



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Department of Administrative and Financial Management, Lviv Polytechnic National University, Lviv, Ukraine,
oksanaukr@hotmail.com

Technical and Economic Security as a Part of Sustainable Development of Agricultural Enterprises of Ukraine

Abstract: *Issues of economic security both regarding country and enterprise level are very acute under conditions of globalisation. Ukraine has a high agricultural potential: fertile land, suitable climate, favourable geographical location and others. However, there are factors that hinder the development of agriculture in this country. These include threats of technical and economic security. As a result of agrarian reform in Ukraine, the property of former collective farms passed into the ownership of private businesses. Technical equipment and other means of production were not modernised or repaired because of financial problems in many agricultural enterprises. As a result, farmers lost significant crop yields, which was reflected in low profitability of financial and economic activity. Market development of agrarian sector requires new approaches to technical support of agricultural enterprises. Modern agricultural producers need physical capital that provides high productivity, energy frugality and usability. The main purpose of this study is to explore the current status of technical and economic security of agricultural enterprises in Ukraine and to recommend ways of its improvement.*

Keywords: *technical and economic security, agricultural enterprises, physical capital, efficiency, sustainable development*

Problems of sustainable development of agricultural enterprises started to be acute and important during economic and political crisis in Ukraine. Agricultural enterprises have to operate in conditions of uncertainty and unpredictability. The main reasons for such situation are instability of agricultural market infrastructure, disparity in prices, dependence on natural conditions of production and all of the above together, along with some other factors make agriculture a risky business. Consequently, it is necessary to provide economic security to agricultural enterprises. Current business development is closely linked to the high level of economic security. Because only in such conditions it is possible to provide effective strategic planning, efficient management and monitoring of both internal and external business processes, etc.

Ensuring economic security of any legal entity is impossible without efficient use of resources, including physical capital. New technologies and high quality of physical capital play a crucial role in converting agriculture to an effective and competitive direction of development ensuring technical and economic security.

Under “technical and economic security” we understand provision of physical capital to an enterprise, its modernisation and reconstruction to achieve continuous production of competitive products and profit generation. The sustainable agricultural production can be achieved only if the enterprise would respond in time to changing market conditions and, on this basis, effectively use capital assets.

In the scientific literature, there are many publications on technical support for agricultural production and efficient use of capital assets (Лягодієнко, 2002; Поперечний, 2009 and others). Special attention is paid to issues of economic security at different levels – from the state to enterprises (Яремова, 2012; Ареф’єва, 2004 and others). However, issues of ensuring technical and economic security of agricultural enterprises are not sufficiently investigated.

The study aims at exploring the current status of technical and economic security of agricultural enterprises in Ukraine and recommending ways of its improving.

Material and method

Theoretical and methodological basis of the research is formed by statements of domestic and foreign economic scientists on issues of effective usage of capital assets and ensuring economic security. Data from State Statistics Service of Ukraine were used for the research. The research also applies methods and techniques of economic investigations.

Results

Agriculture is one of the most important branches of the economy in Ukraine. In 2014, it provided up to 11% of gross value added. The employment in this sector of the economy is more than 3 million people. There are almost 52.5 thousand of agricultural enterprises and entrepreneurs, and they use 36.4 million hectares of agricultural land. However, there are almost 30% of unprofitable agricultural enterprises, which cannot ensure economic security under such financial results. The economic efficiency of many kinds of agricultural production is too small for investment, modernisation and renewal of physical capital (Поперечний, Клебан, 2009). Krupin (2014) argues that mechanisation of Ukrainian agriculture is on a very low level as well, which makes work even harder and efficiency much lower.

Economic sustainability of agricultural enterprises depends on internal factors, such as resource potential and its effective usage, technological equipment of production, economic and technological development of the enterprise ensuring a high level of profitability. Resources are the basis of production and, consequently, its economic life. It is important to note that a company may have enough resources, by quantity and quality, to take up agricultural production and to take into account market demand for competitive production. But, if resources are not used effectively, then, it will not ensure technical and economic security for the enterprise.

Technical and economic security of agricultural enterprises can be characterized by the following criteria:

- Quality and quantity of capital assets in accordance with market demand;
- Physical capital capacity to provide competitive production;
- Ensuring sustainable development of agricultural enterprises due to effective use of physical capital.

Basic indicators of technical and economic security in Ukrainian agriculture are shown in table 1.

The residual value of physical capital in agriculture trends upwards, because of capital investment increasing up to 62% in 2014 against 2010. The largest share of these investments was made by agro-industrial holding companies (Бородіна, 2014). They have access to “cheap” financial resources from international financial corporations and other organisations. They usually invest in new technologies, which are conducive to loss of jobs. The large-scale agricultural enterprises (agro-industrial holding companies) are better provided with physical and working capital, than small-scale farms or households. The small-scale agricultural enterprises do not have enough money to make capital investments. Also they do not have expensive mortgages to borrow money from banks (Калетнік, Пчелянська, 2012). Besides, Ukrainian banks do not offer any special credit programmes for small-scale agricultural producers

for capital investment and interest rates are too high. Most of bank credits (70%) were given to farmers for short-term financing of agribusiness. The rest of bank credits (30%) was directed to large-scale agricultural enterprises for capital investments (Крючко, 2013). The main problem of technical and economic security of agricultural enterprises of Ukraine is that these enterprises mainly use the physical capital rented by the owners of property shares. Agreements of rent are conducted for a short period. Depreciation of fixed assets is counted neither by renters, nor by holders. Thus, one of the sources of physical capital renewal – depreciation – is lost.

Table 1. Basic indicators of technical and economic security in Ukrainian agriculture

Indicators	2010	2011	2012	2013	2014	2014 in % to 2010
Residual value of physical capital, UAH million	63,444.6	77,969.1	88,367.6	98,134.8	103,033.7	162.4
Rate of capital consumption, %	...	32.1	34.2	35.4	38.4	x
Output per UAH 100 of physical capital, UAH	307.18	299.73	252.64	257.66	244.04	79.4
Physical capital per 1 employee, UAH thousand	98.01	123.04	141.64	168.56	195.62	199.6
Net profit per UAH 100 of physical capital, UAH	27.19	32.41	30.25	15.21	19.67	72.3

Source: State Statistics Service of Ukraine, Statistical Yearbook “Agriculture of Ukraine”, author’s calculation.

However, the rate of capital consumption was high and in 2014 it was about 38%. It means that the high level of physical and moral capital consumption cause high maintenance and repair costs, which, in turn, negatively affects the profitability and provision of technical-economic security to agricultural enterprises.

Increase in the production is the main result of effective physical capital use. We can notice that physical capital use in Ukrainian agriculture was not effective, because in 2014 output per UAH 100 of physical capital decreased by 21% against 2010. The explanation of this index is that the rate of capital investment growth is higher than the rate of gross agricultural production growth.

The indicator of physical capital per 1 employee increases. In 2014, it was almost two times higher than in 2010. It was affected by decreasing labour force in agriculture. Employees were dismissed because of implementation of new techniques and technologies in agricultural production, or they found better jobs in other branches of the Ukrainian economy.

The main indicator of technical and economic security of agricultural enterprises is net profit per UAH 100 of physical capital. It decreased by 27% in 2014 compared to 2010. Decreasing profitability of agriculture, in general, is the result of macroeconomic and military and political situation in Ukraine.

Thus, the total working physical capital and its effective use makes an impact on technical and economic security. High level of indicators of technical and economic security of agricultural enterprises would affect the sustainable development of rural areas, because getting a profit by entities gives an opportunity to raise wages and to develop the social infrastructure of enterprises.

According to market economics, effective physical capital use is determined by market conditions. All economic decisions, including those which are related to the physical capital formation and use, should be made taking into account current and expected market situation. Hence, the physical capital will be directed to those sectors of agriculture, which will generate the greatest profit. Unfortunately, agricultural producers make production decisions taking into account current prices and market information of previous years, because the service of market monitoring and forecasting is not well-organised in Ukraine. In such circumstances, it is difficult to form not only strategic, but also current development programmes aimed at efficient use of physical capital, profit-making and ensuring technical and economic security.

There is the tendency for gradual decrease in machinery in agricultural enterprises (table 2). From this it follows that the loading per 1 tractor or 1 combine is increasing. In these conditions, it is difficult to provide mechanised field work on time. Agrarian producers could not use 25-35% of tractors, combines and other machines due to technical problems and physical capital consumption. This leads to the extension of field work and loss of 20-30% of the harvest.

Table 2. Agricultural machinery in agricultural enterprises, at the end of the year

Indicators	2010	2011	2012	2013	2014	2014 in % to 2010
Tractors, thousand pcs	151.3	147.1	150.1	146	130.8	86.5
<i>per 1000 ha of arable land, pcs</i>	<i>8</i>	<i>8</i>	<i>8</i>	<i>8</i>	<i>7</i>	<i>87.5</i>
Grain harvester combines, thousand pcs	32.8	32.1	32	30	27.2	82.9
<i>per 1000 ha of grain sown area, pcs</i>	<i>4</i>	<i>4</i>	<i>4</i>	<i>4</i>	<i>4</i>	<i>100.0</i>
Potato harvester combines, thousand pcs	1.7	1.7	1.6	1.5	1.3	76.5
<i>per 1000 ha of potatoes sown area, pcs</i>	<i>59</i>	<i>49</i>	<i>40</i>	<i>16</i>	<i>43</i>	<i>72.9</i>

Source: State Statistics Service of Ukraine.

There are also many cases, when one enterprise has more machinery of some kind than it is needed and another enterprise does not have the necessary quantities of this type of machinery. Consequently, in such case it is advisable to organise associations of enterprises for optimal machinery use. Within the framework of an association it would be possible to create and coordinate schedules of using machinery and the rent for them. Also it is advisable for small-scale enterprises to create service cooperatives for the purpose of buying new machinery for common use.

Nowadays, agricultural enterprises write-off 2.6-6.5% of existing machines annually, and buy only 2.3-4.6%. For normal reproduction of technical machines it is necessary to renew them by 18-20%. For example, now the Ukrainian agricultural producers use 2% of domestic grain harvesters, 20% of foreign grain harvesters and 78% of old constructive combines from Soviet times. The situation is the same for other types of technologies. Domestic technology and machinery lag behind the world by 2-3 generations, which is characterised by high power inputs and low productivity. Domestic technologies demand more man-hours. Low level of mechanisation affects the amount of production costs. For instance, in large-scale enterprises the technologies of crop production consist of 90-95% of mechanised work, and in small farms it consist of 65-75% (Лупенка, Месель-Веселяка, 2012).

It is complicated or sometimes impossible to use most of physical capital of animal production in a different way. It is difficult to use the old stock-raising farms in circumstances of the existing new technologies. For a long-time these premises were not used, so their condition deteriorated. Because of low business activity in rural areas it is difficult to sell some means of production, which are not used now or would not be used in the future.

Agricultural producers (large-scale enterprises, in general) start to invest in animal production. They build new constructions for stock-raising farms and storehouses using new technologies of agricultural production. We can see that stock-raising farms for cattle increased by almost 4 times in 2014 compared to 2010. Producers also put money in conservation of vegetables, because this field of operation is also problematic for them (table 3).

Indicators of synergy effects of resource use accumulated combination of labour effectiveness, land use, technical and economic efficiency in agricultural enterprises. These indicators include yield of crops and productivity of livestock and poultry (table 4). Increase in such indicators is among the key conditions for sustainable rural development.

Table 3. Constructions for agricultural purposes that were put into operation

Indicators	2010	2011	2012	2013	2014	2014 in % to 2010
Stock-raising farms, thousand enclosures:						
for cattle	3	23	14	8	11	366.7
for pigs	24	15	3	1	15	62.5
for poultry	7,229	5,120	220,647	2,754	11,195	154.9
Poultry farms:						
of egg production, thousand laying hens	1,560	220	5,359	1,546	2,852	182.8
of meat production, million heads per year	13.2	84.9	9	0.2	7.3	55.3
Storehouses for potatoes, vegetables and fruit, thousand tonnes of simultaneous storage	25.5	192.7	78.7	42.4	77.3	303.1

Source: State Statistics Service of Ukraine.

Table 4. Indicators of synergy effects of resource use in agricultural producers of Ukraine

Indicators	1990	1995	2000	2005	2010	2012	2013	2014
Yield of grain and leguminous crops, centners per hectare	35.1	24.3	19.4	26	26.9	31.2	39.9	43.7
Yield of potatoes, centners per hectare	116.8	96.2	121.6	128.4	132.5	161	159.7	176.4
Yield of vegetables and cucurbitaceous, centners per hectare	149	120.2	112.3	157.1	173.6	199.2	199.9	207.8
Yield of fruit, berries and grapes, centners per hectare	42.7	29.9	38.4	63.7	78.2	89.9	103.5	95.2
Milk yield per cow, average for year, kg	2863	2204	2359	3487	4082	4361	4446	4508
Eggs laying per hen, average for year, pcs.	214	171	213	274	281	293	289	276
Daily average live weight gain obtained by raising, feeding and fattening of cattle, g	431	259	255	392	461	504	508	525
Daily average live weight gain obtained by raising of pigs, g	229	117	120	281	375	448	474	481
Wool clipping per sheep, average for year, kg	3.4	2.9	3	3.5	3.4	3.3	3.2	3

Source: State Statistics Service of Ukraine.

There is an upward trend in the indicators of yield of crops and productivity of livestock and poultry (except of wool clipping per sheep). Replacement of equipment and investment in better fertilisers, although not significant, but produce the expected results. However, despite positive trends, Ukraine is far behind European indicators of agricultural productivity (table 5).

Table 5. International comparisons of agricultural productivity in 2013

Indicators	Ukraine	Poland	Hungary	Austria
Yield of grain and leguminous crops, centners per hectare	39.9	37.7	47.9	59.9
Yield of potatoes, centners per hectare	159.7	187.8	218.3	286.3
Yield of vegetables and cucurbitaceous, centners per hectare	185.2	351	190.9	381.7
Yield of fruit, berries and grapes, centners per hectare	99.4	97.9	86.7	121.1
Milk yield per cow, average for year, kg	4446	5388	6869	6460

Source: State Statistics Service of Ukraine.

Technology backwardness, inability of farmers to buy quality seeds, agricultural chemistry tools and new agricultural machinery, great difficulties to take out cheap loans – these are the main reasons hampering the development of agrarian sector of Ukraine.

Conclusions

Thus, according to data as stated above, we can identify the following main threats to technical and economic security of agricultural enterprises in Ukraine:

- Lack of own financial resources for capital investment;
- The big share of physically and morally obsolete agricultural machinery;
- Unprofitable production of some kinds of agricultural products;
- Undeveloped joint usage of agricultural machinery;
- Low business activity in rural areas.

Timely detection and removal to threats of technical and economic security will ensure the sustainable development of agricultural enterprises. For this purpose it is advisable:

- To create favourable conditions for investment from other sectors of the national economy and foreign direct investment on the formation of production potential of agricultural enterprises;
- To improve directions and methods of government support of renewal of physical capital of small-scale agricultural enterprises;
- To provide information support to agricultural enterprises; this will allow them to change production specialisation on time and to earn profit;
- To promote the expansion of technical services and joint usage of agricultural machinery, including cooperatives, associations and rents.

References

- Kleban, O., 2010. Problems of effective use of physical capital in agricultural enterprises of Ukraine. In: *Rural areas and development: Linking competitiveness with equity and sustainability: new ideas for the socio-economic development of rural areas*, vol. 7, p. 135-140.
- Krupin, V., 2014. Ukrainian rural areas: a hidden development potential or a potential burden for Europe. In: *Rural areas and development: Rural transformations under Common Agricultural Policy 2007-2013 and future development*, vol. 11, p. 121-129.
- State Statistics Service of Ukraine. Retrieved from: <http://www.ukrstat.gov.ua/>.
- Ареф'єва, О.В., Кузенко, Т.Б., 2004. *Планування економічної безпеки підприємств: монографія. Європейський університет*. К.: Видавництво Європейського університету, р. 172.
- Бородина, О., 2014. *Нерівний «шлюб» без державного розрахунку*. Retrieved from: http://gazeta.dt.ua/ariculture/nerivniy-shlyub-bez-derzhavnogo-rozrahunku-pro-rol-agrokorporaciy-u-dosyagnenni-ciley-rozvitku-silskogo-gospodarstva_.html.
- Калетнік Г.М., Пчелянська Г.О., 2012. *Фінансове забезпечення аграрного виробництва*. Збірник наукових праць ВНАУ. № 3 (69). pp. 79-86.
- Крючко Л.С., 2013). Сучасний стан та тенденції розвитку кредитування сільськогосподарських підприємств в Україні. In: *Інвестиції: практика та досвід*. № 13, pp. 55-58.
- Лагодієнко, В.В., 2002. *Формування оптимального складу основних виробничих фондів аграрних підприємств та підвищення ефективності їх використання* (за матеріалами Миколаївської області): Автореф. дис. ...канд. екон. Наук. Миколаїв: Миколаївська державна аграрна академія, р. 18.
- Лупенка, Ю.О., Месель-Веселяка, В.Я., 2012. *Стратегічні напрями розвитку сільського господарства України на період до 2020 року*. за ред. – К.: ННЦ “ІАЕ”, р. 182.
- Поперечний, С.І., Клебан, О.Л., 2009. *Використання основних фондів сільськогосподарських підприємств в умовах динамічного ринкового середовища: Монографія*. Львів: НВФ «Українські технології», р. 163.
- Яремова, М.І., 2012. *Формування економічної безпеки сільськогосподарських підприємств*. Інноваційна економіка, № 12(38), pp. 280-283.

