APSTRACT

APSTRACT

Applied Studies In Agribusiness And Commerce

http://www.apstract.net

Vol. 8. Numbers 1. 2014

Aberdeen, Belgrade, Belgorad, Berlin, Budapest, Cork, Debrecen, Fayetteville, Hohenheim, Kazan, Kiev, Nitra, Novi-Sad, Prague, Stravropol, Ulab-bator, Warsaw, Wageningen, Zagreb

Contents

Typography: OPAL www.opalmedia.hu

APSTRACT Applied Studies In Agribusiness And Commerce *Vol. 8. Numbers 1. 2014*

Agroinform Publishing House
www.agroinform.com

Applied Studies in Agribusiness and Commerce

APSTRACT

Official Periodical of the International MBA Network
in Agribusiness and Commerce AGRIMBA

Vol. 8. Number 1. 2014

AGROINFORM
PUBLISHING HOUSE

This number is published with the financial support of University of Debrecen,
Faculty of Applied Economics and Rural Development, Hungary

APPLIED STUDIES IN AGRIBUSINESS AND COMMERCE
Official Periodical of the International MBA Network in Agribusiness and Commerce:
APSTRACT®
©AGRIMBA
Editor-in-chief: Prof. Dr. Wim Heijman Wageningen University
Editorial office: Debrecen University, H-4015 P.O. Box 36.
Phone, fax: (36-52) 508-304
Executive publisher: Agroinform Publishing House Hungary – www.agroinform.hu
Typography: Opal System Graphics www.opalsystem.com

HU-ISSN 1789-221X – Electronic Version: ISSN 1789-7874

Home Page: http://www.apstract.net •E-mail: editor-apstract@agr.unideb.hu

Contents

PREFACE

Dear Colleagues,

In this volume you will find valuable and interesting articles on the main themes covered by our journal: Agribusiness and Rural Development. Let me take the opportunity to thank everybody who contributed to the success of it: the authors, the reviewers and especially the Associate Editor, Krisztián Kovács, without whom the quality of the journal would be much lower than it is now.

I am convinced that Apstract plays an ever more important role in the scientific development of senior and junior staff members engaged in research of the areas concerned, which will certainly enhance the quality of the research output of the related institutions. Agrimba and its journal Apstract is to become an open platform of scientific cooperation between West- and East-European academics, professionals and students, active in agribusiness and rural development.

This was clearly shown at our annual meeting in Nitra on June 16–18, 2014. Apart from the meeting Professor Peter Bielik, rector of the university, and his staff received us with an impressive program. On behalf of the Agrimba General Board I would like to thank him for that. Next year, 2015, Agrimba will organize its 4th bi-annual conference and annual meeting in PoreČHrvatska, Croatia. Mario Njavro, chairman of the organizing committee, will send out the first call for papers soon. I hope that the 4th conference will be even more successful than its predecessors.

Wageningen, July 16, 2014.

Wim Heijman
Editor in Chief

THE MOTIVATIONS FOR THE DIVERSIFICATION OF THE NIGERIAN ECONOMY FOCUSING ON SUSTAINABLE AGRICULTURE

György Iván Neszmélyi Ph.D.

Associate Professor at Budapest Business School
Faculty of Commerce, Catering and Tourism, Department of Commerce
Titular Prof. of Szent István University Faculty of Economics and Social Sciences
e-mail: gneszmelyi@hotmail.com; dr.neszmelyi.gyorgy@kvifk.bgf.hu

Abstract: Agriculture is one of the major branches of the economy in Nigeria, the most populous country in Africa. It employs around 70% of the population and its contribution to the national GDP ranges around 45% (2012).
In spite of the fact that most of the area is arable the majority of food, the Nigerian population consumes, comes from imports. The paper attempts to provide in insight to the reasons, why Nigeria could still not achievew self sufficiency from major food crops and livestock. Beyond the rapid growth of the population, one of the major reasons is the rich oil and natural gas reserves, the exploitation and export of which has been providing with the country with "easy cash" for the recent few decades. Another reason is that the agricultural holdings are small and scattered, and farming is carried out with simple tools and techniques. Modern and large-scale farms are not common.
The political leadership and economic decision makers of the country already recognized the necessity of the development of the food and agricultural sector, which – contrary to the oil industry – would exercise a deep and positive impact on the rural society as well. Nigerian agriculture is being transformed towards commercialization at small, medium and large-scale enterprise levels.

Keywords: quality of *Nigeria, Economic reform, Agricultural development, food security*

Introduction

The Federal Republic of Nigeria is one of the most important states of Africa. Its area is ten times larger than that of Hungary (923 thousand km^2), according to the estimations of the Central Intelligence Agency of the United States (2011) by the number of population (ca.155 million) this is the eight largest country of the world. (This is just an estimation as there are no reliable and exact data available on socio-economic situation of the country.) The population growth is extremely high: the median age is 19.3 years. The Nigerian economy is the 31st largest in the world, by the calculations of the IMF (2009).

The Nigerian economy is the largest in West Africa and the second largest in sub-Saharan Africa, predominantly oriented toward the production of agricultural products and crude oil. Agriculture accounts for about 30.9% of the GDP, 70.0% of employment but contributes only about 2.5% of export earnings. Crude oil and natural gas account for about 15.0% of GDP, 71.0% of export earnings and 79.0% of government revenue.

The Nigerian leadership faces parallely public anger arising from the urging economic reform measures and the increasing spread of extremist groups throughout the country.

Methods of the research

The paper was based on secondary research founded on the descriptive-analytical exploration of concrete economic, social and political factors, which could be found in the background of the distortion of the Nigerian economy. The examinations were based on the available international and Hungarian bibliography, and databases in this field.

Mention should be made about the fact that the author worked in Nigeria between 2007 and 2009, therefore his on-site personal contacts, work experiences and his formerly published papers related to this field [Neszmélyi 2012, 2013] also contributed to the result of his work.

The reasons of the economic distortions

Nigeria is a resource-rich country, with about 34 different minerals, including gold, iron ore, coal and limestone. It has about 37.2 billion barrels of proven oil reserves, 187 trillion cubic feet of proven natural gas1 and produces about 2.3 million barrels of oil per day. It also has about 70 million hectares of farmland. The structure of the Nigerian economy

is oriented toward the production of two primary products: agricultural products and crude oil.

The Nigerian economy slowed down from 7.4% growth in 2011 to 6.6% in 2012. The oil sector continues to drive the economy, with average growth of about 8.0%, compared to -0.35% for the non-oil sector. Agriculture and the oil and gas sectors continue to dominate economic activities and Nigeria. The fiscal consolidation stance of the government has helped to contain the fiscal deficit below 3.0% of gross domestic product (GDP). This, coupled with the tight monetary policy stance of the Central Bank of Nigeria (CBN), helped to keep inflation at around 12.0% in 2012. The outlook for growth remains positive. Short- and mid-term downside risks include security challenges arising from religious conflict in some states, costs associated with flooding, slower global economic growth (particularly in the United States and China) and the sovereign debt crisis in the euro area.

The economic growth has not translated into job creation or poverty alleviation. Unemployment increased from 21% in 2010 to 24% in 2011 because the sectors driving the economic growth are not high job-creating sectors (the oil and gas sector, for example, is a capital intensive "enclave" with very little employment-generating potential). The major policy issue is employment generation, particularly among the youth, and inclusive growth. So, one of the major reasons of the present economic and social problems is the lack of diversification of the Nigerian economic sectors.

The manufacturing base is low and has been dwindling. The share of the manufacturing sector in the GDP declined from 6% in 1985 to about 4% in 2011. The main drivers of economic growth do not require large amounts of labour and thus are not able to absorb the 1.8 million new entrants in the labour force every year.

The economic growth was not accompanied by a structural change of the Nigerian economy. The economy lacks diversification and agricultural production lacks modernisation. To address this, the government is encouraging the diversification of the Nigerian economy away from the oil and gas sector. It is addressing the infrastructure deficit in the country and the development of the agricultural sector through modernisation and the establishment of staple-crop processing zones, with the value chain model to provide linkages to the manufacturing sector [African Economic Outlook (2013)].

Tarrósy pointed out that the principle of the modernist theory is wrong in cases of African countries and societies that for the development of these newly formulated nations and states it was a critical issue whether it was possible and if so in which extent to implement industrialization in classical agricultural regions. Models suggesting increasing rates of industrialization might not be relevant for Africa [Tarrósy I. 2009].

Furthermore it has to be pointed out that Nigeria is the homeland for over 200 ethnic tribes and the majority of the population belongs to two major religious communities (Christian and Moslem). The climatic changes, the southward expansion of dry areas, the increasing shortage of water resources in the northern part of the country were the major reasons of an internal migration. People from the dry northern areas started to flee southward to find better conditions for farming. Even though as it has been already well known that thousands of years ago African people protect themselves against droughts, desertification, or even massive floods or epidemics by migration [Búr G., Tarrósy I. 2011] it is a relatively new phenomenon in Nigeria that this migration led to unrest and clashes between different religious communities. The formerly relatively peaceful co-existence among various religions and ethnic communities is really fragile now, and the situation may be further deteriorated if the activity of radical extremists' groups (like Boko Haram) which appeared a few years ago in Nigeria would continue.

Table 1: Macroeconomic indicators of Nigeria

	2011	**2012 (e)**	**2013 (p)**	**2014 (p)**
Real GDP Growth	7,4	6,6	6,7	7,3
Real GDP per capita growth	4,9	4,1	4,2	4,8
CPI inflation	10,9	12	9,7	9,5
Budget balance % GDP	-0,1	3,7	4,4	5,7
Current account balance % GDP	3,2	10,4	11,8	14,6

Source: African Economic Outlook (2013) (Data from Domestic authorities; estimates (e) and prediction (p) based on authors' calculations).

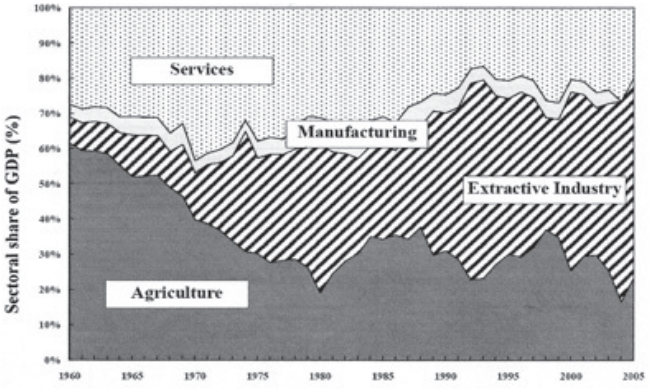


Figure 1*:* Sectoral value added, Nigeria, 1960–2005 (% of GDP)
Source: Tewodaj M. et al. on the basis of World Development Indicators 2007.

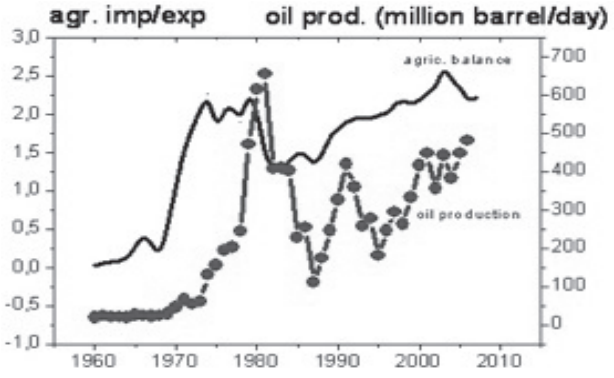


Figure 2*:* The change of agricultural foreign trade balance and the oil production
Source: Zsarnóczai J. S. et al. (2011) on the basis of IMF electronic database

Nowadays the most important sector of Nigeria is the oil production. The different governments failed to diversity the economy away from its overdependence on the oil export. The oil and gas sector provides the 95% of the foreign exchange earnings and approximately four fifth of the general budget revenues (Ikpi, 1988). Parallel with the increasing of importance of oil and gas sector there has been a general decreasing of level of agricultural production. This fact can be seen in worsening foreign trade balance of agro-food sector in Nigeria [Zsarnóczai J. S. et al. (2011)].

As a consequence of this disproportional development, there is an increasing social tension between the urban and rural regions. If there seems no possibility of increasing the living standard of rural population, living in less favoured regions of Nigeria, we have to forecast a rapid increasing of overburdened cities (e.g. the population of Lagos is more than 10 million). This fact further aggravates the problems (crime, environmental pollution) of large towns [Zsarnóczai J. S. et al. (2011)].

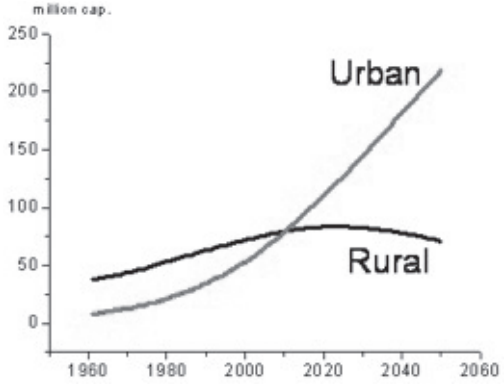


Figure 3*:* The urban population boom in Nigeria
Source: [Zsarnóczai J. S. et al. (2011)] on the basis of Faostat.fao.org

The challenges of the agricultural sector

Despite the country's huge agricultural potential, less than 50% of the total farmland in Nigeria is cultivated, and agricultural productivity is low because of the lack of modernisation. Nigeria relies on the importation of food to meet its domestic demand, with the import bill for wheat, rice, sugar and fish estimated at NGN 1 trillion (USD 6.4 billion) per annum.

The improvement of food security – like the growth of food production – is an issue of core importance. Therefore the urging task is to find the most efficient ways to spread the modern methods and technologies, with the assistance of international agricultural development projects. In many countries, several decades ago agricultural extension systems were established. Even much before independence (1960) it was established in Nigeria in 1954 with the view of supporting the small farmers. *Kozári (2007)* also pointed out that in several freshly independent African and Asian countries during the 1960's such systems – due to the application of inappropriate methods – ceased in the course of several years. However from the mid-1970's the national governments- with the assistance of international organizations (FAO, WorldBank, IFAD, regional banks, etc.) made new efforts to re-organize the agricultural extensions systems in these countries [Kozári J. (2007)].

Auta, S.J. and *I.I. Dafwang (2010)* pointed out that Agricultural Development Projects (ADPs) had already been launched since 1972 in order to increase food production, and to raise the income of small-scale farmers. The success of the pilot schemes led to expansion nationwide by 1984, but nowadays the ADPs in majority of the states stand just as symbols of past glory [Auta, S.J. and I.I. Dafwang (2010)].

Oruruo K. I. summarized the main reasons of the low agricultural efficiency and of the lack of agricultural products as folows.

a) *The former military regimes and bad governance:* From 1966 till 1999 Nigeria was held under the misguided feet of military leaders who heralded affairs with little training on national governance, poor guidance on economic stimulation and general government structures that were inimical to individual capitalist strides. Industries where held at ransom and slowly Nigeria went from a net exporter to a net importer of agricultural produce.
b) *Unrealistic goals and greed:* One of the main reasons why farmers became diasppointed is an unrealistic assessment of the prospects of a farm driven by poor agricultural education, poor business understanding and sometimes outright greed. Entrants must understand that farms must be built in tandem with market realities and societal variables. They must also understand that a farm is a long term business and not a get rich quick scheme, it must be founded on solid economics and must be given time to mature.
c) *Infrastructure deficit:* A farm is a consumer of some vital infrastructure which many farms fail to take into full consideration. Some of these are roads for easy distribution of the products created, electricity for industrialization of processes and water for irrigation. Many Nigerian farms fail because in a bid to access cheap land entrepreneurs buy into locations that are not economically viable due to infrastructural deficits. Farmers must take an integrated approach to planning and implementation of agricultural projects, understanding the importance of location as it correlates to resources and distribution.
d) *Lack of skilled labour pool:* While there is massive unemployment in Nigeria and a lot of manpower is available, when it comes to farming a lack of middle management and skilled labour is a major contributor to the failure of agricultural ventures. In Nigeria there is a culture that equates farming with the lowest of jobs and therefore it is not a popular field of institutional study or personal passion.
e) *Inability to manage large scale operations:* Some agricultural products require production at large scales in order to compete with imported goods. Crops like rice and wheat are of high consumption and therefore the import load is extreme and the prices are highly competitive. A local brand which wishes to compete must have

sufficient economies of scale that will allow it to price itself competitively. This goes back to proper business and opportunity assessment. One must put in place the right structures and account for the related variables that affect his particular produce or livestock line. In some cases of course small establishments can achieve reasonable competitive advantages, so it is not always necessary to create massive large scale farms. This is true in highly manual fields where heavy equipment is not essential to production.

f) Access to financing is difficult: One of the biggest stumbling blocks for agricultural development in Nigeria today is capital. The Nigerian banks are not strong financiers of long term projects and in cases where they choose to finance their rates are exorbitant and unattractive for entrepreneurs [Oruruo K. I.].

The production of primary agricultural commodities and oil continue to dominate the Nigerian economy. Economic growth was not created through a structural change of the economy. Sources of economic growth need to be diversified to strengthen the economy.

The recent years' production output figures can be seen in Tables 2 and 3:

Table 2: Crop production of Nigeria

	1000 ha 2010	1000 t 2010	1000 t 2009	yields t/ha 2010
Rice	1,788	3,219	3 403	1.8
Coarse Grain	11,983	16,259	17 543	1.4
Pulses	2,625	2,289	2 412	0.9
Oilcrops	7,647	2,765	3 322	0.4
Roots And Tubers	7,528	72,850	72 542	9.7
Sugarcane	73	1 414	1 402	19.3

Source: FAO Statistical Yearbook (2012)

Table 3: Animal husbandry production of Nigeria

	10000 tonnes 2009	10000 tonnes 2010
Milk	472	496
Eggs	613	623
Poultry	256	256
Pork	226	226
Beef And Buffalo Meat	298	304
Sheep And Goat Meat	433	440
Fish, Capture	598	n.a.
Fish, Aquaculture	153	n.a.

Source: FAO Statistical Yearbook (2012)

Nigeria, by virtue of its location, enjoys a warm climate with relatively high temperatures throughout the year and two seasons – the rainy or wet season that lasts from mid- March – November in the South and from May to October in the north; and the dry season that occupies the rest of the year (Oyenuga, 1967). Another constant element is the geographical location itself, which means that Nigeria is laying between the tropical zone and Sahara, therefore there are remarkable differences between the northern and southern parts of the country. The rainy season is shorter in the North, where climate is arid, comparing to the South, which is close to the Atlantic Ocean and to the Equator as well. Due to the climatic differences typical production zones can de identified in the country as it can be seen in Figure 4.

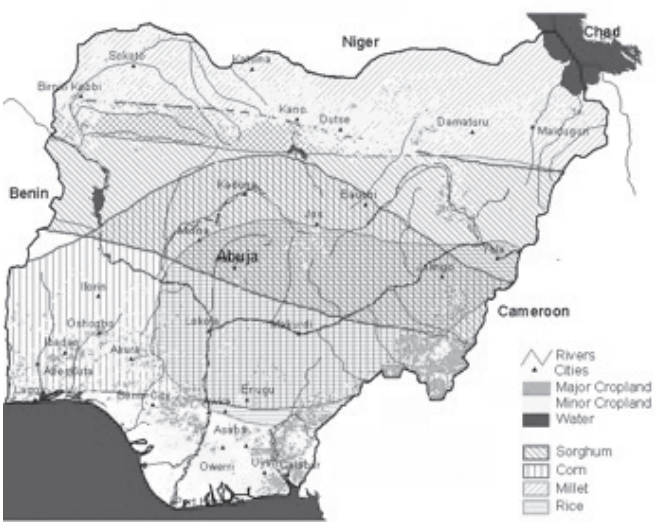


Figure 4*:* Coarse Grain Crop Zones in Nigeria
Source: USDA FAS

As *Zsarnóczai, J. S. et al. (2011*) pointed out that the competitiveness of traditional smallholders is extremely low, if they won't cooperate and they will be transformed into a landless worker. The transformation of the trade is an especially important process. Nowadays this sector of the economy offers a very modest, but relatively stable source of income. As a consequence of an extremely high level of corruption there is an unequal access to factors of production in majority of the countries. A considerable progress could be achieved by improving the transparency of these socio-economic processes. Government assisted or managed rural banks provide inexpensive credit to those who own large pieces of land, even if they do not have any serious business plan, concerning the management of these facilities.

There is a general lack of coherent, long range plans for the development of rural regions. This is not because governments are ignorant, but because the political elite in most cases give a low priority to reducing inequalities and to a much more stable way of development. The low level of agricultural production is paired with high waste level. There is a considerable gap between the agricultural production and consumption of products. If the producers are unable to sell their products on the place of production, there is a considerable economic loss (Fig. 5). This leads to a large-scale fluctuation of farmers' revenue, and a constant imbalance between supply and demand [Zsarnóczai, J. S. et al. (2011)].

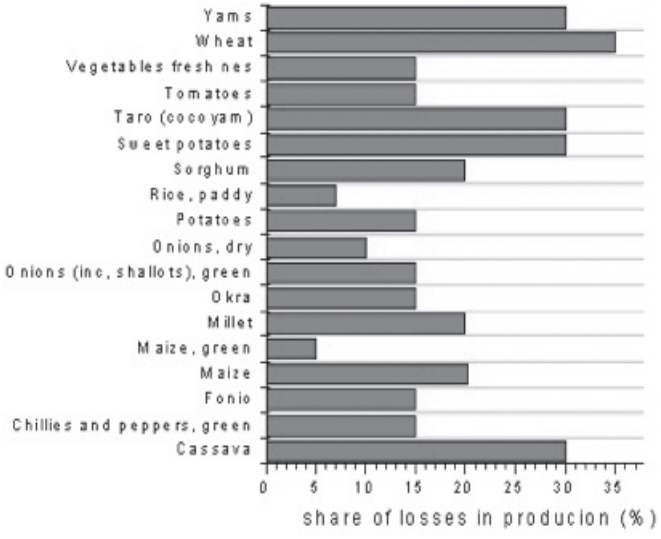


***Figure 5**:* The losses of products in the Federal Republic of Nigeria (2006-2009 averages)
Source: Zsarnóczai, J. S. et al. (2011)] based on faostat.fao.org.

Results

The reasons and goals of transformation

Boosting Agricultural Production involves targeted interventions and reforms, including technological innovation, productivity improvement, infrastructure development in agricultural production zones, commercialisation and input supply and distribution systems. Specific interventions should include increasing the area of land under cultivation, increasing the use of improved seeds and fertilisers, enhanced cultural practices, mechanisation of agricultural production and the adoption of a value chain approach to boost agricultural production. These should be complemented with improvements in infrastructure, particularly road transport, energy, irrigation, storage and processing. Moreover, partnerships with private sector operators and farmers associations should be developed, and long-term financing should be provided at a reduced cost to small- and medium-sized enterprises in the agricultural sector. These measures are incorporated in the Agricultural Transformation Agenda of the current administration.

The negative implications of excessive food import on Nigeria:

- Nigeria's food imports are growing at an unsustainable rate of 11% per annum.
- Relying on the import of expensive food on global markets fuels domestic inflation.
- Excessive imports putting high pressure on the Naira and hurting the economy
- Nigeria is importing what it can produce in abundance.
- Import dependency is hurting Nigerian farmers, displacing local production and creating rising unemployment.
- Import dependency is not acceptable, nor sustainable fiscally, economically or politically.

In November 2012, an Agricultural Transformation Agenda was adopted in which the Governmen t's vision is was set to boost the agricultural sector, in order to make Nigeria an agriculturally industrialized economy" [Adesina A.(2012)].

New policies, institutions and financing structures to drive sector growth:

1. Deregulation of seed and fertilizer sectors,
2. Marketing reforms to structure markets,
3. Innovative financing for agriculture,
4. New agricultural investment framework.

The Federal Government has fully deregulated the fertilizer and seed sector, and sanitized the fertilizer subsidy program

- Government distribution system is inefficient and wastes resources.
- Government distribution channels subsidize corruption
- Implemented Growth Enhancement Support Program to directly target famers.

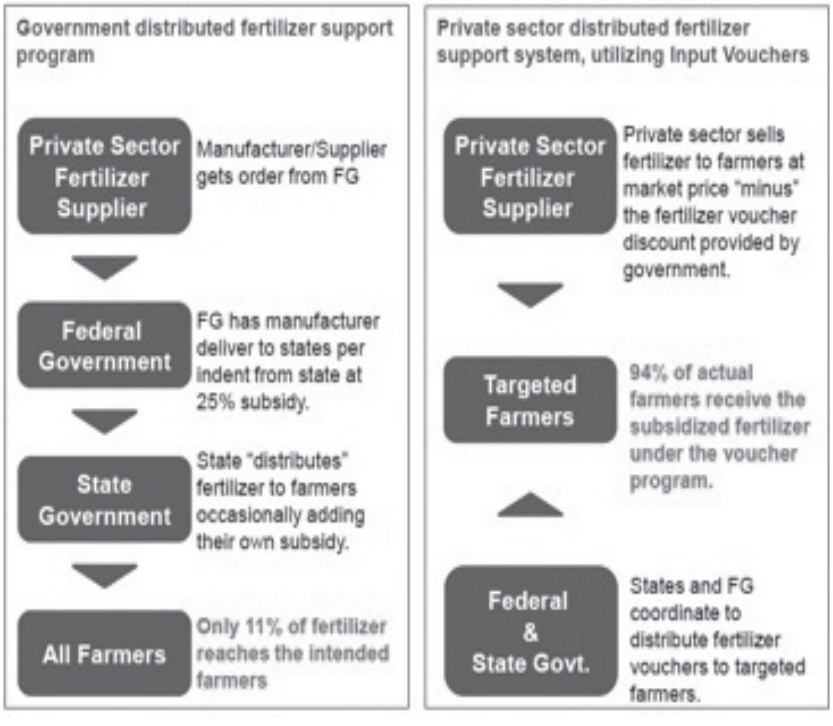


***Figure 6**:* Distribution schemes of fertilizers
Source: Adesina A. (2012)

Distribution schemes of fertilizers

Foreign Investment in the Nigerian Fertilizer Industry: In Joint Venture with Mitsubishi, Notore is expanding its capacity to over 2.75 Million MT/year.

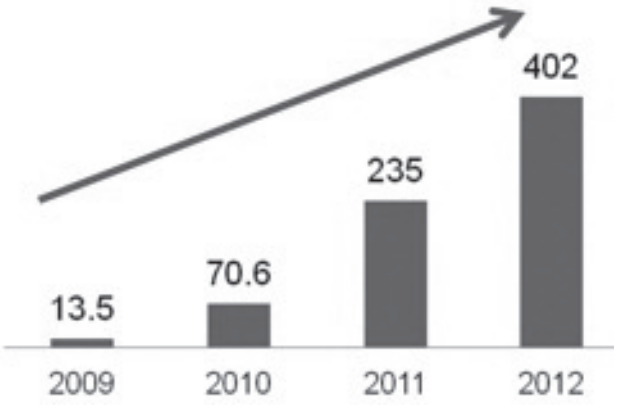


Figure 7: Growth in Production (Thousands of Metric Tons of Urea)
Source: Adesina, A. (figure for 2012 is estimation)

Food processing and manufacturing from local staple crops:

- Rapid urbanization, rising middle class incomes, supermarkets and demand for "ease to prepare foods",
- Target commodities are maize, soybeans, rice, yams, cassava, sweet potatoes, sorghum,
- Staple Crop Processing Zones (SCPZ) 14 sites selected across Nigeria for the first set of SCPZs,
- Development of finance institutions such as the World Bank and the African Development Bank, have pledged support,
- High Quality Nigerian Rice Rolled Out - Modern rice mill (30,000 MT) begins operations in Ebonyi State.

Table 4: Sample Rates of Returns to Agricultural Investments in Nigeria

Crop	Modeled Investment Theme	Start Up Capital (Fixed Assets)	IRR	Payback Period
Tomato	Tomato paste and related products plant to replace imported Chinese paste	$3.9 M for plant with 15,000 tons/annum	20%	~ 4years
Cassava	Cassava chips processing for export to Northeast Asia	$3.5 M for plant with 115,000 tons/annum plant	19%	4.5 years
Cotton	Cotton production and ginning into lint for export and domestic markets	$3.2 M for a 30,000 ton / annum ginnery	20%	3.5 years
Maize	Processing into animal feed to serve fast growing livestock market	$3.5 M for a 50,000 ton/annum plant	30%	~3.6 years
Rice	Rice production and milling to serve large domestic demand	$6.1 M on a 45,000 ton/annum rice mill	33%	3.5 years
Soya Beans	Processing into animal feeds, industrial supplements and oil for domestic markets	$10 M on a 100,000 ton plant	106%	4.5 years

Source: Adesina, A.(2012) on the bases of Monitor Analysis; Interviews with Processors; NIRSAL Analysis

Government incentives to support investors in agriculture

- New fiscal incentives to encourage domestic import substitution
- Removal of restrictions on areas of investment and maximum equity ownership in investment by foreign investors
- No currency exchange controls – free transfer of Capital, Profits and Dividends
- Constitutional guarantees against nationalization/ expropriation of investments
- Zero percent (0 %) duty on agricultural machinery and equipment imports
- Pioneer Tax Holiday for agricultural investments
- Duty Waivers and other industry related incentives e.g., based on use of local raw materials, export orientation etc. [Adesina, A. (2012)].

It was announced recently that the World Bank has approved credit f acilities of 300 million USD for Nigeria to boost agricultural output and food security. According to the World Bank, 200 USD million loan will go to small-holder farmers organised in clusters in six federal states for producers of rice, cassava, sorghum and other staples, while another 100 million USD will be used to improve crop yields, promote market access and better management. The credit will be provided under the International Development Association's terms f or helping poor countries, according to the statement. As of 2010, more than 60 percent of the country's population of more than 160 million people lived on less than $1 a day, up f rom 51.6 per cent in 2004, according to the National Bureau of Statistics [Idowu B. (2013)].

The Commercial Agriculture Development Project (CADP) is aimed to improve Agriculture production in Nigeria by supporting the commercialization of agriculture production, processing and marketing outputs among small and media-scale commercial farmers and agro-processors. CADP is supporting the Federal Government of Nigeria strategy options of diversifying into non-oil sources of growth and away from over dependence on oil and gas. To achieve the above objectives, the project will help to improve access of participating commercial farmers to new technologies, improved infrastructures, finances, and output markets, to strengthening agricultural production systems and facilitate access to market for some targeted value chains among small and medium scale commercial farmers in five participating federal states: Cross Rivers, Enugu State, Kaduna State, Kano State, and Lagos State. These value chains are rice, oil palm, cocoa, fruit trees, poultry production, aquaculture and dairy, with maize and rice as staples [CADP (2013)].

Conclusions

The Nigerian economy needs growth in order to reduce the financial burden of imports, create jobs to absorb the growing unemployment, grow incomes, reduce poverty and increase prosperity. To achieve social development is really very important in a country which is the most populous one in Africa, and where harmony and peaceful co-existence among various religions and ethnic communities is really fragile.

Creating more jobs in rural areas may diminish tensions and also the popularity of radical political groups (like Boko Haram and others) especially in the young generation. The application of new technologies and methods may rapidly increase the efficiency of the agricultural production. Perhaps those lands which have been abandoned due to the scarcity of water could be still kept in utilization.

After all the agricultural reforms should serve not only the development of the rural society but, - indirectly - this is a valuable contribution also to the peace and security of the West-African region.

References

1. **Adesina: A. (2012):** Agricultural Transformation Agenda: Repositioning agriculture to drive Nigeria's economy – Abuja, November 2012
   Downloaded on 10.06.2013. from: http://www.emrc.be/documents/document/20121205120841-agri2012-special_session-tony_bello-min_agric_nigeria.pdf
2. **African Economic Outlook – Nigeria (2013):**
   Downloaded on 10.06.2013. from:
   http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2013/PDF/Nigeria%20-%20African%20Economic%20Outlook.pdf
   http://www.africaneconomicoutlook.org/en/countries/west-africa/nigeria/
3. **Auta, S.J. and I.I. Dafwang (2010):** The Agricultural Development Projects (ADPs) in Nigeria: Status and Policy Implications Research Journal of Agriculture and Biological Sciences, 6(2): 138-143, 2010 INSInet Publication
   Downloaded on 04.01.2014. from: www.aensiweb.com/rjabs/rjabs/2010/138-143.pdf
4. **Búr G. and Tarrósy I. (2011):** Az afrikai vándorlás hátteréről és jellemzőiről In.: Új népvándorlás. Migráció a 21. században Afrika és Európa között. Ed. Tarrósy I., Glied V., Keserű D. IDResearch Kft. & Publikon Kiadó, 2011; ISBN: 978-615-5001-52-9; pp. 99-114;
   Downloaded on 10.06.2013. from:
   http://ittvagyunk.eu/application/essay/127_1.pdf
   Commercial Agriculture Development Project (CADP)
   Downloaded on 10.06.2013. from: http://www.cadpnigeria.org/
5. **FAO Statisctical Yearbook** 2012 FAO, Rome, Italy ISBN 978-92-5-107084-0
   Downloaded on 10.06.2013. from: http://reliefweb.int/sites/reliefweb.int/files/resources/i2490e.pdf
6. **Idowu B. (2013):** World Bank Approves $300m Loan For Agriculture In Nigeria
   Leadership, July 2, 2013– 3:42am Downloaded on 05.07.2013. from:
   http://leadership.ng/news/020713/world-bank-approves-300m-loan-agriculture-nigeria
7. **Kozári J. (2007):** Szaktanácsadás. Debreceni Egyetem Agrár- és Műszaki Tudományok Centruma, Agrárgazdasági és Vidékfejlesztési Kar, Debrecen, 2007. ISBN 978-963-9732-78-0 150 p.
8. **Malachy Agbo:** How Nigeria Can Make Agriculture Blossom ThisDay Live 04.12.2011. Downloaded on 04.01.2014. from: http://www.thisdaylive.com/articles/how-nigeria-can-make-agriculture-blossom/104218/
9. **Mogues T. (2008):** Morris M., Freinkman L., Adubi A:, Ehui S.: Agricultural Public Spending in Nigeria
   IFPRI Discussion Paper 00789 September 2008
   Available from: http://www.ifpri.org/sites/default/files/pubs/pubs/dp/ifpridp00789.pdf
10. **Neszmélyi Gy. (2012):** Nigéria perspektívái: kibontakozás avagy káosz és terrorizmus? (Vistas of Nigeria: Development or Chaos and Terrorism?)
    Nemzet és Biztonság Vol. V. No. 2. Budapest, March, 2012; 64-71 pp.
11. **Oruruo K. I.:** Agriculture in Nigeria
    Downloaded on 10.06.2013. from:
    http://logbaby.com/news/agriculture-in-niger_15856.html
12. **Tarrósy I. (2009):** Politikai elméletek és módszertanok a mai afrikai problémák megértéséhez. In Ed. Csizmadia S., Tarrósy I.: Afrika Ma – Tradíció, átalakulás, fejlődés. IDResearch Kft. & Publikon Kiadó, 2009; ISBN: 978-963-88505-8-4; pp.13–17; Downloaded on 10.06.2013. from: http://www.publikon.hu/userfiles/File/afrikama_f1.pdf
13. **Zsarnóczai, J. S., Lakner, Z., Y. A. Mughram (2011):** Hungarian Participation in Modernisation of the Third World 87-108 pp SzűcsI.,ZsarnóczaiJ.S.[ed.]:EconomicsofSustainableAgriculture Szent István University Publishing, Gödöllő, 2011. HU ISSN 2062-445X
14. **Nigeria Rice Production Increases and Import Duty Raised;** USDA FAS (Foreign Agricultural Service)
    Downloaded on 10.06.2013. from: http://www.fas.usda.gov/pecad2/highlights/2002/03/nigeria/nigeria_rice.htm

HUMAN RATIONALITY, ENVIRONMENTAL CHALLENGES AND EVOLUTIONARY GAME THEORY

Andrea Karcagi-Kovács

University of Debrecen

Abstract: In recent years, game theory is more often applied to analyse several sustainable development issues such as climate change and biological diversity, but the explanations generally remain within a non-cooperative setting. In this paper, after reviewing important studies in this field, I will show that these methods and the assumptions upon which these explanations rest lack both descriptive accuracy and analytical power. I also argue that the problem may be better investigated within a framework of the evolutionary game theory that focuses more on the dynamics of strategy change influenced by the effect of the frequency of various competing strategies. Building on this approach, the paper demonstrates that evolutionary games can better reflect the complexity of sustainable development issues. It presents models of human – nature and human – human conflicts represented by two-player and multi-player games (with a very large population of competitors). The benefit in these games played several times (continuously) will be the ability of the human race to survive. Finally, the paper attempts to identify and classify the main problems of sustainable development on which the game theory could be applied and demonstrates that this powerful analytical tool has many further possibilities for analysing global ecological issues.

Keywords: . rationality, sustainability, game theory, evolutionarily stable strategy

Introduction

In the introduction to their book, Eigen and Winkler wrote the following in 1975: "It's time for us to understand that humans are not nature's mistakes; however, nature is not destined to "care about" human survival automatically and self-evidently. Humans are participants in a Big Game where the outcome is open even for them. Humans have to evolve their skills and capacities in their entirety to become "Players" instead of the "Playthings of Chance" (Eigen–Winkler, 1981, p.18).

The most crucial and urgent task for humans in the 21. Century is to avert the global economic crisis. Human behaviour, i.e. the types of behavioural strategies people pursue in certain (economic, social) situations and their ecological consequences, constitutes an intrinsic element in the interaction of human society and physical laws in nature. Several researchers argue that we are on the brink of a global ecological catastrophe. At present, political decision-makers are in a tight corner, as they have to face a much more alarming, long-term danger while recovering from a serious global crisis (Karcagi-Kováts–Kuti, 2012).

In our days, societies in western civilization, in terms of financial, economic, fertility etc. data are in an instable state and but the most threatening crisis might endanger them in terms of traditional values. Having a look at global summits held by the UN about environmental issues and sustainability reveals that the chances of joining forces in favour of common interests are rather low. Nevertheless, the time factor and increasingly alarming changes highlight the necessity of shifting towards sustainability in an increasingly urgent way.

The most false myth in the XX. Century regarded man to be a rational being, a homo eoconomicus. All sociological, psychological analyses express explicitly that human decisions are not rational and cannot be rational, as the majority of decisions are formed in the sub-conscious and not in the rational part of the brain. Elliot Aronson, the greatest "social-psychologist" of the XX. Century states that humans are not rational, but rationalizing beings, i.e. they bring some decision and try to give reasons why it was logical subsequently (Aronson, 2008). This mechanism is not only dangerous because it is capable of exerting a negative influence on social-economic processes, but because people insist on their bad decisions for a long time. As for environmental ethics and environmental psychology, this fact is of incredible significance.

In relation to the crisis, currently several renowned economists argue that mainstream economics and methods of analysis applied there have failed and a new way is to be sought. Many claim that game theory as an analytical tool is the new avenue. My paper argues that the application of evolutionary game theory, a relatively young area of game theory is the most suitable method to examine how and with the adoption of what kind of behavioural strategies a process

of transformation is to be realized where communities obey the laws of Nature and thus they can achieve a quasi stable state again.

Some words about the game theory

Game Theory – GT is an abstract discipline engaged in the study of rational decisions, the theory of abstract decisions which studies rational decisions in situations where the strategy of individual participants (players) depend on the expected strategy of the other participants. The founding father of game theory was John von Neumann with his work published in 1928 (Theory of Parlour Games), where he used mathematical tools to analyse parlour games and proved the so-called MiniMax theorem claiming that in a given game the best strategy minimizes the possible maximum loss. In fact, the game theory was conceived in 1944 when the book written jointly by John von Neumann and the Austrian economist, Morgerstern, was published entitled "Theory of Games and Economic Behaviour. Their theory was based on their studies on various kinds of parlour games, therefore a vast number of technical expressions were taken over from everyday life and later applied in game theory (e.g. game, player, payoff, etc.). As for their fundamental assumption, "players are selfish (all of them want to maximize their own benefits) and intelligent, i.e. they are aware of all the possible decisions and the related quantifiable gains. Players' intelligence covers the ability to identify the best solution, if there is any, while they do not forget about their counterparts' similar skills either" (Szabó, 2009, p.118). Neumann and his co-author wanted to support economists in the analysis of diverse economic and market situations, strategic problems. However, widespread application of their book had to wait. The main reason was that the Neumann-Morgenstern theory describes game complete information, which means that all players know the payoff function of the other players, their strategic objectives and faculties as well.

The early 50s represented the next turning point. The theory of n-player non-cooperative games and Nash-equilibrium is linked with the name of John Nash, and it describes an equilibrium where none of the players have anything to gain by changing their own strategies as long as other players' strategies remain unchanged. John Harsányi expanded Nash equilibrium to those cases when players do not have a thorough knowledge of other players' strategies and utility functions. Harsányi realized that in reality or in economic life players can only understand others' goals and potentials insufficiently or not at all. His model is grounded on Bayes' theorem, where the main point is that once a player is involved in a game with another player about whom he has only deficient information or no information whatsoever, the best way to select the rational strategy is to allocate probabilities to various possibilities and use them as starting points. Economists started the application of game theory in the mid-70s. Later, this new theory as a new analytical tool emerged in other areas of social sciences (e.g. psychology, sociology, political science.).

A new branch of game theory, the Evolutionary Game Theory (EGT) was born in the early 70s. In 1973 John Maynard Smith and George Price evolution biologists realized that the fundamental ideas of game theory are suitable for the precise description of interactions among living creatures and formalized the key conception of evolutionary game theory, the evolutionarily stable strategy (ESS). This strategy argues that the state of a population where players "play" an evolutionary stable strategy is regarded stable if rare mutants are not capable of spreading (Smith–Price, 1973). Evolutionary games differ from traditional game theory models in several crucial issues. The payoff here is that the given species possesses its survival (propagation) ability (fitness), and the players are not intelligent and rational, meaning that they do not calculate the results of their possible decisions. A whole population is engaged in these games, i.e. it is a multi-player game and while the basic game is played repeatedly, players have the opportunity to modify their strategies, causing modifications in the group itself. Darwinian selection applies in the course of these modifications, i.e. members of a certain population take over the strategy of the most successful player (with the greatest) individual fitness.

The conception of biological evolution is concealed behind evolutionary games, i.e. entities follow this or that strategy in a biologically determined way and their survival probabilities will have varying degrees in line with certain individual strategies. To give an economic example, players of economic life learn from certain events and correct their behaviour accordingly. Today the most vivid example for this may be drastic mood changes on borrowing in the past couple of years. Evolutionary games use three fundamental concepts: mutation, selection and heredity. Mutation means a problem in a system and this is significant in terms of evolutionary stability, as a strategy is ESS if it is played by a satisfactorily large population; mutants in this case are not able to spread in this population, suggesting that an evolutionary stable state is immune to mutation (Szabó, 2003). Selection favours those entities who employ high payoff strategies. To date, there has been no clear-cut standpoint about the fundamental units of natural selection. Followers of group selection claim that the fundamental unit of selection is a large group or species, while the majority argue that the theory of genetic selection serves as the basis of natural selection (Dawkins, 2011), i.e. selection exerts an effect on the survival of a single behaviour. "As for the world concept arising from the theory of group selection, nature wisely provides for expedient cooperation among entities within certain species and thus about the development of the given species…. As for the world concept arising from the selfish gene theory, the world is conducted exclusively by the short-sighted interests of genes without any superior goals, and development is at best the seeming product of perfection through the methods of selfish genes" (Mérő, 2007 p.187). Darwin himself "considered the appearance of morality the most vital evolutionary factor in the origin of humans and assigned its emergence to the effect of group selection" (Csányi, 1999, p.14).

The success story of evolutionary game theory started with John Maynard Smith's famous hawk-dove game. In the past

couple of decades, this example was used in almost every field of social sciences, just like the Prisoner's Dilemma. In the hawk-dove game Smith characterises the population of a given species, where players fight to obtain a certain resource with the restraint that entities in the population can follow merely two strategies: hawks always fight and when they are confronted with hawks, the fight is always brought to an end by a serious injury. However, doves only threaten and pose if they meet other doves and escape when confronted with hawks. We might think that a community reaches the highest total gain if all the members are doves. But this behaviour is instable evolutionarily, as the appearance of a single hawk is enough for doves to take over the strategy of the hawk reaching the highest payoff and thus they start to proliferate rapidly. In the end, the proportion of hawks and doves in a given population will be determined by the values of the payoff matrix, providing the evolutionary stable state of a population (Szabó, 2003). In the evolutionary version of the multi–step game "Prisoner's Dilemma" hallmarked with the name of Robert Axelrod, the strategy of the worst payoff was replaced with the best one at the end of each competition cycle, leaving the former extinct and the latter with a new offspring. The outcome was the development of two evolutionarily stable states. In one of them, each player behaved selfishly without any cooperation whatsoever, leading to the extinction of the given population. As for the other strategy, most players pursued the Tit-for-Tat strategy, as this strategy promised the highest gains (Szabó, 2003).

Analysis of certain issues of sustainability by game theory models to date

Several scientific articles seek to study certain issues of sustainability by using game theory models. Most of them focus on the depletion of resources, i.e. free riding behaviour under non-cooperative conditions. They also analyze potential shifts to tackle climate change, certain negotiation processes and the probability of coalition development by cooperative game theory tools. Below, I present a non-exhaustive list of environmental areas already examined by game theory methods.

Bhat's paper seeks to explore potential methods for the conservation of biodiversity, where two Players compete for the same resource on the resource market. The result is Hardin's the Tragedy of the Commons. However, he emphasises that if the game is cooperative, there are probabilities to avoid depletion and to maintain resources in the long run (Bhat, 1999). Similarly, Acre studies the question of biodiversity and environmental protection as global public goods and uses the evolutionary game theory to explore global public assets. He claims that scientific, economic and political conditions not necessarily lead to the Prisoner's Dilemma. He also argues that international environmental protocols may be improved by collaboration and cooperation, but this massively depends on the proportion of participants employing certain strategies in the group of negotiators (Acre, 2000). Palmini's article uses comprehensive game theory tools, such as the MiniMax theorem and the lottery game for the analysis of hazardous problems with uncertain outcome for the description of environmental problems, and underlines the significance of the selection of risk-averse strategies (Palmini, 1999).

Liu et al. focus on the potentials of the establishment of a closed economic system with zero emission in the Western-Qaidam region, China by a game theory bargaining model (Liu et al., 2012) It means that similarly to symbiosis in wildlife, farmers may cooperate in a mutually beneficial way in material (waste) and energy management, i.e. industrial systems should be developed in the same way as natural ecosystems as these cycles do not generate waste and environmental pressure.

Jaehn and Letmathe analyse the volatility of the CO2 quota trading system by game theory tools (Jaehn–Letmathe, 2010).

Soroos makes a comparison between military and environmental safety. He uses the Prisoner's Dilemma to describe the process of striving after environmental safety and enhances that in negotiation efforts to curb the growth of the ozone hole the Prisoner's Dilemma has not taken a central stage. He claims that this fact vividly demonstrates that we can surpass our narrow-minded, selfish selves and negotiating partners might recognize the necessity of cooperation to support sustainability instead of aggravating international conflicts and unfairness (Soroos, 1994). Courtois and Tazdait also analyse the processes of environmental change negotiations to find the methods for the development of a cooperative coalition. Their model comprises persuasion, dissuasion, revocation and imitation as well. Among others, they found that the distribution of unfavourable effects among players (negotiating parties) significantly boosts propensity for cooperation (Courtois–Tazdait, 2007). Dutta and Radner also write about climate change and make a distinction between national and international possibilities. They emphasize that on international level, climate change is equivalent with the tragedy of common pastures where the game is ruled by dominant states and the laws of Nature. Their model also includes population growth and players' inter-temporal preferences (Dutta–Radner, 2006).

Rocha argues for the application of evolutionary game theory in the analysis of competition among companies producing homogenous products on a quasi-competitive market. His model comprises social responsibility, environmental sensitivity, environmental benchmarking by the state and also social responsibility and environmental performance sensitive consumer boycott. He finds EGT the most suitable tool of analysis because the result to be achieved depends not only on payoffs, but also on the proportion of certain behaviour strategies (e.g. supporters of socially responsible companies or environmentally sensitive ones) within the given population (Rocha, 2013).

A matrix which offers the multifaceted evaluation of individual decision alternatives provides a comprehensive picture about a situation in social decision-making. With the payoff matrix used in game theory, Constanza demonstrates what results are to be expected if humanity, the player trusts the omnipotence of technology or it follows in the footsteps of technological pessimists, where the other player is the Earth,

Table 1. Payoff matrix for techno-optimistic and pessimistic strategies, source: Costanza, 1993

Actual policy	The real state of the world		
		optimistic version	pessimistic version
	techno-optimistic approach	HIGH	CATASTRO-PHE
	techno-pessimistic approach	MODERATE	SUSTAIN-ABLE

Table 1. Payoff matrix for techno-optimistic and pessimistic strategies, source: Costanza, 1993

suffering insignificant or significant injuries as a result of human intervention. The left side of Table 1. presents ongoing, alternative political strategies of technological optimism and pessimism, while we can see the real life situation of the world above.

The intersections are labelled with the results of the combinations of policies and the states of the world. For example, if we pursue the optimistic policy and the world really does turn out to conform to the optimistic assumptions, then the payoffs would be high. This high potential payoff is very tempting and this strategy has paid off in the past. It is not surprising that so many would like to believe that the world conforms to the optimist's assumptions. If, however, we pursue the optimistic policy and the world turns out to conform closer to the sceptical technological assumptions, then the result would be "Disaster." The disaster would come because irreversible damage to the ecological life support system would have occurred (like ozone depletion and global warming) and technological fixes would no longer be possible. If we pursue the sceptical policy and the optimists are right, then the results are only "Moderate." But if the sceptics are right and we have pursued the sceptical policy, then the results are "Sustainable." Within the framework of game theory, this simplified game has a fairly simple "optimal" strategy. (Assuming a "risk averse" player, which global society as a whole must certainly be in this case.) If we really do not know the state of the world, then we should choose the policy that is the maximum of the minimum outcomes (i.e., the MaxiMin strategy in game theory jargon). In other words, we analyse each policy in turn, look for the worst thing (minimum) that could happen if we pursue that policy, and pick the policy with the largest (maximum) minimum. In the case stated above, we should pursue the sceptical policy because the worst possible result under that policy ("Sustainable") is a preferable outcome to the worst outcome under the optimist policy ("Disaster") (Constanza, 1993). In real terms, Constanza presents the precautionary principle by game theory tools in his article.

In 2006 the World Bank published 3 studies analysing the competition for natural resources (e.g. fish stock, forests etc.), the distribution of resources, difficulties arising from the free rider problem and especially the issues of aboveground and underground waters, using the tools of Cooperative Game Theory (CGT) (Parrachino et al., 2006a, 2006b; Zara et al., 2006).

Evolutionary game theory and sustainability

For several reasons, evolutionary game theory can be regarded a suitable method to set up models for the characterization of social transformations. Vilmos Csányi wrote that human ethology "assumes that human behaviour is the result of evolution, the outcome of the adaptation of humans to their environment" (Csányi, 1999, p.7). My paper focuses on the question, how to set up models to illustrate evolutionary processes, where developed national economies switch over to a lifestyle which takes ecological restraints into consideration. However, the analysis of the problem raised several difficulties. One of them is that the interactions and time related changes of a highly complex system (environment-society-economy) should be described. The other one is that scientific knowledge of this system is very uncertain, "answers" from life-support systems, gains (rather losses) are delayed in time, and therefore switching to a new strategy is also delayed. The human factor must also be calculated, as the free rider behaviour is crucial: for a short time, excessive consumption and production leaving behind environmental pollution will provide higher payoff. But Nature's answer, the "slap in the face" will hit everybody, leaving borders and behavioural strategies out of consideration.

Neumann's MiniMax theorem is a theory for minimizing loss. This is true as long as available results are not temptingly high. At this time, however, humans become risk-takers, possible losses shrink into insignificance in the shadow of potential alluring gains (Kahneman, 2013). This is the attitude we adopt when it comes to environmental issues, when we bring decisions about patterns of production and consumption. In environmental terms, sustainable consumption and production would require us to sacrifice temporary pleasures and higher profits. Our behavioural strategies are induced by the probability of potential growth, while our greediness prevents us from calculating serious long-term losses. Human psyche works in the way that long-term perils are either not sensed at all or we think that they can happen only to others, or elsewhere and we play down what happens to the next generation. In economic theory, starting from Keynes, renowned think-tanks always ended up discussing human nature. The model of environmental game theory is suitable for the description of temporally changing processes and for sketching various scenarios while forecasts are prepared.

If the whole planet is considered to be a common pasture, our previous behavioural strategies will certainly lead to the tragedy of Hardin's Commons, which demonstrates the conflict of public good and self-centred behaviour. In the evolutionary competition, if the free rider's gain is too high, only the parasites will survive as long as the total income for the community drops to a minimum in the final phase, i.e. natural resources get depleted. If, however, the rules of the game provide advantages for those players who adopt strategies subjected to the rules of Nature, parasites will disappear from the population and hopefully, as a result of social evolution, our attitude to nature and natural environment will change and we break off with Bacon's "knowledge is power" concept.

The definition of the payoff function becomes problematic

from two viewpoints in the analysis of the game against Nature. The first is that the payoff is determined by the rules of nature, there is no possibility to bargain and potential losses are unknown. The second is that results, i.e. the slap in the face from Nature is delayed in time, so it is questionable whether we can learn from our mistakes in time. Two German sociologists, Wolfgang Krohn and Georg Krücken introduced the concept of evolutionary risk, denoting a new type of risk which is treacherous and hiding, lurking with uncertain time and way of occurrence and when it takes place, it affects everybody, independently of their previous behavioural strategies (Krohn–Krücken).

There are several behavioural forms that we humans learn, whereas our genes lead us to actively select our environment, the space where we can adopt other behavioural patterns (Csányi, 1999).

Evolutionary game theory affords possibility for the players to take their place in space and for setting up models to describe their possible local relations and their effects. According to the rules of evolution, players take over the successful "neighbour's" strategy and thus the proportion of individual strategies within a community constantly changes until – if everything turns out well – the population gets into an evolutionary more stable state.

Conclusions

Game theory tools have been widely used to explore several sub-problems of sustainable development. Most papers use non-cooperative games and analyse mostly the depletion of scarce resources, focusing on selfish human behaviour, leading to Hardin's Tragedy of the Commons. Cooperative games are primarily applied for analysing the possible outcomes of environmental negotiations. So far there have only been a few studies to set up sustainability models with evolutionary game theories, perhaps because evolutionary game theory is a young branch of game theory. Most of these writings analyse the changes of biological diversity by evolutionary game theory models. I am convinced that in the analysis of sustainability as a global ecological problem, evolutionary game theory is a suitable tool to illustrate uncertainties and processes altering in time, originating in our insufficient body of knowledge and the inherent nature of the system, and to provide forecasts focusing on the dynamism of changes in human strategies, the topology of players and therefore the potential meeting points among players; adoptable, learnable and hopefully, from the viewpoint of sustainability, positive behavioural patterns.

References

Arce M. G. D. The evolution of Heterogenity in Biodiversity and Environmental Regimes. The Journal of Conflict Resolution, Vol. 44, No. 6, Economic Analysis of Conflict, 2000; 753–772

Aronson E. A társas lény. Akadémia Kiadó Zrt. Budapest, 2008.

Bhat, G. M. On biodiversity access, intellectual property rights, and conservation. Ecological Economics 29, 1999; 391–403

Cortuis P, Tazdait T. Games of influence in climate change negotiations: Modelling interactions. Ecological Modelling 204, 2007; 301–314

Costanza R. Beyond the Limits: Dealing With an Uncertain Future. Estuaries Vol. 16, No. 4, p. 919–922, December 1993

Csányi V. Az emberi természet. In: Ezredvégi ember, bBoni Kft., Budapest, 1999; 5–39

Dawkins R. Az önző gén. Kossuth Kiadó, Budapest, 2011.

Dutta K. P, Radner R. Population growth and technological change in a global warming model. Economic Theory 2006; 29; 251–270

Eigen M, Winkler R. A játék – Természeti törvények irányítják a véletlent. Gondolat Kiadó Budapest, 1981. (1975.)

Hardin G. The Tradegy of the Commons. Science 1968; 162 (3859), 1243–1248

Jaehn F, Letmathe P. The emission trading paradox. European Journal of Operational Research 202, 2010; 248–254

Kahneman D. Gyors és lassú gondolkodás. HVG Kiadó, Budapest, 2013.

Krohn W, Krücken G. Risikante Technologien: Reflexion und Regulation. http://www.uni-bielefeld.de/soz/personen/krohn/riskante_technologien.pdf

Liu D, Li H, Wang W, Dong Y. Constructivism scenario evolutionary analysis of zero emission regional planning: A case of Qaidam Circular Economy Pilot Area in China. Int. J. Production Economics 140, 2012; 341–356

Mérő L. Mindenki másképp egyforma. Tercium Kiadó Kft., Budapest, 2007. (1996.)

Mészáros J. Játékelmélet. Gondolat Kiadó, Budapest, 2005.

Palmini D. Uncertanty, risk aversion, and the game theoretic foundations of the safe minimum standard: a reassessment. Ecologocal Economics 29 1999; 463–472

Parrachino I, Zara S, Patrone F. Cooperative game theory and its application to natural, environmental and water resourche issues (1). World Bank Polici Research Working Paper 4072, November 2006a.

Parrachino I; Dinar A; Patrone F Cooperative game theory and its application to natural, environmental and water resourche issues (3). World Bank Polici Research Working Paper 4074, November 2006b.

Rocha AB da Silva. An Evolutionary Game for the Issues of Social Investment, Environmental Compliance and Consumer Boycott. University of Leicester Department of Economics, Working Paper No. 13/17, 2013

Scheuring I. Evolúciós játékelmélet. 2006.

Scheuring I. Az emberi együttműködés evolúciós háttere. Természet Világa 138. 2007; 338–343

Smith JM, Price RG. The Logic of Animal Conflict. Nature, 1973; 246:15–18

Soroos S. M. Global Change, Environmental Security, and the Prisoner's Dilema. Journal of Peace Research, Vol. 31, No. 3 1994; 317–332

Szabó Gy. A Jó, a Rossz és a Magányos számítógépes küzdelme. Természet Világa 134, 2003; 197–201

Szabó Gy. A tisztességes magatartás kialakulása: játékelméleti elemzés, Fizikai Szemle, 2009/3; 118–120

Zara S, Dinar A, Patrone F. Cooperative game theory and its application to natural, environmental and water resourche issues (2). World Bank Policy Research Working Paper 4073, November 2006

AGRICULTURAL DEVELOPMENT AND GOVERNMENT EXPENDITURES IN THE NEW EU COUNTRIES

Peter Bielik[1], Luboš Smutka[2], Elena Horská[1], Richard Selby[3]

Abstract: The main ambition of this paper is to analyse agricultural developments in selected new EU member states with particular emphasis on government expenditures in agriculture. The main objective is to identify the relationship between government expenditures development on one side, and agrarian sector performance (the value of production) in selected member states on the other. The conclusions drawn from this analysis are that the agricultural sector has changed its structure and position within the national economy of selected new EU member states significantly in the 20 years since the early 1990s. Member states included in the analysis reduced both the size of their agricultural sector (number of people working in agriculture, total arable areas, number of animals, etc.), and the value of agricultural output. Despite the significant reduction of the agricultural output, member states became more efficient – and in particular their productivity per farmer increased significantly. Selected country's agricultural sector, its structure and production value development are closely related to government expenditures. Significant correlation is apparent between agricultural government expenditures and the change in the number of economically active persons in agriculture, development of agricultural production, agricultural area, agricultural GDP and agricultural capital stock. Regarding the elasticity of new EU member states' agricultural sector in relation to changes in government expenditures, significant elasticity is apparent in the case of the number of economically active persons in agriculture, agricultural production (especially livestock production), area of arable land, agricultural GDP and capital stock.

Keywords: .Government expenditures, agriculture, environmental protection, production output, trade, value, structure, correlation, elasticity, analysis, trend, European Union, new members

Introduction

The agrarian and food sectors are without any doubt the key sectors of any economy around the world (Svatoš, 2009). The agricultural sector and its performance are influenced in many countries by the attitude of individual governments to agriculture (Bartolini; Viaggi, 2013). For many countries, agriculture and its performance (the value of production) and size (the number of hectares and people working in agriculture, livestock population, share in GDP etc.) represent a strategic item of their policy-making activities (Matthews; Buchan; Miller et al., 2013). Agriculture is not only an important part of the economy, but it is also part of the strategic sector, as it satisfies one of the most important needs of the human population – food (Horská, 2011). There is no country which does not have to address the problems of food security, and where internal security policies do not also include food security (Bielik, 2010). It therefore follows that the agricultural sector represents a specific sector of the global economy, and its development is affected not only by economic power (supply and demand), but also by political power (liberalisation, protectionism etc.) (Jeníček, 2009). The agricultural market, both from global and regional/individual countries point of view, is seriously affected by the policies implemented relating to the agricultural sector and market development (Svatoš, 2008). The result of political interventions to agriculture is that the agricultural market represents one of the least liberalised markets within the world market (Horská, Hambálková, 2008). One significant element within the global agricultural market is the European Union (Viaggi; Gomez y Paloma; Mishra, et al., 2013). The EU's Common Agricultural Policy, together with the Common Trade Policy, significantly influences not only the EU's internal agricultural market, but also global market development (De Castro; Adinolfi; Capitanio; et al., 2012). Every new member state of the EU is obliged to accept the Common Agricultural and Trade Policies – and both have a direct impact on the performance of each country's agricultural sector (Drabík, Bártová, 2008). These policies can be either positive or negative (Ramniceanu; Ackrill, 2007). Accession to the EU means significant changes in the economy of each individual member, including the agricultural sector (Lukas, Poschl et al., 2004).

1 Department of Economics and department of Marketing, Faculty of Economics and Management, Slovak University of Agriculture in Nitra
2 Department of Economics and Department of Management, Faculty of Economics and Management, Czech University of Life Sciences in Prague

Government expenditure is a very important source of funding for agricultural sector development (Pokrivcak; Swinnen; de Gorter, 2003). In Europe, and especially in the European Union, government expenditures – and notably subsidies provided by the European Union's Common Agricultural Policy – are a very important source of income for individual farmers and agricultural companies. (Strelecek; Zdenek; Lososova, 2009; Basek; Kraus, 2011). It is a fact that without government support the majority of EU farmers would be operating at a loss (Bielik; Juricek; Kunova, 2007). When considering government expenditures in the agricultural sector it should be noted that currently they are split into two flows. The first flow is represented by purely agricultural expenditures. The second flow is represented by expenditures related to environmental protection (Sadowski; Czubak, 2013). The new EU member countries have recorded a significant growth of government expenditures related to agriculture and environment protection value during the last two decades. In the period 2001–2011 alone, the value of government agricultural expenditures increased from 4.7bn. USD/year to 9.5bn. USD/year (in constant 2005 USD prices), and the value of expenditures for environmental protection increased from ca 3.9bn. USD/year to 9.3bn. USD/year. This means that government expenditures related in some way to agricultural activities, more than doubled during the last ten years. This growth of public support strongly influences the economy, the structure, and the performance of each new EU member states' agricultural sector. Despite the fact that the share of government expenditures on agriculture and environment protection in relation to total government expenditures in individual countries is very low – about 4% of NMCs' total government expenditures value – government expenditures represents a very important part of each countries' agribusiness. Nowadays individual governments of NMCs spend about 20bn. USD for different kinds of expenditures related more or less to activities in the agricultural sector. This means that government expenditures (paid every year) play a very important role in the formation of the agricultural sector's final state budget in individual countries (Rickard; Sumner, 2011). When considering the mutual relationship between government expenditures and agricultural sector development, it is necessary to highlight the existence of many common trends among all NMCs, though there are also huge differences apparent among the individual countries in the area of their agricultural sectors' sensitivity and correlation in relation to changes in the value and structure of government expenditures. (Blazejczyk-Majka, Kala, Maciejewski, 2012; Bohackova, Hrabankova, 2011)

The main aim of this paper is to analyse agrarian sector development in individual new EU member countries with an emphasis on government expenditures (both agricultural and environmental expenditures) directed towards agriculture. The idea is to analyse the relationship between the agricultural sector and its performance (production value) on one side, and the level of government expenditures in agriculture on the other. Government expenditures in agriculture are a very important element influencing the position and performance (production value) of agriculture within the economy of individual countries. Government subsidies have a direct impact on crops and animal production value and structure development. Available public sources (government expenditures) also have a significant impact on the agricultural sector, its productivity and competitiveness. The conducted analysis provides a basic overview of the development of government expenditures value development on one side and agricultural sector and its performance on the other, in the period 2001 – 2011.

Materials and Methods

This paper analyses the value and structure development of government expenditures in agriculture in ten new EU member countries (NMCs), viz: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. Cyprus and Malta are excluded from the analysis because there are not typical representatives of new EU countries and their agricultural sector is very specific. The main objective is to identify the relationship between government expenditures value development on one side, and the performance (gross agricultural production value; the gross value of production is analyzed in constant (2004–2006) USD prices) of the agrarian sector in each of these analysed countries on the other. The analysis provides a basic overview of individual countries' agricultural sector development (in relation to total agricultural production, crops and livestock production). The paper is especially focused on agricultural sector output, productivity (agricultural production value and GDP development per person economically active in agriculture), and size development (area of agricultural land development, number of people working in the agricultural sector etc.). It should be noted that the number of persons economically active in the agricultural sector is taken from the FAOSTAT database – this number covers not only farmers, but also other people somehow connected with agricultural sector development. Thus, the numbers are not necessarily in compliance with individual countries' national statistics. The FAOSTAT database was chosen because of the authors' intention to use data conducted according to the same methodology for the analysis

In the case of government expenditures, this paper analyses their total value development both in relation to agriculture and environment protection (in this case it is assumed that a part of the expenditures for environment purposes is also devoted to farmers, because their production activities are also closely related with environment protection activities (Baylis; Peplow; Rausser; et al., 2008).

A significant part of the paper is devoted to the correlation and elasticity analysis between government expenditures on one side and the number of economically active persons in agriculture, agricultural GDP, agricultural production, crops and livestock production, arable and agricultural land area, and the value of capital stock on the other. In this case correlations and elasticities are calculated from two different points of view. The first is represented by calculations conducted in relation to the total value of public expenditures going only to agriculture. The second point of view is by calculations conducted

in relation to public expenditures supporting not only agricultural activities, but also supporting environmental protection activities. The aim is to identify the level of dependency and sensitivity existing between public expenditures and the development of the agricultural sector structure and performance (gross agricultural production value).

The instruments used to achieve these objectives are: basic indices, chain indices, geomean calculation, elasticity calculation, and regression and correlation analysis (Hindls; Hronová; Seger; Fischer, 2007). To calculate elasticity it was necessary to conduct a set of regressions, providing basic information about the mutual relationships between individual variables (the exogenous variable is government expenditures value) and individual endogenous variables such as the number of economically active persons in agriculture, total agricultural production, crops and livestock production, agricultural area, arable area, agricultural GDP, and agricultural capital stock value.

Logarithmic regression was found to be the most suitable form of regression for the analysis. This type of regression provides information about elasticities directly (Individual regressions were also tested to obtain information about the significance of the relationships analysed. The significant relationships are presented in the individual tables which follow. The main sources of data are the databases of UN FAOSTAT and the World Bank. The analysed time period is from 2001 to 2011 (Data for the previous years are not currently available). All data used in individual analyses (both correlation analysis and elasticity analysis) is conducted on constant prices.

Analysis and discussion

Agricultural sector development in New Member Countries between 1993 and 2011

During the twenty years following the early 1990s, the agricultural sector changed its position in the national economy significantly for each of the New Member Countries (NMCs) (Pieniadz; Wandel; Glauben, et al., 2010). The share of agriculture in the GDP of the whole group of countries declined from more than 7% to about 4% (EUROSTAT, 2013). The most significant reduction of the agrarian sector's share in relation to GDP was recorded in the Czech Republic, Poland, Bulgaria, Slovenia and Romania (decline of share by 40-50%), though apart from Hungary, all the analysed countries recorded a significant drop of the share of the agricultural sector in their national economy. The actual value of the agricultural sector's performance in the analysed countries barely changed, but production output was reduced by about 10-20%. A significant decline of agricultural sector performance was especially noticeable in Bulgaria, Slovakia, the Czech Republic and Latvia. On the other hand, the only countries which were able to stabilise agricultural production value were Poland, Hungary, Romania and Slovenia (for details see Table 1).

When analysing individual countries' agrarian sector performance development, it must be emphasised that despite the decline of the agricultural sector's importance within the national economy of all analysed countries, its production value (together with its effectiveness and productivity) significantly increased, especially in relation to the number of economically active persons in the agrarian sector and agricultural GDP (for details see Table 2).

Gross agricultural production generated by all NMCs decreased from ca 52bn. USD to ca 49bn. USD (in constant 2004–2006 prices) within the analysed time period. Positive growth of agricultural production was recorded only in the cases of Romania and Slovenia. Considering the agricultural GDP development in individual NMCs, it should be emphasised that in all analysed countries, their inter-annual growth rate was lower in comparison with the inter-annual growth rate of each country's economy, which is why the importance of the agricultural sector in relation to the total economy declined significantly in each of the analysed countries. Another specific feature of individual country's agricultural sector development is the significant reduction in the number of economically active persons in agriculture. The reduction in the number of economically active persons in agriculture, together with a significant restructuring of individual countries' agricultural sector, led to a significant growth of individual NMCs' agricultural sector effectiveness.

All analysed countries recorded a significant growth of generated agricultural production value per person economically active in agriculture within the analysed time period. Considering the agricultural production per capita development – the most impressive growth was recorded in Slovenia, Bulgaria, Lithuania and Romania (for details see Table 2). Apart from the Slovak Republic, all the NMCs recorded the growth of GDP per capita of between 1.2%–10.0% per year during the analysed time period. The Slovak Republic recorded in this case GDP growth by about 0.07% (all data is provided in 2004–2006 USD constant prices). However, in general it should be emphasised that almost all analysed countries recorded a significant improvement to their agricultural sectors effectiveness. The most progressive growth of gross production per capita was recorded in the case of crops and especially cereals production. The growth of gross production value per capita in relation to livestock production was significantly lower (in the case of Slovakia the growth of livestock production was even negative). It should also be mentioned that the global economic crisis did not affect individual countries' agricultural sector performance so much. In general only the inter-annual growth rate reduced its value in the majority of analysed countries. If we compare individual country's agricultural sector performance in the period before the crisis (1993–2007) with the later period (2008–2011), we can see that the total agricultural sector performance was still positive. The whole analysed period 1993–2011 afterwards represents one of the most important periods in individual NMCs agricultural sector development – individual countries finished the transformation of their agrarian sector and their agriculture is now more efficient and competitive.

The explanation for the general positive per capita production value development trend is that while the analysed

Table 1. Gross agricultural production value structure in individual NMCs (in constant 2004–2006 million US$)

Gross Production Value (constant 2004–2006 million US$) (USD)		1993	1999	2004	2007	2009	2011	Basic 2007/ 1993	Basic 2011/ 1993	Chain 1993–2007	Chain 1993–2011
Bulgaria	Agriculture	3 230	3 270	2 827	1 964	2 526	2 644	0.6080	0.8186	0.9651	0.9889
Bulgaria	Crops	1 403	1 532	1 802	973	1 530	1 686	0.6935	1.2017	0.9742	1.0103
Bulgaria	Livestock	1 827	1 738	1 025	992	996	958	0.5430	0.5244	0.9573	0.9648
Czech Republic	Agriculture	5 746	4 957	4 907	4 364	4 358	4 335	0.7595	0.7544	0.9805	0.9845
Czech Republic	Crops	2 244	2 165	2 274	1 913	1 978	2 020	0.8525	0.9002	0.9887	0.9942
Czech Republic	Livestock	3 502	2 792	2 633	2 451	2 381	2 316	0.6999	0.6613	0.9748	0.9773
Estonia	Agriculture	734	513	528	610	621	637	0.8311	0.8678	0.9869	0.9922
Estonia	Crops	280	183	171	237	223	227	0.8464	0.8107	0.9882	0.9884
Estonia	Livestock	455	330	356	373	397	410	0.8198	0.9011	0.9859	0.9942
Hungary	Agriculture	5 507	5 943	6 566	5 053	5 551	5 281	0.9176	0.9590	0.9939	0.9977
Hungary	Crops	2 417	3 050	3 766	2 562	3 093	3 003	1.0600	1.2424	1.0042	1.0121
Hungary	Livestock	3 090	2 893	2 800	2 491	2 458	2 278	0.8061	0.7372	0.9847	0.9832
Latvia	Agriculture	1 049	602	673	780	786	767	0.7436	0.7312	0.9791	0.9828
Latvia	Crops	428	268	322	378	372	345	0.8832	0.8061	0.9912	0.9881
Latvia	Livestock	621	335	351	403	414	422	0.6490	0.6795	0.9696	0.9788
Lithuania	Agriculture	1 839	1 511	1 585	1 618	1 712	1 654	0.8798	0.8994	0.9909	0.9941
Lithuania	Crops	874	784	767	716	887	823	0.8192	0.9416	0.9859	0.9967
Lithuania	Livestock	965	727	819	902	825	831	0.9347	0.8611	0.9952	0.9917
Poland	Agriculture	17 356	16 319	16 711	16 974	17 094	16 652	0.9780	0.9594	0.9984	0.9977
Poland	Crops	8 779	7 553	7 954	7 370	7 848	7 126	0.8395	0.8117	0.9876	0.9885
Poland	Livestock	8 577	8 766	8 756	9 604	9 245	9 526	1.1197	1.1106	1.0081	1.0058
Romania	Agriculture	13 531	13 066	15 592	11 407	13 148	14 419	0.8430	1.0656	0.9879	1.0035
Romania	Crops	8033	8 029	10 437	5 936	7 961	9 530	0.7390	1.1864	0.9786	1.0095
Romania	Livestock	5 498	5 037	5 155	5 472	5 187	4 889	0.9953	0.8892	0.9997	0.9935
Slovakia	Agriculture	2 387	2 023	1 947	1 655	1 675	1 660	0.6933	0.6954	0.9742	0.9800
Slovakia	Crops	1 127	997	1 040	817	910	909	0.7249	0.8066	0.9773	0.9881
Slovakia	Livestock	1 260	1 026	907	838	765	751	0.6651	0.5960	0.9713	0.9717
Slovenia	Agriculture	782	848	919	811	783	790	1.0371	1.0102	1.0026	1.0006
Slovenia	Crops	267	297	347	294	281	299	1.1011	1.1199	1.0069	1.0063
Slovenia	Livestock	515	551	573	517	502	491	1.0039	0.9534	1.0003	0.9974
NMCs	Agriculture	52 161	49 052	52 255	45 236	48 254	48 839	0.8672	0.9363	0.9899	0.9964
NMCs	Crops	25 852	24 858	28 880	21 196	25 083	25 968	0.8199	1.0045	0.9859	1.0002
NMCs	Livestock	26 310	24 195	23 375	24 043	23 170	22 872	0.9138	0.8693	0.9936	0.9923

Source: FAOSTAT, 2013

countries as a group of countries recorded a reduction of gross agricultural production value of about ca 7% in the analysed time period, the number of economically active persons in agriculture in these countries decreased from 9.4 million to less than 4.77 million (for details see Table 3). The reason for the agrarian sector productivity growth in relation to the number of economically active persons in agriculture is an increase of investments especially into machinery (in the period 1993–2011 alone, the value of investments into machinery and agricultural equipment in all NMCs increased by almost 20%, while the value of investments (Gross capital stock) into land development (14%), livestock (over 30%) and crops production (over 12%) significantly declined). The number of items of agricultural machine equipment in all the analysed countries increased in the analysed time period from 2.5 million to more than 7 million.

On the basis of the following data it can be said that analysed countries in general recorded a reduction of agricultural sector performance – in this case the lowest level of production in comparison with 1993 was in 2007 (production declined by about 13%) – the current level of production is about 93 – 94% of production level performance of the year 1993. The reason for the NMCs' agricultural sector performance is the reduction of livestock production level and non-food

Table 2. Gross agricultural production value per person economically active in agriculture development in individual NMCs in the period 1993–2011

Gross Production Value (constant 2004–2006 US$) (USD)/capita		1993	1999	2004	2007	2009	2011	Basic 2007/ 1993	Basic 2011/ 1993	Chain 1993–2011	Chain 1993–2011
Bulgaria	Agriculture	7 425	13 028	15 281	13 007	19 136	22 991	1.7517	3.0964	1.0409	1.0648
Bulgaria	Crops	3 225	6 104	9 741	6 444	11 591	14 661	1.9979	4.5456	1.0507	1.0878
Bulgaria	Livestock	4 200	6 924	5 541	6 570	7 545	8 330	1.5642	1.9834	1.0325	1.0388
Czech Republic	Agriculture	10 924	11 089	12 913	12 328	12 970	13 632	1.1285	1.2479	1.0087	1.0124
Czech Republic	Crops	4 266	4 843	5 984	5 404	5 887	6 352	1.2667	1.4890	1.0170	1.0224
Czech Republic	Livestock	6 658	6 246	6 929	6 924	7 086	7 283	1.0399	1.0939	1.0028	1.0050
Estonia	Agriculture	7 340	6 494	7 765	9 385	10 016	10 617	1.2786	1.4464	1.0177	1.0207
Estonia	Crops	2 800	2 316	2 515	3 646	3 597	3 783	1.3022	1.3512	1.0190	1.0169
Estonia	Livestock	4 550	4 177	5 235	5 738	6 403	6 833	1.2612	1.5018	1.0167	1.0229
Hungary	Agriculture	9 178	12 781	16 665	14 036	16 620	17 035	1.5293	1.8561	1.0308	1.0350
Hungary	Crops	4 028	6 559	9 558	7 117	9 260	9 687	1.7667	2.4047	1.0415	1.0500
Hungary	Livestock	5 150	6 222	7 107	6 919	7 359	7 348	1.3436	1.4269	1.0213	1.0199
Latvia	Agriculture	5 492	4 300	5 384	6 555	6 835	6 910	1.1935	1.2581	1.0127	1.0128
Latvia	Crops	2 241	1 914	2 576	3 176	3 235	3 108	1.4175	1.3870	1.0252	1.0183
Latvia	Livestock	3 251	2 393	2 808	3 387	3 600	3 802	1.0416	1.1693	1.0029	1.0087
Lithuania	Agriculture	6 089	6 806	9 491	11 315	13 069	13 669	1.8581	2.2448	1.0452	1.0459
Lithuania	Crops	2 894	3 532	4 593	5 007	6 771	6 802	1.7301	2.3502	1.0399	1.0486
Lithuania	Livestock	3 195	3 275	4 904	6 308	6 298	6 868	1.9740	2.1493	1.0498	1.0434
Poland	Agriculture	3 818	4 290	4 893	5 329	5 630	5 774	1.3959	1.5123	1.0241	1.0232
Poland	Crops	1 931	1 986	2 329	2 314	2 585	2 471	1.1982	1.2795	1.0130	1.0138
Poland	Livestock	1 887	2 304	2 564	3 015	3 045	3 303	1.5982	1.7507	1.0341	1.0316
Romania	Agriculture	5 603	7 148	12 464	10 979	14 291	17 563	1.9595	3.1346	1.0492	1.0655
Romania	Crops	3 326	4 392	8 343	5 713	8 653	11 608	1.7176	3.4897	1.0394	1.0719
Romania	Livestock	2 277	2 755	4 121	5 267	5 638	5 955	2.3134	2.6157	1.0617	1.0549
Slovakia	Agriculture	8 495	8 291	8 731	7 881	8 292	8 601	0.9278	1.0125	0.9947	1.0007
Slovakia	Crops	4 011	4 086	4 664	3 890	4 505	4 710	0.9700	1.1743	0.9978	1.0090
Slovakia	Livestock	4 484	4 205	4 067	3 990	3 787	3 891	0.8899	0.8678	0.9917	0.9922
Slovenia	Agriculture	22 343	40 381	70 692	90 111	97 875	131 667	4.0331	5.8930	1.1047	1.1036
Slovenia	Crops	7 629	14 143	26 692	32 667	35 125	49 833	4.2821	6.5325	1.1095	1.1099
Slovenia	Livestock	14 714	26 238	4 4077	57 444	62 750	81 833	3.9040	5.5615	1.1022	1.1000
NMCs	Agriculture	5 531	6 539	8 400	8 028	9 146	9 888	1.4515	1.7879	1.0270	1.0328
NMCs	Crops	2 741	3 314	4 642	3 761	4 754	5 258	1.3722	1.9181	1.0229	1.0368
NMCs	Livestock	2 790	3 226	3 757	4 267	4 392	4 631	1.5294	1.6600	1.0308	1.0286

Source: FAOSTAT, 2013

production level. On the other hand NMCs recorded a slight growth of crops production and especially a very significant growth of cereals production value. The basic development trends are very similar for all the analysed countries – the exceptions are Hungary, Poland, Romania and Slovenia. While the other countries recorded a significant reduction of agricultural production sector performance – these countries were able to stabilise their agricultural sector, and some of them were able even to get regional comparative advantage. This can be seen in the case of Poland in particular, which is becoming the central European agricultural tiger.

From the above tables it is apparent that the number of economically active persons in the agricultural sector declined significantly in all the analysed countries – whilst the value of agricultural production reduced only slightly in comparison with the reduction of number of people active in agriculture – the result is the significant growth of per capita productivity.

Agricultural sector development in the analysed countries was significantly affected by the reduction of agricultural, and especially arable, land area. The most significant reduction of land area was particularly noticeable in Estonia, Bulgaria, Latvia, Poland, Slovakia and Slovenia. Considering the arable land area, the most significant reduction was recorded in the cases of Estonia, Latvia, Lithuania and Poland.

Table 3 – Share of economically active persons in agriculture in total economically active population in selected countries in the period 1993–2011

People working in agriculture in 1000s	1993	2007	2011
Bulgaria	5.09%	3.98%	2.45%
Czech Republic	5.10%	3.43%	2.92%
Estonia	6.68%	4.84%	4.33%
Hungary	5.80%	3.58%	3.01%
Latvia	7.43%	5.21%	4.83%
Lithuania	8.22%	4.23%	3.52%
Poland	11.86%	8.34%	7.33%
Romania	10.52%	4.80%	3.63%
Slovakia	5.27%	3.87%	3.43%
Slovenia	1.79%	0.45%	0.29%
NMCs	8.94%	5.51%	4.68%

Source: FAOSTAT, 2013

Government expenditures and agricultural production in new EU member countries in the period 2001–2011

Agricultural sector and production performance in individual EU member countries are heavily influenced by government activities (Olper, 1998; Grant, 2012). Government expenditures in individual NMCs significantly increased: in the period 2001 – 2011 their nominal value increased from 4.7bn. USD to ca 11.5bn. USD in the case of expenditures directly connected with agriculture, and from 3.5bn. USD to ca 11.4bn. USD in the case of expenditures connected with environmental protection activities (a part of those sources is also spent for agricultural activities – because of agricultural activities' significant impact on living environment (Westhoek; Overmars; van Zeijts, 2013)). In general, the total nominal value of government expenditures for agricultural and environmental purposes in all NMCs increased during the monitored time period from ca 8.3bn. USD to ca 23bn. USD. The inter-annual growth rate of NMCs' government expenditures into agriculture reached 9.3% in the monitored time period, and in the case of expenditures for environmental protection the inter-annual growth rate reached 12.3% (for details about government expenditures value development see Tables 5 and 6).

When considering the real value development – the growth of government expenditures was not so high, but still impressive – see Tables 7 and 8 – data is processed in constant 2005 USD prices. According to this data in the period 2001 – 2011 the government expenditures for agriculture increased from 4.7bn. USD to 9.5bn. USD (the peak was more than 12bn. USD, in 2008) – the average inter-annual value growth rate reached 7.3%. Government expenditures for environmental protection increased from ca 3.9bn. USD to 9.3bn. USD – the average inter-annual value of growth rate reached 9.2%.

Tables 5 and 7 provide basic information about differences in government expenditures structure and value development in individual NMCs – both in current prices and in constant prices. When considering individual countries' government expenditures, huge differences exist among individual countries in the level of their agricultural sector subsidies. The most impressive growth of agricultural sector support was recorded in the cases of: Romania (5.8x), the Czech Republic (4.4x), Bulgaria (3.6x), Slovakia (3.1x) and Lithuania (2.8x). In general all NMCs approximately doubled the value of government expenditures related to agricultural sector or environment protection. The only exception among all the countries is Hungary. During the analysed time period, Hungary reduced the value of government expenditures by about 28% – the reason being the long term Hungarian economy and state budget crisis (Prochniak, 2011). Another very important finding related to individual NMCs' government expenditures related to agricultural activities is that they play only minor roles in individual countries total government expenditures. Comparing individual NMCs – it is possible to see that the value of expenditures related to agriculture represents ca 2.5 – 6.6% of total government expenditures value. It means that despite the value of government agricultural expenditures growing in individual countries, agriculture still plays only a minor role in individual countries' economy.

Table 4 – Area of agricultural and arable land development in NMCs in the period 1993–2011

Area (1000 Ha)	item	1993	1997	2001	2007	2011	Basic index
Bulgaria	Agricultural area	6 121	6 203	5 498	5 116	5 088	0.831237
Czech Republic	Agricultural area	4 282	4 280	4 278	4 249	4 229	0.987623
Estonia	Agricultural area	1 320	1 023	890	914	945	0.715909
Hungary	Agricultural area	6 130	6 195	5 865	5 807	5 337	0.870636
Latvia	Agricultural area	2 514	1 772	1 581	1 839	1 816	0.722355
Lithuania	Agricultural area	3333	3 417	2 896	26 95.9	2 805.9	0.841854
Poland	Agricultural area	18 715	18 457	17 788	16 177	14 779	0.789687
Romania	Agricultural area	14 793	14 798	14 798	13 630	13 982	0.945177
Slovakia	Agricultural area	2 446	2 445	2 255	1 930	1 929.7	0.788921
Slovenia	Agricultural area	560	495	510	498	458.5	0.81875
NMCs + (Total)	Agricultural area	60 214	59 085	56 359	528 55.9	51 370.1	0.853126

Source: FAOSTAT, 2013

Table 5 – Government expenditures value development in the period 2001 – 2011 in individual NMCs (in current USD prices value)

	Value US$ (USD million)	2001	2003	2005	2007	2009	2011	BASIC	CHAIN
Bulgaria	Agricultural expenditures	97	214	293	365	294	673	6.920	1.213
Bulgaria	Environmental expenditures	178	228	347	100	592	544	3.053	1.118
Czech Republic	Agricultural expenditures	591	956	1649	2351	2967	2671	4.522	1.163
Czech Republic	Environmental expenditures	578	1017	1563	1859	2582	3243	5.607	1.188
Estonia	Agricultural expenditures	60	85	80	177	256	177	2.961	1.115
Estonia	Environmental expenditures	46	72	128	188	206	224	4.905	1.172
Hungary	Agricultural expenditures	1574	1406	1416	1631	1046	726	0.461	0.925
Hungary	Environmental expenditures	401	568	669	983	828	1008	2.515	1.097
Latvia	Agricultural expenditures	129	191	518	595	595	566	4.388	1.159
Latvia	Environmental expenditures	104	133	202	277	327	185	1.785	1.060
Lithuania	Agricultural expenditures	151	303	287	523	501	383	2.534	1.097
Lithuania	Environmental expenditures	8	31	156	345	436	324	39.076	1.443
Poland	Agricultural expenditures	1366	1661	2824	3452	3523	3819	2.795	1.108
Poland	Environmental expenditures	1757	1368	1868	2449	3196	2884	1.641	1.051
Romania	Agricultural expenditures	78	242	603	935	783	652	8.350	1.236
Romania	Environmental expenditures	108	118	316	712	945	1712	15.782	1.318
Slovakia	Agricultural expenditures	493	493	845	949	1488	1318	2.672	1.103
Slovakia	Environmental expenditures	266	342	433	579	727	906	3.398	1.130
Slovenia	Agricultural expenditures	203	259	407	514	635	510	2.507	1.096
Slovenia	Environmental expenditures	124	221	235	298	410	348	2.809	1.109

Source: FAOSTAT, 2013

Another very important finding related to government expenditures is their importance for individual economically active persons in agriculture. Tables 9 and 10 provide information about the basic development trends in the case of expenditures value per person economically active in the agricultural sector. Comparing data in both these tables with data in Tables 7 and 8 we can see that inter-annual growth rate of expenditures value per capita was significantly higher in comparison with the total value growth rate. While the total value of agricultural and environmental government expenditures increased in NMCs by about 7.3%/year and 9.2%/year respectively expressed in per capita value, agricultural and environmental expenditures increased their values by 11.1%/year and 13.2%/year respectively. While in 2001 government expenditures per economically active person in agriculture in NMCs was about 1200 USD, in 2011 it was about 3800 USD (in constant 2005 USD prices). In this case it should be emphasised that environmental protection expenditures are growing faster than agricultural expenditures – both in per capita terms and in total value expression. It means that environmental protection activities are receiving a higher priority in comparison with agricultural production activities. This is fully in compliance with European Union policy – which is nowadays more focused on sustainable development and supporting the multifunctional role of agriculture (Lapka, Cudlinova, Rikoon, 2011).

When considering individual countries' government expenditures both for agricultural and environmental protection activities, individual countries are spending the following amounts of money: Poland (almost 5.7bn. USD), the Czech Republic (5.6bn. USD), Slovakia (2.1bn. USD), Hungary (1.4bn. USD), Bulgarian (850 mil. USD), Slovenia (750 mil. USD), Lithuania (536 mil. USD), Latvia (379 mil. USD) and Estonia (244 mil. USD). The highest level of inter-annual growth rate in the analysed time period was recorded in Romania, the Czech Republic, Bulgaria, Slovakia and Lithuania (all these countries recorded average inter-annual value growth rates higher than 10%).

A completely different order of countries can be seen if we compare individual countries according to government

Table 6 – Government expenditures value development in the period 2001 – 2011 in all NMCs (in current USD prices value)

ALL NMCs	2001	2003	2005	2007	2008	2009	2010	2011	Basic	Chain
Total Outlays	194 035	251 037	341 866	475 059	588 004	521 672	535 473	571 633	2.946	1.114
Agricultural expenditures	4 743	5 809	8 923	11 492	13 629	1 2087	10 692	11 494	2.423	1.093
Environmental expenditures	3 571	4 099	5 918	7 790	10 465	10 250	10 298	11 377	3.186	1.123

Source: FAOSTAT, 2013

Table 7 – Government expenditures development in the period 2001 – 2011 in individual NMCs

(USD million)	(in constant 2005 USD prices value)	2001	2003	2005	2007	2009	2011	BASIC	CHAIN
Bulgaria	Agricultural expenditures	116	239	293	312	222	472	4.056	1.150
Bulgaria	Environmental expenditures	118	243	298	86	449	382	3.229	1.124
Czech Republic	Agricultural expenditures	634	991	1649	2264	2740	2520	3.974	1.148
Czech Republic	Environmental expenditures	621	1054	1563	1789	2385	3061	4.928	1.173
Estonia	Agricultural expenditures	54	94	80	145	203	135	2.494	1.096
Estonia	Environmental expenditures	55	80	128	155	163	109	1.975	1.070
Hungary	Agricultural expenditures	1409	1516	1416	1495	879	572	0.406	0.914
Hungary	Environmental expenditures	494	613	669	900	696	794	1.607	1.049
Latvia	Agricultural expenditures	124	225	518	450	472	259	2.090	1.076
Latvia	Environmental expenditures	58	105	241	209	220	121	2.090	1.076
Lithuania	Agricultural expenditures	164	331	287	452	410	290	1.768	1.059
Lithuania	Environmental expenditures	27	34	156	299	357	246	9.274	1.249
Poland	Agricultural expenditures	1499	1774	2824	3272	3123	3236	2.159	1.080
Poland	Environmental expenditures	1927	1462	1868	2322	2833	2444	1.268	1.024
Romania	Agricultural expenditures	98	312	603	747	519	377	3.833	1.144
Romania	Environmental expenditures	137	152	316	569	627	991	7.220	1.219
Slovakia	Agricultural expenditures	391	535	845	912	1406	1220	3.118	1.120
Slovakia	Environmental expenditures	271	370	433	556	688	838	3.092	1.120
Slovenia	Agricultural expenditures	243	272	407	483	557	448	1.849	1.063
Slovenia	Environmental expenditures	148	232	235	280	360	306	2.072	1.076

Source: FAOSTAT, 2013

Table 8 – Government expenditures value development in the period 2001 – 2011 in all NMCs (in constant 2005 USD prices value)

ALL NMCs (constant 2005) mil. USD	2001	2003	2005	2007	2009	2010	2011	Basic	Chain
Total Outlays	213 646	272 966	341 866	434 270	442 754	449 605	466 259	2.182	1.081
Agricultural expenditures	4 733	6 290	8 923	10 533	10 532	9 215	9 531	2.014	1.073
Environmental expenditures	3 856	4 345	5 909	7 166	8 775	8 616	9 290	2.409	1.092

Source: FAOSTAT, 2013

expenditures for agricultural and environmental activities per person economically active in agriculture: the Czech Republic (17.55 ths./cap), Slovakia (10.66 ths./cap), Bulgaria (7.42 ths./cap), Lithuania (4.43 ths./cap), Hungary (4.41 ths./cap), Estonia (4.07 ths./cap), Latvia (3.42 ths./cap), Poland (1.97 ths./cap) and Romania (1.67 ths./cap). The most progressive inter-annual growth rate in the analysed time period was recorded in Romania, Bulgaria, the Czech Republic, Slovenia, Lithuania and Slovakia (all these countries recorded average inter-annual value growth rates higher than 10%).

On the basis of the above, it can be said that apart from Hungary, all countries recorded significant growth of government expenditures related to agriculture and those expenditures significantly changed structure and performance of agricultural sector in individual countries. The process of restructuring the agricultural sector in individual countries led to a significant growth of per capita (per person economically active in the agricultural sector) government expenditures. The growth of per capita expenditures was much higher in comparison with the growth of total government expenditures for agricultural and environmental activities. The positive feature of this development trend is that agricultural subsidies are becoming more concentrated in relation to individual economically active persons in agriculture, therefore the effectiveness of government support devoted to agriculture is becoming higher; the following analysis proves the existence of the high level of correlation and elasticity between individual countries agricultural sector performance and government expenditures.

The analysis of correlation and elasticity/sensitivity of individual NMCs' agricultural sector on changes in government expenditures related to agricultural and environmental activities

Correlation analysis

Significant correlation exists between agricultural government expenditures and selected features of agricultural sector development in individual NMCs. The analysis of correlation proved (Table 11) a significant relationship between expenditures and the number of economically active persons in agriculture development, agricultural area development, agricultural GDP development, and agricultural capital stock development. Positive correlation is in relation to agricultural GDP and capital stock. Negative correlation exists in relation

Table 9 – Government expenditures value/person economically active in agriculture development in the period 2001 – 2011 in individual NMCs (in constant 2005 USD prices value)

Value in constant 2005 US$ prices/cap	2001	2004	2007	2009	2011	BASIC	CHAIN	
Bulgaria	Agricultural expenditures	510	1 408	2 067	1 685	4 105	8.042	1.232
Bulgaria	Environmental expenditures	518	1 430	568	3 398	3 318	6.402	1.204
Czech Republic	Agricultural expenditures	1 521	3 020	6 394	8 156	7 926	5.212	1.179
Czech Republic	Environmental expenditures	1 489	3 445	5 054	7 097	9 625	6.462	1.205
Estonia	Agricultural expenditures	733	1 420	2 237	3 269	2 255	3.076	1.119
Estonia	Environmental expenditures	744	1 317	2 386	2 628	1 813	2.436	1.093
Hungary	Agricultural expenditures	3 246	3 984	4 153	2 633	1 844	0.568	0.945
Hungary	Environmental expenditures	1 138	1 728	2 501	2 083	2 561	2.250	1.084
Latvia	Agricultural expenditures	953	2 632	3 781	4 108	2 333	2.448	1.094
Latvia	Environmental expenditures	444	1 225	1 760	1 912	1 086	2.448	1.094
Lithuania	Agricultural expenditures	851	1 983	3 163	3 131	2 400	2.819	1.109
Lithuania	Environmental expenditures	137	633	2 088	2 723	2 032	14.792	1.309
Poland	Agricultural expenditures	406	529	1 027	1 029	1 122	2.763	1.107
Poland	Environmental expenditures	522	496	729	933	847	1.622	1.050
Romania	Agricultural expenditures	60	462	719	564	460	7.614	1.225
Romania	Environmental expenditures	84	84	548	681	1 207	14.344	1.305
Slovakia	Agricultural expenditures	1 644	2 877	4 343	6 962	6 321	3.844	1.144
Slovakia	Environmental expenditures	1 139	1 803	2 648	3 404	4 342	3.813	1.143
Slovenia	Agricultural expenditures	14 267	30 438	53 707	69 566	74 748	5.239	1.180
Slovenia	Environmental expenditures	8 687	19 610	31 134	44 958	50 998	5.871	1.194

Source: FAOSTAT, 2013

Table 10 – Government expenditures value/person economically active in agriculture development in the period 2001 – 2011 in NMCs (in constant 2005 USD prices value)

ALL NMCs (constant 2005) – Subsidy/cap	2001	2004	2007	2009	2011	BASIC	CHAIN
Agricultural expenditures	671	1150	1869	1996	1930	2.875	1.111
Environmental expenditures	547	813	1272	1663	1881	3.440	1.132
Total agricultural and environment expenditures	1218	1964	3141	3659	3811	3.129	1.121

Source: FAOSTAT, 2013

to the number of economically active persons in agriculture, agricultural and arable area, and also in relation to agricultural production – both crops production and livestock production. These results are also confirmed by Table 12, which provides the results of correlation analysis between government expenditures including agricultural and environmental expenditures on one side and selected agricultural sector's characteristics on the other. The results of the correlation analysis confirmed the existence of strong relationships between government expenditures and number of economically active persons in the agricultural sector. Government expenditures, together with the previously-mentioned investments, lead to a reduction in the number of economically active persons in agriculture and an increase in the effectiveness of individual countries agriculture. Government expenditures are also very important factors influencing production in individual countries, though not in NMCs as a group of countries.

In this case it should be mentioned that in some countries government expenditures stimulate the growth of production values, whilst in other countries they are not. Reduction of production usually means that part of production is transformed into bio-production. In other areas, usually Less Favoured Areas (LFAs), production is subdued, meaning that a higher correlation of public expenditures exists in relation to livestock production in comparison with crops production. Those NMCs where noticeable stimulation occurs are Estonia, Latvia, Lithuania, Poland and Romania, with the specific case of Hungary, where government support in general is stimulating the level of production – though it is the only one where the level of support was significantly reduced and therefore a strong impact on level of production value is visible. The NMCs where little or no stimulation is apparent are the Czech Republic, Slovakia, Bulgarian and Slovenia.

If we analyse individual countries differences in relation to correlation between government expenditures and agricultural sector characteristics, we can see that in the case of the number of economically active persons in agriculture development, a strong correlation exists in the case of all analysed

Table 11 – Correlation between government agricultural expenditures value development and selected variables representing agricultural sector development in individual analysed countries (NMCs) in the period 2001–2011

Correlation agricultural subsidy	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	–0.528	–0.380	–0.094	–0.516	–0.450	–0.474	–0.302	–0.890
Czech Republic	–0.952	–0.504	–0.088	–0.895	–0.949	–0.941	0.077	–0.974
Estonia	–0.721	0.713	0.566	0.697	0.500	–0.095	–0.079	–0.598
Hungary	0.873	0.468	0.060	0.805	0.857	0.837	–0.337	0.354
Latvia	–0.479	0.737	0.846	0.508	0.761	0.748	0.440	0.827
Lithuania	–0.630	0.579	0.098	0.834	–0.654	0.291	0.389	0.758
Poland	–0.813	0.439	–0.158	0.703	–0.586	–0.520	0.593	0.894
Romania	–0.535	0.070	–0.090	0.655	–0.823	–0.898	0.771	–0.322
Slovakia	–0.953	–0.654	–0.243	–0.877	–0.775	–0.700	–0.248	–0.870
Slovenia	–0.820	–0.638	–0.058	–0.742	–0.603	0.562	0.774	–0.978
MNCs	–0.844	–0.099	–0.087	–0.012	–0.776	–0.670	0.833	0.631

Source: own calculations, 2013

countries except for Latvia (the correlation value is usually negative, meaning that the growth of support is connected with a reduction in the number of economically active persons in agriculture in analysed countries), in the case of agricultural production the correlation higher than 0.5 appeared in Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Slovakia and Slovenia (In this case much higher correlations exists in relation to livestock production – correlation higher than 0.5 appeared in the case of all countries except for Romania). Crops production is much more independent in relation to government expenditures – the higher value of correlation appeared only in Estonia and Latvia – however the correlation analysis proved the high level of correlation between government expenditures and crops production in the case of NMCs as a group of countries (In relation to crops and livestock production – it should be mentioned that correlation value is usually positive, meaning that current government expenditures are encouraging agricultural production value growth in individual countries.). The area of agricultural and arable land is also influenced by government expenditures – the high value of correlation did not only appear in Estonia, Lithuania and Slovenia (correlation value is usually negative – ie: the growth of subsidies does not encourage farmers to increase the area of agricultural land). Nowadays the area of agricultural land and especially arable land is declining, but government policy is not the only factor responsible for this development, though a significant portion of government expenditures is appropriated for programmes reducing agricultural production and changing the status of agricultural land, and programmes preventing the sub-division of the land are especially supported (Renwick, Jansson, Verburg et al., 2013) Agricultural sector GDP development is also correlated with government expenditures development in some countries – especially in Poland, Romania and Slovenia. The high level of government expenditures correlation was discovered in relation to capital stock value development in individual analysed countries apart from Hungary and Romania – however the value of correlation is negative.

Elasticity analysis

The above correlation analyses are followed by elasticity analyses. The individual elasticity values are calculated on the basis of logarithmic regression analysis. Again we can see a significant relationship existing between NMCs' government expenditures and especially the number of economically active persons in agriculture, agricultural production (especially livestock production), area of arable land, agricultural GDP and capital stock. However relationships are positive in many cases, usually the value of elasticity is very low, implying that a change of government expenditures value by one percent causes the change of any selected variable by less than one percent. In relation to individual variables it can be said that for the number of economically active persons in agriculture, elasticity is very low in all analysed countries except for Slovenia and Bulgaria (The explanation for this is that all countries had already significantly reduced the number of economically active persons in agriculture during the period 1990–2000, during their economies restructuring process.). Agricultural production's (both crops and livestock production) elasticity calculated in relation to government expenditures is also very low in all analysed countries (This can be explained as, currently individual expenditures programmes, which are the result of EU policies, are not encouraging the growth of production, and are more focused on restructuring the agricultural production and agricultural activities (Viaggi, Gomez y Paloma, Mishra, et al., 2013). They are more focused to support the multifunctional role of agriculture policy than to support the production growth. Also, the current government expenditures in individual EU countries are applied in relation to the EU's WTO obligations (Swinbank, 1999), meaning that subsidies should not primarily stimulate production.). The area of agricultural and arable land also embodies low elasticity – explained by the effort of the EU to protect agricultural land – despite activities trying to keep land in piece or to keep land out of the production process. It is quite interesting to

Table 12 – Correlation between government agricultural and environmental expenditures value development and selected variables representing agricultural sector development in individual analysed countries (NMCs) in the period 2001–2011

Correlation agricultural and environmental subsidies	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	–0.7931	–0.0866	0.3515	–0.6296	–0.7371	–0.6172	–0.6015	–0.7844
Czech Republic	–0.9878	–0.5175	–0.0818	–0.9313	–0.9865	–0.9832	0.1088	–0.9928
Estonia	–0.6829	0.6504	0.5641	0.5947	0.5201	–0.1521	–0.2727	–0.7919
Hungary	0.6738	0.4592	0.1621	0.6215	0.8407	0.8431	–0.3060	–0.2996
Latvia	–0.4790	0.7370	0.8459	0.5084	0.7611	0.7484	0.4398	0.8266
Lithuania	–0.8673	0.5062	0.0208	0.8216	–0.3764	0.6515	0.6591	0.8700
Poland	–0.8409	0.5323	–0.0356	0.6639	–0.5661	–0.5135	0.5139	0.8961
Romania	–0.9114	–0.0387	–0.0941	0.2385	–0.9189	–0.8468	0.6941	–0.2757
Slovakia	–0.9715	–0.6722	–0.2536	–0.8970	–0.7668	–0.6888	–0.2798	–0.8793
Slovenia	–0.8694	–0.6743	–0.0859	–0.7653	–0.6727	0.4659	0.8525	–0.9486
MNCs	–0.928	–0.080	–0.031	–0.194	–0.846	–0.727	0.788	0.648

Source: own calculations, 2013

Table 13 – The elasticity of selected variables representing agricultural sector in individual analysed countries (NMCs) in relation to one percent change of government agricultural expenditures value development in the analysed time period

Elasticity in relation to Agricultural subsidies	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	–0.2781	–0.1386	–0.0709	–0.2220	–0.0349	–0.0567	–0.0831	–0.3308
Czech Republic	–0.1584	–0.0575	–0.0175	–0.0877	–0.0068	–0.0132	0.0285	–0.0574
Estonia	–0.1438	0.1353	0.1573	0.1247	0.1236	–0.0337	–0.0049	–0.2572
Hungary	0.2259	0.1134	0.0407	0.1899	0.0774	0.0387	–0.1467	0.1196
Latvia	–0.0602	0.1356	0.1627	0.1112	0.1061	0.1483	0.1046	0.0670
Lithuania	–0.3200	0.1551	0.0352	0.2628	–0.0903	0.1339	0.1175	0.2050
Poland	–0.1564	0.0294	–0.0273	0.0759	–0.0821	–0.0851	0.0854	0.0699
Romania	–0.1857	0.0206	–0.0005	0.0482	–0.0380	–0.0351	0.2079	–0.0021
Slovakia	–0.1489	–0.1044	–0.0576	–0.1551	–0.1328	–0.0247	–0.0355	–0.0937
Slovenia	–0.8193	–0.1127	0.0064	–0.1704	–0.0663	0.0364	0.5557	–0.0692
MNCs	–0.31439	–0.01038	–0.02017	–0.00079	–0.07317	–0.04977	0.255588	0.018501

Source: own calculations, 2013

note the low elasticity of agricultural GDP and capital stock value in relation to government expenditures in all analysed countries. This means that government expenditures are not stimulating farmers to increase their investments, and that the majority of incomes from public sources are transformed into the usual cash-flow – these sources are used to cover production costs and probably they are also transformed into farmers' final profit. This is very interesting especially because of the value of government expenditures in individual NMCs related to agricultural sector activities according to the FAO represents almost 40% of the final agricultural production value.

The following Tables 15 and 16 summarise the impact of government expenditures on selected agricultural sector's characteristics in the analysed group of countries. From the results it is evident that a high correlation exists between public support and agriculture in relation to the number of economically active persons in agriculture, agricultural and arable area, and agricultural sector GDP, and gross capital stock in agriculture. Total agricultural production at the general level is not really influenced by government support. The higher level of elasticity existing between the provided public sources and the agricultural sector is apparent in relation to the number of economically active persons in agriculture and agricultural GDP. The conducted functions reached the high determination index values especially in relation to the number of economically active persons in agriculture development, agricultural area development, and agricultural GDP development.

Very interesting results are provided by the following Tables 17 and 18. Both tables provide information about mutual correlation and elasticity existing between agricultural (Table

Table 14 – The elasticity of selected variables representing agricultural sector in individual analysed countries (NMCs) in relation to one percent change of government agricultural and environmental expenditures value development in the analysed time period

Elasticity in relation to Agri+Envi subsidies	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	–0.4581	–0.0407	0.141159	–0.27261	–0.0577	–0.0693	–0.18401	–0.31485
Czech Republic	–0.1682	–0.0600	–0.01704	–0.09283	–0.0072	–0.01403	0.032336	–0.06167
Estonia	–0.1356	0.1267	0.161633	0.109473	0.1334	–0.04411	–0.03452	–0.3095
Hungary	0.3163	0.1913	0.112057	0.268219	0.1272	0.064736	–0.24603	–0.10529
Latvia	–0.0602	0.1356	0.162745	0.111193	0.1061	0.148306	0.104648	0.066956
Lithuania	–0.2757	0.0864	–0.00353	0.168853	–0.0359	0.164056	0.11221	0.166176
Poland	–0.1998	0.0437	–0.00976	0.087852	–0.0959	–0.10178	0.091483	0.098158
Romania	–0.3091	0.0076	–0.00835	0.027158	–0.0464	–0.038	0.219782	–0.00248
Slovakia	–0.1646	–0.1175	–0.06676	–0.17278	–0.1424	–0.02646	–0.04108	–0.10617
Slovenia	–0.9592	–0.1289	–0.00407	–0.19	–0.0793	0.034212	0.668259	–0.07782
MNCs	–0.3303	–0.00853	–0.00767	–0.00947	–0.07515	–0.05065	0.23542	0.02102

Source: own calculations, 2013

Table 15 – The selected results analysing logarithmical regression between agricultural government expenditures and selected variables in the period 2001 – 2011 (in constant USD prices) in NMCs (as a group of countries)

Agriculture government expenditures	Elasticity/b	Abs unit	R2	Correlation	Significance
Economically active persons in agriculture	–0.314392	11.50695	0.71575	–0.84413	Yes
Agricultural production	–0.010381	10.87075	0.007307	–0.09909	No
Crops production	–0.020167	10.287	0.005936	–0.08736	No
Livestock production	–0.000789	10.06757	0.000177	–0.01166	No
Agricultural area	–0.073168	11.54292	0.674622	–0.77623	Yes
Arable land	–0.049774	10.97967	0.535312	–0.66998	Yes
Agriculture, GDP	0.2555876	7.790406	0.758611	0.833399	Yes
Gross Capital Stock	0.0185006	11.88366	0.303383	0.631466	No

Source: own calculations, 2013

Table 16 – The selected results analysing logarithmical regression between agricultural and environment protection government expenditures and selected variables in the period 2001 – 2011 (in constant USD prices) in NMCs (as a group of countries)

Total agricultural and environment protection government expenditures	Elasticity/b	Abs unit	R2	Correlation	Significance
Economically active persons in agriculture	–0.330303	11.83825	0.85027	–0.92771	Yes
Agricultural production	–0.008531	10.85894	0.005311	–0.07968	No
Crops production	–0.007675	10.1788	0.000925	–0.03071	No
Livestock production	–0.009473	10.1512	0.027485	–0.19434	No
Agricultural area	–0.075148	11.60351	0.765889	–0.8457	Yes
Arable land	–0.050654	11.01642	0.596675	–0.72739	Yes
Agriculture, GDP	0.2354203	7.838181	0.692692	0.787853	Yes
Gross Capital Stock	0.02102	11.85003	0.331281	0.648239	No

Source: own calculations, 2013

17) and environmental (Table 18) government expenditures per capita (person economically active in agriculture) on one side and agricultural production per capita (person economically active in agriculture) – both in relation to crops production and livestock production on the other. On the basis of this data we can see that while at the general level the relationship between government expenditures and agricultural production was not proved, at the level of individual economically active persons in agriculture the relationship exists. Also it is possible to see that government expenditures are probably very important stimuli influencing individual farmer's decisions related to the value of agricultural production – especially in relation to livestock production. Again it was confirmed that agricultural expenditures together with environment expendi-

Table 17 – The selected results analysing relationship between agricultural government expenditures and agricultural production in the period 2001 – 2011 (in constant USD prices) in individual NMCs

Agricultural government expenditures/cap	Agricultural production/person economically active in agriculture active in agriculture		Crops production/person economically active in agriculture active in agriculture		Livestock production/person economically active in agriculture active in agriculture	
	Correlation	Elasticity	Correlation	Elasticity	Correlation	Elasticity
Bulgaria	0.59608	0.22978	0.57662	0.30096	0.54793	0.13707
Czech Republic	0.75660	0.08845	0.65159	0.12337	0.90652	0.06201
Estonia	0.79792	0.25944	0.75537	0.27544	0.76636	0.25182
Hungary	–0.49905	–0.12656	–0.44774	–0.20603	–0.36182	–0.04380
Latvia	0.69190	0.19842	0.81651	0.21893	0.54360	0.17991
Lithuania	0.81474	0.42008	0.62838	0.33311	0.87412	0.49972
Poland	0.82358	0.16986	0.61763	0.12026	0.84630	0.21063
Romania	0.53180	0.20699	0.39370	0.19308	0.73485	0.22445
Slovakia	0.26654	0.03782	0.35060	0.07772	–0.21694	–0.00553
Slovenia	0.93039	0.44129	0.90306	0.50567	0.93515	0.40956
MNCs	0.84637	0.24787	0.69897	0.24472	0.92924	0.25089

Source: own calculations, 2013

Table 18 – The selected results analysing relationship between agricultural and environment protection government expenditures and agricultural production in the period 2001 – 2011 (in constant USD prices) in individual NMCs

Agricultural and environment protection expenditures/cap	Agricultural production/person economically active in agriculture active in agriculture		Crops production/person economically active in agriculture active in agriculture		Livestock production/person economically active in agriculture active in agriculture	
	Correlation	Elasticity	Correlation	Elasticity	Correlation	Elasticity
Bulgaria	0.88360	0.32508	0.88216	0.43708	0.73973	0.17905
Czech Republic	0.78298	0.09317	0.67847	0.13010	0.92921	0.06501
Estonia	0.74357	0.25012	0.73284	0.27617	0.69784	0.23731
Hungary	–0.07369	–0.03835	–0.04111	–0.05325	–0.17615	–0.03716
Latvia	0.69190	0.19842	0.81651	0.21893	0.54360	0.17991
Lithuania	0.87049	0.29624	0.67455	0.23102	0.93073	0.35651
Poland	0.87360	0.21378	0.71038	0.16609	0.86079	0.25324
Romania	0.86305	0.25167	0.75079	0.24299	0.96162	0.26155
Slovakia	0.26926	0.03951	0.35639	0.08216	–0.22451	–0.00696
Slovenia	0.95183	0.46524	0.92358	0.52940	0.95690	0.43345
MNCs	0.90733	0.24944	0.77324	0.25211	0.96297	0.24670

Source: own calculations, 2013

tures are correlated with agricultural production more than it is only in the case of pure agricultural government expenditures. In general, total NMCs' agricultural production is not directly driven by public money, but individual farmers' production is driven by public money support, though because the number of economically active persons in agriculture is constantly decreasing, the total growth of production is not fully compensated for by the growth of individual farmer's production. If we take into consideration the reduction of the number of economically active persons in agriculture during the last two decades – we can see that NMCs' agricultural production performance recorded a much lower level of reduction. Especially after the EU accession, individual NMCs were able to stabilise their agricultural sector and its production performance, and some of them even strengthened their position not only within the European Union market, but also within the global market. In general, a high level of correlation between production/cap and government expenditures/cap was recorded in Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania and Slovenia. The only exceptions in this case are Hungary and Slovakia. Similar results also appeared in relation to elasticity analysis.

The results of the elasticity analysis conducted both for agricultural government expenditures and agricultural and environmental government expenditures (Tables 13, 14, 15 and 16) provide similar results. From the Tables 14 and 16 it is even visible that agricultural sectors and their characteristics in individual analysed countries are more sensitive in relation to agricultural and environmental expenditures calculated together. However in this case it should be emphasised that

agricultural production – both crops production and livestock production – is much more sensitive in relation to government expenditures, if the correlation and elasticity analyses are conducted at the per capita level. This means that government expenditures are not so important for the agricultural production at the level of whole agricultural system, but they are very important for individual farmers making their business in agriculture. Finally it is possible to say that because of the growth of individual farmer's performance, stimulated by government expenditures, we can record stabilisation of agricultural production in the analysed regions, and in some countries (e.g. Poland) we can even see significant growth of production value performance.

Conclusion

The agricultural sector has significantly changed its structure and position within the national economy of individual new EU member states during the last two decades. During the analysed time period, individual selected countries have reduced their agricultural sector, and also reduced the value of agricultural sector performance. Despite a significant reduction of the agricultural sector in many analysed countries, it can be said that each country became more efficient in relation to the agricultural sector performance. Individual countries' agricultural sector size (area of agricultural land, number of economically active people, and the share in national GDP etc.) and performance (output) development are closely related to government expenditures going to agriculture.

Both the agricultural sector structure and also the agricultural sector production performance are closely related to available government subsidies devoted to both agricultural and environmental programs. Government subsidies are more related to the development of agricultural sector's size (the number of people working in agriculture, agricultural area, the number of animals etc.) and structure (plant vs. animal production). If we take into consideration the main objective of this paper (being to identify the relationship between government expenditures for agricultural purposes on one side and agrarian sector's development and performance in individual analysed countries on the other), we can say the following:

With respect to government expenditures, the total nominal value of expenditures for agricultural and environmental purposes in all NMCs increased during the monitored time period from ca 8.3bn. USD to ca 23bn. USD. In the same period, inter-annual growth rate of NMCs' government expenditures into agriculture reached 9.3%, and in the case of expenditures for environmental protection the inter-annual growth rate reached 12.3%. Government expenditures are a very important part of agricultural sector development. The most impressive growth of agricultural sector support was recorded in the case of: Romania, the Czech Republic, Bulgaria, Slovakia and Lithuania. In general, the value of government expenditures related to the agricultural sector or environment protection in all NMCs, virtually doubled, the only exception being Hungary. The highest level of correlation between government expenditures and selected agricultural sector's characteristics in NMCs can be seen in the case of the number of economically active persons in agriculture development, agricultural area development and agricultural GDP and capital stock value development. The agricultural sector in individual NMCs is sensitive to changes in government expenditures especially in relation to the number of economically active persons in agriculture, and agricultural GDP development.

A very interesting part of the paper is devoted to correlation and elasticity analyses conducted at the per capita level. This analysis is especially focused on the sensitivity of agricultural production – both crops and livestock production – on changes in total value of government expenditures. The results of these analyses proved the existence of a significant relationship between individual countries' production performance value and government expenditures value development. It was proved that, while at a general level there is no significant relationship between production on one side and government expenditures, at the individual farmers' level a significant relationship exists. It was also proved in general that much higher correlations and also elasticities exist between government expenditures development on one side and livestock production on the other, than in relation to crops production. Crops production in this case is more independent. A much higher level of independency in this case is given by the fact that crops production is not as money-demanding as in the case of livestock production. Also, currently in crops production, a much higher level of profitability exists in comparison with livestock production.

At the end we can say in general that government expenditures value connected with agricultural sector development in individual analysed countries is constantly increasing. In the period 2001–2011 all analysed countries except for Hungary increased government expenditures value both in relation to the total value development and also in relation to the per capita (the number of economically active persons in agriculture) expression. It is, however, necessary to highlight that the main aim of public or government expenditures in the European Union (including all analysed countries) is not to stimulate the effectiveness of the agricultural sector, but to support and develop the multifunctional role of the agricultural sector – the main aim of provided public support is the maximisation of public utility.

At the end of this paper it can be said that government expenditures are a crucial part of individual countries' agricultural sector development. However, government agricultural expenditure is currently a very hot topic; its character and value are discussed not only within the European Union, but also at the global level (e.g. WTO etc.). The European Union – including its NMCs – will have to make a crucial decision about the form, structure and value development of government agricultural expenditures. It is necessary to make a decision whether public sources will be concentrated more on the support of the multifunctional role of agriculture within the European Union, or whether the available sources will be concentrated on improvements to the European agricultural sector and its products' competitiveness in relation to the world market.

References

Bartolini, F., Viaggi, D. The common agricultural policy and the determinants of changes in EU farm size. Land Use Policy. Volume: 31 Special Issue: SI Pages: 126–135 Published: MAR 2013

Basek, V., Kraus, J. Comparison of selected indicators of farms in the EU member states. Agric.Econ.-Czech Volume: 57 Issue: 2 Pages: 71–84 Published: 2011

Baylis, K., Peplow, S., Rausser, G. et al. Agri-environmental policies in the EU and United States: A comparison. Ecological Economics. Volume: 65 Issue: 4 Pages: 753–764 Published: MAY 1 2008

Bielik, P. et al. Economics, social policy and citizenship in the EU Evidence of V4 countries and perspectives for Ukraine, SPU, Nitra. ISBN: 978-80-552-0448-2. Published: 2010

Bielik, P.; Juricek, P.; Kunova, D. The comparison of agricultural support policies in the OECD and the EU countries from the perspective of economic globalization processes. Agric.Econ.-Czech. Volume: 53 Issue: 8 Pages: 339–348 Published: 2007

Blazejczyk-Majka, L., Kala, R., Maciejewski, K. Productivity and efficiency of large and small field crop farms and mixed farms of the old and new EU regions. Agric.Econ.-Czech. Volume: 58 Issue: 2 Pages: 61–71 Published: 2012

Bohácková, I., Hrabánková, M. Influence of subsidies on height and structures of farmers' incomes in EU member states. Agris On-line Papers in Economics and Informatics 3 (3) , pp. 29–43 Published: 2011

De Castro, P., Adinolfi, F., Capitanio, F. et al. The future of European agricultural policy. Some reflections in the light of the proposals put forward by the EU Commission. New Medit. Volume: 11 Issue: 2 Pages: 4–11 Published: JUN 2012

Drabík, D., Bártová, L. An Assessment of the Impact of the EU Enlargement on Agri-food Trade of New EU Member States, SPU Nitra, ISBN 978-80-552-0139-9. Published: 2008

Gorton, M., Danilowska, A., Jarka, S. et al. The international competitiveness of Polish agriculture. Post-Communist Economies. Volume: 13 Issue: 4 Pages: 445–457 Published: DEC 2001

Grant, W. Economic patriotism in European agriculture. Journal of European Public Policy. Volume: 19 Issue: 3 Special Issue: SI Pages: 420–434 Published: 2012

Hindls, R.; Hronová, S.; Seger, J.; Fischer, J.: Statistika pro ekonomy. Professional Publishing, Praha. ISBN 978-80-86946-43-6. Published: 2007

Horská, E. et al. European studies on intercultural dimension of international business, SPU, Nitra, ISBN: 978-80-552-0530-4. Published: 2011

Horská, E., Hambálková, M. Internationalization of agrarian companies, SPU Nitra, ISBN 978-80-552-0136-8. Published: 2008

Jeníček, V. The role of foreign trade and its effects, Agric. Econ. – Czech. Volume: 55 Issue: 5 Pages: 211–220. Published: 2009

Lukas, Z., Poschl, J., et al. Possibilities and barriers of agrarian sector development in central and eastern European countries within EU-25, Ministry of agriculture, Praha. ISBN 80-7084-343-8. Published: 2004

Matthews, K. B., Buchan, K., Miller, D. G. et al. Reforming the CAP With area-based payments, who wins and who loses? Land Use Policy. Volume: 31 Special Issue: SI Pages: 209–222 Published: MAR 2013

Olper, A. Political economy determinants of agricultural protection levels in EU member states: An empirical investigation. European Review of Agricultural Economics. Volume: 25 Issue: 4 Pages: 463–487 Published: 1998

Pokrivcak, J; Swinnen, JFM; de Gorter, H. Agricultural policy and European integration. Ekonomicky Casopis. Volume: 51 Issue: 1 Pages: 33–49 Published: 2003

Prochniak, M. Determinants of economic growth in Central and Eastern Europe: the global crisis perspective. Post-Communist Economies. Volume: 23 Issue: 4 Pages: 449–468 Published: 2011

Ramniceanu, I., Ackrill, R. EU rural development policy in the new member states: Promoting multifunctionality? Journal Of Rural Studies. Volume: 23 Issue: 4 Pages: 416–429 Published: OCT 2007

Renwick, A., Jansson, T., Verburg, P. H. et al. Policy reform and agricultural land abandonment in the EU. Land Use Policy. Volume: 30 Issue: 1 Pages: 446–457 Published: JAN 2013

Rickard, B. J., Sumner, D. A. Was there policy "reform"? Evolution of EU domestic support for processed fruits and vegetables. Food Policy. Volume: 36 Issue: 3 Pages: 438–449 Published: JUN 2011

Sadowski, A., Czubak, W. The priorities of rural development in the EU countries in years 2007–2013. Agric.Econ.-Czech. Volume: 59 Issue: 2 Pages: 58–73 Published: 2013

Strelecek, F.; Zdenek, R.; Lososova, J. Comparison of agricultural subsidies in the Czech Republic and in the selected states of the European Union. Agric.Econ.-Czech. Volume: 55 Issue: 11 Pages: 519–533 Published: 2009

Svatoš, M. et al. Foreign trade – theory and practice. Praha, Grada. ISBN: 978-80-247-2708-0. Published: 2009

Svatoš, M. Selected trends forming European agriculture, Agric. Econ.-Czech. Volume: 54 Issue: 3 Pages: 93–101 Published: 2008

Swinbank, A. EU agriculture, Agenda 2000 and the WTO commitments. WORLD ECONOMY Volume: 22 Issue: 1 Pages: 41–54 Published: JAN 1999

Viaggi, D., Gomez y Paloma, S., Mishra, A. et al. The role of the EU Common Agricultural Policy: Assessing multiple effects in alternative policy scenarios. Land Use Policy. Volume: 31 Special Issue: SI Pages: 99–101 Published: MAR 2013

Westhoek, H. J., Overmars, K. P., van Zeijts, H. The provision of public goods by agriculture: Critical questions for effective and efficient policy making. Environmental Science and Policy. Volume: 32 Special Issue: SI Pages: 5–13 Published: OCT 2013

Contact person:

Doc Ing. Lubos Smutka, Ph.D., Associate professor, Department of Economics, Faculty of Economics and Management, Czech University of Life Sciences in Prague, Kamycka 129, Praha 6 – Suchdol, 165 21, Czech Republic, smutka@pef.czu.cz, +420 224 38 2076

AUTOMATED VALUATION MODEL FOR LIVESTOCK APPRAISAL IN LOANING PRACTICE

Dr. Ferenc Buzás[1], Sándor Kiss[2]

Debrecen University- Centre for Agricultural and Applied Economic Sciences – Faculty of Applied economics and Rural Development[1]
Biblio-Markt Ltd.[2]

Abstract: Actualization of loan security (mortgage) value is of major importance in Hungarian loaning practice. Due to the recession in economics, the value of agricultural portfolio of banks has decreased a great deal, though not to such a great extent as other branches of the economy. Depreciation of estate stock is compensated with additional collateral security. Besides other stock, often temporarily and out of necessity, livestock is presented as additional collateral security. From the loaners' point of view, however, the registered inventory value does not guarantee security. The authors have set up an appraisal method giving professional guidance through automated valuation as to how dairy stock can be used as mortgage for loan security. Hereby we are to present the details of both the theory and the methodology of a model that is appropriate for the valuation of dairy livestock on an MS Excel basis. Thus, the process is fast and has more prospects for all parties in the loaning or leasing business. The method involves the features of livestock technology, the expected realized profit, and breed stock value. By the implementation of this method, the loaners can calculate the value of loan recovery (loan to value) with acceptable security.

Keywords: . automated valuation, livestock value, dairy economy, economic value, loan security

1. Introduction

The national valuation practice relies mainly on real estate assessment. The appliable methods are legally regulated. However, the chosen methods in the case of specific matters differ due to either the loaners or the appraisers. Automated valuation methods started to spread in the 1960s and 70s in the USA (*Márkus and Rábai*, 2005), mainly as a result of the mass marketing of residential properties. Although the method is up to the international standards (see *RICS*, 2013), it has not been applied in Hungary, except for some professional tests. One of the major problems in Hungarian loaning practice is that due to the depreciation of real estates, a significant lack of funds occurred, which is often compensated by additional loan recovery securities. However, in many cases, there are simply no chargeable real estates and thus other assets are involved.

If appropriately registered and identified, the livestock – registered in the category of fixed assets in the books may solve the above mentioned problems in the short run. However, the necessary methods are needed to be worked out. The aim of this paper is to summarise the methodological elements of the loan recovery valuation for livestock, which may be useful for financial institutions, creditors and farming organisations as well.

There are many applied methods in international practices (*Johns*, 2013; *Brown and Horne*, 1994; *Orr, Blawt and McCartney*, 2004), while in Hungary only methods calculating breed value are applied. Other method to set economic value serving as mortgage lending value (as credit security) is not known. The authors are presenting a professional method that is in harmony with all EU valuation principles and guidelines (see *Basel II. Agreement – Capital Requirements Directive, 2006/48/EC, in EVS 2012*) and may be applied to set the value of loan security.

The requirements of assessments made to set the value of loan security are registered in an integrated set of rules and regulations. The European Group of Valuer's Associations (*TEGoVA*) in Europe published *European Valuation Standards* (EVS) in 2003. Some other improved versions are EVS 2009 and 2012. Royal Institution of Chartered Surveyors (*RICS*) regularly publishes internationally accepted issues (Red Book 2012). These determine the professional and methodological basis of valuation. The Uniform Standards of Professional Appraisal Practice (*USPAP*, 2012) fixes the relevant rules and regulations in the USA. As for Hungarian practice, both EVS and RICS are generally accepted.

2. Methodological Basis of the Valuation Model

The livestock as tool of loan security (mortgage) needs to be regarded by the stock, for example its changes in quantity and quality should be followed and concerned at the time of the inspection and in the process of loaning. In order to do so, the most important factor is to register the identifying documents and the necessary inventories. After that, with the help

of the appropriate method, the appraisal of the circumstances conserving the condition of the livestock (farming, feeding, technology, reproduction) needs to be done. This is followed by the calculation of economic value, risk analysis and the calculation of the final mortgage value. Thus, automated appraisal is the logical system based calculation process connected with a special database. In the process of appraisal the different features affecting the final value (*CrV*) are included in modules.

The appraisal method consists of the following modules: database, technological appraisal module, economic appraisal module, final value calculation (loan to value and risk analysis) module.

2.1. Database Module

Database involves the following features:

- *Farm identification data:* name of farm, topographical lot number, address, herds registration number, production control identification number, farm registration number, livestock keeping station registration number, name, address, other data of operating company/entrepreneur, data of contact person and people in charge, management operation system, breeding organization membership.
- *Livestock registration data:* inventory (based on unique registration ENAR), certificate of origin of animal, list of assets, milking control data (AT Ltd), control documents of breeding process by offices (Central Agricultural Office – Directorate of Food Chain-security and Animal Health).

period, ratio of reproduction, calving interval, etc. *(noted: A-L and O, P)* and 3 dependent variables as: culling age (*M*), culling rate (*N*), production lifetime (*R*). Regarding reproduction, compared to other professional standards, the rate of correction is between –2 and 2% per analysed factor *(Table 2***)**. Referring guidelines are based on Csáki (2005). In the last line of the calculation all corrections with + and – signs are summarised – in our example *(Table 2)* is -14%.

- *Appraisal based on animal health indicators (AHI)*: in accordance with correctional value based on mortality rate and disease-free periods (brucellosis, leucosis, TBC etc.) In the last line of the calculation all corrections with + and – signs are summarised *(Table 3)*.
- *Appraisal based on breeding and housing technology (BHI)*: Based on farm inspection, the appraiser can apply +/- 1% of correction (conformance of buildings, equipment, keeping conditions, quality assurance, etc.) *(Table 4)*. In the last line of the calculation all corrections with + and – signs are summarised.

Table 1. The Reproduction Features of a Given Livestock

A	Calving interval	day	443
B	Average service period	day	147
C	Reproduction (prolificity) rate	%	79,60%
D	Average time of first insemination	day	94
E	The rate of pregnant cows after I. insem.	%	24%
F	Interv. between I and II insemination	day	48
G	Fertility index	insemin./cow	3,2
H	Parturition rate of heifers	%	20%
I	Average age of heifers at I. parturition	month	25
J	Average number of lactation	lact./cow	2,3
K	Daily average of lactation on farm	day	354
L	Reproduction indices, inside of herd	%	52%
M	**Average age of culling**	month	***53***
N	**Culling rate (cows)**	%	***43%***
O	Average production of cows	kg/lactation	7391
P	Rate of cow mortality	%	1%
R	**Production life (average per cow)**	month	**28**

Source: Own data and calculation

3. Results and Discussions

3.1. Valuation Module of Technological Elements

In this module (*see Appendix*) direct end indirect technological elements are appraised that affect the value of livestock or reflect the result of the applied method.

- *Reproduction features (RBI):* As it presented in *Table 1*, appraised by applying 15 independent variables from service

The main modules of the appraising model:

Table 2. **Appraising Module of Reproduction Features**

Reproduction indices	U.M.	GOOD		ACCEPTABLE		WEAK		Valued stock	Correction
Parturition interval	day	< 400	2%	420	0%	> 450	-2%	443	-2%
Duration of aver. service period	day	< 110	2%	120	0%	> 140	-2%	147	-2%
Prolificity rates	%	> 80%	2%	75%	0%	< 70%	-2%	79,6%	0%
Data of first insemination	day	< 70	2%	80	0%	> 90	-2%	94	-2%
Gestation rate per I insemination	%	> 50%	2%	40%	0%	> 30%	-2%	24,4%	-2%
Interv. between I and II insemination	day	< 40	2%	45	0%	> 55	-2%	48	0%
Fertilization rate	ins./cow	< 2	2%	2,5	0%	> 3	-2%	3,2	-2%
Parturition rate of heifers (by av.cow nu	%	< 35%	2%	30%	0%	> 25%	-2%	20,4%	-2%
Aver. age of heifers at parturition	month	< 24	2%	26	0%	> 28	-2%	25	0%
Aver. number of lactations	lact./cow	> 4	2%	3,00	0%	< 2,50	-2%	2,3	0%
Aver. of farm lactation	day	< 160	2%	180	0%	> 200	-2%	354	0%
Reprod. index, inside of stock	%	> 75%	2%	60%	0%	< 50%	-2%	51,7%	-2%
TOTAL CORRECTION OF REPRODUCTION BIOLOGY *(RBI)*									-14%

Source: Own data and calculation based on data from Csáki (2005)

– *Appraisal based on livestock administration and inventory (IAI)*: +/- 1% of correction is applied regarding the following features: breeding organization membership, monitorability of administration, management operation system, its modernity, livestock insurance, personal/ professional competencies *(Table 5)*. This part of the module is the most subjective. However, since the rate of correction is low (1%), the objective appraisal is not significantly affected.

The total correction index *(TCI)* means the summing up of the above mentioned corrections affecting the final market value, in our example on the basis of *Tables 2 to 5* that is:

$$RBI\% + AHI\% + BHI\% + IAI\% = TCI\%$$
$$-14\% + 3\% + 1\% + 4\% = \mathbf{-6\%}$$

3.2. The Module of Economic Valuation of the Breeding Stock

Concerning economic value, profitability and income generation capacity is of crucial importance, this module consists of more sub-modules, and each can be appreciated separately:

a) Sub-module: income generation capacity (yield value)

In this case, either national average or the given farm data can be applied. This module can be explained in two ways (in this case we used only national data):

i. Based on the annual lactation (*1iter/animal/year*) regarding the data of potential income generation of the main product issued by Agricultural Research Institute (*AKI, in: Béládi and Kertész*, 2011). In the module the potential income of the whole stock is calculated based on the subtraction of the average sale price and cost price (HUF/l) using the data of 3-5 years *(Table 6)*. The calculation formula for yield (income) value (YV_1) of the livestock is the following:

$$YV_1 = Q_{a\,lact} \times I_s \times L_a \times N_a$$

where:

$Q_{a\,lact}$ *– average milk production (l) /cow/ lactation period;*

I_s *– specific income (HUF/l);*

L_a *– average number of lactation in herd during production period / cow;*

N_a *– average number of cows;*

in our example for the whole livestock that is:

$$YV_1 = 7605 \times 8{,}89 \times 2{,}3 \times 690 = 107.344.000\ HUF$$

(rounded value)

Table 3. **Appraising Module of Animal Health Indicators**

Indicators	Good		Acceptable		Weak		*Correction*	
Cow mortality	< 1%	*2%*	2%	*0%*	> 3%	*-2%*	*1%*	*2%*
Free of Brucellosis		*1%*				*-1%*	*Y*	*1%*
Free of Leucosis		*1%*				*-1%*	*Y*	*1%*
Free of TBC		*1%*				*-1%*	*Y*	*1%*
Free of IBR		*1%*				*-1%*	*N*	*-1%*
Free of BVD		*1%*				*-1%*	*N*	*-1%*
Free of other disease		*1%*				*-1%*		
TOTAL CORRECTON OF ANIMAL HEALTH INDICATORS *(AHI)*								*3%*

Source: Own data and calculation

Table 4. **Appraising Module of Breeding and Housing Technology Indicators**

Indicators	GOOD	ACCEP-TABLE	WEAK	VALU-ATION	Cor-rection
Conformance of buildings	*1%*	*0%*	*-1%*	G	*1%*
Conformance of technical installation	*1%*	*0%*	*-1%*	G	*1%*
Hygenic conditions	*1%*	*0%*	*-1%*	A	*0%*
Conditions of animal health	*1%*	*0%*	*0%*	G	*1%*
Existence of HCCP	*1%*		*-1%*	P	*-1%*
Existence of quality guarantee system	*1%*		*-1%*	P	*-1%*
Other aspects	*1%*		*-1%*		
TOTAL CORRECTION OF BREEDING AND HOUSING TECHN. *(BHI)*					*1%*

Source: Own data and calculation

Table 5. **Appraising Module of Administration and Inventory Control Indicators**

Indicators	GOOD	ACCEPT ABLE	WEAK	VALU-ATION	Cor-rection
Membership of breeding assoc.	*1%*		*-1%*	G	*1%*
Controllability of inventory data	*1%*		*-1%*	G	*1%*
Farm management system	*1%*		*-1%*	G	*1%*
Unique identification system (ENAR)	*1%*		*-1%*	G	*1%*
Stock assurance	*1%*		*-1%*	P	*-1%*
Personal competencies	*1%*		*-1%*	G	*1%*
Other aspects					
TOTAL CORRECTION OF ADMINISTR. AND INVENTORY CONTROLL *(AII)*					*4%*

Source: Own data and calculation

Table 6. **Economic Valuation Module – Sub-module of Profitability 1.**

Specific income of dairy production by main product (milk)					AVERAGE
		2006	2007	2008	2006-2008
Milk price	HUF/l	63,85	70,13	83,66	***72,55***
Milk cost	HUF/l	56,21	63,47	71,27	***63,65***
Milk income	HUF/l	7,64	6,66	12,38	***8,89***

Source: Own calculation based on data from AKI (2011)

Table 7. **Economic Valuation Module – Sub-module of Profitability 2.**

Income of dairy production on the farm level					AVERAGE
		2006	2007	2008	2006-2008
Gross production	HUF/cow/year	567960	647394	741600	*652 318*
Production costs	HUF/cow/year	424838	503840	554855	*494 511*
Farm income	HUF/cow/year	143123	143554	186745	*157 807*

Source: Own calculation based on data from AKI (2011)

Table 8. **Economic Valuation Module – Sub-module Based on Inventory**

	*Gross**	*Depreciation**	*Net**	
Book value of cow stock*	**269 144 670**	82560618	186 584 052	HUF
Specific value (HUF/cow)	*390 065*	*119 653*	***270 412***	*HUF/cow*

The value of pregnant heifers	**111**	head*	**565 000**	HUF/head**	*62 715 000*	HUF

Note: * Farm data; ** data from breeding association

Table 9. Economic Valuation Module – Sub-module of Breeding and Slaughter Value

The structure of breed stock by production phase						
Stock on the beginning of prod.period	***230***	head	260 000	HUF/cow^{A}	*59 800 000*	HUF
Stock on the middle of prod.period	***230***	head	220 625	HUF/cow^{B}	*50 743 750*	HUF
Stock on the end of prod.period	***230***	head	181 250	HUF/cow^{C}	*41 687 500*	HUF
The total value of cow herd:	690	head			***152 231 250***	HUF

Note: ^{A} data from breeding association; ^{B} average of A and B; ^{C} market data from slaughterhouse

i.i. Also based on the data of test operation Farm Accountancy Data Network (*FADN*). Here the income of the whole farm is calculated, but other income sources (by-product, calf, culled cows) are also included in *Table 7)*.

The calculation formula for yield (income) value (YV_2) of the livestock in this case is:

$$YV_2 = I_f \times L_a \times N_a \qquad \textit{where:}$$

I_f – specific farm income (HUF/cow); L_a – average number of lactation in herd during production period / cow; N_a – average number of cows;

accordingly:

$$YV_2 = 157.807 \times 2{,}3 \times 690 = 250.440.000 \text{ HUF}$$
(rounded value)

It is very important to note that in the case of Holstein stock, due to the short production period (2-3 years), calculation of discounted value and deflation with consumer price index is not necessary. The value calculated from the farm income is close to the actual (cumulated, not calculated with capitalization) credit security (assessed) value (i.e. the rate of net income of the farm within a production period), but ignores market value and breeding value, so we advise its use only for control scope or concerning it with lower weight ratio in the final market value (as in the present case).

b) Sub-module: based on accountancy (book) value appraisal

We can get to know the gross purchase price, recorded depreciation and the actual net value of each animal. The module recognizes the average individual value as well *(Table 8).*

BV_{net}cow = Gross (purchase) value – Depreciation

In example the average of specific value for a cow (farm data) is*:*

390.065 HUF/cow – 119.653 HUF/cow = 270.412 HUF/cow

and for the whole herd:

$$BV_{net} = 270.412 \text{ HUF/cow} \times 690 \text{ cows} = 186.584.000 \text{ HUF}$$
(rounded)

Within a given period, based on inventory data and registered depreciation, the value in the books reflects the actual (net) value of the livestock (BV_{net}). However, note that when taking only the inventory into consideration to set the collateral value (*CrV*), the sum must be corrected by the technological correction index.

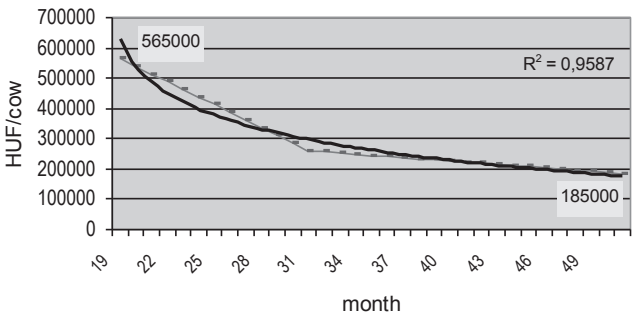
Thus the value of heifers can be calculate as the number of them multiplied with the value reported by Breeding Association *(detailed in Table 8):*

$$CrV = BV_{net} \times (100\% - TCI\%)$$

c) Sub-module: based on breeding value

The breeding organization (in this case Hungarian Holstein Association*) has data on the actual market value of breeding stock replacement and cows in the first year lactation. Both can be set in the database. Value of the breeding heifer stock

Figure 1. The change of breed value of an animal during the production lifetime



Source: own calculation, based on farm data

depends on lactation (higher lactation potential means higher value). In this method breeding value is somewhat similar to 'replacement cost' in the case of real estates *(Table 9)*.
According to the data of the organization, individual (specific) value decreases sharply by the end of the first lactation. However, in the following period (*illustrated in Figure 1*) the rate of decline is slower. By the end of the breeding period, individual value equals with the slaughter value.

The *Figure 1* also shows that even in the case of high breeding value, by the end of an average production period, the rate of depreciation may be as high as 70%. Thus, breeding value is admissible only in the early phase of the breeding period; otherwise, other factors should be taken into consideration, such as the registered value in the inventory.

Depreciation of specific breeding value (per head) can be represented graphically with trend function (R2 = 0,9587), which equation in our case is:

$$y = -130209Ln(x) + 631815$$

Breeding value of the whole stock can be calculated from the per head breeding value. Specific (per head) breeding value is the average of the monthly value during the period from calving (cca. 25 months) to disposal (52 months in present case).

$$\overline{SB_rV} = \frac{\sum_{i=1}^{n} sb_r v_i}{n}$$

where:

sb_rv_i – specific monthly breeding value, n – month's spent in the production period

Breeding value of the whole stock can be calculated from the average specific breeding value and the average stock size. I.e., based on the data of the presented farm:

$$\overline{SB_rV} \times N = 248.125\,HUF/cow \times 690\,cows = 171.206.000\,HUF$$

d) Sub-module: appraisal based on slaughter- and breeding value

Value of the stock at the time of culling is the same as the slaughter value calculated as the multiplication of individual weight and market purchase price. Since culling and replacement are necessary in continuous production, three categories are determined in livestock structure. In this module in the case of stagnant population 1/3 of the stock is at the beginning, 1/3 is at the medium stage and 1/3 is at the final stage of production. In the module, the value of the first category is the highest (marked as "cow in first lactation") the third category is at slaughter value, while the second is at the average value of the other two. The total value of the whole stock can be calculated by adding up the value of all the three categories.

Including both breeding and slaughter value in the first phase of production is necessary because in the case of these cows, production potency is higher, and it is crucial from the economic view. In the case of cows in the productive period, breeding value is the average of the two opposite categories, while during the disposal period, breeding value is irrelevant, only slaughter value is taken into consideration. This method gives way to represent a market view as well *(Table 9)*.

3.3. Module of Calculating Market Value

When calculating the market value, the *aim of the appraisal* or the expectations of the Client can be of crucial importance. Based on some foreign examples, it can be investment value, leasing and credit recovery value or other economic aims. In this module, either of them can be regarded by weighing the appropriate value. However, when the aim of appraisal is credit security, all sub-modules *a2, b, c* and *d* are recommended to use with adequate weights, except for *a1* which is recommended only for monitoring. In our example the market value of cow stock in production can set up by the following mode:

VALUE CATEGORIES	thousand HUF	**WEIGHT**
Yield (income based) value 2.	250 440	10%
Book value	186 584	20%
Breed value	171 206	30%
Slaughter- and breed value	152 231	40%
Weighted average (economic) value of the whole herd	**174 615**	100%

So as to set the final market value, it is necessary to add the value of heifer stock (bred within farm, for cow replacement) at market price or book value (*see Table 8.*), usually there is minor difference between the two. The sum of the two figures gives the value of the whole stock that now can be concerned as market value, and must be corrected with the module based on technological elements (*see part 2.2.2.*), and the result of this can give the final market value.

Value of the cow herd (see above)	174 615	th HUF
The (market) value of heifers (see part 2.2.3.)	62 715	th HUF
Total breed stock value with heifers	237 330	th HUF
Correction indices (see part 2.2.2.)	–6%	
The value of correction	–14 240	th HUF
Final market value of the whole livestock (MV_l)	**223 090**	th HUF

3.4. The Module of Risk Analysis and Credit Recovery (mortgage) Valuation:

The primary focus of this section is the risk of forced sale, which can be determined on the basis of earlier experience, list of professional publications, or appraisal. During risk analysis we have the chance to examine different scenarios, based on the guidelines of short-term sale, i.e. optimistic, pessimistic and realistic versions. In the case of real estates we usually calculate with 50-70% of the market price as allows fast selling during a short period of time. Without further research, we assume 35% as a realistic rate (r_R » 35%) and assumes actual sale within 1-3 months.

Based on the above mentioned calculation, assuming that we have the required data and the database is professionally acceptable, the mortgage (credit recovery or collateral) value (CrV) of a stock of 690 cows, according to the model is:

$$\boldsymbol{CrV = MV_l \times (100\% - r_R) =}$$

$$\boldsymbol{223.090 \times (100\% - 35\%) = 145.000\ thousand\ HUF}$$

(rounded value)

4. Conclusion, Proposal:

The above mentioned model can be applied in the case of a great number of appraisals. The basis of the model is Excel, which can give way to automated valuation, in case of having the required database.

The results may be most useful for loaning institutes, however, it may be profitable on the producers' side as well. For the loaners, it may be useful to introduce new financial patterns, as seen abroad.

Another important and basic condition of the assessment is that the appraisers should be professionally prepared to follow the given guidelines and monitor and check the acceptability of the given documents.

The third condition is that there should be continuous and balanced communication between loaners, producers and appraisers.

Acknowledgement: *Special thanks to László Bognár, executive manager of Holstein-freeze Breeders' Association, and István Sztakó, chief engineer of the Association for their professional help.

References

Béládi K., Kertész R. (2011). A főbb mezőgazdasági ágazatok költség- és jövedelemhelyzete 2010. Agrárgazdasági Információk. AKI. Budapest. 1–141 p.

Brown P.W., Horne D. (1994). Two-Generation Dairy Cow Leasing. Iowa State University – University Extension. Ames. 1–7 p.

Csáki T. (2005). Tejtermelő állományok szaporodásbiológiai gondozása a gyakorlatban. VIII. Állatorvosi és II. MÁOK-HUNGAROVET Nemzetközi Állatorvosi Konferencia és Kongresszus – Budapest.

The European Group of Valuers' Associations © TEGoVA (2012): European Valuation Standards 2012, seventh edition. Part A.2 Valuation of Property for Financial Institutions. 130 p.

GVH (Gazdasági Versenyhivatal) (2005). Jelentés – A jelzáloghitelezés tárgyában folytatott ágazati vizsgálatról. Budapest. http://www.gvh.hu/domain2/files/modules/module25/pdf/print_4132_h.pdf

Johns B.L. (2013). Dairy Cow Leasing. University of Wisconsin – Extension Farm Management. Madison.

Márkus L., Rábai Gy. (2005). Vagyonértékelési módszerek és gyakorlatuk, in Sóós J. 2005. Ingatlangazdaságtan, KJK–KERSZÖV Jogi és Üzleti Kiadó Kft., Budapest

Orr. G.,Blawt P., McCartney I. (2004). Cow-Calf lease agreements. Fact Sheet. Saskatchewan Ministry of Agriculture. 1–11 p.

RICS (Royal Institution of Chartered Surveyors) (2012). Valuation – Professional Standards. Westwood Businnes Park. Coventry. 1–466 p.

RICS (2013). – Automated Valuation Models – Draft information paper. https://consultations.rics.org/consult.ti/_avm/viewCompoundDoc?docid=3764852&sessionid=&voteid=

AN EXAMINATION OF THE ORGANIZATIONAL CULTURE AT THE POLICING

Edit Elekes

„Károly Ihrig" Doctoral School in Management and Organization, University of Debrecen
e-mail: stmiklos685@gmail.com

Abstract: The subject of this thesis is presentation of the examination related to the organizational culture of the Police, the special law enforcement body which guarantees internal order and public security. The police, at the same time, as armed law enforcement body ensure the order of the economy and its legal security. Security is not only important for the citizens and social organizations, but also for the profit and non-profit organizations.
The Police carry out official work, but also provide services that presuppose two types of contact system and modes of management. There were a number of changes in the body of the Police over the past two decades (e.g. accession to the EU, accession to the Schengen area, integration of the Police and the Border Guards, outsourcing certain activities, regionalization of sponsorship activities), in which I have taken part as a manager of the developmental programs. These changes have not only affected the police organization and the approach of the employees, but also the organizational culture.
The changes cannot be considered as closed: the Ministry of Interior, governing the Police, takes decisions on organizational changes, but also the managers at the Police play an important role in this process.
Under „change" I do not necessarily understand a change in the structure, but also a change in the organizational culture to create support for the reform process, and the option to co-ordinate the diverse structures.
The changes have obviously affected the thinking of the managers and the employees, as well as their relationship to the organization. The official duties, including the detection of the crimes (including agricultural and economic crimes), cannot be performed without the day-to-day cooperation with the bodies of the civil law enforcement, through which the Police may increase the effectiveness of detection of such crimes and thus the citizens' subjective feeling of security. Therefore, the present thesis aims at the examination of the Police's organizational culture and its management methods.

Keywords: . Management, law enforcement, organizational culture, organization development

1.Introduction

The Police's cooperating rural partners were formed as a result of self-organization. From among them, the *auxiliary police* assist in taking local public security measures. Local authorities may employ *agricultural rangers*. In hunting areas, *game-keepers* may provide protection for animals and their habitat. The authority of fishery may employ *fish keepers* to preserve stock and habitat. The nature reservation authorities hire *environmental wardens* to protect the natural and archaeological heritage.

The Police have included the cooperation with the above fields, as a new task, into their change management program. A special body of administration, the police force is not only an authority, but also a service provider, which requires two types of management systems. Both Hungarian police traditions and new EU regulations necessitate a continual reform of the police. The reform involves changes in organizational culture and qualitative changes in the tasks and responsibilities. These modifications are supposed to induce qualitative changes in the activities, way of thinking and functions of management as well as in the services provided by the police. The leaders of the police should possess special skills and abilities, in addition to general management competences. Police leaders should utilize these skills in order to make the work of the organization more efficient.

I have been a professional member of the police force of Hungary since 1993. I serve in a county on the state border, so I have an insight into the management methods used in these areas. This essay focuses on police work, its management and the possibilities of organization development.

[1] An organization is comprised by human individuals and assets. The assets are created and operated consciously and purposefully. Coordinated activity takes place in the organization, when the individuals or a group of them toil together in order to achieve a common goal.

2. The concept of organization and organizational culture

An organization is an open system as part which two or more people work together in order to attain a common goal.[1] (Antal – Gébler, 2006)

They are open because they have a macro- and a micro-environment[2] , and the changes in these environments affect the work of the organization. The organization's environment is shown in Figure 1. An organization functions properly when changes in the environment will not induce irreversible or unmanageable changes in the work of the organization, that is, the organization is capable of exerting effective crisis management activities.

Organizations are created for a specific purpose and they consist of parts that are linked together according to a specific logic. There is interaction between the indivual elements and between the specific elements and the whole, while the elements preserve their individuality.

From the aspect of proprietorship, organizations are divided into categories: public and private, non-profit and for-profit organizations. The non-profit organizations in public service tend to be in a monopolistic situation, they are owned by the community and they are supposed to serve public benefit, and their primary objective is not generating profit. Private organizations are in a different situation: as their owners are interested in generating the largest possible profit, the situation of such organizations is determined by the market. They must react promptly to the changes in the environment.

Organizational culture is in essence a cohesive force containing visible and intangible elements that determine the identity of the members of a company and help them in identifying with the corporate goals (Berde et.al., 2004).

Management theory is a relatively new discipline, so it is not yet possible to draw far-reaching conclusions from its present state.

The organizational culture became the focus of researches in the 1980s, when the entirety of the management style of the company and the customs of corporate life within a specific enterprise were defined. Within this concept, the effects of the different cultural backgrounds of the members of the community on the whole of the organization have been widely analysed. In other words: is it really necessary to create a standard organizational culture (The identification of a given organization is visible through the outer sigs such as the strict dress code and traditional company meetings in the case of large corporations). The research findings suggest that large corporations always make efforts to create a uniform culture. The results also suggest that a minimum of ten years is necessary for creating a company culture, and the management of the company often manages the enterprise through and with the help of the continual development of the organizational culture.

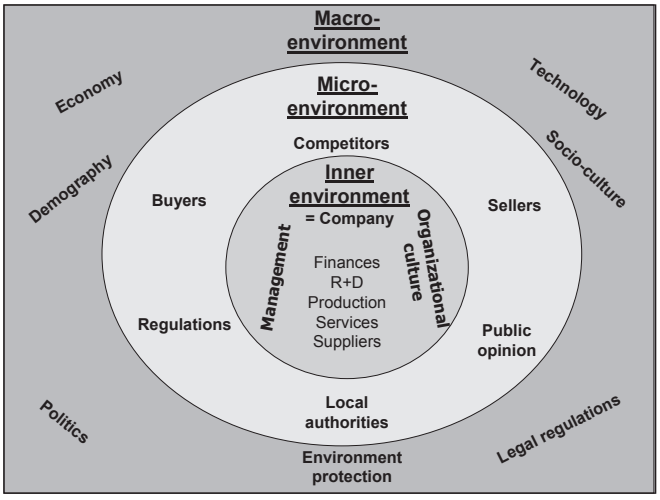


Figure 1. The organization and its environment (Based upon András Bauer [2006])

Organizational culture is therefore the entirety of shared values and norms, an unwritten behaviour code of the organization, manifested in the behaviour, attitude and reactions of the members of the organization concerned (Bakacsi, 2006).

The manifestations of the organizational culture:

- Through a sense of belonging, it creates an organizational identity and supports strategic goals;
- It reduces costs invested in human resources;
- It has an effect on the attitude of the members of the organization, thus promoting high quality work;
- Employer satisfaction is noticeable to partners, too–reflecting the individuality and discernibility of the company;
- It requires the regular development of the skills and competences of the management through regular training programmes;
- In this way, it is possible to manage changes more easily and smoothly.

2.1. Interrelations between the Organization and its Organizational Culture

The effective work of an organization is influenced by a number of factors, especially the organizational culture and its components.

McKinsey's 7S model shows the place of organizational culture in the system of management (see Figure 2) (Barakonyi, 2002).

The seven basic dimensions of management, according to the figure above, are the following:

- Shared values: the rules and norms accepted by the employees. It is the duty of everyone to keep to the rules and bylaws of the organization.

[2] Micro-environment: the direct environment of an enterprise, which the enterprise is able to influence. It determines the presence of the organization in the market. The macro-environment of the enterprise is a broader social context, affecting all the factors of the micro-environment, and the enterprise is unable to influence it. The organization may be pro-active, adaptive or tolerant to the changes in the environment.

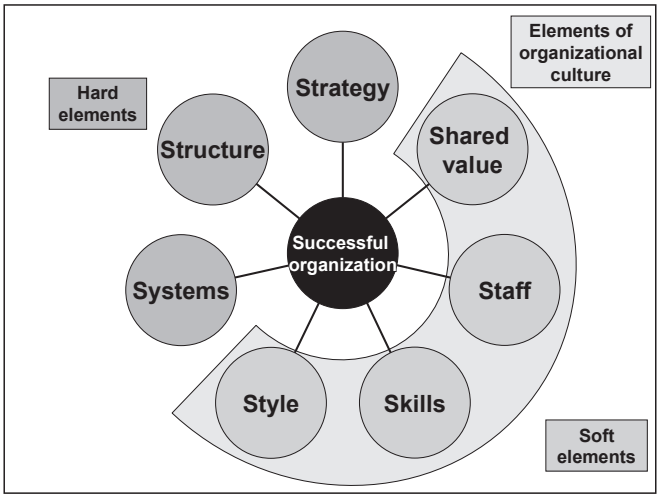


Figure 2. The place of organizational culture in the organization (Based upon Peters [1982])

- Staff: all the employees of the organization.
- Skills: the professional competences and performance of the organization as a whole and those of its employees.
- Style: the behaviour of the management.
- Systems: the frameworks of operative and development activities within the organization.
- Organization (Structure): the organizational scheme of the distribution of work, including the regulations related to authorizations and responsibilities.

Strategy: it is aimed at obtaining a competitive edge and it improves the market positions of the organization. It provides orientation for the future and includes the mission and objectives of the organization.

These dimensions include the tangible, so-called hard elements, such as the organization, the structure and the systems. The other four elements (staff, skills, style and shared values) are less palpable, they are the so-called soft components, all linked to the human resources. The soft dimensions together constitute the organizational culture. It is only possible to develop the organizational culture together with the development of the hard components.

3. The organization of the police force, management and organizational culture

The tasks of the police have stable parts and there are tasks which are constantly modified, which are performed in accordance with other provisions of law. Therefore upholding the law and order, providing public safety, crime prevention and criminal prosecution, as well as the state administrative and policing tasks are considered as their stable duties, while guarding the state borders and upholding law and order along the borders were added to the task of the police after the Police and the Frontier Guard have been integrated.

The head of the police is the Minister for the Interior, who is authorised to issue decrees and regulations in connection with the work and organization of the police force. The organizational units of the police force are arranged in accordance with the relevant enclosures of the Police Act (Metropolitan Police, regional and local police headquarters, border police stations). These units are divided into professional and functional divisions. I do not wish to deal with these in detail, as the legal regulations referred to above contain all the necessary information.

When modernizing the organization, it is to be noted that the various special services (criminal departments, policing, controlling, human resources management, and various offices) cannot be simply closed down or terminated. It is, however, possible to re-arrange the work load, to merge or reorganize various departments as dictated by changes in their performance or in the environment and its efficiency can be increased by new types of cooperations.

The various police tasks require different special skills and expertise. Efficient crime fighting and crime prevention are unimaginable without a good knowledge of local circumstances, a good theoretical and practical knowledge of criminal law and the rules of a criminal procedure. Upholding law and order in public places, policing work, the prevention and investigation of trespassing the laws make it necessary for the police staff to be familiar with the relevant laws, regulations. They are also supposed to have a high culture of police work. It is possible that the defence of constitutional order requires the police force to appear in troop strength, in which case they are supposed to have military expertise and routine.

The first projects of the extension of the Police's duty have been motivated by the accession to Shengen.

Hungary, and within that, Szabolcs-Szatmár-Bereg county, is the eastern gateway to Europe. Hungary's joining the Schengen Zone posed new tasks to the police force; new types of crime appeared, new analytical methods are necessary now, and a more efficient monitoring of migration far away from the state borders is required today.

It is only possible to set up a list of priorities of the tasks of the police force with taking into consideration the location of the police station, its special geo-political situation and the social and economic environment. The order of priorities in a border county is different from those in one far from the border. At the same time, the attitude of the police staff to special tasks is rather subjective, as it is indicated by the findings of the survey presented in this essay.

The police force is not isolated from the rest of the society. In upholding law and public order and crime prevention, the police force closely cooperates with other law enforcement bodies, public authorities, NGOs and the general public. The general standards of this cooperation determine how "citizen-friendly" the police are. In order to fight international crime, the police cooperate with international crime fighting organizations (EUROPOL, INTERPOL) in the framework of relevant contracts and treaties.

The police are performing their tasks in a dynamically changing macro- and micro-environment, so they are supposed to continually adapt to the changes in the domestic and European Union environment and new expectations. The po-

lice force is therefore supposed to have a medium- and a long-term strategy that ensure their effective work. It is, however, not enough for the police to adapt to changes in their environment and new social expectations as a result, it is sometimes necessary for the entire force to renew, which can only be achieved with a conscious change management activity.

3.1. The Place and Role of Management in the Work of the Organization of the Police Force

Any kind of organization requires a leader. The larger an organization is, the more complicated its system of management is. The leaders manage the work of the organization, develop a strategy and make decisions. Leading an organization is a serious task that requires considerable effort from those doing it. Various elements of this work can be acquired, but there are certain characteristic features and competences that are indispensable. Being a good leader is not easy. It is the task of the management to make the best use of the human resources available and to make sure that the organizational goals are attained. The leadership also has an integrative role, with the focus of shaping the human being–organization relationship in its focus.

For constraints of space, I do not wish to deal with the precise definitions and development of leadership theory as I did so in my previous work (Elekes, 2011).

As the police force is an organization similar to the military, we find a single-person leadership system. The style of management depends on the influences of the environment, social expectations and last, but not least, the human characteristic features and personal skills of the leader. The leadership of the police force is primarily autocratic, but there are some democratic features are also mingled into it, as the police force is now a servicing organization. The latter include that involvement of the employees and the increasing cooperation of the various branches and divisions of the force (crime fighting, policing) and the efforts aimed at surveying the demands of the ”customers”.

Even the ancient Greeks recognized that ideal leaders had to be carefully selected and trained. The first step in the training process was the acquisition of practical skills, behavioural patterns and analytical abilities. Then followed the theoretical training and the acquisition of creative skills. All these factors together determined the processes of selection and training (Láczay, 2008). I believe that all these factors are still necessary in law enforcement today. A leader detached from practical work, far away in a closed office, will hardly be able to make good decisions. Being familiar with the laws and legal regulations is in itself not sufficient for a decision maker. A good police leader needs to actively participate in crime fighting, because this is the only way (s)he will be able to become a good manager, and live together with the organization. Only such police leaders will be able to make good decisions.

Management functions involve special management tasks that managers need to perform day by day. The higher in the hierarchy a manager is, the higher number of problem solving and decision making functions are concentrated in their hands.

In the work of the law enforcement, seven management functions are usually analized which we may find to generally characterize nearly all managers and leaders based on the aspect of the process. The functions are the following (Kovács, 2009):

- Information activities (collecting, processing and disseminating information);
- Planning (preparing a decision, finding alternatives);
- Decision making (the most important managerial activity);
- Organization, coordination (determining the order of implementation);
- Directing (leading the implementation of activities);
- Controlling (examining the implementation of the preliminarily specified goals);
- Assessment (informing the personnel implementing the task about success or failure).

I will call the functions listed above as classic managerial functions in the following parts of the paper. I believe, however, that a law enforcement manager will need several further competences. I will term these extra competences as special managerial functions.

During my researches, I have experienced a shift in the determination of the classic and the new tasks and functions, and I managed to discover new relationship systems. The system of the classic and special law enforcement managerial functions, elaborated by myself, is shown in Figure 3.

The most important is the centralization of power, stemming from the military nature of the organization. It is not mentioned in the related special literature. The classic managerial functions are arranged along the arch of the smaller circle, marked in blue, whereas the special managerial functions follow the arch of the larger circle, marked in pink. The figure above shows the classic and special managerial functions in law enforcement. While the classic functions are linked primarily to the operation of the organization, the special functions are connected to the processes of modernization of the organization.

3.2. The Organizational Culture of the Police

In 2010, József Horváth defined the organizational culture of the police in accordance with the basic mission of the law enforcement force and the social expectations. The definition is the following: *”The organizational culture of the police: it is the system of people and organizations that accept the law as a guidance and protection, who earn the respect and confidence of the community, and use the law with empathy and humanism to the benefit of the general public in order to make sure that the smaller and larger groups of the community live in peace and harmony, protecting their own and each others' property. To that end, the members of the organization subordinate their own interests to the interests of their community, and with their oath, general behaviour and ethical attitude*

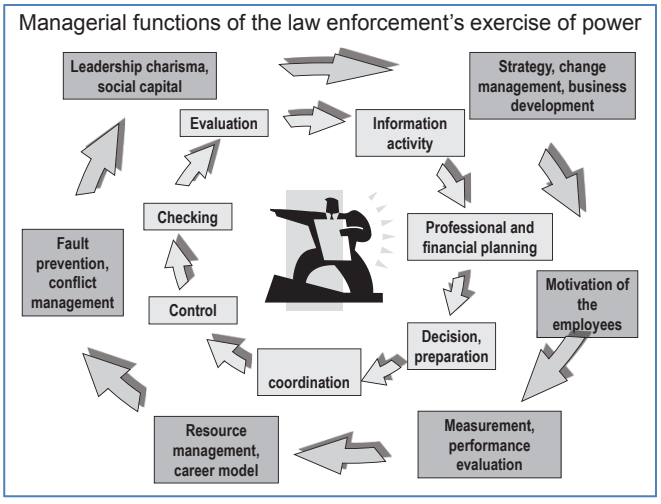


Figure 3. System of managerial functions in law enforcement (from the author)

set an example to all those who disregard or abandon those values."

The organizational culture of the police is the entirety of the shared values and norms within the police force. Meeting the requirements stipulated in the Police Act and quoted above is only a part of the organizational culture of the police. The enclosures of the law are complemented by other factors that are characteristic of the general organizational culture and that are outstandingly important from our aspect. Such are the traditions of the organization, the moral norms of the staff, experiences based upon positive or even negative events (e. g. the apprehension of a criminal or a group of criminals, action in group strength), the system of connection between the individuals, the atmosphere in the job, the relationship between leaders and subordinates and other invisible elements shaping the community.

The question therefore arises as to whether why it is necessary to consciously deal with the organizational culture of the police or the style of leadership of police leaders. Without due care, a very heterogeneous police force may come together and it finally disrupts organizational culture, as some of the staff may not accept shared values and norms. The result of the decline of organizational culture will lead to adverse changes in the attitude of the police force to the general public and also in the efficiency of police work. E. g. the police will not act lawfully, professionally or with the necessary empathy. The number of complaints filed against police procedures will increase, and the image of the police among the citizens will decline.

In the past 3 or 5 years, police have become an increasingly introverted organization, less open to its environment. Spectacular results are placed in the foreground, and the so-called soft elements receive much less attention in the daily work of the police. Several years earlier there were questionnaire surveys with the involvement of the members of the police force and the general public, in order to identify the points where changes were necessary in order to improve the work of the organization. The questions covered organizational results and the development of human resources. Today, on the other hand, the leadership is autocratic at every level of the decision making procedure, excluding internal and external actors. The adverse changes triggered negative processes in organizational culture as well. There has been an increasing lack of shared values in the past few years; professional commitment (which used to be the strongest point of the organization not very long time ago), empathy towards the citizens, comradeship and cohesion have all eroded considerable. The soft elements of organizational culture are of key importance in improving organizational efficiency, and in the style of leadership in the law enforcement bodies. I will address these issues in the following parts of the paper.

4. Organization development and its relevance to the police force

This essay does not wish to deal with the interpretation of organization development, as it is extensively discussed in international literature. My primary objective is addressing certain practical dimensions of organization development[3] particularly in the case of the police force.

Organization development activities are arranged into 3 groups (Gazdag, 2003):

- Professional-aspectual OD, dealing with the aspectual dimensions of organization. Its objectives may include rationalization, the increase of motivation, the improvement of communication, learning behaviour patterns, developing group cooperation, the coaching of management, personality development and the improvement of corporate operation.
- OD focusing on organizational factors, with development activities directed to individuals, behaviour and general activity as its goals.
- Complex OD, which combines the previous two approaches, so its main goal is developing the individuals, groups and the general corporate operation.

In 2008, the Hungarian police force and the border guard merged. The police as an organization underwent a very important fusion, and the changes continue today. The changes affected the organizational structure: the organogram of a police department close to the border is different from that of a police department in the middle of the country. There was, however, no change in the military type of the organization.

[3] The development of an organization is a developmental activity whose aim is to promote the development of an organization and to increase its chances of survival. The concept of organizational development comes from Anglo-Saxon expression Organization Development (in short: OD). The organizational development: 1. is a planned intervention: which is built on the organization's systematic analysis and the diagnosis its condition; 2. covers the organization as a whole: a systemic change, affecting the entire company (or only a unit); 3. is an effort organized from the top: it is based on the commitment of the company's top management and is achieved through its active participation; 4. its purpose is: to increase an organization's viability and efficiency, as well as: to make changes in the organizational processes. (Gazdag, 2003.)

The organizational elements of the border guard were integrated into the law enforcement body, and the stations of the (former) border guards are now in the same status as the police stations. This is one step higher in the hierarchy for them, but they retained their original structure and all the levels of management. One large, inflexible organization grew into an even larger and less flexible organization. The distribution of work in this large, new organization is not even and sometimes not fair, so there are considerable anomalies in the system.

Many of the changes described above primarily affected the staff and personnel issues. As a consequence, many of the senior, experienced staff retired, often not voluntarily, and as a result important positions became vacant. The changes therefore did not have any positive effect, as many of the members of the police force–because of existential reasons–left the organization which thus lost a large amount of expertise and experience. When new senior staff were selected for the vacant positions, the choice was limited. People without proper qualifications and experience were appointed for senior leading positions. Furthermore, the transference-acceptance of the positions often took place overnight, without any training or information for the new staff. By a limited choice I mean that the new generation of leaders did not have the necessary competences. In addition to all that, the crisis also affected the organization. Central finances reduced. All these factors induced adversed changes in the organizational culture.

4.1. Changing Organizational Culture as Organization Development

If an organization has a generally accepted set of values, the leaders may expect obedience from the employees, the laws and regulations will be honoured and observed. It is particularly important when the organization faces an overall change, and the old set of values is to be superseded by a new one. Traditions are important, as they can be relied upon amidst the change.

Another method of inducing change is modifying the organizational culture. Such a modification, as a method of managing change, is a major challenge for the leadership. On the other hand, a shared set of values, and the behavioural norms of the organization, as the supporting columns of the organizational culture, may become an obstacle in the way of change. There are many reasons that may necessitate a change of the culture: problems with the performance, changes in the organizational goals, changes in the environment, time, or changes in the budget.

It is expected that there will be resistance against the change, especially from the side of the staff, but there might be other obstacles (e. g. lack of resources, lack of cooperation) within the framework of the organization.

Good leaders recognize the need of the change and also the risks involved in it before the change takes place, and make their decisions after a thorough analysis of all these factors.

5. Means and Methods of the examination

When I have started to carry out the research, I have performed primary and secondary surveys and I will describe their circumstances.

The questionnaire was designed to collect data regarding the distribution of work, the functions of leadership, the importance of the areas of work and the level of organization.

An important part of this complex survey was to present the organiational culture. It was the first survey of the organizational culture within the police, although civilian organizations have carried out a number of different surveys of the organizational culture of organizations of various sizes active in various sectors. Some of the organizations, the surveys included, are state organizations and law enforcement bodies. The results of our survey could be complared to the results of such surveys. The questionnaire contained questions related to the constructive and passive style elements of the organizational culture.

According to Geert Hofstede (1991), Dutch social psychologist "culture is non other than programming the conscience collectively, which differentiates groups of people from each other". It means that every place of work has its own "programming", that is, culture. Other experts compare organizations to human beings. Just as every individual has their own characteristic behavioural patterns, organizations also have such features, and we call these features organizational culture. At certain places of work people feel better, whereas at others they feel worse. Research into organizational culture is, however, not only important from aspect of the employees' well-being. It is also important to find out how the well-being of employees influences the work and efficiency of the organizations concerned.

The survey of Human Synergistics Hungary has differentiated 12 basic styles of the organizational culture, arranging the twelve features into 3 head categories: agressive defensive, passive defensive and constructive groups, each containing 4 styles[4] (See Table 1).

6. Results

To evaluate the results of the surveys conducted within the own organization, I have used the secondary survey, and, while progressing, I did my best to take the system of categories, created during the examination of the organizational culture, into consideration.

An interesting feature is that at the fields of upholding law and order and border policing, the level of professional leadership (which is the county both in Hungary and in the neighbouring countries) did not appear to be very imporant for the participants of the conference. It is additional information for the modernization of the organization, the rationalization of the levels of management and the transformation of the present, excessively bureaucratic system.

[4] The codes of the various styles are given in brackets, which help to interpret Figure 4 later.

Table 1. Categories and styles of organizational cultures (Based upon survey by Human Synergistics Hungary)

Categories	Agressive resistant	Passive resistant	Constructive
Styles	Resistance (7)	Conformism (3)	Involving-supporting (1)
	Aspiration for power (8)	Adaptation (4)	Cooperation (2)
	Competition (9)	Dependence (5)	Aspiration for performance (11)
	Perfectionism (10)	Avoidance (6)	Self-realization (12)

When developing the organizational culture, the goals are improving the "agressive and passive" styles within the organization, and creating the dominance of the constructive elements.

The research did not provide evidence showing that the organizational culture of a profit-based company is significantly different from that of state- or non-profit organization. On the contrary: at some of the state-owned companies, constructive elements proved to be more powerful than in the case of profit-based companies. The employees of both the state and business companies see expectations at their respective places of work in a similar manner: the companies need "working soldiers" who are ready to fully subordinate their private lives to the company. Hungarian companies are often characterized by perfectionism in the agressive-defensive category. Perfectionism is not the same as the style feature called performance. Perfectionism is characterized by a perpetual pursue of perfection, working overtime, and reproach for mistakes. In Hungary, 100% performance is quite normal, and no special award is due for that, and other forms of appreciation or incentives from the leadership are also missing. It undermines creativity, employees are threatened by the danger of burnout, and perfectionism also destroys innovation. Perfectionism is also characterized by a meticulous observation of the rules and bylaws (as a complete opposite of the image of a modern company), and the organization becomes over-bureaucratized. The style feature called adaptation in the passive-defensive category is also widely observed at Hungarian companies. It is probably a heritage from the socialist times. It is possible to improve the situation in the case of both these style markers. In order to do that, training courses are needed, as well as the coopereation of the employees, and a higher level of meeting the expectations of the customers.

The Figure 4 shows the ideal organizational culture, and I have found that the latter one is the same as the organizational culture in the Anglo-Saxon countries. There are so-called circumplex models, or in another term, radar diagrams in the figure, which separate the agressive (left third), passive defensive (lower-right third) and constructive (upper third) style markers.

The interpretation of the Figure is helped by the codes of the styles given in brackets, in Table 1.

It is clearly seen that in the left-hand side model, the constructive elements are dwarfed by the tie-like pattern repre-

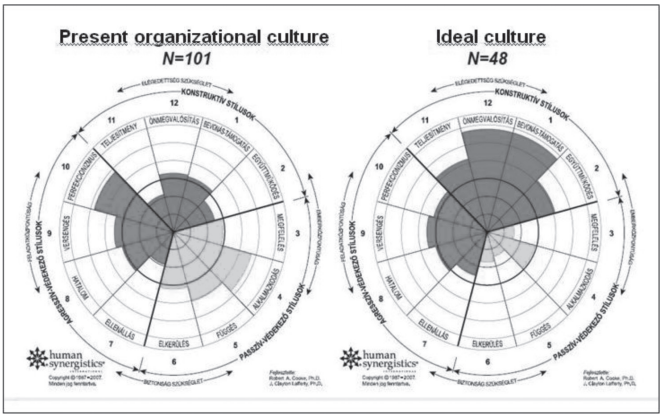


Figure 4. A comparison of the present and the ideal organizational cultures (Source: based on Human Synergistics Hungary [2009])

senting agressive- and passive-defensive style markers. Perfectionism and adaptation are also powerfully present.

The right-hand side model shows the culture of the 48 companies considered as the most ideal in the research project: here, the "tie" is loosened, so the share of the passive defensive style markers is less dominant, although adaptation is also powerful and, within the agressive category, the competitive marker. At the ideal culture it is a positive feature that the share of constructive elements is significantly higher than those of the defensive elements.

The research also revealed that the management style of the CEO of an organization influences the employees as well. If the employees receive little feedback from the management, constructivity will soon decline in a spectacular way. It is therefore very important that the leaders of the organization should regularly provide feedback to their subordinates and maintain a regular contact with them. Support and involvement in the constructive category need development, that is, employees should be involved to a larger extent, they should enjoy a larger atuonomy. The willingness to cooperate between managers and employees is also to be developed, as well as horizontal cooperation between employees in different branches within the organization. Performance is regarded as important by both managers and employees, but internal communication also needs to be improved.

7. Conclusions

As a conclusion we may assert that the organization of the police may only improve its roles as an authority and as a service provider through and as a result of conscious development efforts. The primary research programme suggests that optimization and development is needed in terms of the division of labour and the structure of the organization.

The structure, work, and special tasks of the police are determined by the related laws and legal regulations. Still, the leaders have a range of opportunities to prepare for changes in the social environment, they may utilize the capabilities of their employees, initiate development programmes, support new solutions that may all improve the standards of the serv-

ices they provide. The soft dimensions of the management, the elements of the organizational culture can be improved by the leaders of the organization, these dimensions may serve as a starting point for managing the changes within the organization.

Similarly to the managers of the civilian world, the leaders of the police force implement management functions in their daily work. Considering the military type of the organization, these functions are special. I believe that the management functions described in my paper, and especially the way these functions are implemented, directly influence organizational culture, and through it, the effective work of the law enforcement bodies. They also contribute to the modernization of the organizations.

References

Antal János–Gébler József (2006): *Bevezetés a szervezetbe* [Introduction into organization], Tankönyvkiadó, Budapest

Bakacsi György (2004): *Szervezeti magatartás és vezetés* [Organizational behaviour and management]. Aula Kiadó, Budapest

Barakonyi Károly (2002): *Stratégiai menedzsment* [Strategic management], Nemzeti Tankönyvkiadó, Budapest

Berács József–Bauer András (2006): *Marketing.* Aula Kiadó, Budapest

Berde Csaba–Bilanics Ágnes–Láczay Magdolna (2004): Menedzsment I. Főiskolai jegyzet [Management 1, College notes], Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Kar, Nyíregyháza, 3-76 old.

Elekes Edit (2011): *Leadership functions in a particular administrative organisation*, In: Spring Wind Tavaszi Szél Nemzetközi Tudományos Konferencia kötete, Pécs, 109-117. old.

Gazdag Miklós (2003): *Szervezet, szervezetfejlesztési módszerek* [Organization and organization development methods], In: Alkalmazott pszichológia, V. évf. 3-4. szám 63-79. old., Budapest

Hofstede, Geert–Hofstede, Gert Jan (2008): *Kultúrák és szervezetek* [Cultures and organizations] *– Az elme szoftvere*, VHE Kft., Pécs

Horváth József (2010*): Gondolatok a rendőrség szervezeti kultúrájáról* [Some ideas on the organizational culture of the police], In: Quo vadis rendvédelem? A rendészet kultúrája - Kulturált rendészet című Konferencia kiadvány, Pécsi Határőr Tudományos Közlemények, 21-31. old.; XI. Pécs

Human Synergistics Hungary (2009): *I. Magyarországi szervezeti kultúra kutatás eredményei* [Results of organizational culture research in Hungary] prezentáció anyaga, interneten elérhető: (20011.11.21.) http://organizationalkultura.hu/docs/KONFERENCIA_PREZENTACIO.pdf

Kovács Gábor (2009): *A rendészeti szervek felsőszintű irányítása*. [High level management of law enforcement bodies] Rendőrtiszti Főiskola, Budapest

Láczay Magdolna (2008): Habilitációs eljárás tézisei. *Rendszerváltó generációk vagy elitek vizsgálata egy régió mezőgazdaságában* [The examination of the political system changing elites in the agriculture of a region]. Debrecen

The Conditions of Security in Sustainable Rural Economics

Edit Elekes

University of Debrecen, Centre for Agricultural and Applied Economic Sciences, Faculty of Applied Economics and Rural Development, Károly Ihrig Doctoral School in Business Economics and Organizational Studies
H-4032 Debrecen, Böszörményi út 138.
E-mail: stmiklos685@gmail.com

Abstract: This work aims to map the potentials of safe rural economy. This topic cannot be separated from the processes of globalization and localization, affecting each other, whose positive and negative effects have been focussed on, especially in terms of the protection of security and sustainability or their damaging.

In Hungary, sustainable rural economy cannot be achieved only by the rural economy's systematic stabilization but its present structure and the security system, accompanying the process, also needs to undergo some drastic changes. Sustainable rural economy means a modern economy that aims to keep the rural inhabitants while increases the wealth of the whole society.

The legal security of the sustainable local economy is guaranteed by the state in Hungary. The security of the rural areas is provided by the police as an armed force, the auxiliary police, the public place supervision, the local agricultural rangers, the environment wardens, and by the fish- and game-keepers. The Police Act allows cooperation with the further organizations of the society to preserve public order, and to protect property and prevent and detect crimes.

The purpose of my thesis is to present security as one of the most important factors to improve the rural areas. I also aim to map the possibilities of improving security (such as cooperation, naming the resources assisting strategic tenders and participation in rural development programs).

Keywords: . security, policing, sustainability, rural development, tendering

1. Introduction

Although sustainable development has been discussed at world conferences, has generated numerous decisions and plans, no noteworthy achievements have been made. Following its definition in the 1980's many studies have been written on this topic, which focus on the global phenomena, on the one hand, and show the various local differences, on the other hand. This work does not intend to display the conceptual development or the studies on regional and rural development. However, it does mean to scrutinize them from the modern viewpoint of security policy. Few authors have dealt with the whole spectrum of security dimensions of sustainable development, though it has a considerable effect on the everyday life and sense of security of the countrymen and even on the liveable environment itself.

2. Globalization and the phenomena of deglobalization

Globalization has been a currently-used keyword both with its positive and negative aspects. The development of telecommunication and the Internet have been transmitting cultural patterns, consumer habits and lifestyles which transform citizens of a nation into cosmopolitans. Anyway, the standardization of consumer behaviour cannot be identical under different conditions.

The rapid development of world economics also has the disadvantage of causing global problems (growth of population, problems of nutrition, urbanization and pollution, climate change, drops in biodiversity). Globalization gave rise to the problems of growth and the decline of natural resources but also to serious socio-political and ethic questions. How long can we load our environment? How much more can we endanger the next generation?

Regionalism was born in reply to the spread of globalization. In the European Union cross-border cooperation and cross-regional development are of outstanding importance and are supported by various resources. They cover numerous areas, of which sustainability and regional development are vital.

Sustainability was defined in the early 80's and was adopted by the economic and legislative systems of the EU in 1987.

The late-2000s recession has revealed that sustainability does not mean the long-term maintenance of the GDP increase

rates (Muraközy, 2010), but it influences all elements of economics and social life, the quality of human life, contributes to a safe, long and healthy existence that creates equal opportunities. Securing the operating conditions of the communities is of vital importance. Although the condition of security is not mentioned in terminology, in my judgement, it is crucial for both sustainability and life.

3. The importance of local-level differences

Annually, milliards of Euros from European structural and cohesion funds are spent on regional development programs. Due to the policy of neglecting the system of objectives of sustainability, the regions have been torn apart and developed at various rates (Bulla et al., 2007). The previous statement may refer to various parts of the same country, as well.

The figure 1 displays the rates of development in the subregions of Hungary in 2007.

The Hungarian Central Statistical Office calculates the rates of subregional development by a complex data system including those of the economics, infrastructure, society and employment.

Hungarian regions are characterized by the increasing differences in adaptability, competitiveness and innovation potentials. In previous years efficiency has been set back by the appointment of various administrations for development and distribution of resources.

Regional sustainability should be encouraged by the inhabitants' approach to natural environment and resources. A settlement is sustainable as long as people can live there. For the time being, however, the local governments and the inhabitants have not shown much enthusiasm in regional development programs (Fábián et al., 2009).

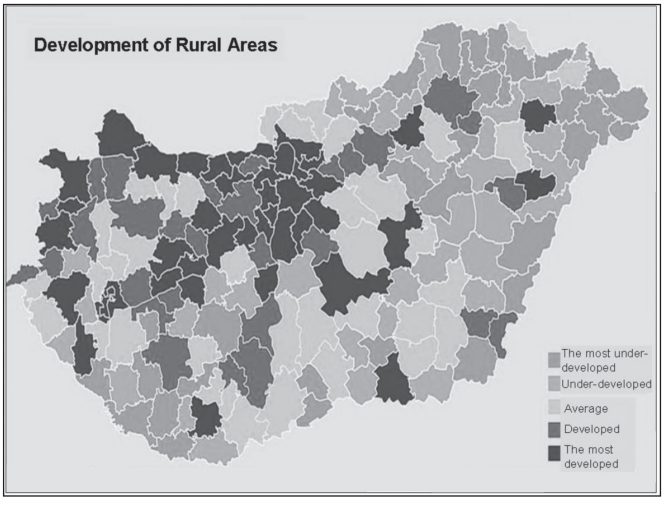


Figure 1. Development of the Subregions in Hungary in 2012
Source: Hungarian Central Statistical Office (KSH)

4. Potentials of Rural Development in Hungary

4.1. The structure of rural development

The possibilities of development are influenced by regional features. Hereby I intend to give a non-exhaustive overview of the opportunities in rural economy.

In 1999 the European Spatial Development Perspective (ESDP) declared that a balanced and sustainable development is available only by adjusting regional development aims to local relations and also by promoting cross-border, transnational and interregional cooperations (Internet 1).

The Greening Regional Development Program (GRDP) includes many of the regional roles. Sustainable development became one of the principles in the 2007-2013 period Cohesion Policy. Structural Funds were defined as the factors of environmental sustainability and regional financing (Csete, 2009).

Article 39 of the Treaty of Rome outlined the objectives of the Common Agricultural Policy (CAP), while financial support is provided by the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD).

Half of the EU's population lives in rural areas. The varying levels of development have contributed to the popularity of the LEADER approaches which assist rural development strategies by encouraging local participation.

The New Széchenyi Development Plan has served to attain the long-term objectives of Hungary between 2007 and 2013. Accordingly, the national perspectives of the agricultural and rural development are to improve the competitiveness and to create the required human conditions in agriculture, food-processing and forestry, to increase employment rates, to create more workplaces and to develop local communities.

By identifying the present conditions of rural economy and by estimating forthcoming risks we seem to get closer to the criteria of development. The steps of sustainable rural development are presented in the figure 2. The leaves represent the coherent purposeful actions that may support the preparation for the future.

Although the idea includes conventions and sanctioning, they cannot necessarily be applied for infringement and violation against social relations or behaviours. More often local infringements make living unviable, deprive people of their subjective sense of security, their social welfare and sustainability.

4.2. Particular potentials of rural development

There have been numerous ideas for the allocation of the resources, however, there seems to be an agreement on using the resources effectively. A significant directive of the forthcoming period is cohesion, the reduction of regional disparities. Regions of special geographical nature facing individual challenges will continue to receive outstanding assistance (Internet 2).

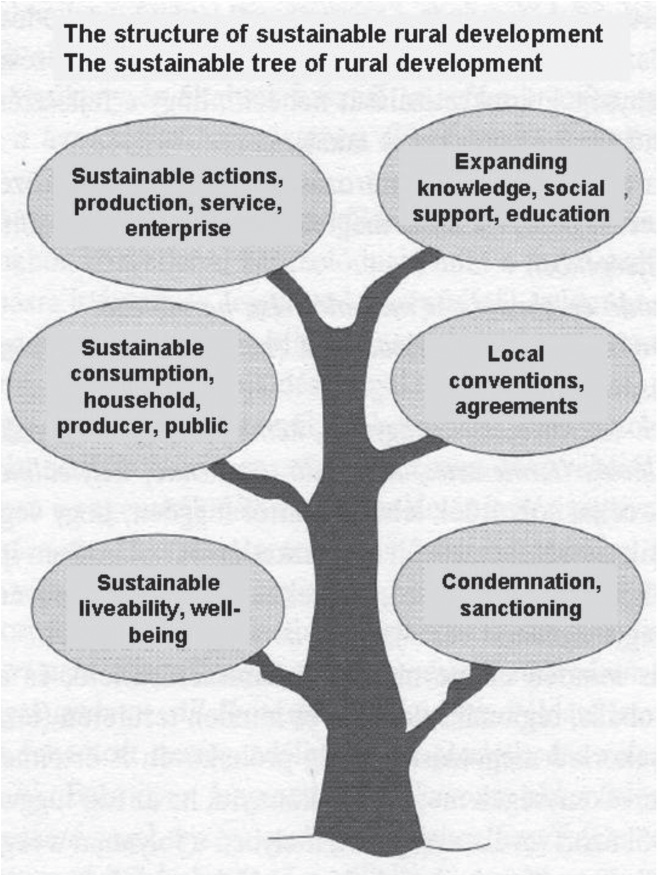


Figure 2. The structure of sustainable rural development
Source: Csete and Láng (p 45)

The related ideas to keep the inhabitants in rural areas by providing workplaces (in village tourism, handicraft, and land management) have proved to be ineffective in themselves.

While the structural changes in agricultural production have been mainly controlled by the funds, it would be a mistake to view environment prevention and improvement as state-directed public services. This ambiguity is the characteristic of agriculture and its security as well.

5. Security and Order

5.1. Crime and policing

Crime is as old as society and can be traced back to cohabitation of men. It is a human behaviour that is continuously revived by relations. There is no society without crimes, however, all societies urge to be disposed of disorders.

In Hungary it is the state's responsibility to protect order and preserve security (personal, property and road). As by act XXXIV of 1994 enacted the Police – with its unique legal status and organization- is a governmental armed policing organization which is to protect public order and security and to guard and maintain that of the borders (Internet 3).

In recent years a great number of self-governed, illegal paramilitary organizations have been established and employed in smaller settlements with the intention to preserve order. These arbitrary groups are not authorized to exercise policing activities since their range of power and operating conditions are not legally defined.

5.2. Policing cooperations, civilian police

The Police does not work in isolation. In preservation of public law and order and in prevention of crime the Police needs to work in close cooperation with different organizations of the society, such as local authorities, further policing and law enforcement organizations and the local inhabitants. The standard and the measures of the cooperation determine the public spirit and the "citizen-friendliness" of the Police.

The present section offers a brief survey of the rural partners of the Police. As a result of the citizens' intention to participate the auxiliary police was born to assist public security measures. Local authorities may employ agricultural rangers. In hunting areas game-keepers may provide protection of animals and their habitat. The authority of fishery may employ fish keepers to preserve stock and habitat. Nature reservation authorities work with environment wardens so as to protect the natural and archaeological heritage.

These guards have different scopes of rights. The auxiliary police do not possess authority rights so may not use any means of coercion. However, they are entitled to prevent crimes or hinder offenders. Agricultural rangers may use physical force or pepper spray. Fish keepers may act only upon the suspicion of offence and the game-keepers may secure vehicles in justified cases.

All the rights of the guards above are different as well as the authorities that are responsible for them. Any natural person entitled may employ fish- and game-keepers. Reasonably, these services should be nationalized and centred under regional nature reserve authorities and thus ensure a unified scope of actions and an effective operation.

As a further solution, it is policing that may be nationalized, and civilian policing may be introduced. Guards of the new policing system may obtain the aproppriate sphere of authority. It necessarily requires the establishment and operation of the relevant educational system (Láczay, 2011).

6. Crime in the subregions

Sustainability coexists with security. It is true in society and economics, and also in agriculture. Subregions are characterized by the agricultural activities and the related supports so it is worth studying crime in subregional aspects.

Few data are available in this field since under the present regulations the Unified System of Criminal Statistics of the Investigative Authorities and of Public Prosecution (USCSIAPP) registers criminal and detection data according to the jurisdiction of police headquarters and counties (Internet 4).

Before analysing certain regional data, let me demonstrate the situation of crime in Hungary. A great number of reported criminal activities have for years been compiled by crimes

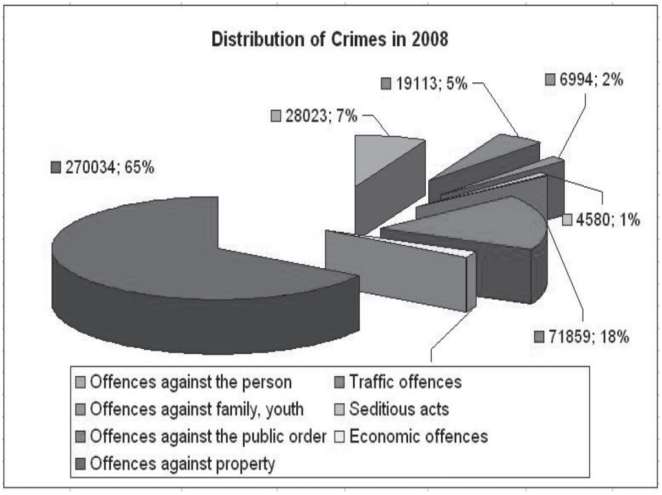


Figure 3. Category distributions of reported crimes in 2012
Source: author's edition
(Data: Hungarian Police Headquarters, GIF Development Department)

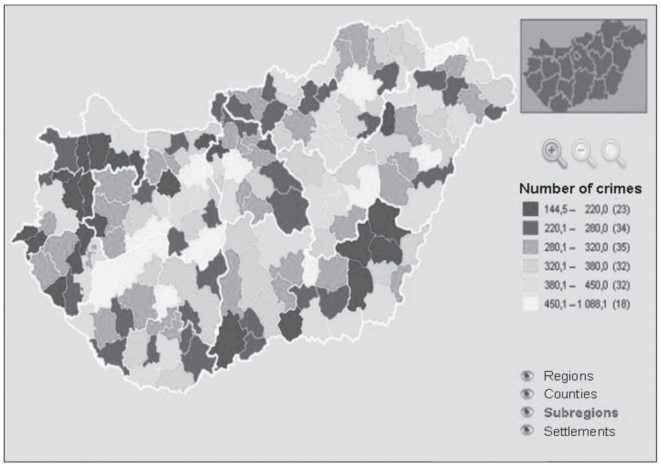


Figure 4. Number of reported offences of public prosecution per 10000 inhabitants in 2012
Source: Hungarian Central Statistical Office (Internet 5)

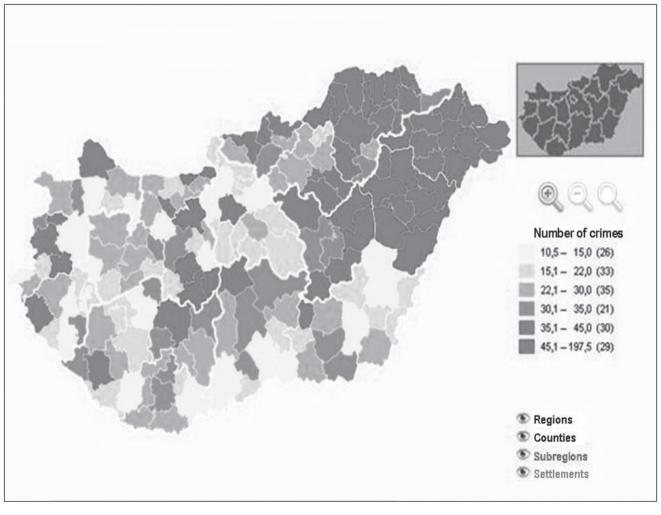


Figure 5. Number of violent rowdy crimes per 10000 inhabitants in 2012
Source: Hungarian Central Statistical Office

against property. In 2012 the rate was 65%. Offences against the public order, having a negative impact on citizens' state of security (18%) and offences against the person (7%) have also shown significant rates. A great deal of offences against property (270034) is compiled by theft (171282): in 2012 it was at the rate of 63.43%. The figure 3 illustrates the distribution of crimes according to the categories of the Hungarian Criminal Code.

The jurisdictions of the headquarters do not overlap the subregions. The territory of Hungary today is divided into 174 regional development and statistical subregions.

The figure 4 displays that the highest crime areas are that of Miskolc and Debrecen, the county town subregions of north-eastern Hungary. Záhony, the farthest border of the EU, is also need to be highlightened. Crime is especially high in the "Hungarian Tourist Paradise", in the subregions around Lake Balaton and also in the capital.

Violent rowdy crimes show different statistics, presented in the figure 5. These offenses are more common in the north-eastern subregions, in the capital and in Fejér County.

6.1. Correlation tests

I examined the statistical correlations between subregional demographical, infrastructural (population, area), agricultural and criminal (criminal activities and violent rowdy crimes) data and the indices of subregional development. Only the bare essentials are illustrated here. Figure 6 shows the number of operating companies per 1000 inhabitants, while Figure 7 shows the number of operating agricultural businesses in the groups of small regions at various levels of development.

As it can be seen from the figure above, there are significant differences within the various groups of subregional development levels (in the Salgótarján subregion: 122, in Fonyód: 46, in Őriszentpéter: 174, in Zirc: 170, in Csepreg: 28).

The analysis of variance has concluded that the number of offences of public prosecution also varies according to the level of development in the subregions. The 0.113 Pc shows that correlation is not linear. There is a high rate of offences in the most developed areas, whereas it is the lowest in average subregions. There is no significant difference between the data of the under-developed and that of the most under-developed subregions.

A similar result can be seen in the relation of development rate and violent rowdy crimes. The correlation is a bit higher (Pc 0,290) but it is not linear either.

Figure 8 shows the number of crimes involving popular action per 10,000 inhabitants, while Figure 9 shows the number of crimes involving violent vandalism per 10,000 inhabitants in the small regions at various levels of development.

The number of violent crimes seems to decrease with the growth of development in the subregions. The highest rate of crimes can be found in the most under-developed regions.

Although, for lack of space, the boxplot diagram of these correlations cannot be presented here, it shows that regarding criminal activities the most under-developed subregion is that

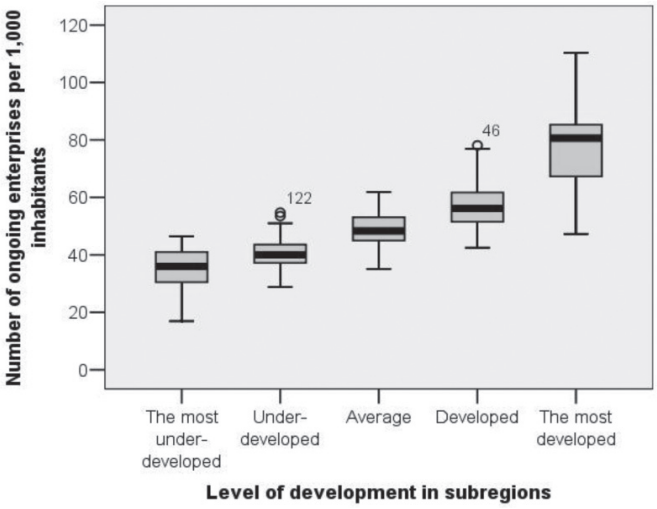


Figure 6. The boxplot diagram of ongoing enterprises per 1000 inhabitants in 2012
Source: author's edition

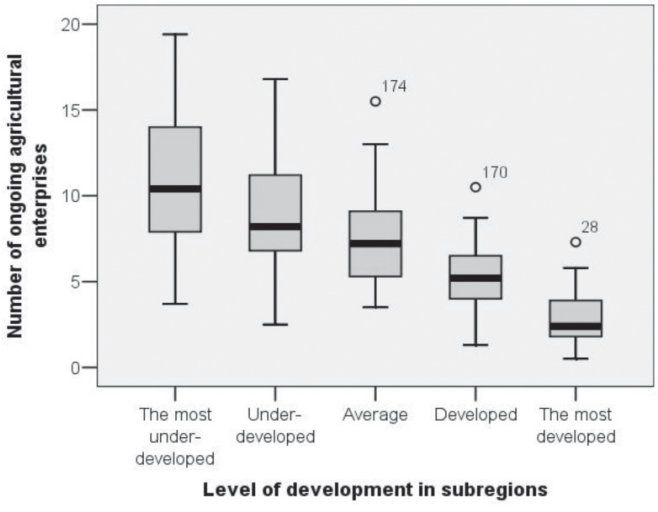


Figure 7. The boxplot diagram of ongoing agricultural enterprises in 2012
Source: author's edition

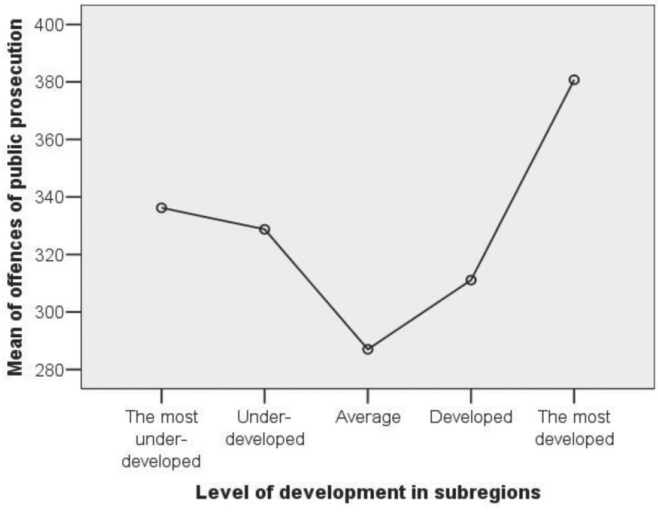


Figure 8. Mean of offences of public prosecution in subregions per 10,000 inhabitants in 2012
Source: author's edition

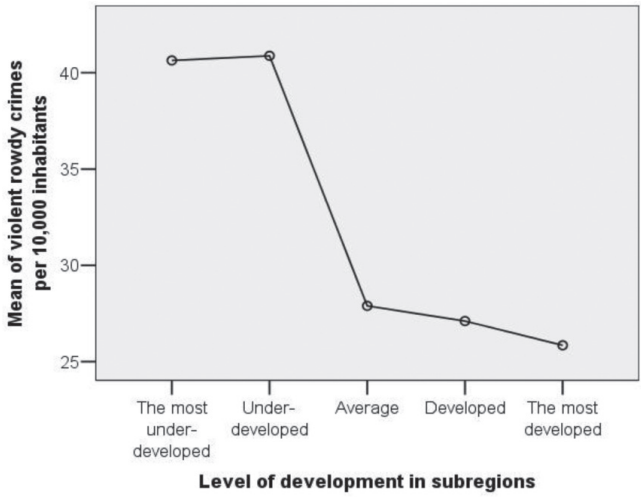


Figure 9. Mean of violent rowdy crimes in subregions per 10000 inhabitants in 2012
Source: author's edition

of Záhony, Marcali is in the middle position, while the most developed ones are that of Debrecen, Siófok and Budapest. As for violent crimes and public disorders the Sárbogárd subregion is under-developed, Abai is middle and Dunaújváros is the most developed one.

These offenses are different in their direction which is presented in the fact that violent crimes and public disorders take up only some part of the crimes reported.I have also investigated the correlation of crime categories in the subregions (data from ORFK- Hungarian Police Headquarters Development Department) and their state of development. The general rates of crime groups (categories) in more developed regions are higher almost in all categories and show an exponentially growing tendency. The relation is of middle strength (Pc=0,356-0,425). Only the correlation between the offences against the person and the development of the subregions seem to differ (Pc=0,242). In this field, underdeveloped regions show an extraordinary high number of offences while the least developed regions represent only a slightly higher rate than that of the average region. The number in the developed regions, however, is more progressively growing, as it has been suggested above. Figure 10 shows the number of crimes against property, while Figure 11 shows the number of crimes against persons in the groups of small regions at various levels of development.

And now we shall have a look at the tendency in the most frequent types of crimes, the number of thefts, and their relations with the number of the agricultural and other enterprises in the subregions. As it could be seen from the reasoning above there is no linear correlation between criminal activities and violent crimes and public disorders. Theft, however, has a relation of varying strength with ongoing agricultural and other enterprises. As for general enterprises, the mean of determining coefficient is low (r^2=0,274), but for agricultural enterprises it is of the middle-sized r^2=0,421. (The determining coefficient shows the % of the cases explained in the correlation above.)

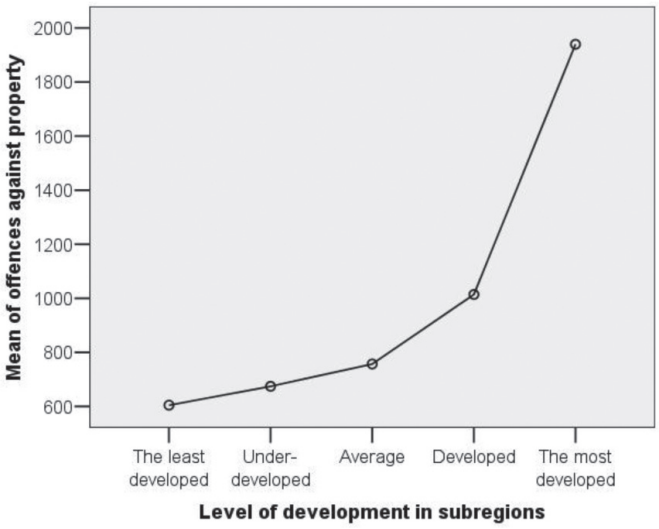


Figure 10: Mean of offences against property in the subregions in 2012
Source: author's edition

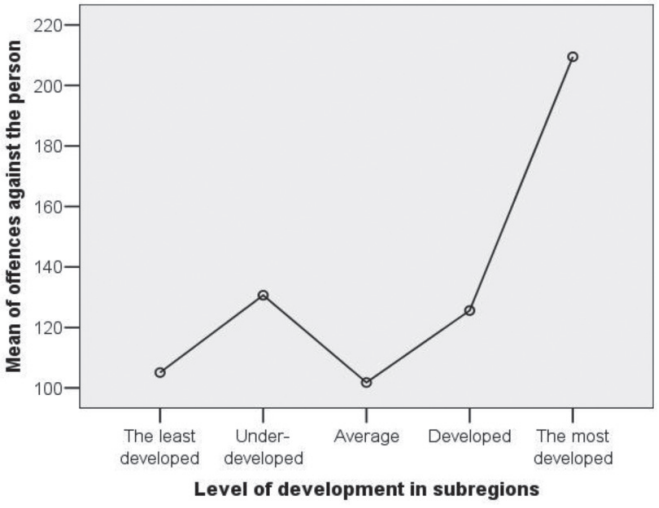


Figure 11. Mean of offences against the person in the subregions in 2012
Source: author's edition

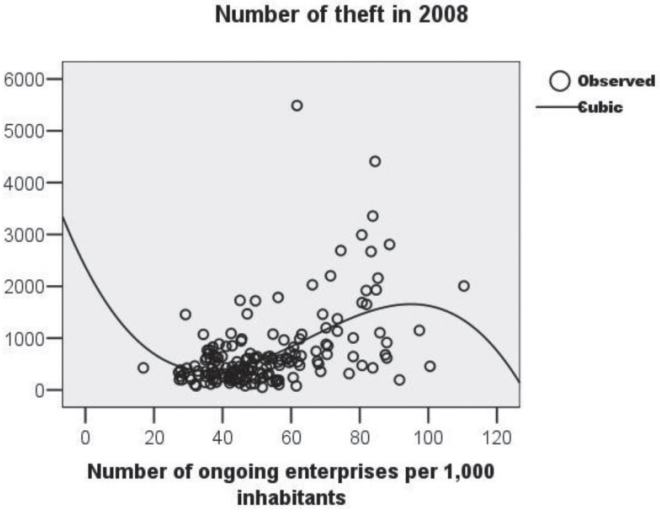


Figure 12. The relation between theft and ongoing enterprises
Source: author's edition

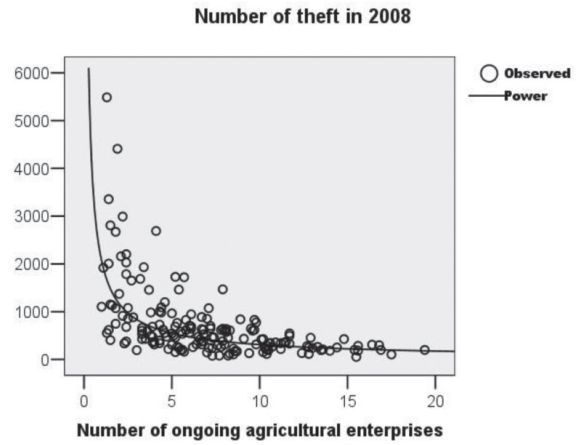


Figure 13: The relation between theft and ongoing agricultural enterprises
Source: author's edition

The means of the determining coefficient of the strength of correlations presupposes the fact that a great deal of theft is related to agriculture. In the case of enterprises the relation can be best illustrated in a third-degree function, while in agricultural enterprises it can be shown in an power function, as shown in Figure 12 and Figure 13.

6.2. Summarizing characterization of the crimes

All countries need to face crimes against their rural economy. In New-Zealand the larceny of cattle, in Hungary attacks on or mutilation of them.

Low-value theft may turn into serious crimes (as it is the case with "in flagrante delicto", caught in the act) that lead to further questions of security.

The annual 0.5% growth of the number of crimes within the EU, as can be read in the EU statistical database (Internet 6), justifies the need to emphasise security-related aspects. Security in rural economy means securing the production, the producer and the product as well.

Poverty and crime are not twin terms. Crimes are most often not committed by the neediest and do not include inclusively agricultural products. It is necessary to introduce the term "rural criminal activity" that refers to the appropriation of or damage to goods produced by someone else in rural economy (cultivation of plants, animal husbandry, gardening, forestry, etc). The particular legal object of the crime is the agriculture itself, the behaviour is presented either in an action (theft, damage) or in nonfeasance (stubble-field fire). The term should enter the Hungarian Criminal Code so as to display more detailed relations between subregional crime and further sociological data.

6.3. Supporting security by law and by other programs

Actions under the police act and those of cooperation with the police aimed at increasing public safety, preserving public order and preventing crimes are supported by resources.

Although security is not mentioned among the priorities of either the European Union or the New Széchenyi Plan, security policy has a significant role in measures and assistance constructions.

The Ministry frequently announces security-related tenders. In 2010 the Hungarian Home Office distributed several million forints with a 100% intensity so as to improve cooperations in public security. A further advantage of the tender was that the rate of instrument procurement was not limited. Since it is not only the sanctioning but also the prevention and awareness campaigns that pave the way for future generations, the Police emphasise education for child and juvenile victim prevention and avoidance. Apart from the official DADA (from the acronym of the Hungarian words for smoking-alcohol-drug-aids) program, these activities are supported by school-visiting programs.

In order to establish security and sustainable support further ideas have been born in Hungary that intend to supply an alternative for direct financial support or benefit.

One of the campaigns is the "Seeds and Pets Action" by the "Minden Gyerek Lakjon Jól!" Foundation ("All children should have enough") for the disadvantaged large families in 274 settlements of the country.

In disadvantaged areas another possibility for the unskilled layers living on the edge of the society, expecting to live entirely on aids, is to provide them with the means of living. This solution is known as the "Érpatak Modell" and was also supported by the Police so as to suppress crop theft. Local authorities plough and prepare lands around homes for production and thus ensure the conditions for farming. After the initial support it is the owner's responsibility to make ends meet.

Both cases demonstrate the fact that there is always an alternative solution. I believe a significant step towards supporting employment and life and also towards a sustainable and safe environment would be the extension of communal work program in the disadvantaged areas.

7. Conclusion

Sustainable rural economy, as indicated in the title, is not able to provide the "keeping power of the country" in itself. The problem has many factors, and it requires coordinated legal, policing and business work. Moreover, rural settlements or even subregions should be able to keep their inhabitants.

The systematic arrangement of the development and the aspects of sustainable development should be operated and checked on the basis of European Union and domestic regulations. Therefore it is essential to create an effective subregional network of centres that is able to organize and boost the everyday life of the neighbouring smaller settlements. Otherwise, "declining" regions may be formed where segregation in social and other fields (e.g. traffic, education) is experienced.

At the same time, based on my study, unfortunately crimes were experienced which can only be combated through the cooperatation of the civilian and the official police forces.

The development and catching up of the rural areas is only possible by purposeful developmental projects and security policy that welcome innovative ideas and new types of cooperation.

References

Bulla M.–Mozsgai K.–Pomázi I. (2007): Fenntarthatóság – Dilemmák és lehetőségek. In: Bulla M.–Tamás P. (eds). Fenntartható fejlődés Magyarországon. Jövőképek és stratégiák. Stratégiai kutatások – Magyarország 2015. Budapest, Új Mandátum Könyvkiadó.

Csete L.–Láng I. (2009): A vidék fenntartható fejlődése – A vidék fejlődésének fenntarthatósága – hétköznapi megközelítésben. Budapest, MTA Történettudományi Intézet – MTA Társadalomkutató Központ

Csete M. (2009): Fenntarthatósági vizsgálatok a vidékfejlesztésben. Gazdálkodás, LIII. 6. 594-607. Budapest

Fábián Gy.–Baják I.–Marselek S. (2009): A fenntartható fejlődés lokális szintje, lehetséges indikátorok. In: LI. Georgikon Napok konferencia-kiadvány.

Láczay M. (2011): Egy közmenedzsment feladat társadalmasításának tradíciói. In: A Virtuális Intézet Közép-Európa Kutatására Közleményei, Vezetéstudományi tematikus szám, III. évf. 1–2. 175–181. Szeged

Muraközy L. (2010) Válságban és válság nélkül – a gazdaságpolitika rétegei. Budapest, Akadémiai Kiadó

ORFK Fejlesztő Osztály (2011): A bűncselekmények kategóriánkénti száma kistérségek szerint – Adatbázis, Nyíregyháza

Internet 1: Európai Gazdasági és Szociális bizottság vélemény – Tárgy: Területfejlesztési Menetrend. In: Eur-Lex (Official site of the European Union), C 168/17-18., 20/07/2007,

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2007:168:0016:0021:HU:PDF

Internet 2: Káposzta J.–Nagy H.–Tánczos T.: A vidéki Magyarország fejlődési lehetőségei a 2013 utáni uniós kohéziós politika tükrében. In: A vidék hangja.

http://www.mnvh.hu/ptPortal/index.php?mod=news&action=showNews&newsid=12025&lang=hu

Internet 3: Act no. XXXIV of year 1994 on Police 16/11/2013

http://njt.hu/cgi_bin/njt_doc.cgi?docid=21269262768

Internet 4: Magyarország bűnözési és bűnüldözési adatai – Belügyminisztérium koordinációs és Statisztikai Osztály. 02/05/2011 http://crimestat.b-m.hu/

Internet 5: Hungarian Central Statistical Office – Interactive maps. 28/04/2011 http://www.ksh.hu/maps/

Internet 6: Eurostat European Statistics, Crime and Criminal Justice, Database. 26/04/2011,

http://epp.eurostat.ec.europa.eu/portal/page/portal/crime/data/database

TESTS OF DIFFERENTIAL DIESEL FUELS IN ENGINE TESTING ROOM

Ferenc Farkas[1]–Valéria Nagy[2]–Attila Bai[3]

[1] Senior Research Fellow , 2 Associate Professor
[1,2] University of Szeged, Faculty of Engineering, Technical Department
H-6724 Szeged, 7 Mars sq.
[3] Associate Professor University of Debrecen, Faculty of Applied Economic and Rural Development
H-4032 Debrecen, Böszörményi str. 138
e-mail: abai@agr.unideb.hu

Abstract: The portion of oil could be estimated 33 % of global primary energy consumption in 2012 (BP, 2012) and its average price – beside the products produced from it as well - significantly increased, unlike the demand for transport which has been reduced. This tendency is expected to remain unchanged in the long run, therefore, there is a great importance for the variety of diesel fuel distributors, in comparison of the ratio value for each of them, and replacing them with biodiesel can be used in the comparison. We executed 3 dynamometer measurements performed to determine three different dealers purchased diesel oil, some economical examinations of the diesel oil retail price, and the use of biodiesel all based on the expected economic studies in the literature studies of extra fuel consumption values.
The results of these tests indicate that the differences of consumption between diesel oils can be up to 5 %, the conclusion is that distinctions of diesel oil consumptions are almost the same when we tested the differences between diesel oil and biodiesel. This means we can reach the same result with a high quality biodiesel as with poor quality diesel oil. This also means that– below 20% of mixing ratio we can easily choose by prices alone. Between these prices and products (D1, D2, D3), we can save 4.8% diesel oil by using D2, 6.2% diesel oil by using D3 compared to D1. There could be a little revolution variance (D2: 2.9-6%, D3: 4.9- 7.1%), but this variance is under 1% so it is negligible

Keywords: *.diesel- and biofuels, internal combustion engine, engine parameters, economics*

Introduction

In the next decades, we have to take into account great changes in world politics and global economy also in the quality of power-supply and for this reason energy terms and goals also will change. The solution for the emerging problems could be the following: increasing the share of better quality or renewable fuels. Latter, not only can improve import dependence but gives many advantages for environment and society. The share of transportation is only 17% in the Hungarian energy consumption (KSH, 2013), but its importance is much bigger in costs, it's further influences pollutant emission.

Literature review

The portion of oil could be estimated 33 % of global primary energy consumption in 2012 (BP, 2012). In 2012 –because of the recession- the usage of fuel has eased down almost all over the world. Unconventional oil production has yet to yield the awaited breakthrough, lots of refineries had troubles, the safe supply of oil was in danger with talks of closing off the Hormuz-strait. Two of the most influential oil product's (Brent and WTI) margin of price grew out of proportion. In Hungary the average prices have increased because the government raised the tax, from 25% to 27% (which is the highest in Europe).The price of Brent oil examined by us (USD/barrel), was changing as shown in Figure 1.

The average price of 2012 of crude oil was 112 USD/bbl, of gasoline was 1036 USD/t, of diesel oil was 980 USD/t in term of FOB-Rotterdam (Reuters, 2013, Figure 2).

In 2012 the domestic consumption of diesel oil was 1527 million liters, it was 3% less than the previous year. This reduction was much more significant in case of gasoline (6%).

Figure 1. Brent oil price in 2012 (USD/bbl), reference: Reuters, 2013

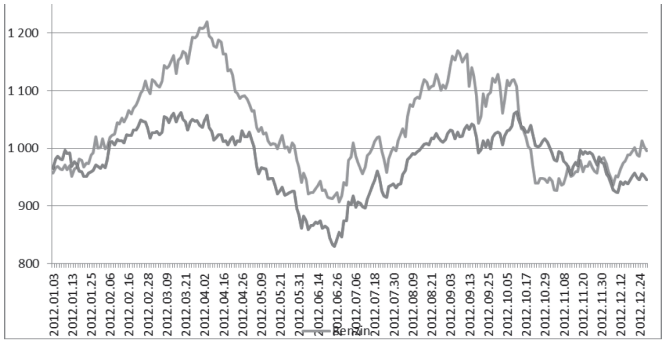


Figure 2. Price of gasoline and diesel oil in 2012 (USD/t), reference: Reuters, 2013
Note: green line: gasoline, red line: diesel oil

Table 1. Qualitative specifications of SME, RME and SyME

Specifications	Diesel oil	SME[1]	RME[2]	SyME[3]
Density (g/cm³)	0,82–0,85	0,88	0,88	0,88
Viscosity at 40 °C (mm2/s)+	2,98	4,22	5,65	3,89
Cloud point (°C)	–12	n.a.	0	3
Flashing point (°C)	74	n.a.	120–179	–3
Sulfur content (mg/kg)	50	20	10	10
Cetene number	51–56	45–51	62	45–51
Caloric value (MJ/kg)	45,42	40,11	40,54	39,77

Reference : Hancsók, 2004 és Hancsók–Kovács, 2002 in Jobbágy (2013)

[1] SME; [2] RME; [3] SyME

The reason of this was that car owners have more rarely used their cars, but trucks and personal transport operated at the same level.

Diesel oil comes from the primary distillation of crude oil, so the quality of the crude oil properties depended on the method of distillation. Till these days the quality of diesel oil was depended on property of original crude oil and the method of distillation, but nowadays the components made by cracking have become more popular. Because of that the quality of oil doesn't matter so much (www.eni.com).

Many studies demonstrate that production and utilization of biofuels – including the vegetable oil-based fuels – are environmentally sustainable and have positive impact for the security of energy supply (Kalligeros, S. et. al, 2003, N. Kapilan et. al, 2010). However, bench testing of vegetable oil-based fuels and comparative analysis of commercially available diesel fuels (Hancsók J. et. al, 1998) should be done simultaneously to answer that under the same experimental conditions, whether there are differences in diesel fuelled internal combustion engine parameters such as torque, power and specific fuel consumption etc. (Lakatos I. 2010). Based on the answer it can be made reliable assessments, evaluations and made professional statement generally in respect of the biofuels compared to the diesel fuel parameters, and analyze the status of biofuels and their impacts on the engines and the future prospects.

According to the previous data of F. O. Licht (2012), biodiesel production was about 18.5 million t in 2012, which was 20% of total renewable fuel production, so it represented significant part of renewable energy (Jobbágy et al, 2012).

Thanks to the provisions of the Renewable Energy Directive (RED) there are ambitious targets for the use of renewable energy. These include targets for renewable energy in the road transport sector. By 2020 10% of the final consumption of energy in transport in the EU and each of its Member States should come from renewable sources. This energy could come from biomass.

However, the overall contribution of renewable energy systems in Europe are low and it is expected that the renewable energy for the 2020 target will come primarily from biomass in the form of biofuels. In 2020 it is expected that the dominant production route for biofuels will still be through the use of edible parts of plants ('first-generation' biofuels) (European Commission, 2010; O. Stoyanov, 2013; European Academies Science, 2012).

Nowadays there are only some rules in Hungary, like 30/2011, (VI.28.) NFM and 54/2012. (IX.17.) NFM direction for qualify of diesel oil and biodiesel. It means that specifications of these fuels are very similar, though density of biodiesel is a little bit higher, than the diesel oil's and according to the regulation normal diesel in Hungary has to contain minimum 6 volumetrical %, maximum 7 v% of biodiesel.

Table 1 shows differential biodiesels made of sunflower (SME), rapeseed (RME), or soybean (SyME). Caloric value of biodiesel could reach 90% of diesel oil's value, but because of 11% oxygen capacity, the firepower is more efficient, so consumption could be more only with 5-10%.

Peak torque applies less to biodiesel fuels than it does to diesel oil, but occurs at lower engine speed and generally its torque curves are flatter. Testing includes the power and torque of the methyl esters and diesel fuel and ethyl esters *vs.* diesel fuel. Biodiesels power less by 5% compared to diesel fuel at a rated load (Demirbas, 2005). Benefits and penalties of usage biodiesel motors based on literature could be summarized in the followings (Demirbas, 2005, Kisdeák, 2009; Hancsók, 2004, Moser, 2011 and Atabani et al, 2012):

- blends up to 20% biodiesel mixed with diesel fuels can be used in nearly all diesel equipment and are compatible with most storage and distribution equipment.
- biodiesel has higher flash-point compared to diesel oil, it makes easier to transport, or store it
- it makes diesel oil more lubricant
- it oxidizes easily, this can be a problem in storage
- by mixing it with diesel oil, when engine starts in cold, biodiesel has narrow period of boiling point and this point is also high as a result,
- it can slacken engine oil because of the viscosity, engine needs some change, like special injector system
- it has oxidative character, so if biodiesel gets into the engine oil, it fast degrades that hereby decreasing oil exchange period
- it gets on fire later compared to diesel oil and it's burns almost immediately, so this gets more loading on parts of the engine
- it cause higher NO_x emission

– it could make rusty some parts (primarily copper), that could cause stanch in pipes or fuel filter, using without esterification in traditional engine prejudicing serious damages of the engine, injectors and piston rings could stuck in.

The statistically significant survey performed by Tóth (2013), mostly among consumers with primary school educations, shows much lower awareness (30% and 40%, respectively) and especially low acceptance (15%).

If we would like to use biodiesel as fuel we need to change the engine or change to diesel oil mode which requires major investment (it costs appr. 1500–5500 EUR; www.oel-alle.de). Buying of a brand new biodiesel engine is even more expensive (cca. 13000 EUR) because of the low market demand. Hungary does not have any standards for pure biodiesel (it exists only in Germany, DIN 51605).

From the 1st January 2013, the excise law (2003. CXXVII. statute) allows to farmers that they can use 97 l of produced biodiesel of their own at maximum if they pay 18% of diesel oil tax (it is now 19.9HUF/l) .

Production of biofuels are not as efficient as combustion of solid biomass, but has certainly some advantages for the variety of possible products and their nature - liquid fuels have higher energy content and can be easily stored, or transported (Boldrin et al, 2013). Future biofuel production systems should be integrated into existing technical biomass potentials. When considering the existing infrastructure of fuel distribution and fuel usage, only a reasonable mix of promising biofuels should be implemented in the energy system (Ußner-Muller, 2009).

As far as we know in Hungary distributors have never done comparative assessments about the quality of the diesel oil, but a test with gasoline in 2011 is available. In this test a Hyundai i30 with a 1400 cm^3 gasoline engine had been used which was tested by the meter instrument of the Hungaroring Driving Technique Centre. For the start of the test 5 liters of gasoline from five different companies was bought and they examined the output of the car in same, non-traffic conditions. In the comparison of the 95 octane number gasoline they get the best average usage with a gasoline from a Lukoil fuel station (7.03 l/100 km). The second was the OMV (7.09 l/100 km) and third was the Agip (7.11 l/100 km). After the leading three ones there was a little gap Shell (7,28 l/100 km) and the Mol (7.35 l/100 km). The last consumption data is 0.3 liter more than the first one Lukoil. It means almost 5% difference, which can not seem to be significant, but after 1000 kilometers there can be a 3,2 liters difference which mean a 1300 HUF saving. This difference can be interpreted in the way that the tested car with a full tank (53 litres) on a highway can travel 33 kilometres more with the best fuel. http://www.origo.hu/auto/20110520-95os- benzin-osszehasonlitoteszt.html

2. Material and Methods

In several research topics we had opportunity to perform engine tests for different purposes (study of the operational characteristic of the internal combustion engine operating on different kinds of fuels). The intention of the comparative analyzes is to determine whether there are some differences between parameters of the internal combustion engine operating commercially available diesel fuels. It is absolutely necessary to determine concrete numerical values or the range of potential differences.

In order to implement the objectives of research task the comparative analyzes were made with three different diesel fuels (D1; D2; D3) in the engine testing room. The measuring apparatus contains– Perkins 1104C type, Euro-II environmental class diesel engine with direct injection, equipped with Junkers type Schönebeck D-4 water-brake and a computer based control and evaluating system connected to it.

Engine specification:

– number of cylinders: in-line 4 cylinder
  – cycle: 4 stroke
– cubic capacity: 4.4 litres (269 cu.in.)
– combustion system: Direct Injection
– bore and stroke: 105 × 127 mm
– compression ratio: 19.3:1
– engine rotation: 1000 rpm

Performance data

– power output: 64 kW (86 bhp)
  – speed: 2400 rpm
– peak torque: 302 Nm
  – speed: 1400 rpm

The measuring apparatus available for the testing:

– Revolution measuring: ABS brake encoder together with serrated wheels, made by WABCO,
– Consumption meter: AI-2000 type (works such as measurement of mass), made by VILATI,
– Torque measuring: torque measuring cell fitted in ENERGOTEST 2000 type test bench, made by KALIBER.

The engine test was made according to directives of ECE 24 standard (Bosch Automative Handbook 2011; Dezsényi Gy. et. al., 1990), so the engine was fitted with the original intake and exhausting systems and these drove the moving parts. The measurements were made in 7 operating points between 1400 rpm and 2300 rpm. The values of torque (M), effective power (P_{eff}) and specific fuel consumption (b) were measured in case of full throttle and fixed dispenser lever position in every operating point (Dezsényi Gy. et. al., 1990; Kalligeros, S. et. al, 2003; Vas A., 1997). After selecting a given operating point the control of the measurement, together with the collection and the evaluation of the data are completely automated.

During the testing process the current values of the measured parameters were displayed steadily on the screen of the computer system connected to the test bench. The measured engine parameters were corrected according to the status indicators (temperature and pressure) of the intake air. The following correlation – suggested also by Dezsényi Gy. et. al. (1990) – could be applied to determine the corrected power:

$$P_0 = P \cdot \alpha_d \qquad [W] \qquad (a)$$

In case of diesel engines the calculated correction factors are $0.9 \leq \alpha_d \leq 1.1$. In our case the calculated value of the correction factor is $\alpha_d = 0.9839$, so the further evaluation was done with the corrected parameters.

At the specific fuel consumption -such a basic data, which need for the economic exam- in the case of reliability of the result, is rated by correlation and dispersion.

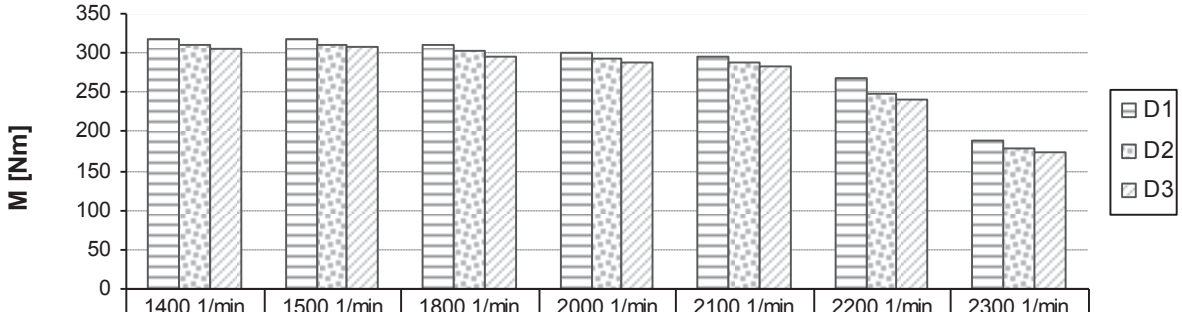
Under the economic rating in 2013 we collected the average minimum and maximum prices of the diesel oil from 3 different distributors (D1, D2, D3), which operate more than half of petrol stations of Hungary. We took into account the minimum-, maximum- and average prices of diesel oils inside and outside of Budapest and the national average of November 2013. We also rated these parameters by distributors and we made comparative analysis between the distributors. Finally – considering the difference between the prices and the qualities of the diesel oil – we defined the economical parameters of the tested diesel oils and the homogeneity of the result by using standard deviation.

Regarding the comparision of biodiesel consumption and of normal diesel we used the results of a test made by Bai et al (2008). During this experiment in 2008, 2400 l biodiesel was used by the public transport in the city of Debrecen, in blended in various mixtures into diesel (10%, 20%, 50%) and fuelled into 2 IKARUS-260 and 2 Ikarus-280 buses. The fuel consumption increased by 4,1 %, 6,5 % and 1,7 %, respectively, the average surplus consumption was 3,9 %.

3. Results and discussion

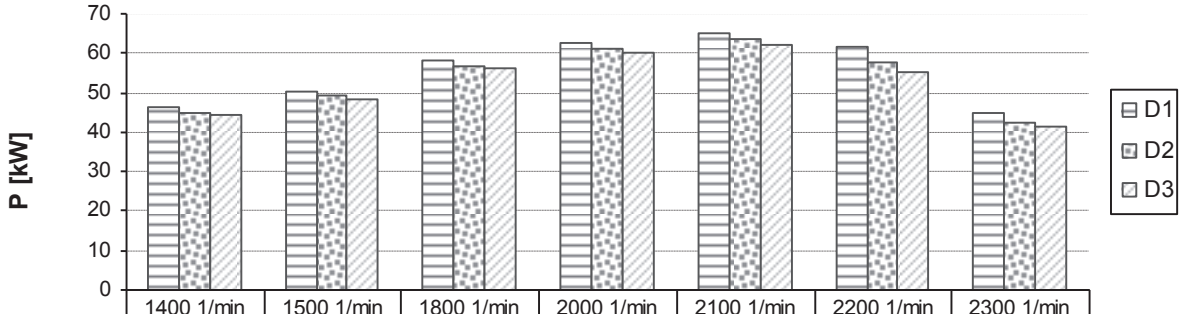
Simple bar diagrams were used to demonstrate and evaluate the numerical measurement results which definitely show the potential differences in the parameters of the engine fuelled by the diesel fuels under testing. As it can seen in Figure 3 the torque values of engine fuelled by D2 and D3 diesel fuels are lower at every measured revolution than torque values of the engine fuelled by D1 diesel fuel. The range of differences (consideration the minimum and maximum torque values at a given revolution) is from 3.15% to 10.42%. The differences of the torque values approach the lower limit of the range at lower revolutions (1400–2100 rpm), while the torque values at 2200–2300 rpm represent the higher values of the range.

The measured power values at given revolution can be seen in *Figure 3*, however the tendency is shown in the Figure 3 on the basis of $P_{eff} = M \cdot \omega$ correlation. Due to the inaccu-



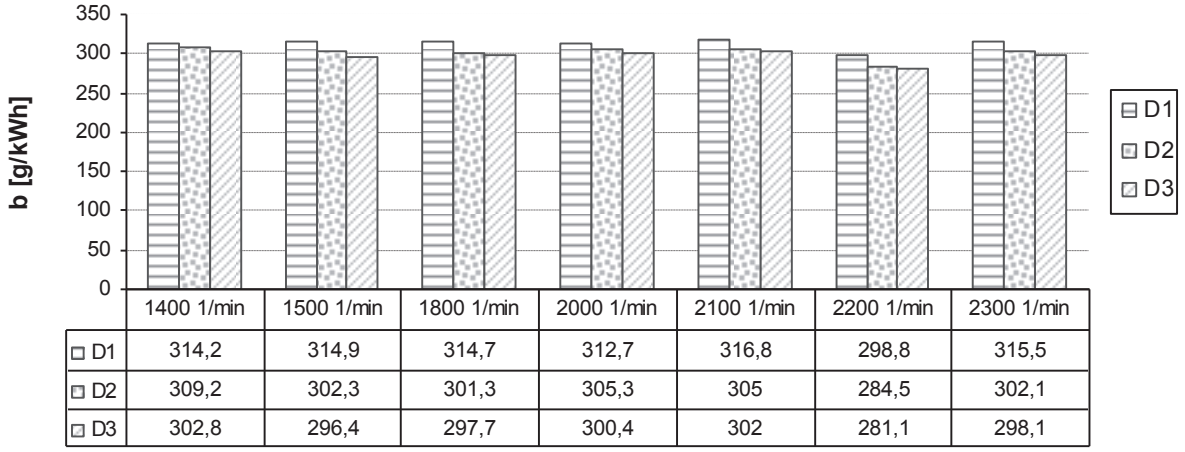
	1400 1/min	1500 1/min	1800 1/min	2000 1/min	2100 1/min	2200 1/min	2300 1/min
D1	317,5	317,5	309,4	299,7	294,6	267,9	188,8
D2	310,2	310,5	302,8	292,3	288,5	249,3	178,4
D3	305,2	307,5	296,2	287,3	282,7	240	173,3

Figure 3. Torque of the tested diesels (own test)



	1400 1/min	1500 1/min	1800 1/min	2000 1/min	2100 1/min	2200 1/min	2300 1/min
D1	46,1	50,4	58,1	62,6	65,0	61,6	45,0
D2	44,9	49,4	56,5	61,3	63,4	57,6	42,5
D3	44,5	48,1	56,4	59,9	62,0	55,4	41,4

Figure 4. Power output of the tested diesels (own test)



	1400 1/min	1500 1/min	1800 1/min	2000 1/min	2100 1/min	2200 1/min	2300 1/min
D1	314,2	314,9	314,7	312,7	316,8	298,8	315,5
D2	309,2	302,3	301,3	305,3	305	284,5	302,1
D3	302,8	296,4	297,7	300,4	302	281,1	298,1

Figure 5. Specific fuel consumption of the tested diesels (own test)

Table 2. Specific fuel consumption of D1 to the other diesel oils

Revolution 1/min	1400	1500	1800	2000	2100	2200	2300	average	SD
D1(MOL)	1	1	1	1	1	1	1	1	0
D2(OMV)	0,984	0,960	0,957	0,976	0,963	0,952	0,958	0,964	0,012
D3(AGIP)	0,964	0,941	0,946	0,961	0,953	0,941	0,945	0,950	0,009

Examining the dynamics of the particular diesel oil consumptions it can be stated that although basically the reaction to the speed growth was similar in all three cases, reaction of the D2 and D3 were almost the same to the changes of parameters (r2=0.99). In case of comparison of D1 to the others, we can see substantially bigger differences (D1/D2 r2=0.9, D1/D3 r2=0.93).

racy of the measurement the range of the difference has been changed slightly: 2.93% -10.07%. The reason of the change is explained by accuracy of the measuring system and accuracy of stored values in the background program. (Note: The displayed values are decimal precision.)

Figure 5 shows the values of the specific fuel consumption. The specific fuel consumption of engine fuelled by D1 diesel fuel exceeds at every measured revolution point the values with D2 and D3 diesel fuels. The range of deviation (based on the maximum and minimum consumption values at a given revolution) is from 3.63% to 4.68%. The average special fuel consumption was 3.6 % lower with D2 and 5% less with D3, quite reliable, because the dispersion was only about 1 % in both cases. (Table 2)

Table 3 shows the difference of the average values of the tested diesel oils and their standard deviation.

The differences between the specific fuel consumptions (3.6 %, or 5 %, in Table 2) suggests that the consumption difference between the examined diesel oils are similar to the expected difference between the diesel oil and biodiesel consumptions. This means that the same distance can be fuelled by biodiesel with standard quality than normal diesel with lower quality. This also means that the competitiveness of biodiesel (under 20 % mixing ratio) can be evaluated only by its price difference compared to the diesel oil of differential distributors.

Table 3: The averages of specific fuel consumption of differential diesel oils

	average (g/kWh)	SD
D1(MOL)	312,5	6,2
D2(OMV)	301,4	7,9
D3(AGIP)	296,9	7,4

The specific fuel consumption of a given engine depends on its operating status, loading and revolution. The effective operational range of the engine is well-determined by plotting the character field of the specific fuel consumption – so called shell curves of Alfred Jante (1976) (Gál P., 2005) – on the whole operation range. To plot the shell curves the different values of the fuel consumption concerning to different loads and effective mean pressure (p_{eff}) should be known at the given revolutions (Dezsényi Gy. et. al., 1990; Fülöp Z. 1990).

$$peff = Peff \cdot i \cdot (2 \cdot n \cdot VH)–1 \quad [Pa] \qquad (b)$$

where:

P_{eff} [W] – effective power

i [-] – number of strokes

2 – stroke constant

n [s^{-1}] – revolution

V_H [m^3] – overall stroke volume

The diagram area defined by binary function (revolution and effective mean pressure) provides the opportunity to present all the important parameters of the engine in one diagram.

Table 4. Basic data of consumer's prices of the test diesel oils

	Min.	Average	Max
Prices in the country			
MOL	401,9	420,6	462,9
OMV	405,9	419,1	438,9
AGIP	402,9	411,9	446,5
Prices in Budapest			
MOL	408,9	414,6	430,9
OMV	409,9	412,2	417,9
AGIP	403,9	411,3	429,0

Table 5. Consumer's prices compared with D1

	Min.	Average	Max	Average
Prices in the county				
MOL	1			
OMV	1,010	0,996	0,948	0,985
AGIP	1,002	0,979	0,965	0,982
Prices in Budapest				
MOL	1			
OMV	1,002	0,994	0,970	0,989
AGIP	0,988	0,992	0,996	0,992

The consumer prices collected and used for the economic studies are shown in Table 4 and Table 5. The later one contains the relative values compared to the D1. From both we might notice that the diesel oils with the better quality (leading to lower consumption) are cheaper too. Although the cheapest gas stations D1 is cheaper available, than D2, but based on the average value, D2 diesel oils are better with 0.4-0.6 % than D2, and with 0.8-2.1 % in case of D3. At the most expensive fuel stations (in the same sequence) we can see 3-5.2 % and 0.4-3.5 % difference. In Budapest there are smaller differences between the prices and they are also cheaper than the average value considering the country. If we take the average of the specific prices at several distributors (in relation to the country and Budapest) the same relative price level (0.987, so less than 1.3 %) can be experienced according to D1 diesel oil. According to the economy of the fuel consumption it could be stated that (in case of the above-mentioned consumer prices) the usage of D2 diesel oil generates 4.8 %, D3 diesel oil 6.2 % fuel cost saving compared to D1 (Table 6). Although the numbers of this is dissimilar in case of different speeds (D2: 2.9-6 %, D3: 4.9-7.1 %) but its standards deviation is so low (1 %) that statistically we can reliably expect these savings practically in every driving condition.

4. Conclusions

Whereas today the importance of the sustainable development and tenable survival is determinant, it is essential to recognize the engine parameters induced by both fossil fuels and renewable fuels from both energetic and environmental aspects that is the engine tests have to be performed with different quality fuels to facilitate to define the optimal engine operation ranges. Illustrating the parameters of an internal combustion engine fuelled by different kinds of fuels in function of the revolution presents clearly the differences due to quality properties and combustion technical parameters of the fuels. The measure parameters facilitate the energetic qualification of the used fuels.

In conclusion, we can say that the differences in the parameters of an engine fuelled with different diesel fuels can reach 10% under unfavorable conditions, beyond the all possible cases, which are significant differences in the machine operation. Therefore the engine tests performed with vegetable oil base biofuels always has to be preceded by investigations performed to define the engine parameters of the diesel fuel in order to facilitate the reliable analyzes and evaluations, furthermore to compose well-established, universal, innovative professional statements.

According to our examinations the differences between the specific fuel consumptions of the tested diesel oils can reach the 5 %. In conclusion, consumption differences between the tested diesel oils almost the same like expected consumption difference between the diesel oil and biodiesel. This means that with the same amount of lower-quality diesel oil, the same distance can be defined as the standard quality biodiesel. This also means that the competitiveness of biodiesel (under 20 % mixing ratio) can be evaluated only by its price difference against the diesel oil distributors. According to the economy of the fuel consumption it could be stated that (in case of the above-mentioned consumer prices) the usage of D2 diesel oil generates 4.8 %, D3 diesel oil 6.2 % fuel cost saving compared to D1. Although the numbers of this is dissimilar in case of different speeds (D2: 2.9-6 %, D3: 4.9-7.1 %) but its standards deviation is so low (1 %) that statistically we can reliably expect these savings practically in every driving condition.

With knowledge of the experimental results, the further direction of the research can be the elaboration of a mathematically well-manageable energetic system model, in which all the characteristics and parameters influencing the energetic operators can be taken into consideration, of course observing the priority requirements. It can be determined that further researches are needed to compare systematically the environmental and energy performance of biofuels.

Table 6. Costs of fuels of D2 and D3 compared with D1

Revolution 1/min	1400	1500	1800	2000	2100	2200	2300	average	dispersion
D1	1	1	1	1	1	1	1	1	0
D2	0,971	0,947	0,945	0,963	0,950	0,940	0,945	0,952	0,011
D3	0,951	0,929	0,934	0,948	0,941	0,928	0,933	0,938	0,009

References

Atabani, A. E.–Silitonga, A. S.–Badruddin, I. A.–Mahlia, T. M. I.–Masjuki, H. H.–Mekhilef, S. (2012): A comprehensive review on biodiesel as an alternative energy resource and its characteristics. Renewable and Sustainable Energy Reviews, Volume 16., Issue 4., pp. 2070–2093.

Bai A. (témafelelős), Grasselli G., Kormányos Sz, Szendrei J, Teleki A, Bói S A bio-üzemanyagok alkalmazásának tapasztalatai a debreceni tömegközlekedésben. Összefoglaló tanulmány. European Commission. 6th Framework Programme on Research, Technological Development and Demonstration Mobilis 513 562 Integrated Project. Mobility Initiatives for Local Integration and Sustainability. WP5 Clean and Energy Efficient Vehicles. Koordinátor: Debrecen MJV Önkormányzata, Toulouse-i Önkormányzat. pp. 1–164, Debrecen, 2008 szeptember 1.

Boldrin A.; Balzan A.; Astrup T.: Energy and environmental analysis of a rapeseed biorefinery conversion process. Biomass conv. Bioref. (2013) 3:127–141 doi 10.1007/s13399-013-0071-9

Bosch Automative Handbook (8th edition) – Reference handbook for academic and personal use. Robert Bosch GmbH, 2011. (p 366–441)

BP (2012): BP Statistical Review of World Energy. BP, London. 48 p.

Demirbas, A. (2008): Biodiesel. A Realistic Fuel Alternative for Diesel Engines. ISBN 978-1-84628-994-1 e-ISBN 978-1-84628-995-8 DOI 10.1007/978-1-84628-995-8 Springer-Verlag London Limited, p. 145–146

Demirbas, A. 2005. Biodiesel production from vegetable oils via catalytic and non-catalyticsupercritical methanol transesterification methods. Progress in Energy Combus Sci 31:466–487.

Dezsényi Gy., Emőd I., Finichiu L., Belsőégésű motorok tervezése és vizsgálata (Design and analysis and design of internal combustion engines); p 122–137; p 825–827, Tankönyvkiadó, Budapest 1990.

Europe 2020 – Europe's growth strategy (A strategy for smart, sustainable and inclusive growth), European Commission, Brussel 2010

F.O. LICHT (2012): F.O. Licht's World Ethanol and Biofuels Report, Volume 10. Issue 15.–Volume 11. Issue 7.

Fülöp Z., Belsőégésű motorok (Internal combustion engines); p 36–38, Tankönyvkiadó, Budapest 1990.

Gál P., Examination of the friction processes taking place in the control mechanisms of gas exchange for internal combustion engine; p 93–98, Budapest 2005.

Hancsók J.–Kovács F. (2002): A biodízel. BME-OMIKK, Budapest, 2002. 56 p.

Hancsók J. (2004): Korszerű motor- és sugárhajtómű üzemanyagok III. Alternatív motorhajtóanyagok. Veszprémi Egyetemi Kiadó, Veszprém, 2004.

Hancsók J., Lakatos I., Valasek I., Üzemanyagok és felhasználásuk (Fuels and their use); Tribotechnik, Budapest 1998.

Jante, A., Grundlagenprobleme der Verbrennungsmotoren anhand Thermodynamischer Kreisprozesse dargestellt, Technische Universitat – Dresden 1976

Jante, A., Vorlesung Verbrennungsmotoren, Als Manuskript gedruckt, Technische Universitat – Dresden 1976

Jobbágy P.–Kovács S.–Balogh P. (2012): A biodízel árváltozásainak elemzése és előrejelzése GARCH modell segítségével. VIKEK Közlemények, Volume 4., Issue 5., pp. 253–262.

Jobbágy P: A hazai biodízel ágazat komplex elemzése. Doktori (PhD) értekezés, Debreceni Egyetem, Ihrig Károly Doktori Iskola. Debrecen, 2013.

Kalligeros, S. et. al.: An investigation of using biodiesel/marine diesel blends on the performance of a stationary diesel engine, In: Biomass and Bioenergy Vol. 24, 2003 pp. 141–149

Kisdeák L (2009): A járművek kenőanyagaival kapcsolatos aktuális kérdések. Előadás a MOL Nyrt. szállító partnereinek találkozóján. 13 p.

Magyar Ásványolaj Szövetség (MÁSZ): Éves jelentés (2012), Budapest, 2013, pp. 1–28.

Moser, B. R. (2011): Biodiesel Production, Properties, and Feedstocks. . pp. 285–347. In Biofuels: Global Impact on Renewable Energy, Production Agriculture, and Technological Advancements (zzerk.: Tomes, D.–Lakshmanan, P.–Songstad, D.). Springer, New York, 2011. ISBN 978-144-197-144-9

N. Kapilan, Ashok Babu T. P., Reddy, R. P., Performance and emissions of a dual fuel operated agricultural diesel engine, Annals of Faculty Engineering Hunedoara Tome VIII, Fascicule 1, 2010 pp. 159–162

Orlin Stoyanov: Development and testing a Diesel engine diagnostic system, Annals of Faculty Engineering Hunedoara Tome XI, Fascicule 2, 2013 pp. 37–40

Popp, J.–M. Harangi-Rákos–K. Pető–A. Nagy: Bioenergy: Risks to food-, energy- and environmental security. Apstract, Agroinform Publishing House, Vol 3–4, 2013 (accepted manuscript)

Republic of Hungary national renewable energy action plan for 2010–2020. Deputy Secretariat of State for Green Economy Development and Climate Policy for the Ministry of National Development, May 2010

The current status of biofuels in the European Union, their environmental impacts and future prospects. European Academies Science Advisory Council Policy Report 19 (Sustainable biofuels), December 2012

Tóth, T.: A megújuló energiaforrások társadalmi háttérvizsgálata a Hernád-völgy településein, különös tekintettel a dendromassza-alapú közösségi hőenergia-termelésre. Doktori (Ph.D.) értekezés. Debreceni Egyetem. Természettudományi Doktori Tanács. Földtudományok Doktori Iskola. Debrecen, 2013, pp. 1–135

Ußner M.; Muller–Langer A. F.: Biofuels today and tomorrow: effects of fuel composition on exhaust gas emissions. Accred qual assur (2009) 14:685–691doi 10.1007/s00769-009-0587-7

Vas A., Belsőégésű motorok az autó- és traktortechnikában (Internal combustion engines in automobile and tractor technics); p 68–85, Mezőgazdasági Szaktudás Kiadó, Budapest 1997.

Internet: www.ksh.hu, www.oel-alle.de, www.eni.com, www.petroleum.hu, www.reuters.com/article/2013/05/09/us-brent-wti-narrows-idUSBRE94815E20130509

SENSITIVITY OF TECHNICAL EFFICIENCY ESTIMATES TO ESTIMATION METHODS: AN EMPIRICAL COMPARISON OF PARAMETRIC AND NON-PARAMETRIC APPROACHES

Henry de-Graft Acquah

Department of Agricultural Economics and Extension
University of Cape Coast, Ghana
Email: henrydegraftacquah@yahoo.com
Telephone: 00233 245 543956

Abstract: This paper highlights the sensitivity of technical efficiency estimates to estimation approaches using empirical data. Firm specific technical efficiency and mean technical efficiency are estimated using the non parametric Data Envelope Analysis (DEA) and the parametric Corrected Ordinary Least Squares (COLS) and Stochastic Frontier Analysis (SFA) approaches. Mean technical efficiency is found to be sensitive to the choice of estimation technique. Analysis of variance and Tukey's test suggests significant differences in means between efficiency scores from different methods. In general the DEA and SFA frontiers resulted in higher mean technical efficiency estimates than the COLS production frontier. The efficiency estimates of the DEA have the smallest variability when compared with the SFA and COLS. There exists a strong positive correlation between the efficiency estimates based on the three methods.

Keywords: .Technical Efficiency, Stochastic Frontier Analysis, Deterministic Frontier Analysis, Data Envelope Analysis, Tukey's Test.

Introduction

Advances in the productivity and efficiency literature have led to the development of various methods of measuring efficiency. The two most widely used approaches to evaluate the efficiency of decision making units (DMU) are the non-parametric Data Envelope Analysis (DEA) and Parametric Stochastic Frontier Analysis (SFA).

There is an on-going debate over these approaches and productivity researchers tend to have strong preference over which method to use for efficiency estimation. Majority of studies measuring technical efficiency using frontier methodology usually uses only one of the above methods at a time to estimate the production function and efficiency. Although there is a considerable amount of literature in the field of efficiency in production, only a small proportion of this literature is dedicated to comparison of measurement methods of technical efficiency. Furthermore, the findings of the few studies that investigated sensitivity of technical efficiency estimates to different methods are mixed; hence there is the need for more research to focus on comparing technical efficiency measurements from alternative models in order to determine the robustness of estimates from a particular model.

In effect, this study is by no means the first to investigate the sensitivity of technical efficiency estimates to estimation methods. However this study is significant, in the sense that it appears to be the first comparative study of frontier estimation methodologies using a well-known data set (i.e. frontier 4.1 data set). This is a departure from the numerous previous studies using lesser known empirical data for such a comparison. Furthermore, this contribution adds up to the few existing studies that shed light on the sensitivity of empirical results to the selection of the estimation techniques. It is against this background that this study investigates the sensitivity of technical efficiency predictions to estimation technique. The primary objective of this paper is to investigate the sensitivity of technical efficiency estimates to estimation techniques using the frontier 4.1 data set.

Methodology

Researchers have developed several approaches to measure technical efficiency. Based on Farrell's (1957) pioneering article, both parametric and non-parametric techniques measuring efficiency has been developed. Among the numerous

approaches, the Stochastic Frontier Analysis (SFA) and the Data Envelope Analysis (DEA) are two approaches that have been heavily used in the estimation of technical efficiency in production. Preceding the stochastic frontier model are the deterministic parametric frontier models of which the corrected ordinary least squares (COLS) approach is widely used.

The stochastic frontier approach was developed by Aigner, Lovell and Schmidt (1977) and Meeusen and Van den Broeck (1977) and the Data Envelope Analysis (DEA) was developed by Charnes, Cooper and Rhodes (1978). Subsequently, numerous authors (Kumbhaker and Lovell, 2000), Seiford and Thrall (1990), Fried et al (1993), Coelli, Rao and Battese (1998), Bravo-Ureta and Pinheiro (1993), Coelli (1995) and Cooper et al. (2000) have reviewed these approaches in the economic literature.

A major difference between the parametric and non-parametric approaches is the estimation principle. The DEA method relies on the idea of minimal extrapolation. The main advantage of the DEA is that it does not require specification of a functional form of the production function. The DEA may be applied to multiple outputs and multiple inputs with each being stated in different units. DEA is deterministic and attributes all deviations from the frontier to inefficiencies. The main disadvantage is that it is not possible to estimate parameters for the model and hence impossible to test hypothesis concerning the performance of the model. However, recently, bootstrap methods have been employed to obtain measures of statistical precision in the DEA model.

Alternatively, parametric stochastic frontier models assume that deviations from the model can be due to both noise and inefficiency. It also assumes the production function has a functional form. The principal advantage of the SFA is that it allows the test for hypothesis concerning the goodness of fit of the model. Whilst, the main disadvantage is that it requires pre-specification of the functional form and a distributional assumption for technical inefficiency.

Alternative Approaches to Technical Efficiency Estimation

This section discusses parametric and non-parametric frontier estimation. The non-parametric methods emphasize the Data Envelope Analysis (DEA) and the parametric approach emphasizes the two most commonly employed parametric alternatives: Deterministic Frontier Analysis (DFA) and Stochastic Frontier Analysis (SFA).

Deterministic Frontier Analysis (DFA)

Consider the production function below:

$$y^k = f\left(x^k;\beta\right) - u^k, \;\; u^k \overset{iid}{\sim} H, \;\; k = 1,\ldots,k, \tag{1}$$

Where H is some probability distribution with support only on R_+. The above model assumes that all deviations are the result of inefficiency. Noticeably, the deterministic model assumes that there is no noise in the data like a DEA model. The above equation can be estimated using the OLS. However there are problems in using OLS to estimate this production function. Greene (1980), notes that the OLS estimator is biased downwards in this estimation. As a result of this problem, it is possible for the estimated residuals of the model to have the incorrect signs. However, since the calculations of technical efficiency relies on these residuals being non negative, Greene (2008) suggest a correction for this bias by shifting beta hat, $\hat{\beta}$ the OLS estimator of β_0 upward by the largest positive residual. This two-step procedure is known as the Corrected Ordinary Least Squares (COLS) method. The COLS involves two steps.

First is to make an ordinary least square estimate of the value of β

$$\min_{\beta} \sum_{k=1}^{K} \left(y^k - f\left(x^k;\beta\right)\right)^2 \tag{2}$$

Second, find the smallest possible correction of the intercept $\beta_0$to β_{00} to ensure that all observations are below the production frontier. In short adjust β_0 upward with the maximum error term.

$$\beta_{00} = \max\left\{y^k - f(x^k;\hat{\beta}) \middle| k = 1,\ldots,K\right\} \tag{3}$$

Stochastic Frontier Analysis (SFA)

The stochastic frontier model includes both a stochastic error term and a term that can be characterized as inefficiency. The model can be specified as follows:

$$y^k = f(x^k;\beta) + v^k - u^k$$

$$v^k \sim N(0,\sigma_v^2), \;\; u^k \sim N_+(0,\sigma_u^2), \;\; k = 1\ldots,K \tag{4}$$

The v term takes care of the stochastic nature of the production process and possible measurements errors of inputs and outputs and the u term is the possible inefficiency of the firm. We assume that the term v and u are independent. If u=0, the firm is 100% efficient and if u>0 there is some inefficiency. The N_+ denotes a half normal distribution. That is a truncated normal distribution where the point of truncation is 0 and the distribution is concentrated on the half-interval.

Data Envelopment Analysis

DEA is a linear programming based technique for measuring the relative performance of organizational units where the presence of multiple inputs and outputs make comparisons difficult.

Assuming that there are n DMU, each with m inputs and s outputs, the relative efficiency score of a test DMU p is obtained by solving the following model proposed by Charnes et al. (1978):

$$\max \frac{\sum_{k=1}^{s} v_k y_{kp}}{\sum_{j=1}^{m} u_j x_{jp}}$$

$$\frac{\sum_{K=1}^{s} v_k y_{ki}}{\sum_{j=1}^{m} u_j x_{ji}} \leq 1 \forall i$$

$$v_k, u_j \geq 0 \forall k, j \tag{5}$$

Where

K = 1 to s, j = 1 to m, i = 1 to m

y_{ki} = amount of output k produced by DMU I,

x_{ji} = amount of input j utilized by DMU i

v_k= weight given to output k,

u_j= weight given to input j

In order to solve the model, we need to convert it into a linear programming formulation.

$$\max \sum_{k=1}^{s} v_k y_{kp}$$

$$s.t \sum_{j=1}^{m} u_j x_{jp} = 1$$

$$\sum_{k=1}^{s} v_k y_{ki} - \sum_{j=1}^{m} u_j x_{ji} \le 0 \forall i$$

$$v_k, u_j \ge 0 \forall k, j \qquad (6)$$

The dual problem can be specified as follows:

$$\min \theta$$

$$\sum_{i=1}^{n} \lambda_i x_{ji} - \theta x_{jp} \le 0 \forall j$$

$$\sum_{i=1}^{n} \lambda_i y_{ki} - y_{kp} \ge 0$$

$$\lambda_i \ge 0 \forall i \qquad (7)$$

Where

θ efficiency score, and λs = dual variables

Analysis Of Variance and Tukey's Test

The analysis of variance is employed to compare three or more means for statistical significance. It involves simultaneous comparison of means using the F test. Fundamentally, variances are analyzed to make inferences about population means. Tukey's test is used in conjunction with an analysis of variance to find means that are significantly different from each other.

Results

Comparing DEA, SFA and COLS efficiencies

In order to calculate firm specific technical efficiency using alternative methods, we use the well known data sets provided with Tim Coelli's frontier 4.1. The data consist of the output of 60 firms (y) and variables labour and capital as the input variables of these firms. Subsequently, the technical efficiency of the 60 firms is computed using alternative methods namely, Data Envelope Analysis (DEA), Stochastic Frontier Analysis (SFA) and Corrected Ordinary Least Squares (COLS). For the purpose of brevity, I will denote DEA technical efficiency, SFA technical efficiency and COLS technical efficiency by teDEA, teSFA and teCOLS respectively in the rest of this paper.

The results in Table 1 indicate that the efficiency scores of the firms derived using the 3 methods, ranged between 20 to 100%. At lower levels of efficiency (<50%), SFA and COLS obtained 3 and 38 firms respectively whilst DEA recorded no firm. At moderate levels of efficiency (50 to 79%), SFA reported 33 firms, DEA reported 20 and COLS reported 21 firms. At higher levels of efficiency (>80%), SFA recorded 24 firms, DEA recorded 40 firms and COLS reported 1 firm.

Table 1. Frequencies and Cumulative Frequencies of Technical Efficiency Estimates of Firms obtained with DEA, SFA and COLS

Percent	teSFA Freq F	C. F	teDEA- Freq F	C. F	teCOLS Freq F	C. F
10–19	0	0	0	0	1	1
20–29	0	0	0	0	8	9
30–39	1	1	0	0	11	20
40–49	2	3	0	0	18	38
50–59	6	9	3	3	14	52
60–69	9	18	4	7	6	58
70–79	18	36	13	20	1	59
80–89	22	58	21	41	0	59
90–99	2	60	14	55	0	59
100	0	60	5	60	1	60

The average efficiencies of the three methods are presented in Table 2. The average efficiencies tend to differ among the three methods studied. The teDEA approach provided a higher mean efficiency of 83.37%, this is followed by teSFA and teCOLS approaches with 74.08% and 45.45% respectively. The coefficient of variation (CV) which is defined as the standard deviation expressed as a percentage of the mean is also investigated. The teCOLS method tends to have the largest CV of 31.72 %. This followed by teSFA and teDEA methods with CVs of 17.36% and 13.37% respectively as indicated in Table 2.

In order to investigate whether there is a significant difference in means between the efficiency scores from different methods, the analysis of variance (ANOVA) and Tukey's HSD (Honest Significance Difference) test were applied. The anova test (p-value=2e-16) suggest a significant difference among the scores from the three efficiency techniques as illustrated in Table 3. Using Tukey's HSD follow up test indicates that significant differences exist between teSfa and teDae, teCols and teDae, and teCols and teSfa as shown in Table 4.

Table 2. Average Efficiencies with Standard Deviation (S.D) and Coefficients of Variation (CV) according to the Different Estimation Methods

Model	Mean	S.d	CV (%)
teSFA	74.0833	12.8621	17.3617
teDEA	83.3667	11.1430	13.3663
teCOLS	45.45	14.4204	31.7279

Table 3. Analysis of Variance of Technical Efficiency Estimates of Firms obtained with DEA, SFA and COLS

	Df	Sum Sq	Mean Sq	F value	Pr (>F)
Method	2	46 874	23 437	141.3	<2e-16 ***
Residuals	177	29 355	166		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 4. Tukey's Honest Significance Difference test of Technical Efficiency Estimates of Firms obtained with DEA, SFA and COLS

method	diff	lwr	upr	p adj
teSfa – teDae	–9.283333	–14.84071	–3.725953	0.0003327
teCols – teDae	–37.916667	–43.47405	–32.359286	0.0000000
teCols – teSfa	–28.633333	–34.19071	–23.075953	0.0000000

Table 5. Correlation Analysis of the Efficiency Estimates between the Different Methods.

	teDEA	teSFA	teCOLS
teDEA	1.0000	0.8169	0.7892
teSFA	0.8169	1.0000	0.9191
teCOLS	0.7892	0.9191	1.0000

Table 5 provides the results of the correlation analysis between the actual values of the efficiency estimates from the three different methods. The correlation between the DEA and SFA efficiencies is 0.82, suggesting that the two kind of efficiencies are highly correlated, but they are not perfectly correlated. Similarly, Bogetoft and Otto (2011) in an empirical study noted that the correlation between DEA and SFA efficiencies as 0.78. They suggest that the two kinds of efficiencies are highly correlated.

The evidence of a strong correlation between teSFA and teDEA can also be seen in Figure 1 where there is a clear positive slope in the connection in the points. It is also obvious that the correlation between parametric methods tends to be stronger (0.92) than correlation between parametric and non parametric methods (0.82). Noticeably, it is also clear that there are several firms with DEA efficiency of 100% that have much lower SFA efficiency. There is even a firm with DEA efficiency of 100% and SFA efficiency of 57%.

Figure 2 shows three different boxplots representing efficiency scores derived from three estimation methods namely: DEA efficiency (teDEA), SFA efficiency (teSFA) and COLS efficiency (teCOLS). It is obvious that the mean and median differ between the three methods and the spread in the DEA efficiencies is much smaller than the spread in the SFA and COLS methods. It can also be noted that the median is lower for COLS efficiency and that, there are only a few firms with very high efficiency.

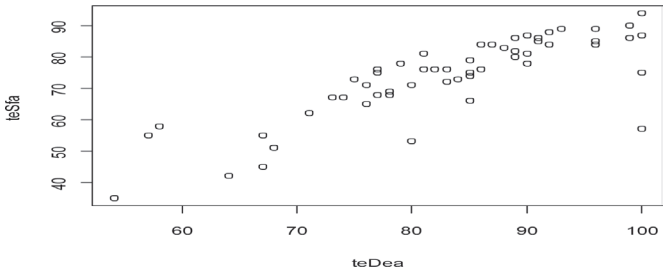


Figure 1. Scatterplot showing the Correlation between teSFA and teDEA

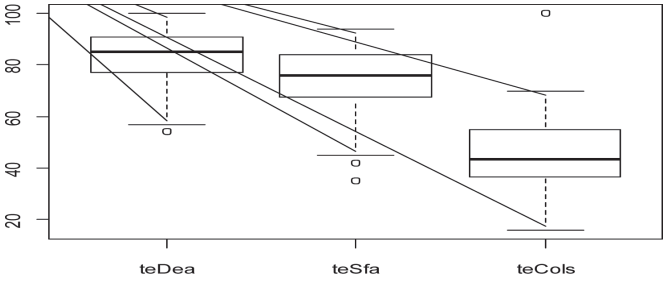


Figure 2. A Boxplot of the Different Estimation Methods

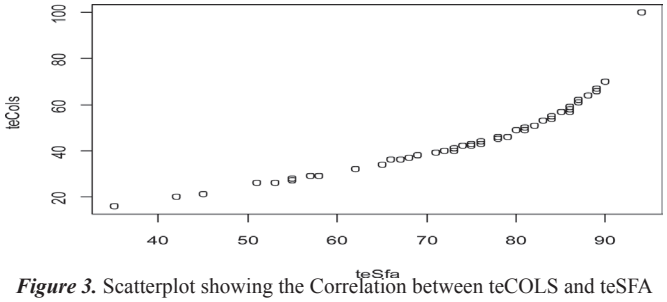


Figure 3. Scatterplot showing the Correlation between teCOLS and teSFA

The relationship between SFA and COLS efficiency is illustrated in Figure 3, where it is clear that for almost all firms the COLS efficiency is lower than the SFA efficiency except a few with very high COLS efficiency. This is expected as the COLS efficiency is constructed such that at least one firm has an efficiency of 1, which corresponds to the firm with the largest OLS error.

The histogram of the efficiency estimates of the 3 methods differ in the shape of their distribution. Noticeably, the histogram of teDEA shows more uniform distribution of efficiency estimates when compared to those of teSFA and teCOLS.

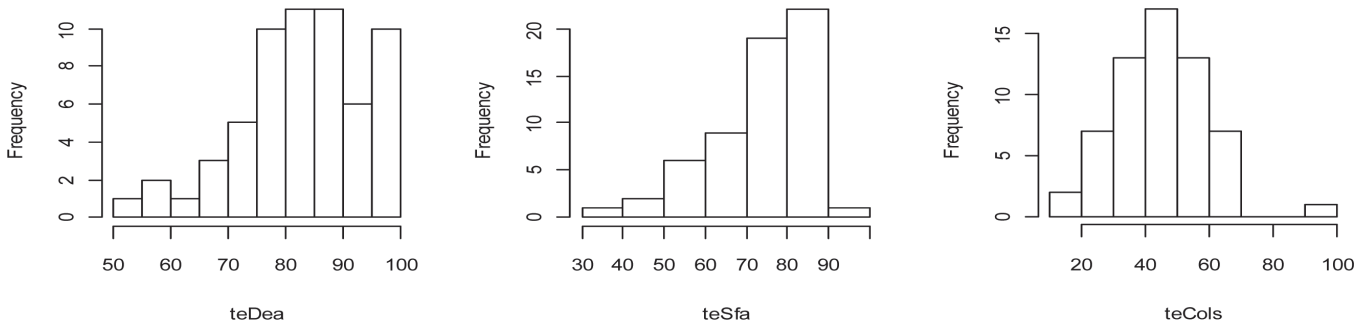


Figure 4. Histogram of Technical Efficiency Scores

Discussion

The results presented shows that the actual values of the efficiency estimates differ between the three competing methods. These differences in estimates may be attributed to the methodological differences in the different methods used. Mean technical efficiency is found to be sensitive to the choice of estimation method. Statistical test such as ANOVA and Tukey's HSD suggest significant difference in means between the efficiency scores from different methods. DEA and SFA frontiers resulted in higher mean technical efficiency estimates than the COLS production frontier. The different technical efficiency estimates provided by the different methods might have different policy implications since they imply different levels of firm capacity. These results suggest that the different methods lead to differences in conclusion. The findings of the current study are consistent with those of some studies. Jaforullah and Premachandra (2003) found that mean technical efficiency of the dairy industry is found to be sensitive to the choice of estimation method. They noted that generally, the SFA and DEA frontiers resulted in higher mean technical efficiency estimates than the COLS production frontier. Similarly, Bravo-Ureta and Rieger (1990) found that estimates of technical efficiencies vary across frontier estimation methods. Fundamentally, using one of the three techniques could lead researchers to entirely different conclusions due to the significant differences in efficiency scores between the methods.

The results from the research further revealed that efficiency estimates derived from the different methods tends to differ in the extent to which they vary. The results suggest that efficiency estimates from teCOLS is more variable when compared with efficiency estimates of teSFA and teDEA methods. Notably, teDEA efficiency estimates has the smallest variability among the three methods.

Though the actual values of the estimates differ between the methods but the estimates based on the three methods are highly correlated. This is consistent with Neff, Garcia and Nelson (1993) who found the correlation between the parametric measures to be higher than the correlation between parametric and non-parametric models. The presence of a strong positive correlation between the different efficiency estimates in this research suggests that the methods can be used concurrently to provide a holistic perspective of firm specific efficiency analysis.

It can be noted that the differences in methodology between the DEA, SFA and COLS accounts for the different results that were presented. These results are consistent with Bogetoft and Otto (2011) who found that several firms with a DEA efficiency of 1 that has much lower SFA efficiency. For example using a scatter plot they noted that there was a firm with a DEA efficiency of 1 and SFA efficiency of 0.6. Furthermore, Bogetoft and Otto (2011) using box plots found that the median is lower for COLS efficiency when compared with DEA and SFA efficiency. They found that for most firms they studied, the COLS efficiency was lower than the SFA efficiency. The significant differences in efficiency scores observed from different methods in the current study certainly have implications for the conclusions which can be derived for policy. It remains imperative that researchers employ an integrated approach that takes into consideration competing methods whilst modelling efficiency of decision making units.

Conclusion

Parametric and non parametric approaches of computing technical efficiency of decision making units have been developed. This study investigated the effect of the different methods on efficiency scores, by estimating technical efficiency from parametric and non parametric methods. The results indicates that though the actual values of the efficiency estimates differ between the alternative approaches of estimating technical efficiency, there exists a strong positive correlation between the efficiency estimates based on the three methods. Mean technical efficiency is found to be sensitive to the choice of estimation technique. Statistical test suggest significance difference in means between efficiency scores from different methods. On the basis of these results, this study argues that differences in conclusions are possible when the alternative methods of measuring technical efficiency such as the DEA, SFA and COLS are applied. Importantly, the methodologies in the DEA and SFA are very different and that is an important reason for the different results. Moreover, the differences in technical efficiency estimates provided by the alternative models might have different policy implications since they imply different levels of firm capacity. The presence of a strong positive correlation between the different efficiency estimates, suggest that the methods can be used concurrently to provide a holistic view of firm specific efficiency analysis. In effect, in estimating mean technical efficiency of an industry, it is advisable that one applies different methods of efficiency estimation as opposed to a single approach since the measurement of technical efficiency is sensitive to the choice of estimation method. Thus applying the approaches concurrently will produce better information on the technical efficiency of the industry by producing a range within which the true technical efficiency may lie.

Acknowledgements

The author is grateful to Dr. Edward Ebo Onumah and two anonymous reviewers for valuable comments.

Reference

Aigner, D.J., Lovell, C. A. K. and **Schmidt, P.** (1977): Formulation and estimation of stochastic frontier production function models. Journal of Econometrics 6: 21–27.

Bogetoft, P. and **Otto, L** (2011): Benchmarking with DEA, SFA and R. New York: Springer.

Bravo-Ureta B.E and **Pinheiro A.E.** (1993): Efficiency Analysis

of Developing Country Agriculture: A Review of Frontier Function, Agricultural and Resource Economics Review 22: 88–101.

Bravo-Ureta, B. E. and **Rieger, L.** (1990): Alternative production frontier methodologies and dairy farm efficiency. Journal of Agricultural Economics 41: 215–226.

Charnes, A., Cooper, W. W. and **Rhodes, E.** (1978): Measuring the efficiency of decision making units. European Journal of Operations Research 2: 429–444.

Coelli, T. J. (1995): Recent developments in frontier modelling and efficiency measurement. Australian Journal of Agricultural Economics 39: 219–245.

Coelli T.J., Rao D.S.P. and **Battese G.E.** (1998): An introduction to Efficiency and Productivity Analysis. Boston: Kluwer Academic Publishers.

Cooper, W.W., Seiford, M.L. and **Tone, K.** (2000): Data Envelopment Analysis: A Comprehensive Text With Models, Applications, References and DEA-Solver Software. Boston: Kluwer Academic Publishers.

Farrell, M. J. (1957): The measurement of productive efficiency. Journal of the Royal Statistical Society A120: 253–290.

Fried H.O., Knox Lovell C.A. and **Schmidt S.S.** (eds.) (1993): The Measurement of Productive Efficiency: Techniques and Applications. New York: Oxford University Press.

Greene, W. H. (2008): Econometric Analysis. (six edn) Pearson Prentice Hall

Greene, W. H. (1980): Maximum likelihood estimation of econometric frontier functions. Journal of Econometrics 13: 27–56.

Jaforullah, M. and **Premachandra, E.** (2003): Sensitivity of Technical Efficiency to estimation approaches: An Investigation using New Zealand Dairy Industry Data. University of Otago Economic Discussion Papers No. 0306.

Meeusen, W. and **van den Broeck, J.** (1977): Efficiency estimation from CobbDouglas production functions with composed error. International Economic Review 18: 435–444.

Neff, D. L., Garcia, P. and **Nelson, C. H.** (1993): Technical efficiency: A comparison of production frontier methods. Journal of Agricultural Economics 44: 479489.

Kumbhakar, S.C. and **Lovell, C.** (2000): Stochastic Frontier Analysis. Cambridge: Cambridge University Press.

Seiford, M.L. and **Thrall, R.M.** (1990): Recent Developments in DEA: The Mathematical Programming Approach to Frontier Analysis, Journal of Econometrics 46: 7–38.

ANALYZING SOUNDNESS OF NATIONALIZED BANKS IN INDIA: A CAMEL APPROACH

S.K.Khatik- Amit Kr Nag

Barkatullah University, Bhopal, India

Abstract: Performance of the economy of any country is largely dependent on the performance of its banking sector. Since, banking sector constitutes a major component of the financial service sector. Soundness of the banking sector is essential for a healthy and vibrant economy. The efficiency, productivity, profitability, stability and a shock free economy is possible only when a country is having a sound and healthy banking sector. The present research work has been undertaken to analyze the soundness of five nationalized banks in India. In order to measure the performances of these banks CAMEL MODEL Approach has been applied, incorporating important parameters like Capital Adequacy, Assets Quality, Management Efficiency, Earnings Quality and Liquidity. The finding of the study shows that Bank of Baroda has been ranked at the top position, the Union Bank of India and Dena Bank secured the 2nd position, the next was the State Bank of India which secured the 4th position and in the last position was the UCO Bank which secured the 5th position.

Keywords: Capital Adequacy, Assets Quality, Management Efficiency, Earning Quality and Liquidity.
JEL Code: G2, G12, G21, G32& G33.

Introduction

The banking arena in the country has witnessed significant changes in the last two decades due to the outbreak of reforms in the financial sector. The process of liberalization initiated in 1991 has made ingress of new private sector banks possible and permitted the foreign sector banks to increase their branches in the banking sector. As a result of which, the nationalized banks were forced to face the cutthroat competitions created in the market, which is created due to the entry of private banks, foreign banks and NBFC's. The private banks and foreign banks are coming up with their attractive policies and providing the customer with better services with the aid of hi-technology and new ways of providing convenience to customer. Influenced by the new found technology and increased thrust on product innovation, the nationalized banks in the country also witnessed a phenomenal growth in the last two decades. In the above background it is essential to examine the financial soundness of nationalized banks by using the CAMEL Model. Since, CAMEL Model attempts to detect problems before they manifest themselves. CAMEL model is basically a ratio based model used for evaluating the performance of banks and is used for ranking or rating of the banks.

Review of literature

Prasuna (2003) opinioned that 'tough competition amongst the banks benefits the consumers with better facilities, innovative products and better bargains'. A competitive banking system promotes the efficiency and therefore important for growth, but market power is necessary for stability in the banking system (Northcott, 2004). Bodla and Verma (2006) emphasized that the prime objective of the CAMEL model of rating banking institutions is to catch up the comparative performance of various banks. In the views of Ghosh Saibal (2010), privatization improves bank soundness, enhances profitability and efficiency since government ownership has been empirically proven to be detrimental to growth. Goyal Krishna A., (2010) analyzes the various risk management measures and strategies in place in India owing to increase in competition, deregulation, innovative financial instruments and delivery channels.

A profitable and sound banking sector is at a better point to endure adverse upsets and adds performance in the financial system (Athanasoglouet al., 2008). Sen Gupta (2011) paper deals with the introduction of Basel III norms post the 2008 financial crisis, and the challenges associated with its implementation in India. Chaudhary Sahila and Sultan Singh (2012) analyze the impact of the financial reforms of 1991 on the increase in soundness of Indian Banking through its impact on the assets quality. According to them the key players to ensure this soundness are again, risk management, NPA levels, effective cost management and financial inclusion.

Importance of the study

With the emergence of the private sector banks as well as with increase in competition from foreign banks, the nationalized banks were forced to restructure their activities and were

obliged to improve professionalism in the banking activities. Increase in competition and the insistence on profitability has compelled the nationalized banks to move towards economic oriented model, leaving the social approach followed for decades. Against this back ground, it is imperative to measure the soundness of the banking sector through a performance measurement system that provides an opportunity to assess the performances of these nationalized banks.

Objective of the study

This study has the following objectives:

- To analyze the concept of CAMEL Model approach.
- To examine the Capital Adequacy, Assets Quality, Management Efficiency, Earning Quality and Liquidity of nationalized banks.
- To study the overall performances and soundness of nationalized banks with the help of CAMEL Model approach.

Hypothesis of the study

Ho: There is no significant difference in the performances and soundness of the five nationalized banks on the basis of CAMEL Approach.

Methodology

For the study, statistical data has been collected from various annual reports published periodically by the Nationalized Banks. The statistical techniques like percentage, averages, coefficient of variation, one way ANOVA have also been applied. For proper analysis and evaluation of operational performance and financial strength, the individual items of profit and loss accounts and balance sheet have also been regrouped.

Limitations of the study:

Limitations are always a part of any kind of research work, as the report is mainly based on secondary data; proper care must be taken in knowing the limitations of the required study.

1. The financial performance of the company is shown just for the last six years, ending 2013. Hence, any uneven trend before or beyond the set period will be the limitations of the study.
2. This analysis is based on only monetary information, analysis of the non monetary factors are ignored.
3. As per the requirement of the study some data have been grouped and sub grouped.

Performance Measurement of Nationalized Banks on the basis of CAMEL Model

CAMEL model is the mechanism which is used for the critical analysis of the balance sheet of banks and the presentation of such analysis to provide for the assessment of the health of the banks. In the present research work, CAMEL model has been used as a measuring rod to measure the capital adequacy, assets quality, management efficiency, earning quality and liquidity of five nationalized banks.

Capital Adequacy Ratio

Capital Adequacy indicates the financial health of a banking unit. Capital Adequacy maintains depositors' confidence and promotes the stability and efficiency of financial system. Capital Adequacy reflects the overall financial conditions of banks and its ability to meet the need for additional capital. It also shows the bank's ability to meet financial instability. Banks have to maintain Capital Adequacy as specified by RBI. As per RBI norms, Banks in India should have Capital Adequacy of 12%. It is calculated as follows:

$$Capital\ Adequacy\ Ratio = \frac{(Tier\ I + Tier\ II)\ Capital}{Risk\ Weighted\ Assets} \times 100$$

Interpretation

Table no.1, states the capital adequacy ratio of five nationalized banks. In the year 2007–2008 the State Bank of India had the highest CAR with 13.54% followed by Bank of Baroda (BOB) with 12.91%. The Union Bank was next with 12.51% followed by 11.09% by the DENA Bank and in the last position was UCO Bank with 10.09%. In the year 2008–2009 the CAR for SBI decreased to 12.97% followed by BOB to 12.88%. The highest in this year was of Union Bank with 13.27% and the lowest was of UCO Bank with 9.75%. In the year 2009–2010, the CAR was highest for BOB with 12.84% followed by DENA Bank with 12.77%. The lowest was of UCO bank with 11.35%. In the year 2010–2011, the CAR was highest of DENA Bank with 13.41% followed by BOB with 13.02%. In the year 2011–2012, the CAR of BOB was highest with 12.95% followed by SBI with 12.05%. In the year 2012–2013, the CAR was highest for UCO Bank 12.42% followed by BOB with 12.09%. The overall average of Capital Adequacy Ratio was highest of BOB with 12.78% followed by Union Bank with 12.42%. On the basis of Capital Adequacy Ratio, the BOB was having the 1st rank followed by Union Bank of India which was having the 2nd rank. The 3rd rank was of SBI followed by DENA Bank which was having the 4th rank and the last rank was of UCO Bank. The Standard Deviation was highest of State Bank of India with 0.97 and lowest of Bank of Baroda with 0.31. The coefficient of variation was highest of UCO Bank with 8.45% and the lowest was of Bank of Baroda with 2.46%.

Table No. 1: Capital Adequacy Ratio (%)

Year	State Bank of India	Bank of Baroda	Union Bank of India	Dena Bank	UCO Bank
2007–2008	13.54	12.91	12.51	11.09	10.09
2008–2009	12.97	12.88	13.27	12.07	9.75
2009–2010	12.00	12.84	12.51	12.77	11.35
2010–2011	10.69	13.02	12.95	13.41	11.87
2011–2012	12.05	12.95	11.85	11.51	11.03
2012–2013	11.22	12.09	11.45	11.03	12.43
Mean	12.08	12.78	12.42	11.98	11.09
Rank	3	1	2	4	5
S.D.	0.97	0.31	0.62	0.87	0.94
C.V.	8.00	2.46	4.97	7.30	8.45

Source: Compiled from the annual reports of the respective banks. (From 2008–2013)

Table No. 2: Net NPA to Net Advances Ratio

Year	State Bank of India	Bank of Baroda	Union Bank of India	Dena Bank	UCO Bank
2007–2008	1.78	0.47	0.17	0.94	1.98
2008–2009	1.79	0.31	0.34	1.09	1.18
2009–2010	1.72	0.34	0.81	1.21	1.17
2010–2011	1.63	0.35	1.19	1.22	1.84
2011–2012	1.82	0.54	1.7	1.01	1.96
2012–2013	2.1	0.24	1.79	1.39	3.17
Mean	1.81	0.38	1.00	1.14	1.88
Rank	4	1	2	3	5
S.D.	0.14	0.10	0.62	0.15	0.67
C.V.	8.02	26.79	62.06	13.03	35.46

Source: Compiled from the annual reports of the respective banks. (From 2008–2013)

Assets Quality

Assets Quality is an important tool to judge the degree of financial strength. It determines the component of non-performing assets as a percentage of total assets. It shows the types of debtors the banks are having. It is a measure of quality of assets when management has not provided for loss on NPAs. It is calculated as follows:

$$\textit{Net NPA to Net Advances Ratio} = \frac{\textit{Net NPA}}{\textit{Net Advances}}$$

Interpretation

Table no.2, states the Net NPA to Net Advances Ratio of five nationalized banks. According to the above study, in the year 2007–2008, the Net NPA to Net Advances Ratio was highest of UCO Bank with 1.98 followed by SBI with 1.78. The lowest Net NPA to Net Advances Ratio was 0.47 of BOB. In the year 2008–2009, the highest Net NPA to Net Advances Ratio was of SBI with 1.79 followed by UCO Bank with 1.18. The lowest Net NPA to Net Advances Ratio was of BOB with 0.31. In the year, 2009–2010 the Net NPA to Net Advances Ratio was highest of SBI with 1.72 followed by DENA Bank with 1.21. In the year, 2010–2011, the Net NPA to Net Advances Ratio was highest of UCO Bank with 1.84 followed by SBI with 1.63. In the year, 2011–2012, the Net NPA to Net Advances Ratio was highest of UCO Bank with 1.96 followed by SBI with 1.82. The Lowest Net NPA to Net Advances Ratio in this year was of BOB with 0.54. In the year 2012–2013, the Net NPA to Net Advances Ratio was highest of UCO Bank with 3.17 followed by SBI which was 2.1 and the lowest was of BOB with 0.24. The overall average of the Net NPA to Net Advances Ratio was highest of UCO Bank with 1.88 followed by SBI with 1.81. The next was DENA Bank with 1.14 followed by Union Bank of India with 1.00 and at last it was BOB with 0.38. On the basis of ranking, the BOB was ranked 1st, Union Bank of India was ranked 2nd, the DENA Bank was ranked 3rd, the SBI was ranked 4th and the UCO Bank was ranked 5th. The Standard Deviation was highest of UCO Bank with 0.67 and lowest of Bank of Baroda with 0.10. The coefficient of variation was highest of Union Bank of India with 62.06% and the lowest was of SBI with 8.02%.

Management Efficiency

Ratios in this area involve subjective analysis and efficiency of management. It shows management capability to assign premium to better quality bank and discount the poorly managed ones. For measuring the management efficiency, business per employee has been calculated. Business per employee attempts to measure the efficiency of all the employees of a bank in generating business for the bank. It is calculated as follows:

$$\textit{Business per Employce Ratio} = \frac{\textit{Total Business}}{\textit{Total Employees}}$$

Interpretation

Table no.3, states the business per employee of the five nationalized banks. In the year 2007–2008, the business per employee was highest of Bank of Baroda with 7.04, followed by Union Bank of India which was 6.2. The lowest in this ratio was of State Bank of India which was 4.56. In the year, 2008–2009, the business per employee was highest of Bank of Baroda which was 9.13, followed by UCO Bank with 7.32 and the lowest in this year was 5.56 of State Bank of India. In the next year 2009–2010, business per employee was highest of Bank of Baroda which was 9.81, followed

Table No. 3: Business per Employee (Per Lakh)

Year	State Bank of India	Bank of Baroda	Union Bank of India	Dena Bank	UCO Bank
2007–2008	4.56	7.04	6.2	5.76	5.8
2008–2009	5.56	9.13	6.94	7.31	7.32
2009–2010	6.36	9.81	8.53	8.27	9.01
2010–2011	7.05	12.29	10.43	10.99	11.36
2011–2012	7.98	14.66	10.7	13.17	12.47
2012–2013	8.07	16.89	12.15	14.75	13.43
Mean	6.60	11.64	9.16	10.04	9.90
Rank	5	1	4	2	3
S.D.	1.26	3.36	2.12	3.21	2.75
C.V.	19.14	28.91	23.17	31.96	27.81

Source: Compiled from the annual reports of the respective banks. (From 2008–2013)

Table No. 4: Return on Average Assets Ratio (%)

Year	State Bank of India	Bank of Baroda	Union Bank	Dena Bank	UCO Bank
2007–2008	1.01	0.89	1.26	1.06	0.52
2008–2009	1.04	1.09	1.27	1.02	0.59
2009–2010	0.88	1.21	1.25	1.01	0.87
2010–2011	0.71	1.33	1.05	1	0.66
2011–2012	0.88	1.24	0.79	1.08	0.69
2012–2013	0.91	0.9	0.79	0.86	0.33
Mean	0.91	1.11	1.07	1.01	0.61
Rank	4	1	2	3	5
S.D.	0.11	0.17	0.21	0.07	0.17
C.V.	11.81	15.08	19.70	7.03	27.05

Source: Compiled from the annual reports of the respective banks. (From 2008–2013)

by UCO Bank which was 9.01 and the lowest was of State Bank of India with 6.36. In the year 2010–2011, the business per employee was highest of Bank of Baroda which was 12.29, followed by UCO Bank which was 11.36 and the Lowest was 7.05 which was of State Bank of India. In the year, 2011–2012, the business per employee was highest of Bank of Baroda which was 14.66, followed by 13.17 which was of DENA Bank. The lowest business per employee for this year was of State Bank of India being 7.98. In the next year of 2012–2013, the highest business per employee was f Bank of Baroda which was 16.89, followed by 14.75 of DENA Bank. The lowest in this year was of 8.07 of SBI. The mean was highest of Bank of Baroda with 11.64, followed by DENA Bank with 10.04. The Bank of Baroda ranked 1st, DENA Bank 2nd, UCO Bank3d, Union Bank of India 4th an SBI 5th. The Standard Deviation was highest of Bank of Baroda with 3.36 followed by DENA Bank with 3.21 and lowest of State Bank of India with 1.26. The coefficient of variation was highest of DENA Bank with 31.96% followed by Bank of Baroda with 28.91 and the lowest was of SBI with 19.14%.

Earning Quality

Earning Quality shows the ability of a bank to earn regularly. It also explains the sustainability and growth in earnings in the future. This factors gains importance on the fact that much of the banks income come through non -core activities i.e., investments, treasury operations and so on. This ratio expresses the quality of income in form of income generated by core activities income. For measuring the earning quality of five nationalized banks return on average assets ratio was applied which measures the efficiency in utilization of assets. It is calculated as follows:

$$\textit{Return on Average Assets Ratio} = \frac{\textit{Net Profit}}{\textit{Averange Assets}} \times 100$$

Interpretation

Table no. 4, states the Return on Average Assets ratio of the five nationalized banks of India. In the year, 2007–2008, the Return on Average Assets ratio was highest of the Union Bank of India with 1.26, followed by DENA Bank with 1.06. The lowest Return on Average Assets ratio was of UCO Bank with 0.52. In the next year 2008–2009, the highest Return on Average Assets ratio was of Union Bank of India with 1.27, followed by Bank of Baroda with 1.09 and the lowest was of UCO Bank with 0.59. In the year 2009–2010, the highest Return on Average Assets ratio was of Union Bank of India with 1.25, followed by Bank of Baroda with 1.21 and the lowest of Return on Average Assets ratio was of UCO Bank with 0.87. In the year 2010–2011, the highest Return on Average Assets ratio was of Bank of Baroda with 1.33, followed by Union Bank of India with 1.05 and the lowest was of UCO Bank with 0.66. In the year 2011–2012, the highest Return on Average Assets ratio was of Bank of Baroda with 1.24, followed by DENA Bank with 1.08 and the lowest was of UCO Bank with 0.69. In the last year 2012–2013, the Return on Average Assets ratio was highest of SBI with 0.91, followed by Bank of Baroda with 0.90 and the lowest was of UCO Bank with 0.33. The overall average was highest of Bank of Baroda with 1.11, followed by Union Bank of India with 1.07 and the lowest was of UCO Bank with 0.61. Accordingly, the Bank of Baroda was ranked 1st, Union Bank of India 2nd, DENA Bank 3rd, SBI 4th and UCO Bank 5th. The Standard Deviation was highest of Union Bank of India with 0.21, followed by Bank of Baroda and UCO Bank with 0.17. The coefficient of variation was highest of UCO Bank with 27.05% followed by Union Bank of India with 19.70%.

Liquidity

Liquidity of a bank represents its ability to meet its financial responsibilities. Maintaining correct level of liquidity is

important for ensured growth and earning. Banks have to be more careful in investments in order to create more profit on investment as well as to provide liquidity to the depositors. High Liquidity ratio shows the banks efficiency. For measuring the liquidity of five nationalized banks liquid assets to total assets ratio was applied which measures the overall liquidity position of the bank. It is calculated as follows:

$$\textit{Liquid Assets to total Assets Ratio} = \frac{\textit{Liquid Assets}}{\textit{Total Assets}}$$

Interpretation

Table no. 5, shows the Liquid Assets to Total Assets Ratio of the five nationalized banks of India. In the year 2007–2008, the highest Liquid Assets to Total Assets Ratio was of Bank of Baroda with 0.1242, followed by SBI with 0.1234 and the lowest was of UCO Bank with 0.0871. In the next year 2008–2009, the Liquid Assets to Total Assets Ratio was of SBI being 0.1299, followed by DENA Bank with 0.1209 and the lowest was of UCO Bank with 0.0972. In the year 2009–2010, the highest Liquid Assets to Total Assets Ratio was of Bank of Baroda which was 0.1274, followed by SBI with 0.1061. In the following year 2010–2011, the highest Liquid Assets to Total Assets Ratio was Bank of Baroda with 0.1393, followed by SBI with 0.1269. In the year 2011–2012, the highest Liquid Assets to Total Assets Ratio was of Bank of Baroda with 0.1435, followed by SBI with 0.0955 and the lowest of Union Bank of India with 0.0598. In the last year 2012–2013, the highest Liquid Assets to Total Assets Ratio was of Bank of Baroda with 0.1561, followed by SBI with 0.0927 and the lowest Liquid Assets to Total Assets Ratio was of Union Bank of India with 0.052. The highest overall average of Liquid Assets to Total Assets Ratio was of Bank of Baroda with 0.1327 and the lowest was of Union Bank of India with 0.0781. Accordingly, the Bank of Baroda was ranked 1st, State Bank of India 2nd, DENA Bank 3rd, UCO Bank 4th and Union Bank of India 5th. The highest Coefficient of variation was 21.55 of Union Bank of India and lowest was of Bank of Baroda with 12.02.

Table No. 5: Liquid Assets to Total Assets Ratio

Year	State Bank of India	Bank of Baroda	Union Bank	Dena Bank	UCO Bank
2007–2008	0.1234	0.1242	0.0913	0.1045	0.0871
2008–2009	0.1299	0.1059	0.0993	0.1209	0.0972
2009–2010	0.1061	0.1274	0.0808	0.0888	0.059
2010–2011	0.1269	0.1393	0.0852	0.0764	0.1039
2011–2012	0.0955	0.1435	0.0598	0.0635	0.0754
2012–2013	0.0927	0.1561	0.052	0.0866	0.0621
Mean	0.1124	0.1327	0.0781	0.0901	0.0808
Rank	2	1	5	3	4
S.D.	0.02	0.02	0.02	0.02	0.02
C.V.	13.35	12.02	21.55	20.59	20.81

Source: Compiled from the annual reports of the respective banks.
(From 2008–2013)

Testing of Hypothesis

Null Hypothesis (Ho)-

There is no significant difference in the performances and soundness of the five nationalized banks on the basis of CAMEL Approach.

The critical value of F for $v_1 = 4$ and $v_2 = 20$ at 5% level of significance is 2.866 whereas the calculated value of F is 8.59. Since the calculated value of F is more than the table value, we conclude that there is significant difference in the performances and soundness of the five nationalized banks on the basis of CAMEL Approach during the study period. Hence, null hypothesis is rejected.

Conclusion

Interpretation

Table no.7, depicts overall raking based on CAMEL Model to rate the banks according to their performance. It is clear from the above table that BOB has been ranked at the top position with composite average of one. The Union Bank of India and Dena Bank secured the 2nd position with almost 2 each. The next was the State Bank of India which secured the 4th position with the composite average of 3.6 and in the last position was the UCO Bank which secured the 5th rank with the composite average of 4.4.

Table No. 6: Analysis of Variance (ANOVA) Table:
One Way Classification Model

Sources of Variation	Sum of Squares (SS)	Degree of Freedom (v)	Mean Square (MS)
Between Samples	31.6	4	7.90
Within Samples	18.4	20	0.92
Total	50.0		

Interpretation of ANOVA

$$\mathbf{F = -8.59 \ \& \ F_{0.05} = 2.866}$$

$$\mathbf{F > t_{0.05}}$$

Table No. 7: Composite Ranking: Overall Performance

Name of Banks	C	A	M	E	L	Average	Rank
State Bank of India	3	4	5	4	2	3.6	4
Bank of Baroda	1	1	1	1	1	1	1
Union Bank of India	2	2	4	2	5	3	2
Dena Bank	4	3	2	3	3	3	2
UCO Bank	5	5	3	5	4	4.4	5

Suggestions

The following suggestions could be laid down in the light of the findings:

i. The UCO Bank needs to increase its Capital Adequacy Ratio in order to maintain its depositors' confidence and to promote the stability and efficiency of its financial system.

ii. The UCO Bank should give due importance to the management of its assets since, the quality of assets is an important parameter to measure the degree of financial strength. .

iii. The State Bank of India should improve its management efficiency in order to take crucial decisions depending on the risk perception.

iv. The UCO Bank should try to improve the quality of its core banking activities i.e., from lending activities in order to increase income. Since, quality of earning is an important criterion that determines the ability of a bank to earn consistently.

v. The Union Bank of India should give utmost importance to its liquidity position and should try to improve it, since liquidity is a crucial aspect which measures the bank's ability to meet its financial obligations.

References

Bhat, S. (2008), "Financial Management –Principles and Practice": New Delhi: Excel Books, pp608–615.

Bhayani, S. (2006): "Performance of the New Indian Private Sector Banks: A Comparative Study", Journal of Management Research, Vol.5, No.11, pp53–70.

Brigham, E. F. (1978), " Fundamentals of Financial Management", Illnois: The Dryden Press, p.168.

Gupta, R. (2008): "A CAME Model Analysis of Private Banks in India", Journal of Gyan Management, Vol.2, No.1, pp. 3–8.

Howard, B. B. Uptan.M, (1953) "Introduction to Business Finance", New York: McGraw Hill Book Co., Inc., p.188.

Khan, M. Y. and **Jain, P. K.** (1982), "Basic Financial Management", New Delhi: Tata McGraw Hill Publishing Co. Ltd., p.139.

Pandey, I. M. (2002): "Financial Management": New Delhi: Vikas Publishing House Pvt. Ltd., p.912.

Prasad, K. V. N and **Ravinder, G.** (2012): "A Camel Model Analysis of Nationalized Banks in India" International Journal of Trade and Commerce-IIARTC, Vol.1, No.1, pp23–33.

Said, M. (2003): "liquidity, Solvency and Efficiency: An empirical analysis of the Japanese banks distress." Journal of Oxford, Vol.5, No.3, pp. 354–358.

PLANNING PRACTICES OF LOCAL GOVERNMENTS BASED ON THE RESULTS OF AN EMPIRICAL RESEARCH

Sisa Krisztina A.

BGF PSZK Institute of Accountancy senior lecturer, PhD student
e-mail: sisa.krisztina@pszfb.bgf.hu

Abstract: The purpose of this study is to explore the most important findings of the empirical research conducted amongst local governments of settlements in Hungary, in order to perform a comprehensive analysis on their practices and methods regarding planning. The primary research was conducted in the spring of 2013, with respondent local governments answering relevant questions by submitting a self-administered questionnaire. The main purpose of the questionnaire survey was to find out whether the involved parties perform actual formal strategic and operative planning activities, and what kind of management planning methods – solutions already working and widespread in the business sector – they apply within the process of planning. In this study, we attempt to conduct a comprehensive analysis on modern planning systems and to appoint the fields that need to be improved, through the results of the questionnaire survey and our own experiences.

Keywords: .Planning, Strategic planning, Budget of local government.

Introduction

Local governments and their related bodies operating under various legal statuses manage large sums and significant assets, therefore this sector has a significant influence on the competitiveness of the whole of the economy. The local public sector has found itself in a critical economic and financial situation on many occasions since the "great transition" of 1990, which called for the elaboration and actual implementation of various reform measures. It is apparent that local governments of settlements are still either awaiting for or under transformation. Many local studies[1] have been presented on the economic and financial situation of local governments, revealing as a summary that experts also urge the implementation of reform measures regarding the management of local governments, the financing of the performance of its services and budget planning. Also, the establishment of planning systems allowing for the most accurate determination of the volume of public and generated funds financing the transparency of the performance of their public services, duties and the quality of the administration, are all in the interest of the national economy as well. The sector is characterized by the complexity and slowness of information flow, the inaccurate planning of cost allocation (expenditures), the poor transparency of the financing of tasks, and the belated or inappropriate decision making of the leadership.

The objective of business administration on a sub-sovereign governmental level can be described by the "3E" paradigm. According to this, public services must be effective, efficient and economic. Nowadays these "threefold of goals" have been completed with the issue of quality, or more precisely with the expectation of "quality public services". The question is, how much do the currently applied planning system support the fulfilment of these objectives? Experts and those who are directly involved agree that the planning system must be reformed and improved, along with the elements of the procedure and the methods of planning. We believe that by the careful and targeted selection of the tools offered by the NPM (New Public Management) school or public management model – on account of its practicality – it is possible to select the appropriate management tools and methods, the application of which is justified on the level of local governments, and which also contribute to the implementation of economic, efficient, effective and quality public services.

These strategic and operative analysing-planning methods which are applied within the frame of controlling, and are already successfully applied by the private sector allow for the more efficient operation of these processes, and also enable the achievement of the set objectives regarding the sector of local governments. It is also supported by the favourable change causing the reformation of the accounting information system as the fundamental basis of information for planning, by introducing a performance-driven approach in the budgetary accounting system as from 2014.

[1] For further details, see the studies of Lóránt [2010], Vígvári [2009, 2011], Báger-Vígvári [2007].

1. Literature review

1.1 Concepts on planning within the public sector

For the concept of planning, there is no definition found in literature independent from history – political culture – and theoretical planning schools, which would hold in all historical periods and political systems. In general, definitions regarding planning narrow down the concept by considering it to be equal with the preparation of the budget. [László, 1994; Kohárinė, 2011; Farkas (ed), 2004; Csanádi–Tóth, 2002]. László understands planning as a decisive element of the preparation of the budget. The planning activities of those who are operating from a budget include the construction of the budget, during which the transformed plan (or budget) prepared by bureaucrats, and disputed by all parties of the negotiation process is approved by the political body entitled to make a decision [László, 1994].

We believe that we must not consider the planning of the budget and planning to be equal, since the budget actually refers to a – usually annual – financial plan which is prepared annually, while the referenced literature discusses the budget as an umbrella term, which also includes the long-term planning duties of local governments. Therefore the economic program as a long-term plan is discussed within the frame of budgetary planning, as part of the plan. Similarly to the concept of planning management, it is also suggested to separate long-term planning from the process of preparing the annual plan (budget), of course both fields of planning are included in the concept of the planning process.

The following definition describes planning in a more general and comprehensive way: planning includes the analysis of the external environment, internal features and the exploration of potential development paths for local governments and their institutions, furthermore it also enables the sharing of information and the reconciliation of interests between participants [Báger ed., 2010]. This definition is close to the business approach of planning in terms of considering the analysis of the internal features and abilities of the environment and the organization to be part of the planning process, and also it draws the attention on the cooperation that is realized between those who take part in the planning process, which should result in a plan representing the various interests of different stakeholders.

New elements of the concept of planning emerge in the next definition, which include the interpretation of planning as a structured process, and emphasizing it as a tool for control, thus positioning planning as a management function – similar to the definition of planning used in the private sector. Public planning is the execution of democratic will without intentions on limiting the behaviour and capacity of members of the society, instead, by the means of planning, it is possible to get closer to the efficient implementation of the public will, and to facilitate social-economic development. Planning is a well-structured instrumental method of success-oriented social actions, an explicit tool for control [Faragó, 2001].

Literature referred so far on planning focus on the process-nature of planning, and consider the process to be final with the completion of the plan document, as the fulfilment of the main purpose of planning. We believe that the planning of local governments – just as in case of the business sector – cannot be limited to the preparation process of plans only, since one of the key indicators of the success of planning is the effective implementation of plans, and its power to support measures, management decisions and the performance of everyday tasks and actions, therefore the implementation of plans must also be analysed by exploring the differences between estimations and the completion of estimations and their related reporting processes, along with the elaboration of a scheme to measure the efficiency and effectiveness of the goals set during planning and in plans.[2]

Financial planning by local governments in Hungary is traditionally associated with budgeting. All initiatives aiming to reform the concept and methodology originate in the public management reform trends. The most reknown public sector reform concept is the New Public Management (NPM) movement. Several theoretical schools are represented among NPM-reforms that consider the adoption of management practices and methods for the public sector as a solution for the malfunctions of state and public administration. These schools reveal the outdated elements of planning, while draw attention to areas in need of reforms.

The article of Hood in 1991 [Hood, 1991] called my attention on the fact, that the expanding NPM offers non less than a universal solution for public services, however the author have already foreseen several sources for internal tensions which actually emerge later. The NPM doctrine announced the adaptability of the methods of the private sector to fit the public sector as well, and also proclaimed a more efficient control over processes, the priority of the market as an allocation mechanism and the role-shift of the government (as "it should govern, and not execute"). The reasons for its expansion include political-ideological factors, fiscal aspects, and the demand of citizens for improved public services, while the primarily cause for becoming a global phenomenon is considered to be the cultural-scientific dumping of the pioneering Anglo-Saxon countries, which was further convinced by the fact that global organizations also recommend this radical proposal [for details see: László, 2012].

The ideology and the evaluation of public management reforms announced and/or implemented accordingly is a recurring element in all of my studies in the subject. The lessons learned from these evaluations: 1) the importance

[2] On the other hand, the analytic examination of the planning activity cannot be considered independent from other leadership sub-systems, on account of the complex nature of the activity.

of the local context: the identity of slogans resulted in completely different solutions in case of countries with differing traditions and practices [Pollitt and Bouckaert, 2011]; 2) the practical application of the basic axioms did not work out as expected[3]. Even the pioneering NPM countries such as Great-Britain, Australia or New-Zealand reconsidered their approach on public services in light of the results [Warner, 2012]. Dunleavy and his co-authors (2006) report on the termination and reversing of a number of key factors in case of the above pioneering countries, and Warner [2008, 2010] also discusses the trends on reversing outsourcing and privatisation, and the expansion of mixed services. Similarly, Hall [2012] investigates how public services are being „executed by the government" and the reasons for it; 3) the recovering of this task will result in governments taking up the role of the executor, instead of conveniently being the organizer of services. It allows for the control over a great share of the local economy, however it also brings back the administration-related problems, which they have been able to get rid of by outsourcing them: on account of the traditional budgetary approach and the political influence, it is impossible to implement an economic-oriented approach on tasks (e.g.: effectiveness, efficiency, economy, financing, service quality). According to what has been discussed regarding the local society, the solution lies in the development of the management activities of self-governments and its institutions – especially focusing on the field of strategic management (strategic thinking) – and the establishment of a controlling system, which could be applied both in case of its own institutions, and external service providers, in order to ensure value-adding public services.

The importance of planning

As regards planning, future becomes the moving force of actions and decisions. The importance of planning in the public sector is probably even greater than in the private sector, since the players of the public sector perform their duties from public funds, providing their services for the "customers", members of the society. The outstanding importance of planning in the public sector might be explained by the following reasons:

- Budgetary authorities perform their public services and satisfy social public needs out of the payments of citizens, paid under various claims. Tax-paying citizens – as a rightful claim – want to see through the kind of compensations they receive in exchange for their payments (social control). The "state" can only give an accurate answer to this question, if an accurate budget (plan) is made on the public services to be performed (expenditure requisites), and their financial coverage (financing sources). The state must become accountable. In order for this, we must be able to measure public services (output and outcome), and the practical implementation of budget planning is also required, by applying the most appropriate planning method during the process of planning.
- The state and its various apparatuses react slowly to the changes of the economic environment and to the impulses of the market's supply-demand relations, therefore the fulfilment of public services and the financing system must be thought through as accurately as possible, with foresight and by the reduction of risks and uncertainties to a minimum level, all of which would be impossible to implement without an effective planning process. Without a carefully elaborated efficient planning also supported from a professional aspect, it is impossible to create an effective budget.

Further arguments supporting the necessity of planning are "sector neutral". The future motivates management decisions through planning, the uncertainties and risks regarding the operation might be reduced by an accurate, well-thought and formalized planning, as planning marks the path of development for a company, which enables the implementation of a more effective (goal-driven), successful operation.

According to Faragó, the major characteristics of planning within the public sector of a modern market economy are the followings:

- "multi-levelled and the involvement of several players (the system is not formed by only the basic conflicts of economy);
- Presence of two directions (top-down and bottom-up at the same time);
- It accepts the necessity of governmental intervention (from outside, top-down) (for the long-term interests of the nation);
- Value-pluralism;
- Aspires to conform to the level of the society's knowledge (scientific, rational), however it is also restricted by the volume and type of the available information;
- Dual: it partially assists (generates), and partially limits the private sector
- And it is determined by politics." [Faragó, 1997].

Planning establishes contact between the local government and its environment. We must prepare for the anticipated changes and challenges of the environment with the help of planning. Legislative environment as the "explanation variable" plays an outstanding role considering the elements of the environment, since it influences and explains directly the basic conditions of the operation of the planning system as a "dependant variable". Therefore, prior to the comprehensive introduction of the planning system it is recommended to briefly review the legislative environment.

[3] In Hungary, privatisation and liberalisation were accompanied by the process of denationalization, during which the ability of the state to regulate the market was shaken, the recovery of which is indispensable, and as a recommendation, according to the neoweber state model (NWS).

1.2. Legislative framework of planning, operation of designing system

The framework and essential regulations regarding planning activities of local governments are regulated in Hungary by laws and related government regulations. The basic and decisive prescriptions regarding planning are specified by the law on public finances (hereinafter referred to as Áhtv.)[4] and the law about the local self-governments of Hungary (hereinafter referred to as Ötv.)[5]. Regulations regarding the process of planning generally focus on the planning of the annual budget, while duties on planning for a mid or long term are barely included in the legislation.

The general objectives of planning are described by the 12. § (1) of Áhtv., "*the purpose of planning is to ensure that the approval of the expected revenues are supported from the aspect of economics, and estimated expenditures are only determined to an extent necessary for the appropriate performance of public services*". The legislation also declares that new public services can only be created or undertaken, when the necessary financial resources are available for its completion. In case financial resources become unavailable throughout planning, the termination of the public service must be executed.

1.2.1 Regulations affecting long-term planning

According to the current legislative environment, the preparation of long-term plans is required in case of settlement instruments, settlement development concepts and plans, and economic programs adjusted to political terms. Certain sectoral legislations might also prescribe obligations on the preparation of long-term programs and plans, such as environmental programs, rural development or touristic concepts etc. According to the regulations of the Ötv., local governments must determine their own economic program. The leadership of the local government formed after the elections records its long-term development concepts in an economic program and development plan, based on the results and experiences of the previous political term, its perspectives on the future, and own objectives set out during the campaign. Within the terms of the Ötv., the time interval of an economic program must cover at least one political term (which is 4 years in Hungary currently), though it might be longer than that. In this sense, the economic program might fulfil the role of a comprehensive long-term plan, if it includes the main objectives, tools, achievement methods and strategic plan elements of fields of activities, which are of strategic importance. Nevertheless, neither the Ötv., nor the Áhtv. contains mandatory obligations on the structure, content, form and validity of the economic program, therefore local governments determine their long term objectives and the criteria and toolkit of the implementation themselves. The content of economic programs are not regulated in details by legislation, instead there is a general statement: "*the economic plan and development plan determines the objectives and tasks which serve the purpose of ensuring the services to be performed by the local government and the improvement of their quality, if possible in accordance with the extent of the budget of the local government, by thoroughly considering the peculiarities of the local society, environment and economy*" (Ötv. 116.§(3). Further specifications of the Ötv. declare that the economic program must be elaborated in accordance with the regional development concepts of the county, and special focus must be placed on development concepts regarding the ensuring of public services and the improvement of their quality. This is a general and comprehensive objective, the implementation of which depends on local governments, thus allowing for a great deal of freedom for local governments regarding the completion of their strategic planning duties. There are no other obligations or guidelines specified by legislation regarding the preparation of an economic program.

The purpose of an economic program – as a long-term, comprehensive plan – is to be the foundation of the annual budget concept and annual budget to be prepared subsequently. An economic program can only fulfil the role of a comprehensive strategic plan, if its objectives, tools and programs are also built in the annual budget, and the government is able to follow the selected "track" within the program in order to achieve its objectives. The economic program has to be modified and updated in exceptional cases – such as an unexpected modification in a regulation, or other changes within the environment –, since plans are active or passive tools for adjusting to the changes of the environment.

1.2.2 Mid-term (tactical) planning

Mid-term, or so-called tactical action plans create the direct and measurable relation between strategic and annual plans throughout the planning process of companies. Regarding the mid-term planning of local governments, the Áhtv. declares it briefly that at latest until the regulation and decision on the budget is approved, and within the frame of a decision, local governments have to perform an assessment annually on the amount of their own revenues defined by the legislation issued under the authority of the Stability law, and also on the amount of its expenditures that are derived from operations generating debt according to the Stability law, estimated for the three years that follow the financial year.

1.2.3 Short-term planning: The concept of the budget and the annual budget

The preparation of draft regulations on the budget of local governments requires a continuous preparation and planning work. The economic program prepared at the beginning of

[4] The current legislation in force is the act CXCV. of 2011. on public finances, and the related government regulation number 368/2011. (XII.31.) on the execution of the law on public finances.

[5] The current legislation in force is the act CLXXXIX. of 2011. on the local self-governments of Hungary.

the political term (election) is one of the foundations of the draft regulations on the budget, the other one is the budget concept prepared annually under the direction of the notary. The concept on the budget is prepared by the notary and the planning unit under the direction of the notary, taking into account the bill on the central budget, the expected economic policy of the government and its macro-economic forecasts, the planned objectives of the economic program, foreseen revenues, undertakings and other payment obligations. Leaders of institutions overseen by the local government have to be involved in this planning process, which means that institution leaders must be informed about the planned guidelines of the central budget, about planning instructions and principles on the performance of services of governments, and also on the regulation of resources. After that, local governments determine the range of numerical and textual information they require from institutions themselves, for the elaboration of the concept. Actual calculations have to be performed within the budget concept regarding the expected resources of revenues and the tasks of self-governments (expenditures), practically in a structure corresponding to the revenue and expenditure elements of the budget. The actual structure and content of the concept is not specified by the law. During the process of composing the concept, the mayor asks for the opinion of bodies on the draft concept, with the opinion of the financial body being of utmost importance considering the financial feasibility and sustainability of the concept. The body of representatives is empowered to approve the draft budget concept which already includes the opinion of bodies, and which is implemented in the form of a decision. The exact form and content of the decision made by the body of representatives is not regulated by legislation. The first stage of the budget planning process is completed with the approval of the budget concept, which results in a document that will serve as the actual foundation of the planning of the budget.

Legislations in force are characterized by the dominance of regulations on the preparation of the annual budget. The tasks related to the preparation of the annual budget of local governments are clearly regulated by the Ötv., Áhtv., and the government regulation on the execution of the law on public finances. The annual budget is the foundation of the administration of local governments, which is part of the government's budget. The budget represents an actual fund, which serves the purpose of financing defined objectives. The budget is also a financial plan, which is driven by the future and includes uncertainties and risks as well, on account of its nature. Furthermore, the budget is a legal document which is approved by a legitimate political body, and it expresses and exercises public policy objectives [Győrffi–Vígvári, 2009]. In a political sense, the budget is the program of the government, from the aspect of public policies, it is the classification of all governmental tasks, and in financial terms, it is a tool for harmonizing expenditure claims with revenue opportunities [Magyary, 1923. quoted by: Sivák–Vígvári, 2012].

Áhtv. defines the budget as a document, which contains the appropriated value of budgetary revenues being realized in the financial year (revenue estimates) and budgetary expenses (expenditure estimates). (Áhtv.4.§(2)) The budget is also regarded as a plan by the legislation, which includes the estimated, thus the planned amounts of expenditures and revenues for the upcoming year. The second, final step of budget planning is the preparation of the annual budget and its approval in the form of a regulation.

A budget in general is prepared annually, which means that the budget is usually valid for a calendar year. The annual budget is the financial foundation of the performance of mandatory and volunteered services throughout the administration. A two-levelled planning is typical in case of the budget planning of local governments. First, the joint budget of the government and its institutions has to be prepared, which is determined by the local government, in the form of a regulation on the budget, and second, a budget will also be prepared on the elements of the government and its institutions. Vígvári has a different interpretation of the two levels of the budget planning process, accordingly, the first level of planning is the central level, where the planning of the financial resources "to be spent" in the financial year is implemented, being available in the form of a governmental fund for the performance of mandatory services of local governments [Vígvári, 2002]. The second level is the actual planning of the budget of local governments [Vígvári, 2002].

The initial foundations of the annual budget planning are the objectives of the economic program for the financial year, the decision of the body of representatives on the budget concept, and the budget law including the announced central budget. The planning process of the budget is a multi-stage process with several players involved. The major planning processes are: tasks regarding the preparation of the budget, the construction of the budget, the submission of the budget to the body of representatives and its approval, the elaboration of the regulation on the budget.[6]

Besides the preparation of the annual budget plan, the Áhtv. includes a brief note on the obligation of preparing a liquidity plan, that local governments are obliged to prepare a liquidity plan on the scheduling of the reception of revenues and the completion of expenditures. However there are no legal instructions on the structure, content and frequency of preparing a liquidity plan. Other obligations on the preparation of short term plans are also not regulated by the referred legislation.

2. Materials and methods

2.1 Planning and data collection

We have conducted primary researches as well, in order to complement the theoretical information gathered during the secondary research activities, and also to confirm our previ-

[6] The process and procedure of the planning of the annual budget is described in details for example by Farkas [ed.], 2004.

ously drawn up hypotheses. The primary research has been implemented by the means of a scheduled empirical research based on quantitative data collection. The data collection has been conducted with surveying, which is considered to be the most common instrument within social sciences for gathering primary information. The registration of data did not cover the entirety of the population. Errors within data collection can be grouped in two large categories:

- sampling errors
- non-sampling errors [Hunyadi–Vita, 2002].

In case of the latter there is no available exact mathematical tool, which would be able to filter its impacts, yet its size cannot be ignored [Hunyadi–Vita, 2002]. Such errors during the research include the distorting effect of pessimism (respondents tend to underrate their own performance), the effect of vanity (respondents paint a more favourable picture of the performance of the organization they directly control and supervise than it actually is – even due to personal reasons) [Szűcs, 2002].

In case of the former, the appropriate planning of sampling, and the achievement of the required preciseness ensures the minimization of the impact.

Our task regarding the planning of data collection was to minimize the impacts of the two types of errors at the same time. We aspired to carry out a simple random sampling, and also to make the sample size as large as possible.

Based on the planned sampling method, we have tried to deliver the self-completed questionnaires to respondents through a variety of channels. We have contacted several governmental associations, namely the TÖOSZ (national association of the governments of settlements), MJVSZ (the association of towns with county rights), and BÖSZ (the association of the Budapest governments). These organizations have proven to be quite helpful, and forwarded the questionnaires to governments on our request.

It was difficult to complete and collect the questionnaires, therefore we have included college students in the research as well, and we have personally called the associates of the involved governments in order to ask them to fill out the questionnaire. The completion of the questionnaire occurred via telephone, e-mail and in case of the research amongst students, by personal interviews. The data collection lasted for several months, as we needed to re-send the questionnaire, in order to increase the number of the filled out questionnaires – thus increasing the size of the sample. **There was a total number of 600 questionnaires sent out, out of which we have been able to make use of 64 valid forms within our empirical research.**

The empirical research has been conducted with a sample consisting of 64 valid elements. Sample selection was implemented by the method of simple random sampling, which supports effectively the creation of an independent and representative sample. Local governments were categorised as specified by the Act on Local governments, with the following categories: capital districts, towns with municipal rights, towns and villages (large villages). Local governments of villages and large villages represented the greatest share, 37,5% within the sample, which is parallel to the distribution of local governments in Hungary according to their type. The proportion of towns within the sample of local governments was 29,7%, and 20,3% in case of capital districts, while the lowest proportion with 12,5% was represented by the local governments of towns with municipal rights.

The category types of local governments also reflect on the size of their organization. However we must also consider that a particular type of local government might appear in multiple categories based on the number of its staff regarding the size of the organization, therefore we have performed the grouping of local governments according to their size based on the number of staff, instead of defining size categories by the type. It means that the number of staff of the institution exceeded 1000 employees only in case of "large" local governments: capital districts and towns with municipal rights. Throughout the empiric research, local governments with a staff number less than 50 were considered to be the smallest, while the largest ones were local governments with a staff number exceeding 1000. It must be noted that during the analyses there was only 1 local government with a number of staff over 3000 included in the sample, therefore this size category was merged into the category of 1000–2999 employees. As a result, local governments involved in the study were analysed by rendering them in 4 size categories. The four size categories were named "micro" (less than 50), "small" (50–199), "medium" (200–999) and "large" (more than 1000).

2.2 Statistical method

The study is supported by both primary and secondary research as well. Primary sources of data were provided by questionnaires sent to involved parties (financial executives, planning coordinators, notaries). The questionnaire consists of several groups, including mostly multiple-choice, relevant questions. In this present study, we aspire to summarize the typical characteristics regarding the current system of planning and planning practices. Now we have a variety of statistical analysis methods available for the analysis of databases. The actual application of these various statistical analysis methods were complicated by the fact that the data subject of the analysis are in general quality-type data measureable on a nominal and ordinal scale as well. As a consequence, descriptive statistical analyses prevail throughout the study, while with the help of statistical independence analysis we also attempted to explore causal links. Based on the element number of the sample, it is considered to be a small sample, therefore when selecting further statistical methods we had to prefer statistical methods applicable on a small sample. Considering these criteria and characteristics, the available data was analysed with an independence analysis implemented by a Chi-squared test, a two-sample T-test, a variance analysis and cluster analysis. For performing an analysis on the data, we have applied a computer-assisted data procession with the SPSS data processing software.

3. Results

3.1 Long-term – strategic – planning practices

First we wanted to understand the purposes local governments aspire to achieve with planning. The results of the analysis indicate that in most cases (37% in general) they are fulfilling their legal obligations with planning. The second highest result – 29% in average – was achieved by the answer that they prepare various plans for their own goals and interests. Other external factors also represent a significant share, with 16% in case of supervisory authorities, and 15% in case of obligations towards the European Union. If we break motivational factors into three categories, which are own –internal– interests, external force (the total share of legal obligations, supervisory authorities and EU obligations) and other motivations, the picture becomes significantly worse, since the total average share of external obligations when preparing a plan reaches 68%, compared to which the 29% proportion of internal self-interest seems insignificant. It was interesting to examine the motivations of local governments for planning separately by their size. Self-interest represents a surprisingly high proportion (42%) in case of micro governments, while the fulfilment of legal obligations was selected mostly in the category of small governments (with 48%), and large governments were only able to achieve the second position in relation to the same factor, with 40%. The results lead us to the conclusion that the application of a strategic and management approach is less typical with leaders of local governments.

Besides the annual budget, the questionnaire includes the most typical types of plans applied in business. The various plans applied in the business sector can all be adapted to this sector as well. Naturally when applying them we must take into account the peculiarities of the administration of governments, financing and the accounting information system. Answers had to be submitted in the form of yes or no questions about the types of plans that are being prepared in practice. In case of complex planning activities, the following plans are suggested to be prepared:

- long-term plans (joint strategic plans on the level of the government and its institutions, sectoral and functional strategic plans)
- annual budget as the preliminary financial plan
- secondary financial plans (liquidity plan, cash flow)
- other plans (resource plans, risk assessment, other).

Detailed results are presented in the related attachment (number 1.) of the study.

Respondents indeed implement long-term planning, 87,5% of them prepare joint strategic plans on the level of the government and its institutions, which they consider to be equal with an economic program. When observing the other levels of long-term plans, we receive less favourable results, 50% of respondents prepare sectoral, and only 34,4 percent prepares functional strategic plans. The results are similar in case of examining the answers based on the sizes (figure 1. demonstrates the results in details). The proportion of those who prepare joint strategies are between 79 and 94 percent in case of all size categories. Sectoral strategic plans are most frequently constructed by large local governments (with 87%), and micro governments are the ones less likely to prepare it, with a proportion of 21 percent. The existence of functional strategies are also the lowest in this case – similarly to the aggregated results, their share is between 21 and 47 percent.

The next "yes or no" question was about whether local governments involved in the study perform formalized strategic planning. The majority of respondents, 37 out of local

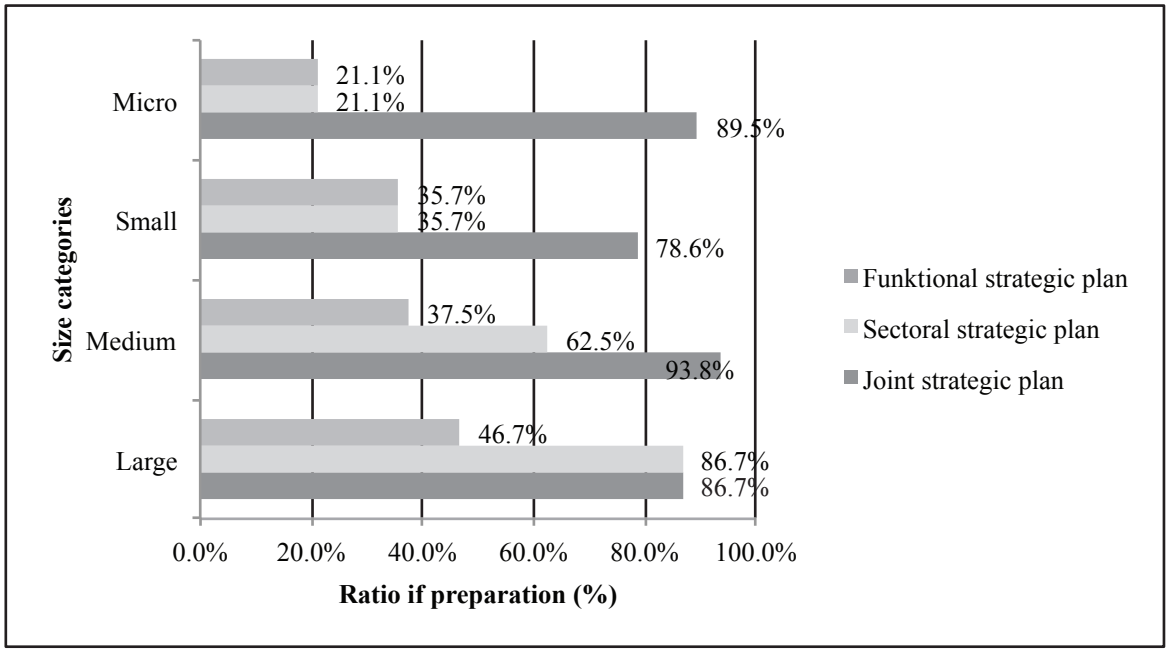


Figure 1. Relation between the type of government and long-term planning

Source: own edition (2013)

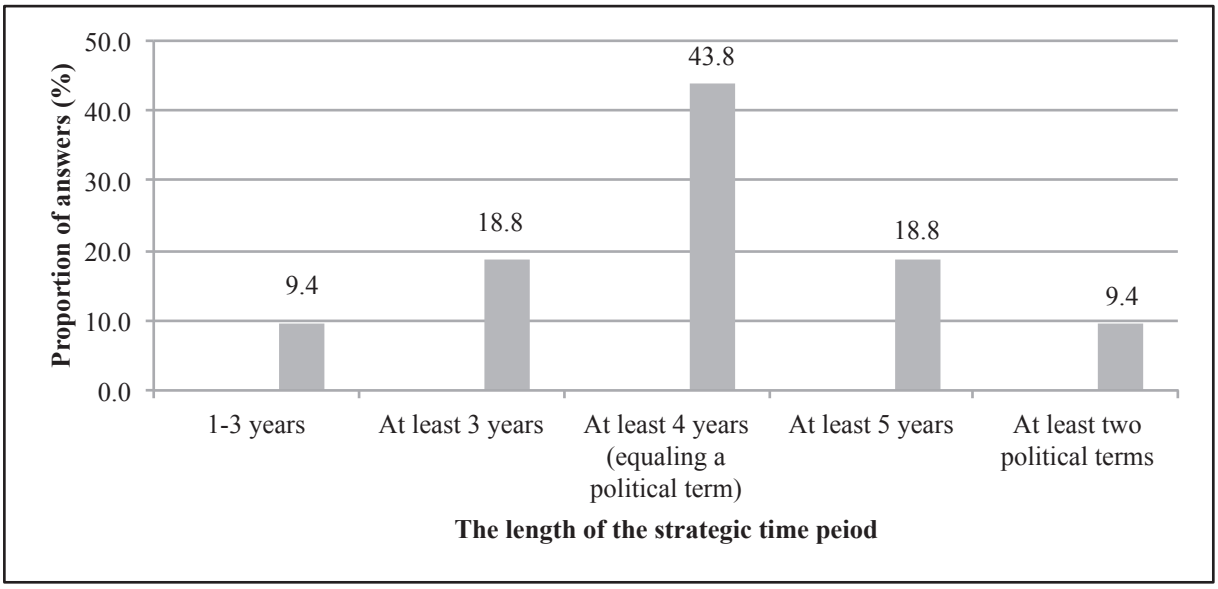


Figure 2. "Strategic periods" according to respondents

Source: own edition (2013)

governments (57,81%) admits to implement formalized strategic planning, however the proportion of local governments to answer with "no" slightly exceeded the proportion of those who said "yes" in case of micro and small sized local governments (52,63% of micro self-governments, and 57,14% of small self-governments). Furthermore, 55,6% of the remaining 27 local governments who do not apply formalized strategic planning believes that its realization in the future is reasonable. I believe that this ratio reflects a positive attitude regarding the future application of strategic planning.

Nevertheless, the high proportion of the existence of formalized planning contradicts the approach of respondents on strategic periods.

43,8% of respondents believe that a political term (4 years in Hungary) is considered to be a strategic time period, and only 9,4% of them agree that strategic planning must cover a period that lasts for the length of at least two political terms. Considering that political decisions have long-term effects in general, it is important that planning is not only about "tomorrow", but it should bear in mind the wellbeing of future generations as well. Further consequences of a short-term approach is that when the current leaders – elected representatives and officers – are characterized by short-term thinking and enforcement of interests, their chances to be re-elected decrease. Now when the management of a town is replaced every 4 years, it is impossible to establish a future that is supported by strategic planning as well.

Naturally the examination of the existence of long-term planning cannot be based on solely these questions, since actual strategic planning is not limited exclusively to the preparation of strategic plan documents. Monitoring activities, continuous reporting, feedback and the revision of strategic plans and their necessary modifications all form an integral part of the planning process. Strategic plans supporting efficient operation in the long-term must be underpinned by the application of strategic analysis and planning methods which are already applied in the business sector and could be successfully adapted to local governments as well, otherwise strategic plans mean nothing but romantic, impractical concepts and promises which are impossible to keep for the members of the society, instead of well-designed plans which are mathematically founded as well, and could be realized successfully in the future.

We attempted to assess the proliferation and frequency of the application of the most popular methods by governments, which can be applied during the elaboration of the strategy, with the help of a scale ranging from one to five. The values of the scale were: 1 – we have never heard about this method; 2 – we are familiar with it, but we have not applied it yet; 3 – we have applied it, but it did not work; 4 – we apply it occasionally; 5 – we apply it frequently. The results are demonstrated by figure 3.

The results of the questionnaire survey confirmed our preliminary hypothesis, which is that involved parties are completely unfamiliar with the strategic planning-analysing methods which are most frequently applied in the business sector (PEST analysis, Porter models, ABC analyses, GAP analysis, Scenario planning, LEAP, EFQM, value-chain analysis, external-internal factor evaluation matrix), or even if they have previously heard about a very few of the methods, they have never actually applied them in practice (such as BSC analyses, Portfolio method, TQM, Benchmark analysis). The most common method was the "SWOT" analysis with its 20,3% ratio. Table 1. demonstrates that the majority of analysed governments (57,8%) lack the implementation of strategic monitoring. It means that they do not track the completion of strategic goals through the measurement of indicators. This result also confirms that the elaboration of a

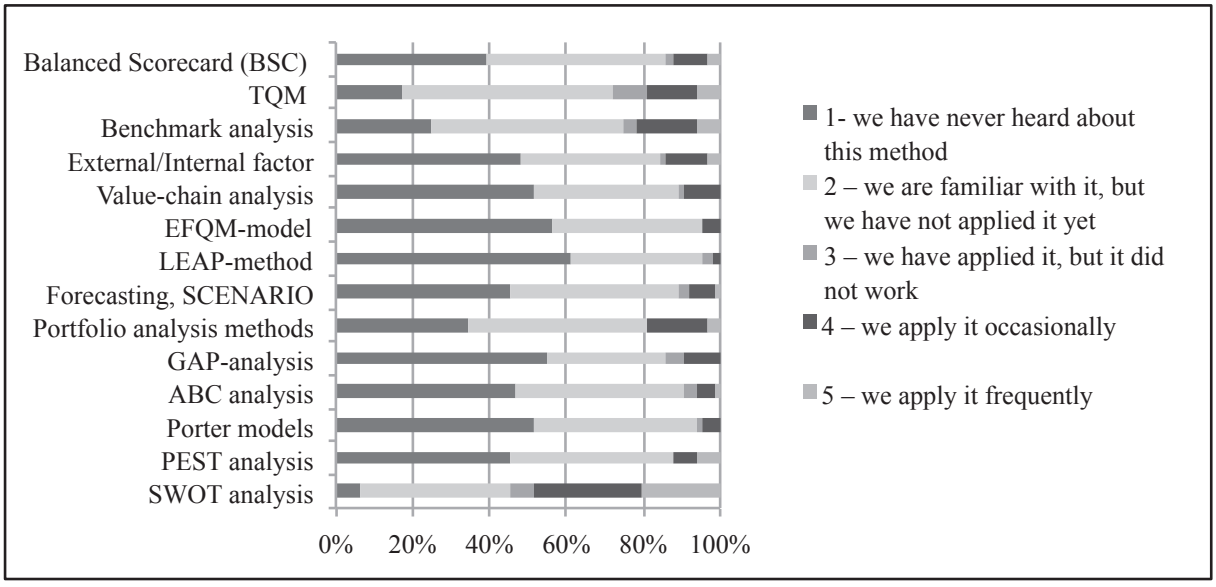


Figure 3. Existence of strategic planning-analysing methods

Source: own edition (2013)

Table 1. Existence of the tracking of strategic plans

Item		Number of answers	Distribution (%)
Answer	Yes	27	42,2 %
	No	37	57,8 %
Total:		64	100,0 %

Source: own edition (2013)

strategy is mostly motivated by conforming to an external obligation (such as legal obligation or political will) instead of strategic planning and management driven by their own motivations. Conforming to this external obligation is already completed with the preparation of an economic program in most cases. After all, the results also indicate the lack of strategic management activities.

Afterwards, we tried to gather information about the frequency of revising strategic plans. The two basic criteria regarding planning are flexibility and realism, which both have to be present during the planning process. Plans must be reviewed continuously in order to see whether the set objectives are still realistic, and the designed actions and action programs are viable, or briefly whether the plan is still feasible. In order to make if feasible, the foreseen impacts of environmental changes considered on a wider level must be adapted, thus plans must be updated continuously. In this sense, the review and maintenance of plans – including strategic plans as well – has to be a continuous and frequent activity, otherwise the basic criteria of flexibility and realism will not be realized in the process of planning. Experiences show that these two principles are not as much realized in the public sector. Only 37,5% of respondents said that the revision of plans is a frequent, annual duty, while in case of 32,8% it is implemented in every 2–4 years. Another significant share, 20,3% is represented by those who perform revision activities occasionally, on a non-regular basis. Nevertheless, 56,3% of local governments participating in the study are satisfied with the realization of long-term goals and initiations. Strategic planning in case of local governments – considering that the providing of services is both special and public – can only be efficient and serve the interest of the "public", if the strategic objectives as the foundation of strategic plans are elaborated and approved by the cooperation of all stakeholders (involved parties). Based on the empirical data that supports this study, there is only a low level of such cooperation of involved parties in case of local governments in Hungary (figure 4.), since out of all parties, only the participation of the mayor, the notary and financial-administration leaders are determinant in the process of elaborating the strategy. It is recommended to ensure the active participation and motivation of other stakeholders in the process of long-term planning.

Results regarding the examination of the relationship between the size of the local government and strategic planning practices

According to our hypothesis, there is no link between the size of the government and the applied strategic planning habits and practices, therefore performing a segmentation based on size is unnecessary here. By this, we attempt to prove that "size" is irrelevant when analysing the planning system. This relationship was analysed with Chi-squared test. The assumed results have been confirmed by the performed statistical independence analysis. With the help of the SPSS program, we were seeking for the relation between the size of the local government and the application of formalized strategic planning and the tracking of strategic plans. The statistical analyses demonstrated a low level of relation when per-

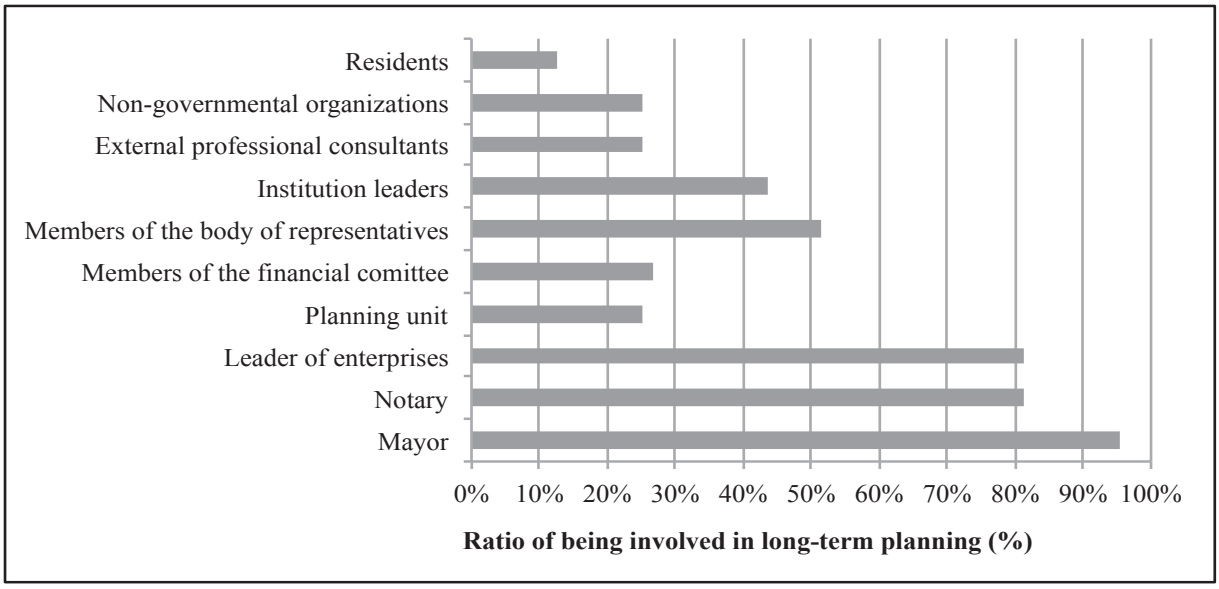


Figure 4.: Participants of preparing the strategic plan
Source: own edition (2013)

formed on a significance level of 22,1% with a 4,4 value of the test statistics, meaning that there is no statistical relationship between the size of the government and the application of formalized strategic planning in practice. There was also no relationship found between the tracking (monitoring) of the completion of strategic objectives within the entire length of the strategic period and the size of the government. The results demonstrate that this relationship exists on a significance level of 28,5% with a 3,792 value of the test statistics. We believe that the appearance of continuous monitoring implemented through the indicators of the plan objectives is linked to the application of formalized strategic planning, and is not dependent on the size.

3.2 Short-term – annual – planning practices

When analysing the short term – annual or shorter – planning practices, we come to a conclusion – detailed results are illustrated in annex no. 1. – that due to the regulations on the planning of governments, the preparation of the annual budget is most frequently applied as the primarily financial plan. The preparation of a liquidity plan is also typical, with a cumulated average of 77 percent, the high proportion of which can also be explained by the effective regulations prescribed by the law.[7] The preparation of plans regarding cash flow, purchase, maintenance, risk management, resource or other short-term plans represent an unsubstantial percentage, since none of the aggregated average proportions regarding short term plans exceeds 40 percent. The lowest ratio, with an average of 25% is found in case of the preparation of cash flow. These comprehensive statements are valid when examining governments separately by their size. It is also important to see that 53% of large governments prepare risk assessment and planning, which might be explained by the large scale investments they have realized, and risk assessment and return calculations that are brought forward by the financing of EU investments and renovations.

As a summary, the emphasis of short-term planning is on the preparation of the annual budget and the planning of liquidity. Throughout the analysis we aspired to see the exact number of the different type of plans that are applied in practice. According to the results, the analysed self-governments prepare "5 types of plans" in most of the cases (23%), followed by "4 types of plans" (in 17%) as the second most frequent practice. When considering the number of mandatory plans, these results also demonstrate that local governments apply planning primarily with the objective to conform to legal obligations, and it is less triggered by their own motivations or management approach. All of this confirm our previous statements. The implementation of planning activities driven only by external forces contradicts the presence of strategy-driven management.

Regarding the planning of the annual budget as the most frequently prepared annual plan, the analyses has covered the examination of the methodologies as well, in particular in the form of multiple choice, yes or no and open questions about the methodology of the planning of the budget.

Amongst other issues, we have analysed the proportion of the practical application of planning techniques used in the preparation of the budget of local governments being included in the sample, and thus the level of its spread in practice. Respondents have been asked to distribute 100% amongst the major methods of budget planning, based on the frequency of

[7] Besides the preparation of the annual budget plan, the Áhtv. includes a brief note on the obligation of preparing a liquidity plan. [see Áhtv. 78.§ (2)]

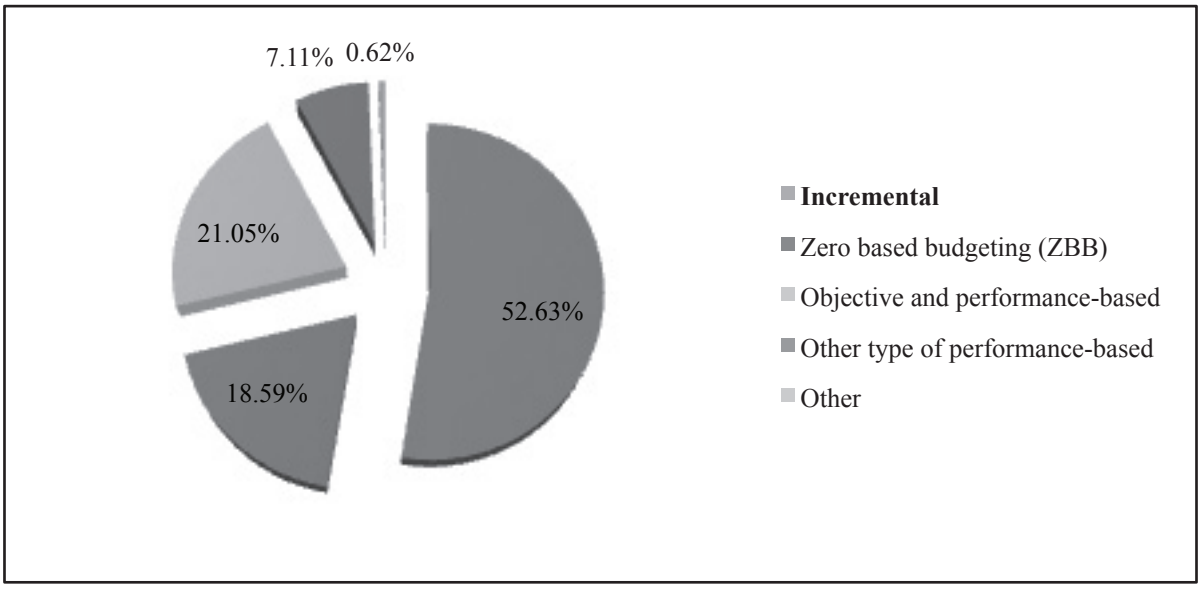


Figure 5. The proportion of the application of budget planning methods in practice

Source: own edition (2013)

their application in practice. The results of the analysis are illustrated by figure 5.

Based on the literature about budget planning, the most urgent and obvious fields of the improvement of planning systems are the renewal of the technology of the annual budget planning and the decrease of the dominance of incremental budget planning techniques and its differentiated application by the type of tasks. The statements of our theoretical research was confirmed by the empirical results of our study, since 51,6% of involved parties believe that budgetary planning is characterized by a basic approach, which has to be changed in the future. As it is demonstrated by figure 5., when considering the estimations about expenditures on mandatory tasks, the majority of local governments included in the sample, 52,63% of them apply incremental budget planning techniques, and the second most frequently used methods are objective and performance based (program) techniques with a ratio of 21,05%. The ZBB procedure is applied in case of an average of 18,59% of the local governments included in the sample. Within this group of questions, respondent governments applying objective and performance based planning methods were asked to appoint the tasks affected by program planning. By summarizing the answers, the most frequent tasks were the followings:

- settlement development,
- occasional projects, EU tenders,
- investment and renewal expenditures,
- residential old people's home care,
- maintenance,
- mandatory public work planning,
- sports,
- basic health care services,
- social expenditures.

Out of the listed tasks, program based budget planning methods and approaches are used most often in case of settlement development and investment and development related tasks.

When asked "if you do not apply program based budget planning techniques, do you plan to use it in the future?", the vast majority of respondents, 73,7% said no.

The questionnaire analysis therefore confirms the conclusions drawn from literature, which considers incremental budget planning to be the most popular planning method of local governments in Hungary. The results also testify our hypothesis that various budget planning techniques have to be differentiated to fit the task to be performed. Based on this hypothesis we also aspired to see how involved parties would differentiate budget planning methods amongst all mandatory tasks of local governments specified by the law in force. The following planning method options were offered

1. Incremental planning method
2. Zero based planning method
3. Program budget planning
4. Other

Other methods have not been specified by respondents, therefore the summary includes only the result of a choice from the three major methods. The summary of answers are included in annex number 2.

By summarizing the results, it is obvious that respondents believe the incremental planning technology to be the most efficient one to be applied with the majority of the government's tasks, and they only consider the planning of budget expenditures within the frame of a program structure to be better in case of settlement development, cultural services and sports, youth and nationality related issues. The zero-based planning method was not selected as a frequently applicable method by any of the participants. It is interesting that regarding the field of kindergarten and social care services and child protection, the ZBB method is preferred by respondents instead of program budgeting. These results reflect on a contradiction com-

pared to results of the previous analysis, since they show that except for a few examples, those who are involved in planning are completely satisfied with having an incremental planning and they believe it to be the best method for allocating the budget amongst tasks.

3.3 The future of the planning system from the viewpoint of stakeholders

In order to provide a comprehensive evaluation of the planning system, we have composed 8 statements, which had to be evaluated on a scale from 1 to 3. The options for grading were 1 – not true, 2 – true, but does not require modification and 3 – true and requires modification. The statements to be evaluated were the followings:

1. The incremental approach is dominant in case of the planning of the budget
2. Short-term plans support the implementation of long term plans
3. We consider the impacts of long-term goals on the budget when compiling the annual budget.
4. The significance of plans according to the order of subfunctions is low.
5. An annually repeated budget planning activity is dominant in the planning practice.
6. An institution-oriented planning is preferred instead of program planning.
7. The planning system fails to ensure transparent administration and the balance between the public duties to be performed (expenditures) and resources of financing (revenues).
8. The preparation of plans is basically motivated by having to complete various legal obligations.

The processed results are presented in details in annex number 3.

By summarizing the results of the submitted answers it is obvious that there are only two scenarios when respondent governments feel that a change would be necessary, in case of the first statement – *the incremental approach is dominant with the planning of the budget* – and the seventh one – *the planning system fails to ensure transparent administration and the balance between the public duties to be performed (expenditures) and resources of financing (revenues)* – rating option "number 3" was dominant, with a ratio of 51,6% and 43,8%. Regarding the remaining six statements, respondents admitted that the statement is true, yet they felt it does not require any modification or improvement in the future. Surprisingly, none of the statements received the answer "1". These results project that those who are responsible and involved in the operation of the planning system at local governments are not open towards the innovation of the planning system. We believe that stakeholders are afraid of innovation because it is recommended to perform an efficiency screening on the planning process as the first step of development, which might imply the risk of reduction within certain elements and scope of duties of the process (lean approach), which might also result in the reorganization or even the termination of the scope of duty in question.

With the last round of questions in the survey we attempted to examine the intention of further developing the planning system, the potential fields regarding the innovation of the planning system and also those recommended by governments, within the frame of multiple choice questions.

The introductory question investigated whether respondents "plan to improve the planning system in the near future". We have received favourable answers, as the development of the planning system is included in the short term objectives in the majority of the cases, which is 59,4% of respondents. The majority of respondents marked "three" – in 20,3% – or "four" – in 18,8% – fields for development. According to the answers summarized in table 2., key fields for the innovation of the planning system from the perspective of stakeholders are the establishment and improvement of the strategic planning process – in 65,8% – and the development of the budgetary technique, shifting it towards an objective and performance based planning – in 71,1%. The majority has not preferred the remaining fields of development, or do not feel that these fields require improvement. Respondents had the opportunity to add further fields besides the listed fields for development under the category "other", however they have not submitted any new fields here.

4. Conclusions

We believe that planning systems must be strengthened in the future both regarding long-term and short-term planning, irrespective to the size of the government. Prior to the first step of development we must answer the basic question "what

Table 2. Opinion of local governments on the fields of innovation of the planning system

Field for innovation	Proportion of those who said "yes"
The establishment and improvement of the process of strategic planning	66%
The strengthening of the strategic role of the economic program within the frame of strategic planning.	40%
Improvement of the budget planning technique towards objective and performance based planning.	71%
The elaboration/improvement of a system of indicators measuring the realization of plans.	26%
Establishment/improvement of a regular reporting system towards the leaders.	37%
Establishing an operational (causal) relation between long term plans and the annual budget.	47%
Making the planned numbers more substantiated.	34%
Strengthening the communications of plans, objectives towards all members of the organization.	32%
Establishing strategic and performance management closely linked to planning.	26%
Other	0%

Source: own edition (2013)

do we expect from planning". The right answer might be that the benefit measurable throughout the implementation of plans should be in accordance with the expectations of "stakeholders". Benefit in this sense equals the impact (outcome) on stakeholders – also being set amongst the preliminary objectives.

The weakest points of the planning system according to the results of the empirical research are:

- The preparation of plans are basically motivated by having to conform to various legal obligations, instead of being triggered by self-interest and management motivation. The compulsory nature of planning is also reflected by the low number of the various plans prepared, the lack of a strategic management and also by the excessive application of the incremental budget planning method which is regarded to be outdated.
- The planning system fails to ensure transparent administration and balance between the public services to be performed (expenditures) and resources of financing (revenues).
- An annually repeated budget planning activity is dominant in the planning practice. As a natural consequence, the operation, and finally the performance of public services is determined by the past and not by the future.
- The incremental approach is dominant in case of the planning of the budget.
- An institution-oriented planning is preferred instead of program planning.
- The presence of "ungovernable" or "uncontrollable" expenditures is inevitable, the only question is their proportion to the whole of expenditures. [Sisa–Szabó, 2013]

Comprehensive suggestions on innovation regarding the planning system:

- The strengthening of a strategic approach and strategic management, besides transforming strategic planning and analysing methods to be adaptable for local governments. Within this frame, the strengthening of the strategic role of the economic program. A Balanced Scorecard prepared for each program is the best method to support the completion of objectives set in strategic plans, and thus strategic management activities. Besides the application of BSC, we recommend the continuous implementation of complementary methods such as the SWOT, EFQM and Benchmark methods. With the help of these methods, it is possible to operate a complex strategic planning-analytic-decision supporting system within the frame of strategic controlling.
- The renewal of the budget planning technique, its differentiated application for each task and shifting towards objective and performance based budget planning. Task financing requires planning on a task level, the management of tasks by the cost bearer and the gathering of expenditures – and if possible, of revenues – by tasks.
- Linking strategic plans with the annual budget, the establishment of a measurable causal relation system. The imprints of the strategy are reflected by the preferences of the expense side in annual budgets. The measurability and traceability of the realization and completion of the causal relation and strategic objectives (figures) in the annual budget is supported by the complex strategic – tactical and budgetary planning system established within a program structure. Program structures improve the transparency of plans and support the system of task financing as well, since a particular program actually implies a task to be performed.[7]
- The establishment of an integrated tracking system of indicators for measuring the completion of plans. When elaborating these indicators, the peculiarities of the operation and administration of governments must be considered in order to create indicators that reflect these appropriately and accurately. On one hand, these might rely on the database received from the budgetary accounting system, and also from the "new" financial accounting information system (the complex accounting information system of the government in total).
- The operation of the whole of the planning system within the frame of a controlling system. It might be successfully adapted to fit in the public sector as well, conserving the basic functions and tools of controlling.
- The establishment of a cooperative planning system with the involvement of a wider range of stakeholders (e.g.: local enterprises, other administration organizations, non-governmental organizations, residents). This basic expectation is also defined by the public management philosophy also known as "Governance". Public hearings organized by local governments might provide an excellent opportunity for this, which must be well promoted in advance, in order to be able to deliver all the necessary information to stakeholders in due course.

Prospective research trends:

- A further verification by empirical research of the presumption that local governments adopting strategic planning enjoy comparative advantages on the long term (compared to other municipalities with similar circumstances, but operating without an actual strategy) is also being advocated in the dissertation.
- Involving local governments open-minded for further development, a programing method based on strategic

[8] Further details about the concept, structure and application benefits of the so-called program-based budget planning are described in the study of Báger [2006].

planning could be tested experimentally, by means of involving certain governmental functions, respectively.
– For further verification of the propositions formulated in the study, the advantages of controlling should be examined aiming to reveal specific municipal features in a research project performed among local governments already applying the method. Subsequently, the publication of experimental results gained in the research revealing the supportive role of the controlling in planning, could provide useful and instructive knowledge to experts concerned.

Summary

The study aims to reveal the main conclusions of the empirical study performed among local governments in Hungary, regarding their planning practices with a comprehensive approach. The primary research was conducted in the first quarter of 2013, in the framework of which the interviewed municipalities were requested to fill out the relevant fields of a questionnaire on a voluntary basis. The primary purpose of the survey was to determine if any formalized strategic and operative planning methods are actually being implemented in the actual planning procedure of the given municipality. Based on the results of the survey and our empirical data gathered in course of the process, the study endeavors to analyze modern planning methods and identify the areas requiring substantial reform.

Literature

Báger G. [2006]: Programalapú költségvetés. Jellemző vonások, gyakorlati tapasztalatok. Pénzügyi szemle Vol. 51. 3. Issue. pp. 281–301.

Báger G.–Vígvári A. [2007]: Államreform, közpénzügyi reform. Nemzetközi trendek és hazai kihívások. ÁSZ kutató Intézete. Budapest. p.149.

Báger G.–Kiss D.–Kovács R.–Vígvári A. [2010]: A nemzetgazdasági tervezés megújítása. Nemzeti igények, Uniós követelmények. ÁSZ Kutatóintézet. Budapest. p. 92.

Csanádi Á.–Tóth J. [2002]: Az önkormányzatok pénzügyei. 013/2002. Perfekt Kiadó. Budapest. p. 290.

Dunleavy P.– Margetts H –, Bastow S.–Tinkler J. [2006:] New Public Management Is Dead — Long Live Digital-Era Governance. Journal of Public Admistration Research Theory. 16(3). pp. 467–494.

Faragó L. [1997]: Tervezéselméleti alapvetések. Tér és Társadalom Vol. 11. 1997/3. pp.1–15.

Faragó L. [2001]: Szeletek a tervezés mélyrétegeiből. Tér és Társadalom Vol. XV. pp. 11–24.

Farkas S. (ed.) [2004]: Költségvetés tervezés, gazdálkodás, beszámolás, ellenőrzés. Saldo Kiadó. Budapest. p. 397.

Fónagy Árva P.–Zéman Z.–Majoros Gy. [2003]: Értékmérési módszerek vizsgálata. Pénzügyi Szemle Vol. 48. 4. Issue pp.380–403.

Győrffi D–Vígvári A. (szerk.-lektorok) [2009]: A közpénzügyek nagy kézikönyve. Complex Kiadó. Budapest. p. 1115.

Hall D. [2012]: Re-municipalising municipal services in Europe. http://www.psiru.org/sites/default/files/2012–11-Remun.docx Download: 19.03.2013.

Hood C. [1991]: A public management for all seasons? Public Administration, 69(1) Spring.

Hunyadi L.–Vita L. [2002]: Statisztika közgazdászoknak. KSH. Budapest. p. 770.

Kohárinė P.E. [2011]: Államháztartási ismeretek. Perfekt Kiadó. Budapest. p. 309.

László Cs. [1994]: Tépett vitorlák. Az államháztartásról közigazgatási és jogi szempontból. AULA Kiadó. Budapest. p. 363.

László Cs. [2012]: The State as a Public Service Provider – Rewised. Budapest Business School Science Almanach.

Lóránt Z. [2010]: Utak és tévutak –tények, adatok a helyi önkormányzatok gazdálkodásáról. Pénzügyi szemle Vol. 55. 3. Issue pp. 622–640.

Magyary Z. [1923]: A magyar állam költségvetési joga. A „STUDIUM" bizománya.

Pollitt C–Bouckaert G. [2011]: Public Management Reform: A Comparative Analyis – New Public Management. Governance, and the Neo-Weberian State. 3rd Ed. Oxford UP.

Sisa K. [2013]: Kutatási kérdőív az önkormányzatok komplex tervezési folyamatának felmérésére. Budapest.

Sisa K.–Szabó Sz. [2013]: Települési önkormányzatok tervezési rendszerének a jövője az érintett önkormányzati szereplők szemszögéből. Erdei Ferenc Tudományos Konferencia. 2013. szeptember 5. Gazdálkodás és menedzsment tudományos konferencia. „Környezettudatos gazdálkodás és menedzsment". II. kötet. Kecskemét. ISBN 978-615-5192-21-0 pp. 563–568.

Sivák J.–Vígvári A.: [2012]: Rendhagyó bevezetés közpénzügyek tanulmányozásába Complex Kiadó. Budapest. p. 261.

Szűcs I. (ed.) [2002]: Alkalmazott statisztika. Agroinform Kiadó. Budapest. p. 551.

Vígvári A. [2002]: Közpénzügyek, önkormányzati pénzügyek. KJK. Kerszöv Kiadó. Budapest. p. 380.

Vígvári A. [2009]: Pénzügyi kockázatok az önkormányzati rendszerben. ÁSZ kutató Intézete. Budapest p. 73.

Vígvári A. [2011]: Önkormányzati pénzügyek. Hazai kihívások és nemzetközi példák. ÁSZ kutató Intézete. Budapest. p. 114.

Warner M. E. [2008]: Reversing privatization, rebalancing government reform: Markets, deliberation and planning. Policy and Society, 27(2). pp. 163–174.

Warner M. E. [2010]: The Future of Local Government: Twenty-First-Century Challenges. Public Administration Review 70 pp. 145–147.

Warner M. E. [2012]: Privatization and urban governance: The continuing challenge of efficiency, voice and integration. Cities, 29. pp. 38–43.

2011. évi CXCV. törvény az államháztartásról

2011. évi CLXXXIX. törvény Magyarország helyi önkormányzatairól

368/2011. (XII.31.) évi kormányrendelet az államháztartásról szóló törvény végrehajtásáról

249/2000. (XII. 24.) Kormányrendelet az államháztartás szervezetei beszámolási és könyvvezetési kötelezettségének sajátosságairól

4/2013. (I.11) Kormányrendelet az államháztartás számviteléről

2000. évi C. törvény a Számvitelről

Information for authors

Applied Studies in Agribusiness and Commerce (*APSTRACT*) is the official periodical of the International MBA Network in Agribusiness and Commerce for the discussion and dissemination of applied research in agricultural economics, agribusiness and commerce performed within the International MBA Network. Submitted manuscripts should be related to rural development or the economics of agriculture, natural resources and environment. Papers should have a practical orientation and demonstrate innovation in analysis, methods or application. Topic areas include production economics and farm management, agricultural policy, agricultural environmental issues, regional planning and rural development, methodology, the marketing of agricultural and food products, international trade and development. *APSTRACT* publishes practical research and case studies, as well as papers discussing policy issues. Shorter features include book reviews and comments on previously published articles. In addition, the journal publishes on its website the Annual Report of the International MBA Network in Agribusiness and Commerce enabling the members of International MBA Network to have immediate access to the papers. Reactions to articles previously published in *APSTRACT* should be sent to the Editor. Critical comments and suggestions are always welcome.

General rules of formatting a paper and preparing a list of references are consistent with the recommendations of American Psychological Association (APA 2001) and the APA Style Guide to Electronic References (2007). Manuscripts should be headed with the title of the paper, first and family name(s) of author(s), with corresponding institute name and address where the research was carried out.

TITLE OF THE PAPER
First name(s) and surname of author[1], first name(s) and surname of author[2]
[1]Name and address of institute 1
[2] Name and address of institute 2

Include an abstract immediately after the title. Abstract provides readers with a quick overview. Abstract should contain the research topic or research questions, participants, methods, results, and conclusions. You may also include possible implications of your research and future work you see connected with your findings. Your abstract should be a single, double-spaced paragraph with no indentation. Your abstract should be between 200 and 300 words. The abstract should give a clear idea of the main conclusions of the article, the methods employed, an indication of reasoning and a concise summary of the key points of your research. Provide a maximum of five key words below the abstract. Listing your keywords will help researchers find your work in databases.

All articles will be held to the same set of scholarly standards. Articles should be written in English and should not exceed 20 pages, including abstract, tables, figures, and graphs. Shorter articles will also be considered. Font size 10, with margins; top 6 cm, bottom 5 cm, left 4.5 cm and right 4 cm on A/4 sheets. Manuscripts should be divided into sections, each with numbers and section heading. Do not use more than two grades of headings. Manuscripts should be divided into the following sections: Abstracts, Keywords, Introduction, Materials and Methods, Results and Discussion, Acknowledgements, References. Background information to the article, such as sponsoring bodies of the research project, should appear in the foot notes, but collect references at the end of the manuscripts. Publishers do not recommend footnotes and endnotes as they are expensive to reproduce, if necessary, footnotes should appear at the end of the page on which they are inserted.

Label each table with an Arabic number (*Table 1, Table 2,* and so on) and provide a clear title. Tables should be quoted in text and placed in their position in the manuscript. Keep tables as simple as possible. Tables spreading across double pages are difficult to read and typeset. Proposed format for table headings are: Table (number): Title of table (note if any). Table heading is located before the table. Row and column headings should only have the initial letter capitalized. Below the table, give its source as a note. Figures should be numbered consecutively, quoted in text and placed in their position of the manuscript. Camera-ready copies of line drawings and photos should be submitted. Proposed format for headings of figures including graphs, charts, drawings, and photographs are: Figure (number): Title of figure (note if any). Figure title and tables should appear below the figure. Discuss the most significant features of each figure. Mathematical formulas should also be placed in the text. Units should conform to the International System of Units (SI). Although the amount of explanation and data included depends upon the study, do not give formulas for common statistics (i.e. mean, t test) and do not repeat descriptive statistics in the text if they are represented in a table or figure. When including statistics in written text, be

sure to include enough information for the reader to understand the study.

A citation of a publication by a single author should be made with a signal phrase that includes the last name of author followed by the year of publication in parentheses (*Nábrádi* 2009). When citing a publication with two authors, include both family names in the signal phrase each time you cite the work (*Nábrádi* and *Heijman* 2009). A work with three or more authors is identified with the family name of the first author followed by et al. and the year of publication (*Nábrádi* et al. 2009). If the author is a government agency or other organization, name the organization the first time you cite with an acronym in parentheses and use the acronym in the signal phrase followed by the year of publication in parentheses (FAO 2009). When your parenthetical citation names two or more works, put them in the same order that they appear in the reference list, separated by semicolons (*Nábrádi* 2009; *Nábrádi* et al. 2008). When possible, cite an electronic document the same way as any other document using the name of author followed by the year of publication.

Alphabetize entries in the list of references by the family name of the first author; if a work has no author, alphabetize it by the acronym of the organization followed by the year of publication. The date of publication appears immediately after the name of authors. Observe all details: capitalization, punctuation, use of italics, and so on. Begin the entry with the family name of first author, followed by a comma and the initial(s) of first author. If more than one author, continue with a comma followed by the family name of the second author, followed by a comma and the initial(s) of the second author, etc. until all authors are listed. Then give the year of publication in parentheses followed by a period. The following models illustrate the style for entries in the list of references:

Book: Author, A. A., Author, B. B. (Year of publication). *Title of book*. Name of publisher, Place of publication. Pages.

Article in an edited book of conference proceedings: Author, A. (Year of publication). Title of paper. In: Author, B. B. (Ed.) *Title of edited book or conference proceedings*. Name of publisher, Place of publication. Pages.

Articles in journal Author, A. (Year of publication). Title of paper. *Title of journal, Volume number* (issue number if available). Pages.

Articles from electronic sources: Author, A. (Date of publication). Title of paper. Name of publisher, Web place of publication.

Refereeing process: Submitted papers are sent to two independent, anonymous reviewers selected by the Editorial Board members for judgment on their appropriateness for publication. Lists of Editorial Board members can be found on the inside cover of the *Applied Studies in Agribusiness and Commerce*. The recommendations of the refereeing panel are made known to the authors by the Editor. Revised articles should be sent directly to the Editor in the same way as first submissions. Proofreading: Proofs are sent to authors for reading and correction directly by the publisher and a date for the return of proofs will be given; corrections arriving after the stated date will only be incorporated if time is available.

Articles should be submitted to the Editor by e-mail, prepared in a recent version of Word for Windows. One printed copy of the complete article should be sent via post.

Editor: *Prof. Dr. Andras Nábrádi*
Faculty of Applied Economics and Rural Development
University of Debrecen
4032 Debrecen, Boszormenyi ut 138, Hungary
Tel: 00/36/52/526967
e-mail: editor-apstract@agr.unideb.hu

AGROINFORM
PUBLISHING HOUSE

Editor: *Prof. Dr. András Nábrádi – Editorial office:* H–1149 Budapest, Angol u. 34.
Phone/fax: (36-1) 220-8331 • E-mail: studio@agroinform.com
Executive publisher: Etelka Bolyki, managing director
Typography: Opal System Graphics • *Production:* Agroinform Visual Studio
The publication is distributed by AGROINFORM Publishing House • www.agroinform.com
H–1149 Budapest, Angol u. 34. • Phone: (36-1) 220-8331
HU-ISSN 1789-221X