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Issues of Swine Breeding Development and the Main Solution Ways in the Republic of Armenia

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ABSTRACT

Within the frame of the current scientific article the production and economic indicators of the swine breeding branch in the economy of Armenia have been analyzed. The strategic role and significance of the branch development have been justified putting stress on the increase of self-sufficiency level of the pork production in the republic. In the mentioned context the disclosure of the issues existing in the swine breeding branch of the RA has been considered as a priority, the solution of which will enable to increase the self-sufficiency level of pork in the country ensuring growth in the consumption sizes of the local pork production, as well as increase in the share of the local production within the overall structure of pork consumption.

Introduction

The agricultural production is one of the main sectors of economic development, which provides the population with food product and supplies the light and food industry with raw material. Moreover, the agricultural sector is of vital importance for the increase of economic independence and, therefore, for the provision of national security of any country.

Provision of safety in the agri-food system is a permanent

priority to ensure the national security of any country, particularly in the current conditions, when related to the pandemic of coronavirus, the urgency of food provision issue has increased and all countries try to create a great amount of food product supplies to possibly provide their own population with basic foodstuffs for a long-term perspective. To this end the countries seek to pursue a policy which would entail to the increase in the level of self-sufficiency and safety provision in agri-food system.

Materials and methods

General and holistic analysis of the swine breeding branch has been conducted based on our studies and statistical data published in the collections of the National Statistical Committee of the RA. Throughout our investigations the main field-related problems requiring urgent solutions have been enhanced, which will enable to further improve and develop the current situation of the swine breeding branch in Armenia. In the framework of conducted studies scientific abstraction and research methods, as well as computational, graphical, comparative and statistical methods have been applied which promoted more descriptive and comprehensive consideration and presentation of the field issues and the steps for their disclosure and solution.

Results and discussions

Livestock is one of the main branches of the RA agricultural sector, which has a considerable role in the provision of livestock product to the population of the country.

In the post-Soviet period the branch structure of the RA agriculture underwent significant changes and the branch of animal husbandry, having traditionally dominant position (about 60 % of gross agricultural production), stepped back possessing 40 % of the gross agricultural production; anyhow in the recent years a considerable growth in the share of livestock branch has been observed in the mentioned structure, particularly in 2018 the specific weight of the branch amounted to 53 % in the gross agricultural production (Statistical yearbook of Armenia, 2019).

The structure of gross agricultural production per branches is introduced in the Diagram 1.

The studies have shown that the rate of per capita pork consumption has a decreasing tendency, which is mainly due to the reduction of local production sizes, which in its turn is related to the multiple issues raised in the sector.

In this regard it is very important to enhance and consider all the problems in the swine breeding branch, which could enable to increase the self-sufficiency level of the pork production in the country promoting the increase in the consumption rate of the local pork production, as well as the growth of its share in the consumption structure on the whole, since, along with the economic factor the provision of high quality and safe foodstuff to the population is also of paramount importance. It is obvious that the widespread and large-scale import of the food of animal origin, particularly pork production implies many threats regarding the provision of food and foodstuff safety.

Swine breeding is the most productive and rapidly growing branch in the livestock sector. It is second to none in fat and meat yield. The live weight of a piglet at the age of 8 months grows up to 100 times. Throughout a year more than 2-3 tons of live weight can be developed from a mother pig (sow), in case when yearly 2-3 c meat can be received from a cow. For the gain of 1 kg live weight of a pig 5-6 feed unit (FU) is used, while in case of meat fattening up to the age of 7 months 4-4.5 feed unit is needed, in case when in the cattle breeding 7-8 feed unit for the development of 1 kg live weight is applied. The slaughter yield in pigs is rather high (70 %-80 %) and pork is more nutritious (Kovalenko, 1999). So, 9-10 FU is used for 1 kg beef production, 5-6 FU – for 1 kg pork, 7-8 FU – for 1 kg mutton and 3-4 FU for 1 kg poultry production (Hakobyan and Tchepetschyan, 2012).

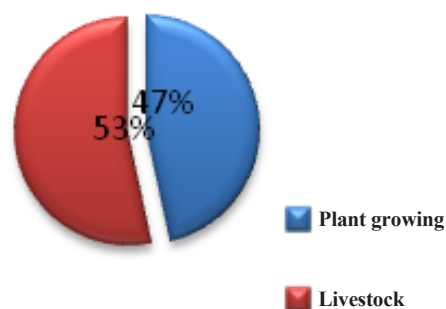


Diagram 1. The values of gross agricultural production per branches (composed by the authors).

Crumbled maize is used in the pigs' feed ration in concentrated state; it has also a great portion in the combined concentrated feed (30-60 %). Currently the most maize demand is satisfied by means of import. Particularly, in 2018 the import sizes amounted to 67855.7 tons, the cost of which made 11753.3 thousand USD (Official webpage of the RA customs service), while in the same year the maize croplands covered 1145 land area and the gross yield was 47580 centners (Agricultural croplands and gross yield, 2019). The RA maize croplands, gross yield and the average yield capacity per ha are presented in Diagram 2 (Agricultural croplands and gross yield, 2014, 2015, 2016, 2017, 2018).

Three main directions are identified in the swine breeding branch: meat, bacon and fat production. The studies have shown that meat and bacon productions are more widespread in our country.

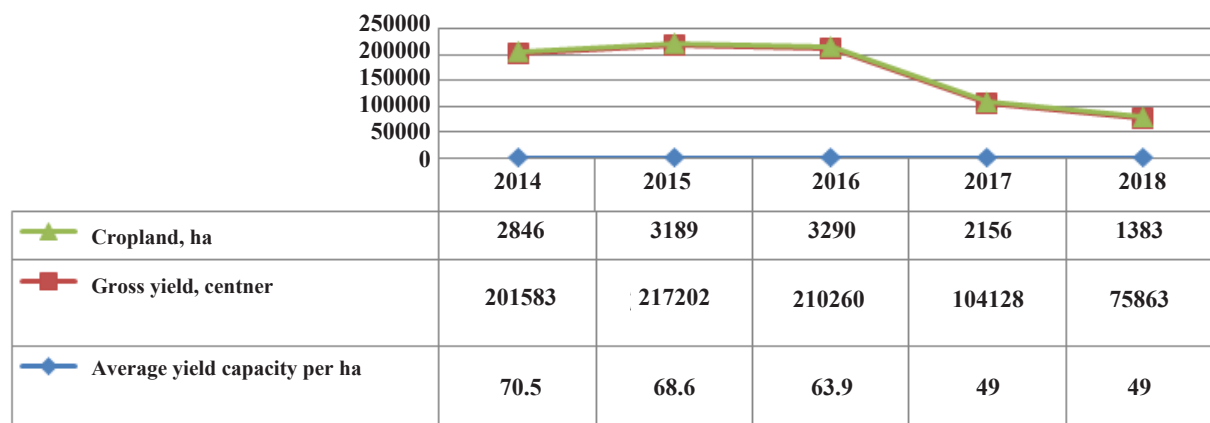


Diagram 2. Maize croplands, gross yield and the average yield capacity per ha (composed by the authors).

Table 1. Hog number (head) in the RA per regions, 2014-2018*

Regions	2014 h	2015 h	2016 h	2017 h	2018 h
Aragatsotn	10521	10674	14228	15127	12201
Ararat	19434	19447	20959	19770	18586
Armavir	19999	20506	25444	27012	24342
Gegharkunik	11527	12766	15191	15941	16225
Lori	12255	10952	15358	15815	12532
Kotayk	15305	14826	20586	20370	22415
Shirak	13810	12870	14771	18666	14670
Syunik	11686	12364	13730	13467	12533
Vayots Dzor	1890	2418	2627	2519	2185
Tavush	16894	16688	20069	16401	16668
Yerevan city	6478	8921	11813	10461	14400
Total in the RA	139799	142432	174776	175549	166757

*Food Security and Poverty, 2017, 2018, 2019

Prior to transitional period swine breeding was organized in the large complex farms, i.e. in the collective and state farms, on the background of imported feed base. After declaration of independence in the large and mid-sized farms the mentioned branch was inefficient and didn't receive sufficient finances, whereas in the current conditions significant investments are required for the high-tech branch organization. There isn't any relative privilege in the swine breeding branch in Armenia, at least for a short-term perspective, since the major part of the

feed product is still imported (RA strategy of sustainable agricultural development, 2002).

Before privatization 98 % of the hog number in Armenia belonged to large white breeds, the other breeds (Duroc, Landrace, Welsh) were used for cross-breeding. In 1994 the Armenian meat pig breed was introduced, which fastly got spread in the republic and according to investigations it makes 9-10 % of the current hog number (RA strategy of sustainable agricultural development, 2002).

All regions (marzes) and almost all rural communities of our republic are engaged in swine breeding. The hog number per RA regions for 2014-2018 is introduced in Table 1.

Upon the analysis of the data introduced in Table 1 it becomes clear that the hog number grew up as of 2014-2018, anyhow in 2018 it was reduced as compared to the data recorded in 2017 by 8792 heads or by about 5 %, which entailed to the reduction of pork production sizes. Due to the decrease of hog number and meat production sizes the index of self-sufficiency level in pork production for 2018 also fell down by 4.7 % against the same index recorded for 2017. According to the average data of the RA national food balance the same index was estimated 57.5 % for 2014-2018 (Statistical yearbook of Armenia, 2019, Food security and poverty, 2019). The indices of pork production, its import and self-sufficiency level for 2014-2018 in Armenia are introduced in Table 2.

The data of Table 2 indicate that the main part of the pork demand is satisfied at the expense of import, which, as to our assessments, is a serious problem from the economic, social and healthcare prospects due to insufficient quality and secure local pork production.

Table 2. The indices of pork production, its import and self-sufficiency level in the RA for 2014-2018*

Year	Production (thousand tons)	Import (ton)	Self-Sufficiency (%)
2014	16.2	7246.8	54.2
2015	17.5	6429.5	57.8
2016	18.0	5659.0	64.1
2017	16.6	7027.2	58.0
2018	16.3	8899.4	53.3
Average	16.9	7052.4	57.5

*Statistical yearbook of Armenia 2019, Food security and poverty, 2017, 2018, 2019

Table 3. The import of pork in the RA per different countries for 2015-2018*

Country	2015, ton	2016, ton	2017, ton	2018, ton
Belarus	-	-	54.8	289.9
Brasil	4658.4	3881.3	5816.9	7764.1
Belgium	124.3	48	71.9	-
Germany	128.6	28	224.7	-
Italy	30	61.4	52.7	46.2
Canada	101	-	126.9	75.1
Norway	-	470.4	395.6	225.1
Ukraine	315.3	608.8	40.3	-
Russian Federation	31.3	142.3	282.5	744.8
Total	5388.9	5240.2	7066.3	9148.2

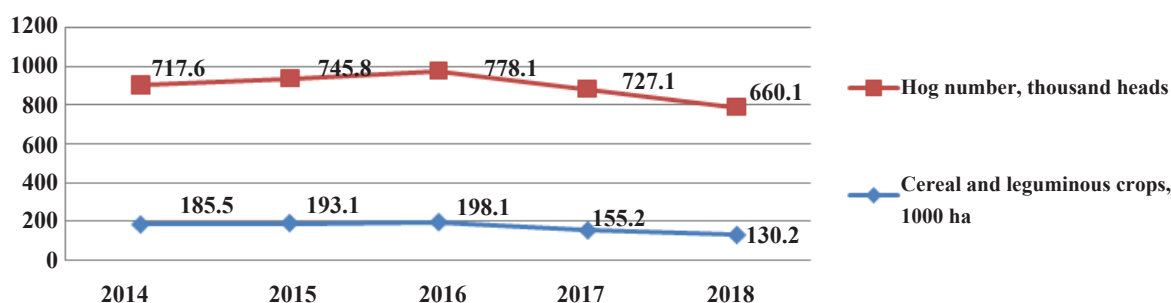
*Official webpage of the RA Customs Service

The data on the pork import into Armenia and on the import sizes per different countries are presented in Table 3.

The data presented in Table 3 testify that within 2015-2018 the considerable part of the pork was imported into Armenia from Brasil respectively making 86.4 %, 74 %, 80.9 % and 85 % of the total pork production.

Investigating the foreign markets and world practice it becomes clear that the low level of feed provision is the key problem for different countries engaged in pork production, including Armenia, which is related to insufficient level of feed production and to the high feed prices in the foreign markets. Due to the aforementioned issues severe pork price volatility and significant price variations per countries are observed in the foreign markets, which are mostly conditioned by the shortcomings in feed production field. So, there are rather favorable conditions for the development of swine breeding branch and for the provision of its competitiveness in those countries where the cultivation of cereal crop complex is developed. Based on the mentioned circumstance it becomes quite obvious that due to the underdeveloped cereal crop complex in the Republic of Armenia, as well as to the insufficient level of feed production there are serious obstacles for the development of swine breeding branch. Particularly, per the data obtained for 2014-2018, considerable reduction of cereal and leguminous croplands was recorded. The dynamics of cereal and leguminous croplands and hog number for 2014-2018 is introduced in the Diagram 3 (Statistical yearbook of Armenia, 2019).

Since January 1997, 10 % customs duty is defined for the import of animal-based products, particularly for pork import, which has also exerted an adverse effect on the competitiveness of the local pork production. The studies have shown that due to the low level of population's purchase capacity the preference area in the pork consumption market is mostly towards the imported product, since it is significantly cheaper than the local pork

**Diagram 3.** The dynamics of cereal and leguminous croplands and hog number for 2014-2018 (composed by the authors).

price, which has surely a negative impact on the extension of the local product industry. The high price of the local pork is conditioned by the high cost price of the production process, since the feed expenses take a great share in the overall production costs, which in its turn is again related to the insufficient level of local feed production. There are also many obstacles for import, which have obviously emerged since the proclamation of independence.

As a matter of fact, during the years of Soviet period, the factual annual combined feed consumption made 0.7-0.8 mln tons in the republic, the considerable part of which belonged to the imported product, nevertheless in the recent years the mentioned index has dropped in about ten times.

Based on the abovementioned we can state that the swine breeding branch of the RA can't have a relative privilege at least for a mid-term perspective, since the main part of feed is imported from abroad and related to the import liberalization the imported pork price is rather affordable; besides, the sale system operates inefficiently. As to our analyses, the latter is connected to a number of issues among which the insufficient quantity of specialized structures for pork transportation, storage and sale, as well as the low availability of their rendered services (lack of means for investing the latest technologies for pork storage, packing and containerizing services) are the most important ones.

Along with the issues related to the development of feed production, sale system and feed base there are also other problems viewed in the context of swine breeding development, the complex solution of which can be real only in case of successive development of interrelated units in the mentioned sector. This particularly refers to the design and introduction of cluster model for the branch development.

Cluster is a group of interrelated enterprises centralized in a certain area (equipment, staffing, suppliers of professional services, general infrastructures, scientific-research and teaching centers, etc.), which complement each other and increase the level of competitive advantages for both individual enterprises and for the whole cluster (Yakobson and Kirilova, 2015).

The implementation of adequate measures by the state and local self-governing bodies, as well as their active participation in the whole process is an important prerequisite for the establishment and development of the clusters, since the mentioned bodies are just those linking units by means of which strong cooperation and mutual support are formed between the organizations of different sectors participating in clusterization.

Establishment of clusters have become rather widespread, since the mutually agreed activities of the structures acting within the framework of these clusters greatly promote the increase of coordinated activities between state, private sectors and scientific branch.

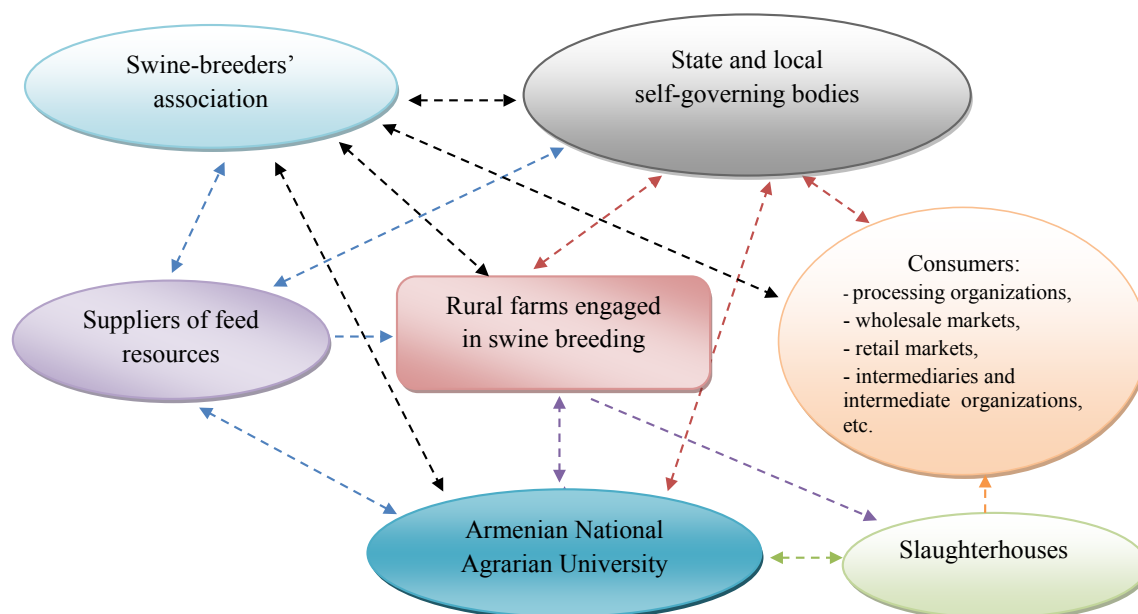


Diagram 4. Cluster model recommended for swine breeding branch (composed by the authors).

Based on the aforementioned circumstances and the priorities of branch development, as well as on the peculiarities of the economic and production interrelations, we have designed a cluster model for the branch development, which is introduced in Diagram 4.

Conclusion

The studies have shown that the low level of feed production and feed provision is considered to be one of the crucial issues in the development of swine breeding branch. Thus, we find it urgent and vital to propose conceptual approaches for its increase, upon the application of which it will be possible to significantly improve the situation in this sector for a mid - and long-term perspective. So, the renovation of combined feed production and its mass implementation, as well as the development of relevant activities with the consideration of economic and production resources is of utmost importance. Development and implementation of state support programs for the small and mid-sized enterprises engaged in cereal and combined feed production, as well as in that of protein and vitamin supplements is the next recommended approach by our research group. Taking into account that from the prospect of swine breeding development maize is the most valuable and high energy feed among the cereals and the fact that it is more productive than the other crops, we consider that the development of the maize production strategy should be viewed as a key direction in the context of the branch development. The development of the mentioned strategy and the implementation of a specific state policy is an imperative, since the maize croplands have been reduced in recent years, which directly interferes with the development of animal husbandry, particularly swine breeding branch.

Being considered as the most important economic component and the carrier of its development, the clusters can propose efficient pathways for the provision of rapid growth in the branch. It is viewed as a relatively new research field and its establishment and introduction can surely have a considerable effect on the development of the swine breeding branch in our country.

According to the recommended model (Diagram 4) a close cooperation between different organizations of the mentioned branch, various infrastructures, scientific research and teaching centers, as well as between the rural farms engaged in swine breeding is envisaged. Upon the stated interrelations such important issues as the increase of feed provision level, selection of relevant personnel and improvement of their training system, rendering consultatoin services, as well as upgrading

of slaughterhouse and sale systems can be handled successfully.

In the recommended clusterization model swine breeders' association is included based on the study of the swine breeding development practice in the Ukraine. So, the Ukrainian association founded on a voluntary basis is an efficiently operating, non-commercial organization. It was established through the unification of the farms from different regions of the country which are enagedd in swine breeding branch. As of 2018, 39 farms of 19 regions were the members of the mentioned association. Among the members there are both large farms and small households and on the whole 100 thousand ha croplands belong to the mentioned farms, which provide 41 % of the pork market. The main goal of the mentioned structure is to introduce and protect the interests of the farms involved in the association, to promote the contribution of the latests technologies in the sector, to expand the sale markets and to protect the domestic producers.

The association cooperates with the processing enterprises, trade organizations, with the centers providing consultations in swine breeding branch, as well as with local self-governing bodies. The main functions of the associations are:

- ◆ Providing support in veterinary medicine and animal husbandry,
- ◆ Organizing and implementing seminars and courses,
- ◆ Studying and analyzing pork market,
- ◆ Providing information through different methods,
- ◆ Developing and implementing events, etc.

The main directions of the association activities are:

- Providing information and conducting analyses,
- Providing support in educational sector,
- Promoting legal, economic and other types of support,
- Analyzing the current legislation, engaging experts, committees and groups in the process of the study and solution of the raised problems (<https://latifundist.com>).

We are convinced that the establishment of an association with the mentioned functions and its inclusion in the cluster model can have a favorable effect on the development of the RA swine breeding branch and on the improvement of production and economic relationships; it will also enable to solve the current problems of the swine breeding branch in a more fundamental way.

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