Improvement of Agricultural Management: Functional Comparative Approach

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ABSTRACT

Agrarian sector can and must face an important mission of supporting food security inside the country and at the global level. In concern for Ukraine it is complicated because of the sharp misbalance between agricultural segments caused by imperfect management. To meet this challenge the research methodology was focused on improving management functions involving coordination, control, planning, organization, and motivation. A sound solution to the issue will be to implement methods and approaches of managing the agrarian sector applied by the world leader such as the USA. It is valuable for macro-economic substantiations to state and regional programs of agricultural development as well as for micro-economic optimization of the farmers' activities. The cluster model distributing regions and states by volumes of agrarian products addressed coordination and control over the results of agricultural production. A function of planning was considered through specialization of the agricultural activity including growing grain and oilseed crops, oleri-culture and horticulture, productions of meat, milk, and eggs. Indicators of agricultural wage, technological perfection, their compliance with the real external economic and legislative environment were chosen as criteria for analyzing motivation and organization components. The offered sequential monitoring and comparing dynamics of development in agrarian sectors of Ukraine and the USA will provide the desired continuous improvements in quality and effectiveness of agricultural management.

INTRODUCTION

Agrarian sector is responsible for an important economic and social mission of providing the initial people's need in food. Only effective agricultural management is capable of supporting the global food security of the Earth population that is forecasted to increase up to 9 billion people by 2050 (Gibson, 2012; Grafton et al., 2015; Candel and Biesbroek, 2018).

At present effective management involving optimal planning, organization, motivation, coordination and control converted the US agriculture into the most powerful contributor to the world food security system (World's Top Exports, 2018). Namely, the crop production of the US agricul-

ture heads the Top-exporters' list by wheat, corn, and soybeans, occupying respectively 15.7%, 32.3%, and 43.9% of the markets with the products for $6.1 bln., $9.6 bln., and $22.9 bln. The US farmers of the fruit, berries, and nuts segments take the leadership in the almond export for $4.3 bln. They rank as second exporting 19.2% of sweet cherries, 13.1% of apples, 11.6% of grapes. The US farmers take the world third place exporting 15.1% of strawberries, 12.5% of oranges, and 8.5% of water melons. The animal husbandry of the US agriculture is the dominant among the beef exporters for $6.2 bln. or with the market share of 14%. The US producers rank as second in providing 14.5% of the world poultry export and 15.2% of the pork one. The US farmers sell abroad eggs for $602.8 mln. and milk for $1.5 bln. that correspond to the second and sixth places in the global scale. Thus, the given statistics is the convincing justification of the US agricultural achievements which deserve the special attention from both the agrarian practitioners of the other countries and the world scientific community.

Ukrainian agriculture also joins the global food security system as the major world exporter of 47.5% of sunflower seeds and oil. Farmers of Ukraine rank as the fourth by export of 10.1% of corn and 8.5% of barley. They hold the fifth share of 5.7% at the honey market and the sixth share of 7.1% at the wheat one (World's Top Exports, 2018). At the same time, Ukrainian agriculture does not provide food security by animal proteins, especially meat and milk, even to the domestic consumers. It confirms the imperfect management and critical misbalance in the principal sector of Ukrainian economics (Hudym and Khalatur, 2016; Vasylieva, 2017; Vasylieva and Velychko, 2017). All the described above persuade us about the urgent necessity to explore options on extending methods and approaches of the US agricultural management over agricultural production in Ukraine.

1. METHODOLOGY

According to the dominant economic terminology, management is determined to be a rational operating and supervising over an entrepreneurial activity. Together with capital, labor, and money, management belongs to the key factors of production. The process of managing is a set of acts or functions for forming and using resources of business entity to reach the desired aims. In other words, management is a sum of its principal functions such as planning, organization, motivation, control, and coordination.

In particular, the function of planning consists of forecasting and decision making about strategies, goals of development, and the expected results. The function of organization takes responsibility for a distribution of resources and a performance of tactical tasks of the operated activity. The function of motivation deals with the maximal revealing the personnel's productive potential. The function of control keeps checking for a correspondence between the set and obtained results of activity. The function of coordination provides balanced links and compliance among the management functions outlined above. Recent methodological studies conducted by Olson (2010), Kay et al. (2011), Beierlein et al. (2013), Popescu and Jean-Vasile (2015), Barnard et al. (2016) incorporated fundamental bases of agricultural management such as:

— evolution, components, and prospects of developing the global agri-food system by means of implementing the contemporary scientific results, technologies, and modern methods of business-management;

— definition of the manager's missions by stages of agricultural production and sales;

— features of performing management functions under the strict competition and strong consumers' demands;

— management responsibilities over budget planning and capital expenditures, the ways to optimize an administrative structure of the enterprise, its legislative base of activity and agribusiness accounting;

— methods of search, training, and motivation in favor of developing labor force in agriculture;

— special techniques and communications applicable to management in agrarian sector.

It should be noted that the listed results are general and have to be adjusted to the reality of Ukrainian agricultural production. Lupenko and Mesel-Veselyak (2012) substantiated that the nearest strategic goals of management in Ukrainian agriculture suppose increasing agricultural production, expanding organic technologies, supporting export capacities, rising productivity and wage of the workforce, and enlarging profitability of agriculture. Such issues may be achieved via effective management applied to solving tasks of increasing yields in crop growing and animal breeding, harmonizing demand and supply in agrarian sector, performing a land reform, unifying the domestic laws according to the world standards, developing agricultural cooperation and integration, improving pricing and financial environment, maintaining innovative and investment modernization in Ukrainian agriculture.

The current features of Ukrainian agriculture are the high biological and climate risks, essential volatility of the global agrarian markets, and an instable macro-economic environment within the country (Babenko et al., 2017; Babenko et al., 2018). To solve this problem Kolesnyk et al. (2018), Mykhailova et al. (2018), Vdovenko et al. (2018), offered conceptual mechanism of agricultural management which is influenced by the factors of an ownership relation, organizational structure of agricultural production, market and social restrictions, natural conditions of an economic activity, and the state policy in agriculture. Mission and functions of the proposed mechanism of agricultural management are focused on providing expert assisting and intellectual advising, creating the joint information environment to monitor and coordinate activity, forecast and prevent violation of food security.

Undoubtedly, the national agriculture has its own course of development and market niche (Katan et al., 2018; Khalatur et al., 2018). However, their scientific assistance needs patterning the best world results and methodology which address the contemporary market challenges the most effective way. Thus, the main purpose of this study was to ground the criteria for monitoring agricultural management and specify directions of its improvement by means of comparative analysis over the agrarian achievements in Ukraine and the USA. To attain the given goal the research dealt with the following tasks, namely:

– to apply cluster simulation to coordinating results of agricultural production in Ukraine and the USA;
– to assess effectiveness of agricultural management by the functions of control, planning, organization, and motivation;
– to present recommendations on implementing the US agricultural gains into management of agrarian sector in Ukraine.

A methodological core of the research findings is as follows (Table 1).

Table 1. The system of criteria to improve functions of agricultural management

Functions	Criteria
Coordination	Cluster distribution
Control	Results of agricultural production
Planning	Specialization of activity
Organization	Perfection of technologies and macro-environment
Motivation	Wage

Source: composed by the author.

Agricultural management must assist a cyclic process of agrarian production. Therefore, it is proposed to start improvements of agricultural management with coordination of producers who have the similar conditions and prospects of their development. The most appropriate way to make such distribution by the volumes of agrarian products was to apply the mathematical apparatus of cluster modelling (Porter, 2000; Phillips et al., 2012). This approach makes it possible to combine sample elements into clusters of strong, average and weak agricultural productions with the least sum quadratic deviations from the unknown in advance centers.

Clusters' indicators maintained the current control over effectiveness of agricultural management. The ones used in this research were weights of the clusters, volumes of agrarian products, shares in total agricultural production, deviations between average agricultural production within the clusters and in the whole country.

The clusters' characteristics on specialization by branches of crop and animal husbandries reflected a functional quality of planning and revealed its promising comparative improvements.

The organizational component of agricultural management was assessed via criterion of perfection in technologies and macro-environment that concern the key options over rising productivity and correcting agricultural policy.

Labor force is an invaluable asset in agrarian sector. Strategic agricultural progress depends on highly qualified professionals, acquainted with the world innovations. Certainly, many farmers suffer from the lack of free time and finances, scarce incentives and access to the qualitative educational materials, psychological and language barriers to meet international experience. That is why the wage like the strongest tangible stimulator of labor force development became a criterion to assess a motivation within agricultural management.

On completion of the cycle of agricultural production and implementation of the created recommendations, it is necessary to update the values of the described criteria to monitor the further continuous increase in quality and effectiveness of agricultural management. Such methodological procedure concerns checking a practical feedback to illustrate management progress in facing challenges of agricultural reality.

2. RESULTS OF CALCULATIONS

The calculated results based on the described methodology were obtained at the samples of agricultural productions in 24 regions of Ukraine and 50 states of the USA for 2017 (State Statistics Service of Ukraine, 2018; US National Agricultural Statistics Service, 2018). Clusters' distributions of states and regions by the volumes of agrarian products were performed by the method of artificial neural nets built in the computer tool NXLClusterizer. The contents of clusters with strong, average, and weak agricultural productions were aggregated in Tables 2 and 3. The quantitative characteristics of the obtained clusters to Ukrainian and the US agriculture were collected in Tables 4 and 5.

The principal directions of agricultural production define specialization of the agrarian activity and clarify assessments of management quality with regard to planning agricultural production. The core specialization typical to crop growing in the USA and Ukraine are productions of

- wheat which is the basic grain food crop;
- corn which is the basic grain feed crop;
- sunflower and soybeans like the key oilseeds in Ukraine and the USA;
- vegetables and potatoes;
- fruit, berries, and nuts;
- feed crops including grasses for hay and root crops.

Table 2. Cluster groups of Ukrainian regions by the volumes of agrarian products

Cluster of strong agricultural production		Cluster of average agricultural production		Cluster of weak agricultural production	
Regions	Agrarian products, $ mln.	Regions	Agrarian products, $ mln.	Regions	Agrarian products, $ mln.
Cherkasy	488.92	Chernihiv	402.30	Chernivtsi	166.82
Dnipropetrovsk	562.64	Kherson	411.53	Donetsk	284.33
Kyiv	538.02	Kirovohrad	383.66	Ivano-Frankivsk	221.84
Kharkiv	524.24	Lviv	362.50	Luhansk	174.03
Khmelnytskiy Pol-	510.05	Mykolayiv	326.35	Rivne	259.42
tava	528.53	Odesa	433.96	Volyn	253.72
Vinnytsya	758.26	Sumy	378.47	Zakarpattya	145.48
		Ternopil	336.50		
		Zaporizhya	355.92		
		Zhytomyr	366.38		

Source: composed by the author based on the data of State Statistics Service of Ukraine (2018).

Table 3. Cluster groups of the US states by the volumes of agrarian products

Cluster of strong agricultural production		Cluster of average agricultural production		Cluster of weak agricultural production	
States	Agrarian products, $ mln.	States	Agrarian products, $ mln.	States	Agrarian products, $ mln.
California	49474.39	Arkansas	9840.06	Alabama	6317.60
Iowa	32105.19	Colorado	8470.42	Alaska	55.65
Nebraska	25517.25	Florida	8840.61	Arizona	4354.79
Texas	28235.52	Georgia	10445.96	Connecticut	648.15
		Idaho	8176.58	Delaware	1383.08
		Illinois	17313.82	Hawaii	819.02
		Indiana	11291.89	Kentucky	6643.29
		Kansas	18326.71	Louisiana	3545.34
		Michigan	8677.12	Maine	810.74
		Minnesota	20223.65	Maryland	2476.79
		Missouri	10472.22	Massachusetts	516.18
		North Carolina	12558.42	Mississippi	6084.01
		North Dakota	9249.59	Montana	4486.14
		Ohio	10161.53	Nevada	823.92
		Oklahoma	8738.34	New Hampshire	299.04
		Pennsylvania	8153.49	New Jersey	1142.91
		South Dakota	11160.93	New Mexico	3303.08
		Washington	11310.39	New York	5728.27
		Wisconsin	12481.61	Oregon	5510.58
				Rhode Island	94.59
				South Carolina	2657.72
				Tennessee	4059.99
				Utah	2232.26
				Vermont	891.07
				Virginia	4137.76
				West Virginia	858.95
				Wyoming	1932.45

Source: composed by the author based on the data of US National Agricultural Statistics Service (2018).

The core specialization typical to animal husbandry in the USA and Ukraine are productions of beef, pork, poultry (mostly broilers-chickens, besides turkeys in the USA), cow milk, and eggs.

Data of Table 2 specified that planning and organization within the cluster of strong agricultural production in Ukraine resulted in the prevailing productions of corn (50.5%), fruit, berries, and nuts (43.6%), pork (37.1%), poultry (79.1%), and eggs (50.8%). Ukrainian regions set in the cluster of average agricultural production took leadership in growing wheat (48.6%), sunflower seeds (47.2%), vegetables and potatoes (41.7%), feed crops (41.2), as well as in producing beef (40.2%) and milk (39.3%). Farmers of the cluster of weak agricultural production were especially successful in producing pork (28.8%) and growing fruit, berries, and nuts (30.3%) (State Statistics Service of Ukraine, 2018).

Table 4. Clusters' characteristics by agricultural production in Ukraine

Indicators	Cluster of strong agricultural production	Cluster of average agricultural production	Cluster of weak agricultural production
Weight by number of regions, %	29.17	41.67	29.17
Total volume of agrarian products, $ mln.	3910.65	3757.57	1505.63
Share in the total agricultural production, %	42.63	40.96	16.41
Average volume of agrarian products, $ mln.	558.67	375.76	215.09
Deviation between average agricultural production in the cluster and country, %	46.15	-1.70	-43.73

Source: calculated by the author based on the data of State Statistics Service of Ukraine (2018).

Table 5. Clusters' characteristics by agricultural production in the USA

Indicators	Cluster of strong agricultural production	Cluster of average agricultural production	Cluster of weak agricultural production
Weight by number of states, %	8	38	54
Total volume of agrarian products, $ mln.	135332.35	215893.31	71813.35
Share in the total agricultural production, %	31.99	51.03	16.98
Average volume of agrarian products, $ mln.	33833.09	11362.81	2659.75
Deviation between average agricultural production in the cluster and country, %	299.88	34.30	-68.56

Source: calculated by the author based on the data of US National Agricultural Statistics Service (2018).

Data of Table 3 revealed that planning and organization within the US cluster of strong agricultural production resulted in the outstanding productions of corn (31.5%), soybeans (21.9%, the most productive state is Iowa). Due to California this cluster is the unattainable winner in growing fruit, berries, and nuts. Cluster's animal husbandry produces 30.2% of beef (the most productive

state is Texas with the share of 13.2%). Iowa's farmers alone provide 31% of pork. 3 clusters' states belong to the Top-10 producers of poultry. The country's leader in the milk segment is California (18.6%). Furthermore, the discussed cluster maintains 24.8% of eggs (the most productive state is Iowa with the share of 14.9%). Agricultural advantages of the US farmers incorporated into the cluster of average agricultural production are as follows. 3 clusters' states are the Top-3 growers of wheat. 8 states belong to the Top-10 producers of soybeans and corn, in particular, Illinois provides 13.9% of soybeans. 6, 8, and 7 clusters' states are comprised into the lists of Top-10 producers of beef, pork, and eggs. 3 states are among the Top-5 broilers' raisers. At last, the considered cluster provides 48.3% of milk. The agricultural activity in the cluster of weak agricultural production is focused on producing beef, poultry (especially, turkeys), and milk where the state of New York ranked the third among the largest US dairy manufacturers. The cluster's crop growing is mostly presented by feed crops, local berries and mushrooms, except for Montana which is the best wheat producer famous for perfect durum wheat (US National Agricultural Statistics Service, 2018).

The calculated indicators of the wages as the criteria to motivation in agricultural management of Ukraine and the USA were assembled in Table 6 (State Statistics Service of Ukraine, 2018; US National Agricultural Statistics Service, 2018).

Table 6. Clusters' characteristics by the wages in agriculture

Countries	Indicators	Cluster of strong agricultural production	Cluster of average agricultural production	Cluster of weak agricultural production
Ukraine	An average wage in agriculture, $ per month	236.86	228.12	216.49
	An average wage in agriculture relative to the minimal wage, %	171.77	165.44	157
The USA	An average wage in agriculture, $ per month	2095.20	2023.58	2041.72
	An average wage in agriculture relative to the minimal wage, %	155.27	159.83	163.41

Source: calculated by the author based on the data of State Statistics Service of Ukraine (2018) and US National Agricultural Statistics Service (2018).

3. DISCUSSION

Let us pass to the detailed interpretation of the obtained calculated results. In contrast to the recent research run by Vasylieva (2017), the described cluster coordinations of the US states and Ukrainian regions were made not by the sectoral, but territorial principle. The current achievements of the entire agrarian sector of Ukraine can be ranked 18th among the US states between North Dakota and Florida. Thus, the obtained coordination by the levels of strong, average, and weak agricultural development enabled us to reconcile the US states and Ukrainian regions according to a relative success in the agricultural activity. It will be followed by the better targeted recommendations on improving agricultural management in Ukraine got from positive results in planning, organization, and motivation in the US agriculture.

According to Lueg and Radlach (2016), systems of control in management become more common as for providing sustainable development in all areas of activity. At the same time, there is an alarming lack of the similar tools in agriculture since only qualitative indicators maintain an

objective control over management quality (Vasylieva and Velychko, 2017). The presented in research approach benefits from the choice of the well-timed accessible statistic indicators to the annual volumes of agricultural productions by regions and states. Besides, it ensures double monitoring of management quality: based on Ukrainian dynamics and with regard to the US exemplary indicators. Namely, data of Tables 4 and 5 clarify that the US states are much more differentiated by results of the agricultural activity than that of Ukrainian regions. It is explained by the fact that nowadays agrarian sector is the most powerful and stable in Ukraine and every region is involved in agriculture. The cluster of strong agricultural production in the USA covers just 8% of states. Besides, a ratio of their contribution into the total sum of agrarian products is 1:4.23 which is about 4 times more than the US average corresponding value.

The similar cluster in Ukraine comprises approximately 29% of regions. However, a ratio of their effect over the total sum of agrarian products is only 1:1.46 which exceeds the average value in Ukraine barely by 46.15%. The shares of states and regions in the clusters of average agricultural productions are almost equivalent. But the total contribution of the US farmers surpasses the relative weight of Ukrainian production by over 10 p.p. Furthermore, the considered US states have one-third more relative results in comparison with the US total average agricultural production. On the contrary, Ukrainian farmers demonstrate productivity equal to the level in Ukrainian agriculture. Regions and states, put into the clusters of weak agricultural productions, make almost identical relative contributions into the total agricultural results in their countries. It is worth mentioning that the share of Ukrainian regions with the poor volume of agricultural production is around 25 p.p. less than that of the US states. Ukrainian farmers of the discussed cluster work better in a relative scale, but the US farmers produce 12.37 times more in the absolute figures.

For sure, specialization of the agricultural activity is a proper criterion of effective planning. The critical issue in the agrarian sector of Ukraine is a sharp disproportion between crop growing and animal breeding with the ratio of 73% to 27% (State Statistics Service of Ukraine, 2018). The effective meat and milk cattle breeding are necessary components of all US clusters. A comparative analysis of the obtained calculated results over the cluster of average agricultural production displays an optimal concentration of beef (40.2%) and milk (39.3%) segments together with the balanced growing of corn (42%) and feed crops (41.2%). An economic base of stabilizing meat and milk cattle breeding in the cluster of strong agricultural production is linked with growing 50.5% of corn and 36.5% of feed crops to meet the demands of producing 35.7% of beef and 39% of milk. A poor growing of feed grain and oil-protein crops is the principal obstacle to effective development of beef and milk segments in the cluster of weak agricultural production.

The US pork production is much more differentiated than that of Ukraine, where it is a typical uniform specialization of all regions. The similar tendencies in the US and Ukrainian agriculture emerge in poultry and eggs production. Such activities involve the most successful states and regions of the clusters of strong agricultural productions. Specialization in growing wheat depends on the favorable natural and climate conditions. They appeared to be in the clusters of average agricultural productions in both the USA and Ukraine. The largest corn and soybeans productions are spread in the central US states which belong to the clusters of strong and average agricultural productions. Ukrainian regions dominant in growing corn and oilseed crops, especially sunflower, are also situated in the similar clusters. Growing vegetables and potatoes involves all Ukrainian regions. As distinct from the USA, they supply mostly seasonal products. The US farmers practice all-the-year-round productions in both the open air and greenhouses. The most popular vegetables in Ukraine are tomatoes, cucumbers, cabbages, onion, table beet, and carrot. The US producers and consumers prefer tomatoes, lettuces, onion, and carrot. Growing fruit, berries, and nuts is extremely profitable agribusiness. Therefore, such activity is concentrated in the clusters of strong agricultural productions in both the USA and Ukraine. An insufficient saturation of the domestic market means that Ukrainian farmers should expand areas under permanent crops of fruit trees and nuts as well as increase growing berries in greenhouses.

Now let us pass to considering technological problems and imperfect features of macro-economic environment to find the vectors of improving agricultural management in Ukraine following the example of the US agriculture. Namely, the remarkable results in the US beef and milk productions are explained by the exclusively high productive herd. It is mostly the Red Angus breed in the meat segment and Holstein breed in the dairy one. Like in Ukraine, the US farmers apply corn and grass feed. Robotic milking equipment is not widespread. The initial obstacle to effective organization of Ukrainian cattle breeding is high inflation which makes impossible to stand expenditures before earning income after nearly two-year cycle of beef production. Besides, milk production needs quality certificates since their absence diminishes purchase prices. Practices of the US farmers in pork production and poultry are useful to medium and small households and farms in Ukraine. Indeed, they may reorganize their activity to produce organic pork, poultry, and eggs as well as promote sales through electronic commerce.

Like in the USA, a tangible option to improve growing wheat in Ukraine connects with updating a machinery park. The precise farming with the GPS-navigation of tractors and combine harvesters manufactured by John Deere allows reducing fuel consumption, decreasing soil contraction, optimizing application of fertilizers, cutting loss of grain. In order to purchase new machinery the US farmers have accessible loans with an annual interest at the rate of 3-5%. Unfortunately, Ukrainian farmers cannot get financing even with an annual interest at the rate of 25% that affects development of agriculture and rural areas (Hartavska et al., 2015). Leasing and cooperation seem to be the pillars to solve this crucial issue.

The most profitable component of the US crop production is growing corn and soybeans with the combined returns above $50 bln. The share of corn among grain crops in the USA reaches about 60%. 38% of the harvest is spent for cattle feed. The world share of the USA in manufacturing bio-ethanol amounts to 59%. The share of soybeans among oilseed crops in the USA reaches 86%. 16% and 9% of the harvest are spent for feeding chickens and hogs. The world share of the USA in manufacturing bio-diesel amounts to 18%. The core bases of these formidable results of the US farmers are growing GMO-varieties of corn and soybeans. Nowadays the Monsanto Inc. developed 10 GMO-crops such as the mentioned corn, soybeans as well as cotton, canola, alfalfa, sugar beet, papaya, squashes, potatoes, and apples, supplied at the US market. These crops stand drought, are persistent to deceases and pests, have the improved nutrition profiles, demonstrate higher yields. Growing GMO plants goes with No-Till technology, reduces applying pesticides, decreases waste of water, and puts down prices for agrarian products. The issues of security have been researching for over 25 years. Traces of GMO were not exposed in milk, meat, and eggs got from animals raised with the GMO feed (US National Agricultural Statistics Service, 2018). At present Ukraine is not officially involved in development and implementation of the similar progressive bio-technologies. On the contrary, growing corn and sunflower takes place with a poor application of fertilizers and an uncontrolled use of dangerous herbicides and insecticides that demolishes soil fertility. The share of the cultivated area in Ukraine reaches 56.2% that ranks the second in the world after Bangladesh. For comparison, the share of the cultivated area in the USA is only 16.6%. The reason of such a negative situation in Ukraine is a moratorium at the land market. The postponed agrarian reform caused an irresponsibility of tenants in light of a poor mechanism of control over agricultural land use and dynamics of soil fertility (Koroteyev et al., 2017).

Improvements in arranging olericulture in Ukraine suppose better logistics of storage and sales to increase proceeds and provide steady supply of vegetables and potatoes at the domestic market (Velychko, 2014). Success in growing fruit, berries, and nuts in the USA is strongly correlated with irrigation. The average share of the irrigated lands in the USA reaches over 6%, while it is above 40% in the states of fruit and berries specialization. Farmers practice to gather water from rain and melting snow in the chain of artificial ponds for the further irrigation through the underground tubes. Drip irrigation is applied in the fruit and nuts orchards to reduce waste of water. Facilities for greenhouse berries are transformed to run on the renewable resources of energy such

as solar batteries and wind generators. The similar ways of arranging effective horticulture are worth active implementation in agrarian sector of Ukraine.

Overall, the unique assistance to effective organization of the US agriculture is operated by the Cooperative Consulting Service Extension created at the federal level by the Smith-Lever Act in 1914. It unites specialists of agricultural universities into the nation-wide chain which is committed to the important mission of advising and sharing new knowledge and technologies among local farmers and rural communities. Such approach also seems to be quite applicable for Ukrainian agriculture.

The employment in agriculture and related industries in Ukraine and the USA amounts to approximately 16% and 12% of the total workforce. Agricultural management in both countries is focused on increasing educational level, providing appropriate gender balance, and involving the youth into agrarian production. Contemporary global tendencies reveal the sequential reduction in number of farmers as well as the hired and contracted workers to the extent of advancing scientific and technological progress right up to the entire automatization of the agricultural activity. Nevertheless, the strongest motivator of rising productivity in agriculture is a wage (Bazylevych et al., 2016). Data in Table 6 depict the average wage of the US farmers to be nearly 9 times more than that in Ukraine. Besides, there are reverse trends in changing the shares of the average wages in Ukrainian and the US agriculture with regard to the minimal wages among the clusters. Indeed, monetary motivation was the most encouraging in the cluster of Ukrainian regions with strong agricultural production (171.77%). On the contrary, an attempt to improve agricultural results by means of a higher wage was registered in the cluster of the US states with weak agricultural production (163.41%).

Overall, highly effective management in the US agrarian sector is supported and incentivized by the US Department of Agriculture incorporating Services of agricultural marketing, economic research, animal and plant health inspection, food and nutrition, food safety and quality, foreign trade, statistics, conservation of natural resources, risk-management, rural development, and so on. The current activities and achieved results of the US Department of Agriculture find an on-line presentation in Internet. A regular monitoring over the US agricultural development will foster continuous stable improvements of agricultural management in Ukraine.

CONCLUSION

Ukraine strives to become a dignified player at the global markets of agrarian products. Well-balanced agricultural management is an obligatory condition to saturate the domestic demand for qualitative food and extend Ukrainian niche within the world agriculture. The best bases for these purposes are practically checked methods of managing agricultural production. The undeniable leader in such activity is the USA.

It is appropriate to undertake coordination and control over agrarian results within the clusters of strong, average, and weak agricultural productions. The obtained macro-economic conclusions would be useful for substantiating state programs of agricultural development.

Planning, organization, and motivation as the principal functions of agricultural management will benefit from estimating via criteria of optimal agrarian specialization, technological perfection, economic adjustment to legislative environment, and monetary assessment of agricultural labor. In this case relevant monitoring and comparing will define options and perspectives in improving agricultural management at the levels of agrarian enterprises, farms, and households.

Geographical situation and European integration encourage us to continue this study focused on developing agricultural management in Ukraine via achievements in the agrarian sectors of the key countries in Europe.

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