and the competencies of graduates (including digital and cross-cultural competence), as well as circular mobility (in particular with a view to reduce hidden unemployment in rural areas), promoting non-agricultural forms of employment in rural areas, and providing universal broadband Internet access for all residents will increase labor force participation. Towards this end it would be appropriate to modernize the system of professional qualifications, including to introduce solutions allowing for the confirmation of competences acquired through non-formal and informal learning, as well as a support system for increasing or changing qualifications of people who are disadvantaged on the labor market, etc. Increasing the mobility of the population will be also important for economic development. It is necessary to increase accessibility to labor markets, both in material terms of material - such as transport and housing, as well as in terms of digitization of peripheral areas. Development of transport infrastructure should allow for the possibility of rapid access from the currently less developed (mostly rural) centers to the growth centers, which offer more employment opportunities. Reducing travel time to urban centers will translate into increased willingness to seek employment outside of the place of residence and, consequently, affect the economic development of regions from which the employees come from[26].

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[26]   **PCM,.** [2012]: *National Development Strategy 2020 – Active Society, Competitive economy, Efficient state, Warsaw, September 2012, 79 p.*

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