



Human capital in the structural transformation process of rural areas and agriculture

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Outline



- **Introduction**
- **Data sources**
- **Hypothesis**
- **Results**
- **Policy of human capital formation in agriculture and rural areas in Poland in 2014-2020**
- **Summary**

Data sources



I. IAFE-NRI survey

carried out in 76 villages located across Poland

sample: 3.331 farming families
(area of agricultural land over 1 hectare)

data on selected farmers characteristics and agricultural holdings

analysis covered the years 2005-2011, but also the expected changes in farms in 2011-2016

II. EU and domestic law, strategies

„Europe 2020. A strategy for smart, sustainable and inclusive growth”

Communication on "The CAP towards 2020..."

Regulation of the EP and of the Council no 1305/2013

Regulation of the EP and of the Council no 1306/2013

„Partnership agreement”

„The National Development Strategy 2020”

„Strategy of sustainable development of rural areas. agriculture and fishery 2012-2020”;

Polish RDP2014-2020 (project, april 2014)

III. Data: European Commission, Eurostat, Ministry of Agriculture and Rural Development

„Rural development in the EU. Statistical and economic information. Report 2013”

„Report on implementation of the RDP 2007-2013”
(no 8/2013)

IV. State of the art

Hypothesis



I. The process of physical capital accumulation in agriculture was linked with the level of farmers' human capital

II. The quality of human capital will more and more affect the structural transformations of rural areas and competitiveness of farms

Human capital and structural transformations in agriculture



farmer's
knowledge
and skills
(human capital)

farm's
production
resources
(physical capital)



economic
change in farm

investment
innovation
(acquisition of
funds
and *know-how*)



structural
transformation
of the
agricultural
sector

DATA SOURCES AND METHODS

I. FARMERS' HUMAN CAPITAL LEVEL

IAFE-NRI SURVEY SAMPLE (N=3331)

complex phenomenon

zero-unitarisation method (synthetic measure)

diagnostic variables

(farmers characteristics)

✓ age
(nominant, quantitative)

- ✓ level of general and professional education
- ✓ health self-assessment
- ✓ use of ICT (for professional development)
- ✓ use of advisory services
(stimulants, ordinal variables)



II. PRODUCTION ASSETS AND ECONOMIC CHANGES IN FARMS

SAMPLE: THE SAME FARMS IN 2005 AND 2011 (N=2687)

PRODUCTION ASSETS

in 2005

- agriculture land (ha)
- livestock(LU)
- level of machinery and technical equipment
- condition of buildings

ECONOMIC CHANGES IN FARMS

in 2005-2011

- investments in production fixed assets
- use of EU funds
(apart from direct payments)

in 2011-2016

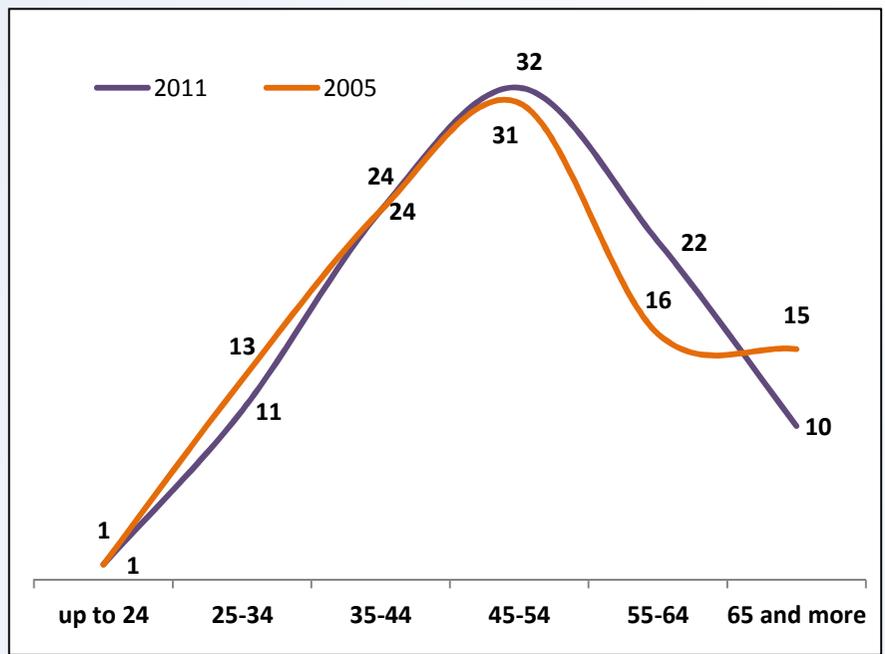
- investments plans

RESULTS

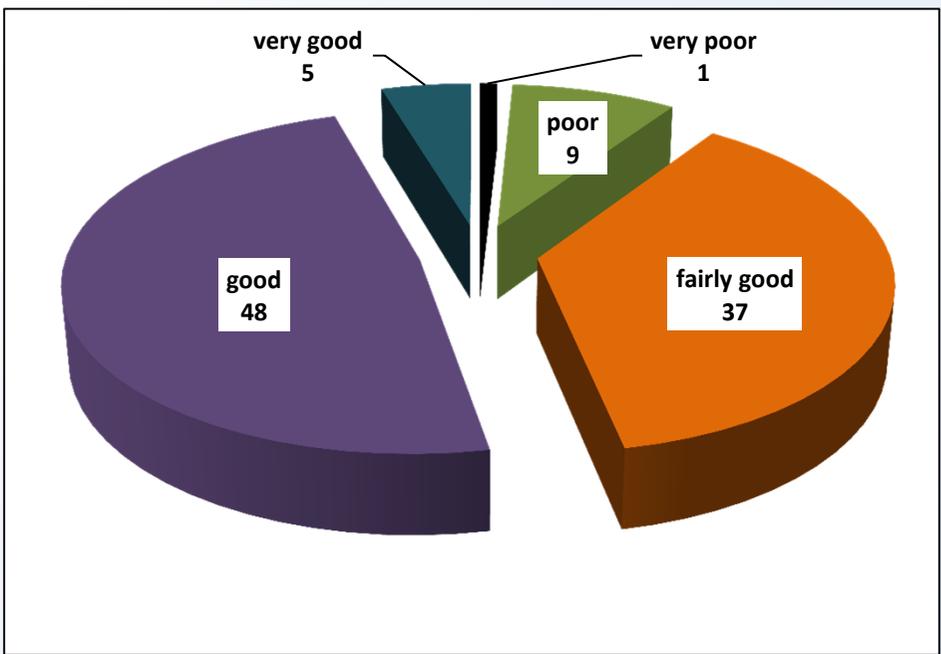
SELECTED FARMERS CHARACTERISTICS (I) (in %)



AGE



HEALTH SELF-ASSESSMENT IN 2011



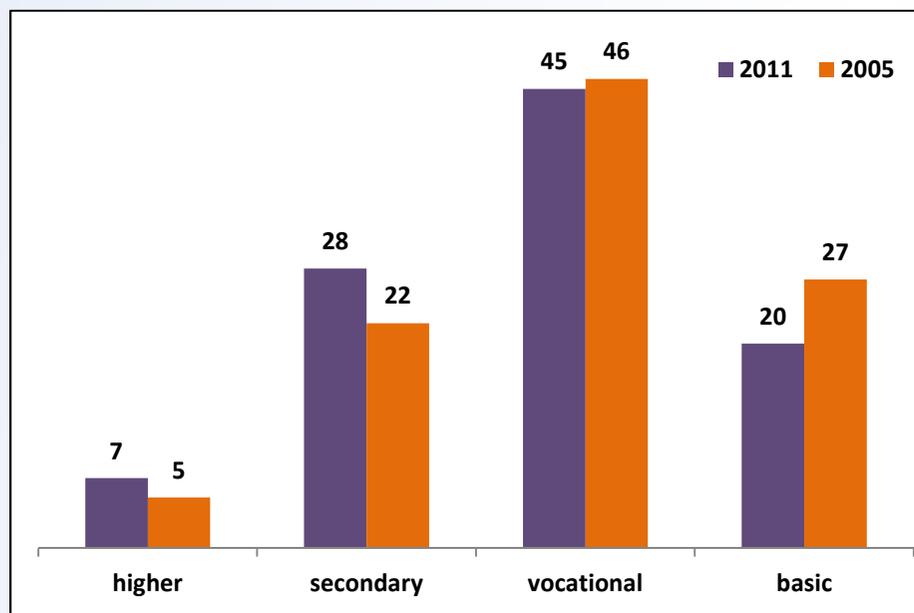
Source: IAFE-NRI surveys 2005, 2011.

RESULTS

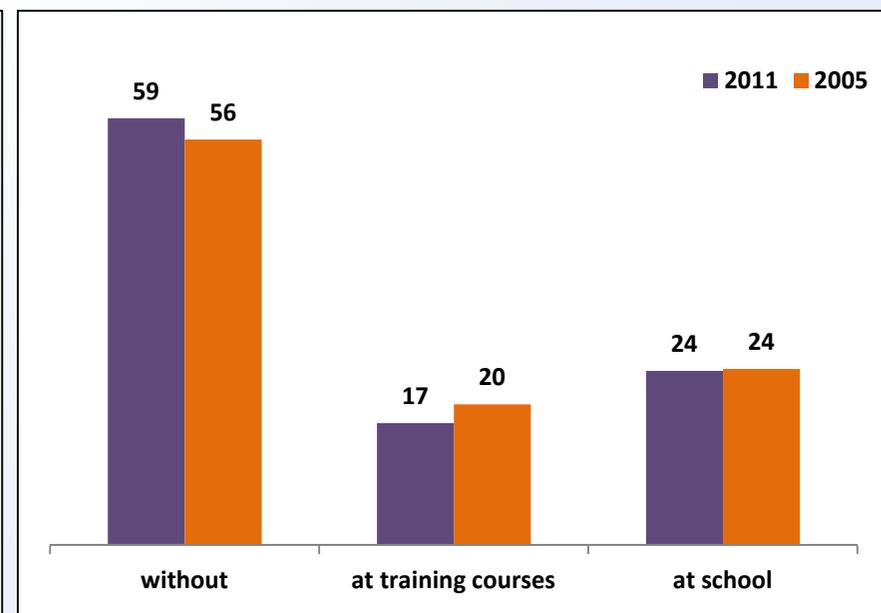
SELECTED FARMERS CHARACTERISTICS (II) (in %)



LEVEL OF GENERAL EDUCATION



LEVEL OF PROFESSIONAL EDUCATION

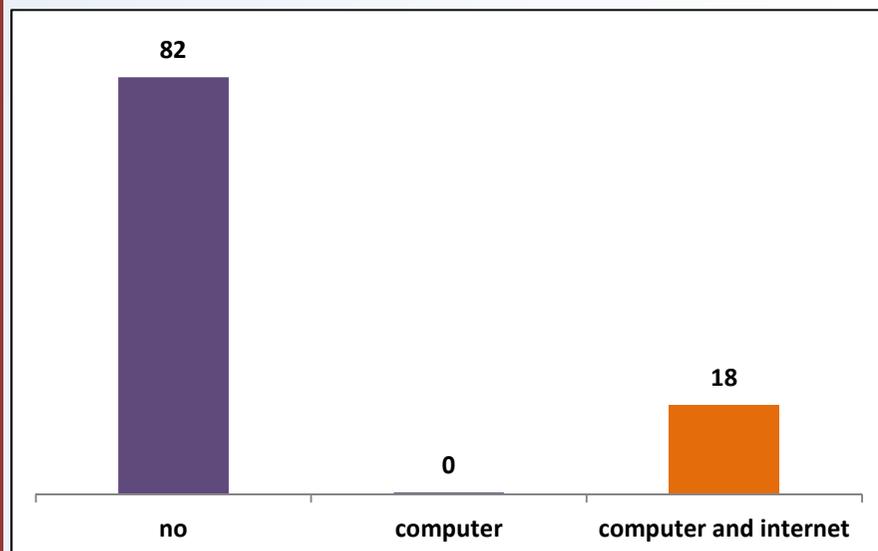


RESULTS

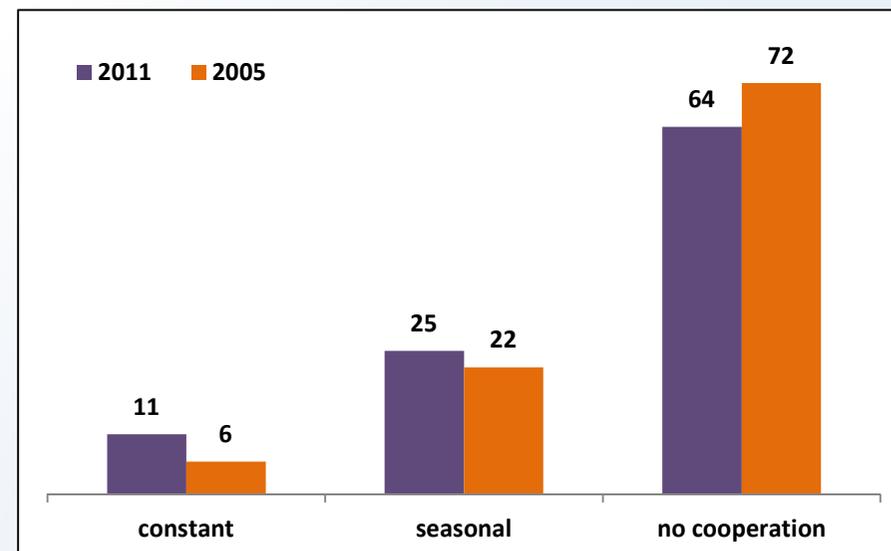
SELECTED FARMERS CHARACTERISTICS (III) (in %)



USE OF COMPUTER AND INTERNET* IN 2011



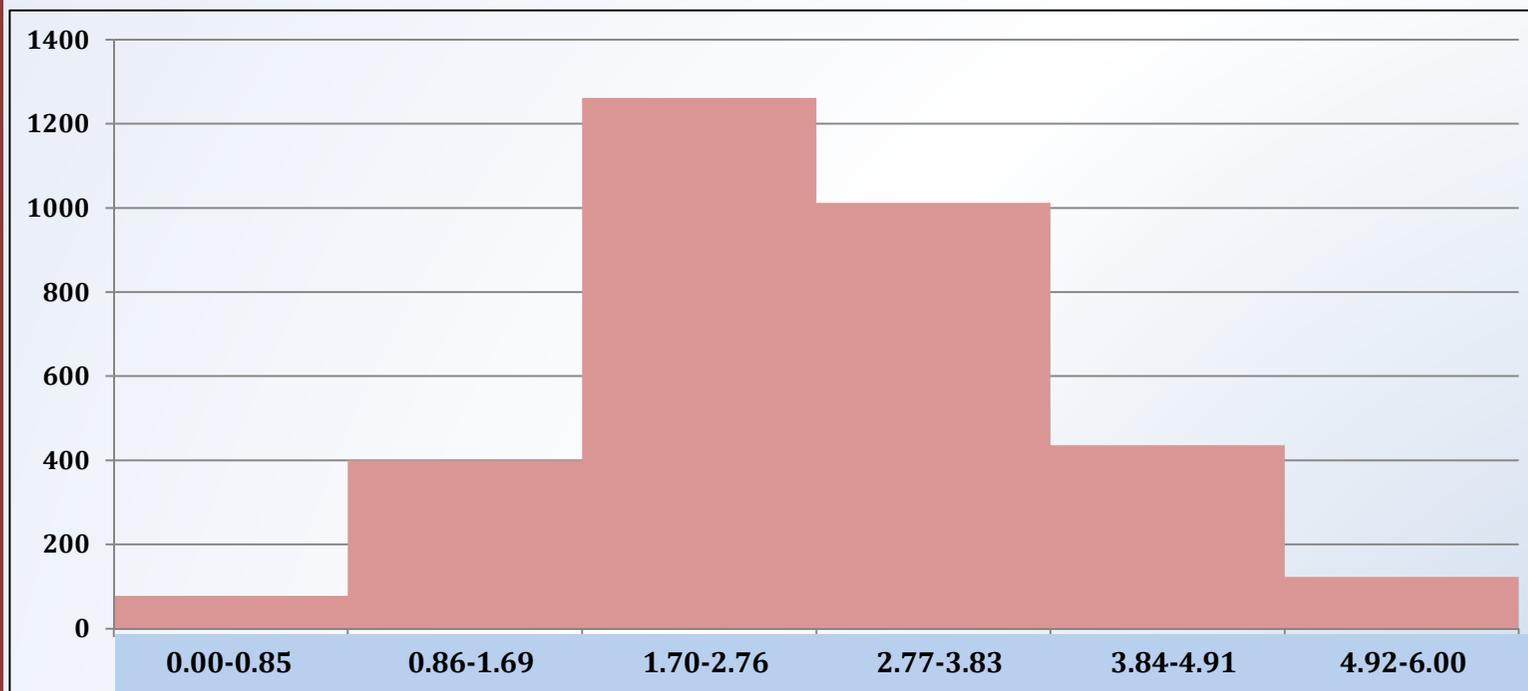
COOPERATION WITH AGRICULTURAL ADVISOR



*for professional needs

FARMERS' HUMAN CAPITAL LEVEL

(distribution and descriptive statistics)



N	MEAN	MEDIAN	MIN.	MAX.	MODE	CV	STANDARD DEVIATION	VARIANCE	SKEWNESS	KURTOSIS
3331	2.76	2.72	0	6	2.77	0.39	1.07	1.14	0.38	-0.05

FARMERS' HUMAN CAPITAL LEVEL* AND THE ECONOMIC CHANGES** IN FARMS 2005-2016 (IN %)



HUMAN CAPITAL LEVEL	investment activity in 2005-2011	investment plan up to 2016	use of second pillar RDP instruments in 2005-2011
very low	29.0	8.0	0.8
low	38.2	15.1	1.4
average	49.0	26.4	6.6
high	75.0	48.6	14.7

*FOR 2,697 THE SAME FARMERS. SURVEYED IN 2005 AND 2011.

** INVESTMENTS IN AT LEAST ONE FIXED PRODUCTION ASSET: 1. MACHINERY AND TECHNICAL EQUIPMENT, 2. FARM BUILDINGS, 3. AGRICULTURAL LAND, 4. LIVESTOCK. THE EU FUNDS OTHER THAN DIRECT PAYMENTS WERE ONLY INCLUDED

ECONOMIC CHANGES IN FARMS LOGIT ESTIMATES USING 2687 OBSERVATIONS



INVESTMENTS IN 2005-2011

variable	coefficient	std. error.	t stat	sig.	odds ratio (in %)
constant	-0.512	0.057	-9.006	***	-40
high level of machinery and technical equipment	0.839	0.126	6.639	***	132
area of agricultural land (ha)	0.003	0.003	1.047		0
number of livestock (SD)	0.004	0.003	1.268		0
poor technical condition of farm buildings	-0.142	0.115	-1.236		-13
high level of human capital	1.362	0.117	11.676	***	291

***p-value at the level up to 0.001

Number of cases „correctly predicted“= 1729 (64%);

f(beta'x) at mean of independent = 0.499

McFadden R²=0.069

Log-likelihood ratio = -1728.641

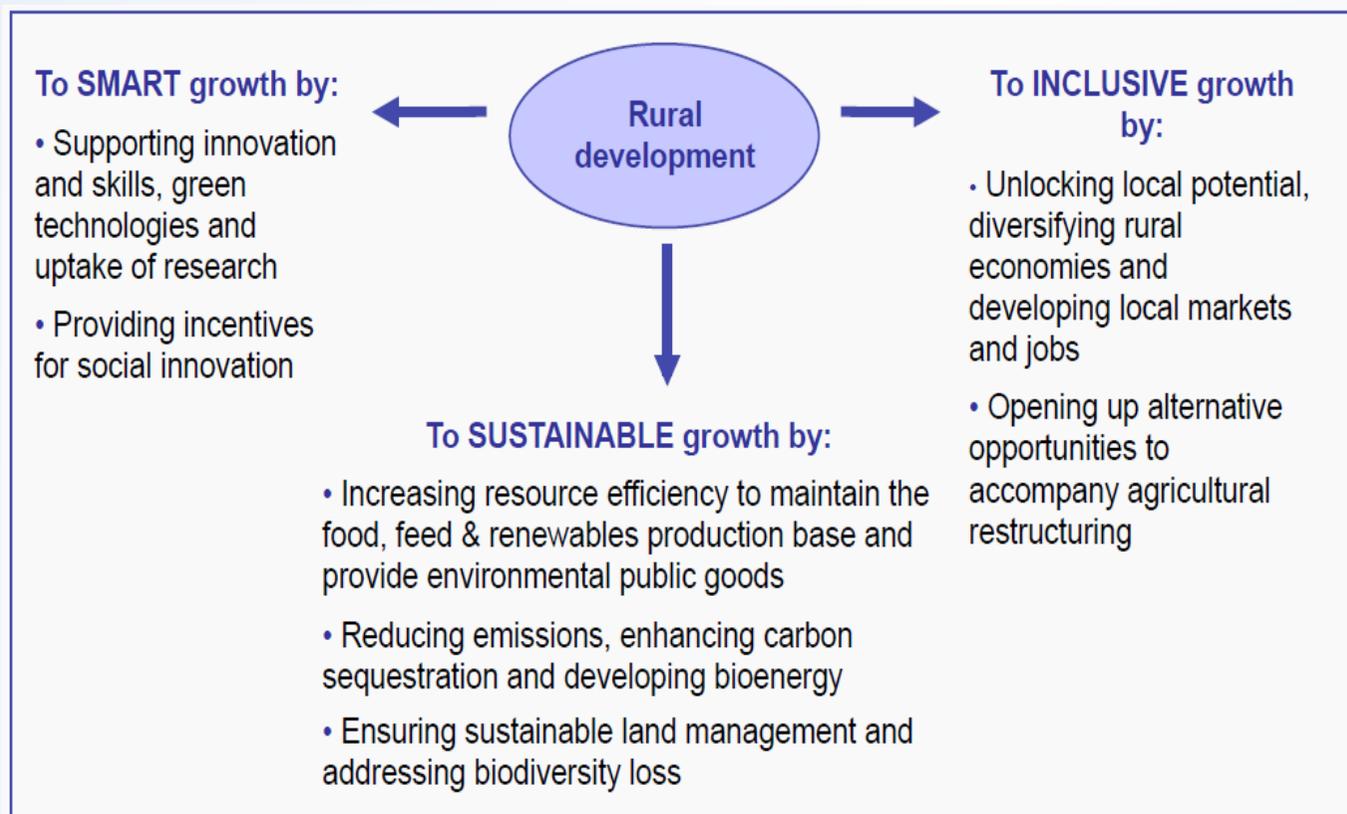
Likelihood ratio test: Chi-square (5) = 256.801 (p=0.000)

HUMAN CAPITAL IN AGRICULTURE AND RURAL AREAS IN POLAND



- **Education**
 - Increasing number of population with secondary and higher educational level
 - A big gap between rural and urban population remains
- **Age**
 - Process of ageing of the population
 - Still favorable comparing to urban population
- **Migration**
 - Positive balance for suburbs and negative for remote areas
- **Role of agriculture as a source of employment**

EUROPA 2020 AND RURAL DEVELOPMENT



INNOVATION AND KNOWLEDGE IN AGRICULTURE



Three main factors (which for simplicity can be described as process, policy and people) influence the progress of innovation (Hartwich 2013):

- The nature of the innovation (i.e. process). Innovations can be substantial or incremental and these require the application of different kinds of understanding, learning and resources;
- The innovation context (i.e. policy) or 'enabling environment' that enables the innovation to be used and become part of the productive process;
- The innovation constituency (i.e. people). This refers to the type of intended users of the innovation and those who will be affected by it.



DEVELOPMENT STRATEGIES

Long-term National Development Strategy

- competitiveness and innovativeness of the economy
- balancing the growth potential of the regions in Poland
- effectiveness and efficiency of public administration

Partnership Agreement 2014 -2020

Coordinates intervention of the three EU policies in Poland
Cohesion Policy, CAP and the Common Fishery Policy in the new
2014-2020 programming period

RDP 2014-2020

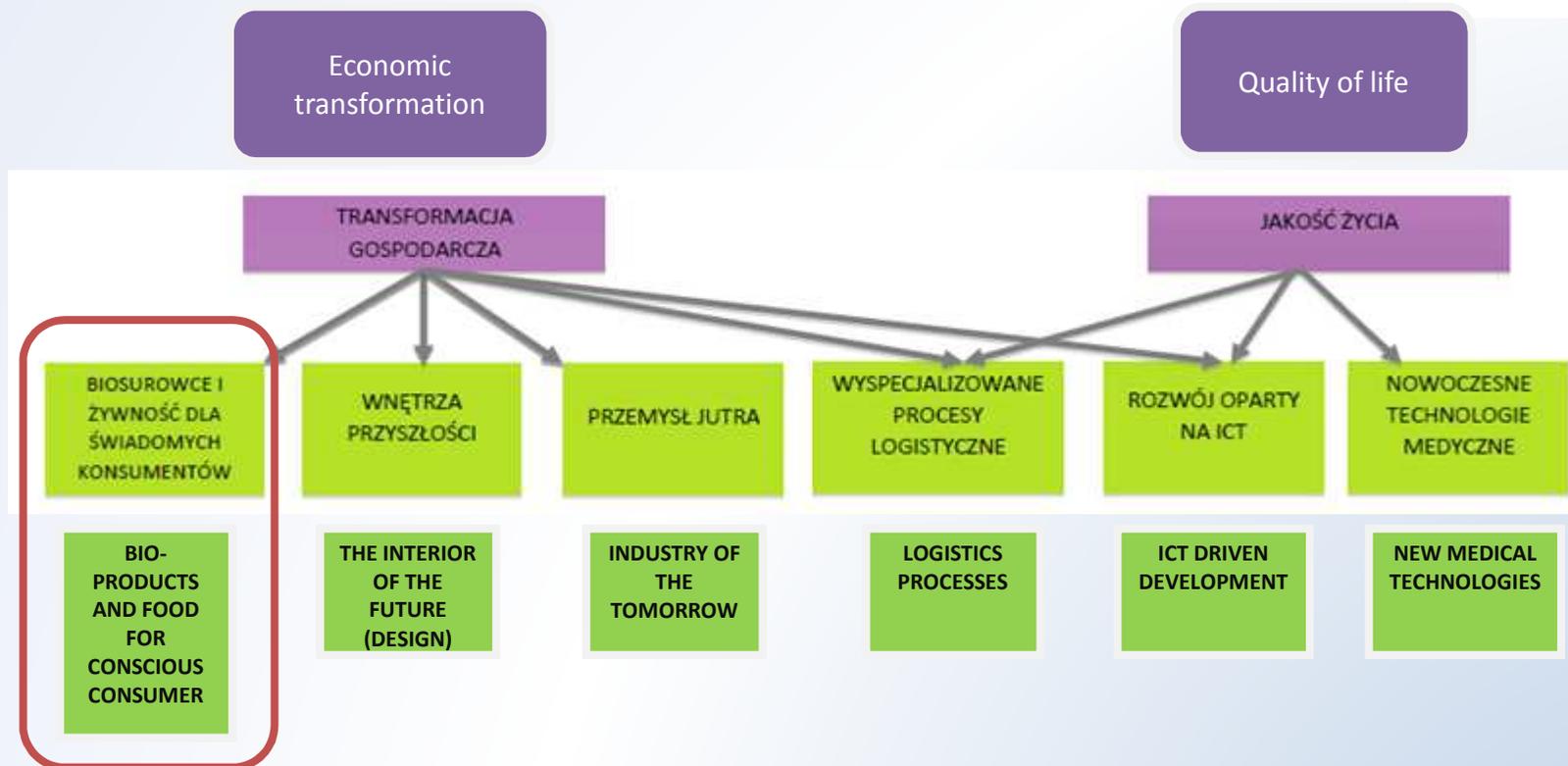
- Transfer of knowledge and innovation in agriculture, forestry and rural areas;
- Modernisation of agricultural holdings: improving competitiveness, profitability, impact on the ecology and innovation;
- Co-operation between the various stakeholders in the agri-food industry.

NATIONAL SMART SPECIALIZATION



- **HEALTHY SOCIETY**
- **AGRI-FOOD, FORESTRY-TIMBER AND ENVIRONMENTAL**
- **BIOECONOMY**
 - Innovative technologies, processes and products of the agri-food and forestry
 - Healthy food (quality and performance of production)
 - Biotechnological processes and specialty chemicals and environmental engineering
- **SUSTAINABLE ENERGY**
- **NATURAL RESOURCES AND WASTE MANAGEMENT**
- **INNOVATIVE TECHNOLOGIES AND INDUSTRIAL PROCESSES (IN HORIZONTAL APPROACH)**

REGIONAL SMART SPECIALIZATION - WIELKOPOLSKA REGION



biomaterials and food production in the entire value chain - from high quality raw materials, using modern methods and technologies, sales and distribution, as well as industrial waste management

REGIONAL SMART SPECIALIZATION - WIELKOPOLSKA REGION



a) safe bio- and organic foods

Production of bio-products and healthy foods and functional foods; Food security; Plants resistant to climate change

b) modern food production technologies

Bio- and nanotechnology, molecular biology and food chemistry, class ICT systems class traceability in food production safety

c) the innovative method of sale and distribution of high-quality food

Marketing of high quality food and raw materials, innovative production chains, Packaging - food design

d) organic food production and waste management

Environmental pesticides, bio-economy, including innovative natural products
Recycling and upcycling, fuel-energy economy based on agricultural biomass

e) the development and professionalisation of human resources for the area of specialization



SUMMARY

- 1. The level of farmers' human capital could be perceived as low.**
- 2. A positive and significant impact of high level farmers' human capital on economic changes in agricultural holdings (production assets accumulation)**
- 3. Social-economic changes in rural areas are more and more driven by quality of human capital (i.e. changes in employment).**
- 4. EU and National strategies for rural and agricultural development increasingly focus on building innovative, knowledge-based rural economy.**



Thank you!

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