

Niche crops

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The purpose. To open short history of formation of niche crops as components of food chain of a man and to assess changes of volumes of their production for last decades. **Methods.** Analysis of references and statistical base of FAO concerning niche crops. **Results.** The history of introduction in farming agriculture of so-called niche crops, change of their harvested acreages, productivity and volumes of production for 1990 — 2014 in the world, regions and countries-leaders is considered. **Conclusions.** Production of separate niche crops is caused by changes of harvested acreages and increase of yield. Magnification of interest of producers to growing chick pea, pease and sorghum is connected to changes of necessities of regional and world markets.

Key words: *niche crops, buckwheat, chick pea, linseeds, millet, mustard, oats, pease, green peas, sorghum, rye, the plots, productivity, production.*

In the eyes of only one generation, some plant crops, which have long played a significant role in the human food chain, have become so-called niche cultures. In many respects this was due to the rapid development of production of such main crops as wheat, corn, rice. Increasing the area of these crops, agrarians in many countries were forced to reduce the area of other crops, which in the end was called a niche. However, today the situation has changed and these cultures have attracted the attention of producers for various reasons, in particular, climate change, which is becoming more arid.

According to I. Khodorov, the return of interest to these crops is determined by the significant benefits for each of them: sorghum - fodder in arid areas; buckwheat, millet, oats, rye - stable market; peas - increase yields of successor cultures; whips - high prices on foreign markets; flax - cleaning of crops from harmful substances [1].

The purpose of the research is to reveal a brief history of the formation of niche cultures as components of the human food chain and to assess the changes in the volumes of their production over the past decades.

Research methodology. Analysis of the Literary Sources and FAO Statistical Database on Nine Cultures.

Research results. In view of the growing interest in niche cultures in Ukraine, a special conference was held in 2012, and the magazine Agro-Money has devoted one of its rooms to these cultures [2].

According to G. Popova, sorgho, for example, is best suited to the changing climatic conditions of Ukraine, with high fodder quality in the content of protein in the grain of 12 - 14% and 118-130 k., 24-25 k.od. in the green mass and 22 - 23 k.od. in silo [3].

In contrast, buckwheat sorghum is more whimsical than weather, with high enough moisture content in the soil. At the same time, the costs for its cultivation are much less than for cultivation, for example, corn (6 - 8 thousand UAH per 1 ha against 25 thousand UAH). Buckwheat is good for crop rotation and does not require significant nutritional and fungal protection costs [4]. The rye is less favorable to weather than wheat, but the richer endurance does not compensate for its less yield and less, respectively, profitability due to the insignificant need for the production of certain types of bread, the percentages of which in the total volumes of its production for human consumption are small [5].

When M.I. Vavilov, a world-renowned Russian biologist, was an expedition to Afghanistan and Iran, then among the fields of pobilby (a kind of ancient wheat that has filamentous grain and a broken ear) discovered oats in the form of weeds, since oats were not cultivated here. This enabled him to trace the direction of development of oats from weeds to agricultural crops.

From Iran, wheat, along with garbage oats, was sold to neighboring Turkestan, where its production was of great importance. And wherever wheat was exported, everywhere it "accompanied" oats. The farther north, the harder it was to handle a delicate halfboard. Oats, as a stable and unpretentious plant, spread to the northern territories of European countries. That's how oats became an independent agricultural crop.

The peas culture appeared about 8 thousand years ago in the rich Crescent region, at the same time as some grasses (wheat, barley) and other beans began to grow (lentil, vika) [6].

The appearance of peas in the New World is associated with the name of H. Columbus, who, during his first voyage, brought seeds to Santo Domingo. About the consumption of whole beans is a mention since the XVI century. in the Netherlands and France. The use of whole beans is mentioned Jean Ruell in the work "Natura Stirpium libri tres" (1536). By the end of the XIX century. The production of peanut peas, which is well preserved, is developing. Now, for example, in France, they consume 2.2 kg of peas per person per year, mainly green peas, Ethiopia - 6 - 7 kg, but it is mainly peeled peas.

Peas are used in a variety of forms. First of all, it's the world's favorite green peas, that is, unripe seeds that are frozen or preserved. Sometimes they use the fruit completely, but provided that the doors do not contain a hard parchment layer. Young sprouts are used as vegetables in Asian countries, and sprouts have already appeared in our country, moving from Chinese cuisine. Dry peas are used to make soups. In addition, part of the pea goes to processing - for the production of proteins and feed for livestock and poultry, as well as in some cases, is a raw material for the production of protein and starch. Parts of plants remaining after peeling are good cattle feed.

Along with the direct economic effect of growing peas, which occupies 10 - 20% of the area, the side effect is that it is a good precursor to winter wheat, because it raises the nitrogen balance, reduces mineralization of the soil and prevents its erosion [7].

Consumption of peas in the form of green peas has become fashionable in France during the reign of Louis XIV. During the XIX century. the popularity of green peas in France has peaked and the number of varieties has increased significantly. So, the breeders Denaiffe and his sons in their 1906 work describe about 250 varieties of peas.

From the beginning of XX century. Thanks to the development of technologies in the food industry, cereal peas in large quantities are produced in developed countries. It can be preserved or frozen, in addition, there was the possibility of mechanization of its cultivation and harvesting.

In 1920, the American inventor Clarence Birdsey (founder of the company General Seafood) first produced frozen green peas. There is even a monument of peas - a statue of a giant of green in Blue Earth, Minnesota.

In 1926, the Minnesota Valley Canning Company (later renamed Green Giant), a US company, creates the Geant Vert brand to produce a product labeled "better than green peas". This brand exists to this day. In France, the company Bonduelle, which (if to believe in advertising) is the first number in Europe for freezing and preserving vegetables, has produced at the Bonduelle de Renescure the first cans of canned peas. Peas are now an important food crop in the world.

However, with over 25 million tons collected in 2014, peas are the only 4th legume crop in the world, far away after soybean (306.5 million tons), peanuts (45.9 million tons) and beans (48.2 million tons) t). For human consumption 48% of peas are used, 35% - for livestock feed.

Most producing countries grow peas green or yellow. Australia and India mainly produce brown peas.

Nut - Turkish peas, mutton peas, peas shish, blubber, nahat, humus - a leguminous culture, which began to be used in the Middle East 7500 thousand years ago. It is grown mainly in Turkey, North Africa, Mexico, India and Pakistan [8].

Linen. Has more than 100 species, the most important - flax usual. They have been growing for a long time, but it is difficult to name their homeland, although it is relatively old one year old, it is most likely to originate from the Eastern Mediterranean (Transcaucasia, Anatolia, Western Persia). Flax grows to produce raw materials for industry and seeds, which are used in the production of linseed oil, perfumes and medicine [9].

Mustard. Its seeds are used during canning of vegetables, mushrooms, fish, seasonings, and also in pharmaceuticals [10].

Millet has up to 500 species. This culture began to be grown in China and Mongolia since the third millennium BC. Culture is non-waste, grain is used for the production of wheat, straw and lucerne - for feed to ruminants. In recent years, genetics have been working to turn millet into an energy culture in order to use it for fuel production [11].

Homeland of Sorghum is the North-East Africa (Ethiopia and Sudan). In India, sorghum is grown from the third millennium BC. e., in China and Egypt - from the second millennium BC to III century. In Europe, sorghum was introduced in the XV, and in America - in the seventeenth century. Sorghum grain is processed into cereals, flour and starch, straw is made of paper, brooms, etc., the green mass is used on silage. By quality, sorghum is not inferior to corn, suitable for cultivation in arid and semi-arid regions of the planet [12].

Over the past two decades, there are divergences of interest in the production of niche crops in the world, as evidenced by the data of the FAO statistical base [13].

In general, the area of niche crops declined by 20.5% over the last 24 years, or by almost 29 million ha.

In terms of crop yield among niche crops, green peas are the first to be distinguished - 73.95 c / ha in 2014 for a maximum - 79.52 c / ha in 2000.

The lowest yield of mustard and millet is 8.39 and 9.03 c / ha in accordance. However, if the areas for the cultivation of millet decreased by more than 16%, then mustard, on the contrary, increased by 10.9%.

During the period of 1990 - 2014, the productivity of most niche crops tended to increase, which was reflected in the gross collections of these crops. For example, if the crop of flax seeds decreased by 298 thousand tons (10.2%), then Nuts - grew by 11.5 million tons (541.7%). The gross collections of buckwheat declined substantially - by almost 1.7 million tons (46.9%), oats - by 18.7 million tons (43.1%), and especially rye - by 22.9 million tons (60.1%). . The gross harvest of green peas grew by 9.9 million tons (132.6%). However, in general, gross collections of niche cultures remained practically at the level of the initial year's analysis due to the growth of nut, pea, green peas and sorghum (table).

The main production of buckwheat is concentrated on two continents of the world: in Asia and Europe. For the reduction on both continents of harvesting areas in 2014 compared to 1990 (in Asia - by 663 thousand hectares, in Europe - by 900 thousand hectares), their share decreased from 96.1 to 92.4%. At the same time, the increase in average yields in Europe in general led to an increase in the proportion of its gross national taxes in the world from 40.9% in 1990 to 54.3% in 2014, while the fall in Asia's yields has led not only to a significant reduction in buckwheat production (over 1.2 million tonnes), but also to a decline in the share of this geographic region from 53.4% to 32.7%.

The main region for buckwheat production in Asia is the East Asia georegion with its main producer in China, which in 2014 produced 564.9 thousand tons of buckwheat - almost one third of its world production.

In 1990, 12 countries were engaged in the production of buckwheat, the leaders of which were China - 1.9 million tons, and the former USSR - 1.4 million tons. In 2014, the number of Buckwheat countries grew to 17 in 3 leaders, because this group includes the former Soviet republics: Russia - 601.7 thousand tons and Ukraine - 167.4 thousand tons. China has reduced the production of buckwheat by more than 1.3 million tons and in terms of volume has taken the second stage of the world ranking.

In addition to the former Soviet republics, the African country Tanzania, which has grown 24.1 thousand tons, has appeared among the Buckwheat, and on the contrary, almost ceased production of the South African Republic (only 239 tons).

The production of buckwheat in Poland and France has considerably increased (41 and 88.9 thousand tons, respectively), as well as the fact that the decline in the production of buckwheat in the world is due to a decrease in its production in leading countries, which in 1990 grew more than 3.3 million tons, and in 2014 - only 1.4 million tons. That is, for the drop in buckwheat production in the world by 1.3 million tons, the leaders of the country reduced the volume by 1.9 million tons and, accordingly, their share from 95 to 72.6% to world volumes.

For the highest yield of nut, or cow pea, in Europe, 10,2 p / ha (+1,9 p / ha to 1990) and North America 16,5 p / ha in 2014 (for 1990). data are not available), these geographic areas, due to small gardens, have a negligible weight at the world level in terms of production volumes - only 0.3% together.

The hegemony of this culture is Asia, where the main areas of Nuts are concentrated, which over the course of 24 years increased by over 3.3 million hectares, with an average yield increase of 2.7 centners per

hectare. This provided for more than 2 times the growth of gross taxes, which in 2014 amounted to 11.7 million tons, or 85.2% of world volume.

Since mints are a food crop of poor countries, in the group of the 14 leading countries of its production in 1990 there was only one European country - Yugoslavia (10.6 thousand tons), and in 2014, this group entered The United States (12.4 thousand tons), which may be due to an increase in domestic demand for mints due to the influx of migrants from poor countries to the United States.

In general, the major producer countries increased the yield of potatoes from 2.1 to almost 4.9 million tons, or 2.3 times, almost at the same time maintaining their share in world volumes.

In 1990, nests were grown in 26 countries, in 2014 - 33 countries.

The main producers of flax seeds are the three largest geographic regions of the world: North America - 38.9%; Asia - 36.6 and Europe - 19.4%, which together produced 2.5 million tons, or 95% of the world's flaxseed. Asia lost its first position in terms of production, and this was due to the growth of flax seed production in Europe (+195.6 ths. Tons) and in Africa (+30.8 ths. Tons). At the same time, an increase in crop yields in Europe has been achieved thanks to an increase in yields from 3.6 to 9.1 c / ha, or 152.8%. In the world, the yield of flaxseed from 1990 to 2014 increased by 3.5 cents / ha for the largest increase in the East Asia region (+7.4 c / ha).

The number of flax seed producers has also increased from 37 in 1990 to 51 in 2014. In terms of production, 10,000 tons of such country-leaders in 1990 were 17, and in 2014 - 12. If in 1990 they together produced 2870 thousand tons, or 98.2% of world volumes, then in 2014 - 2560.7 thousand tons, or 96.4%.

Most countries have reduced the production of flaxseed, and one of the world's leaders in Argentina is particularly noticeable - by 497 thousand tons, at the same time in Ethiopia (+49.1 thousand tons). If the main producing countries in 1990 grew 2.87 million tonnes of flaxseed, then in 2014, by reducing their volumes to 2.56 million tonnes, their share in the world declined from 98.2 to 96.4%.

In the production of millet, the share of Africa and Asia in the world in 1990 amounted to 88.2%, and in 2014 it increased to 95.9%, which is due, first of all, to the increase in Africa's harvest areas, which in 2014 were 62.7% of the world, and the increase in yield in Asia by 5 centners per hectare for a decrease in Africa by 0.5 centners per hectare.

On the Asian continent, the main producer of millet is the countries of South Asia, which, due to an increase in yields of 5.5 centners per hectare, reduced the harvesting area by 6.2 million hectares, which increased the production of millet to 1.3 million tons. Europe, due to more than a two-fold reduction in harvesting The area (from 2.9 to 0.6 million hectares) decreased the gross collections of millet from 3.2 to 0.6 million tons.

The highest yield of millet in 1990 was obtained in the countries of East Asia - 19.9 c / ha, in 2014 p. - 28,7 c / ha, or 218,8% above the average world index.

The group of countries leaders in the production of millet (a limit of at least 1 million tons) has practically not changed, with the exception of the exodus from the former USSR. If India remained in the first place, adding almost 1 million tons to gross harvest, Nigeria and Niger changed their ranks due to the fact that the first country reduced its production by 3.7 million tons, while the second, on the contrary, increased by 1.5 million tons. Together, the leaders of the 1990s produced 25.1 million tonnes of millet, or 83.9% of world volumes, in 2014 - respectively 20.2 million tons (minus almost 5 million tons), or 71.1% of world volumes. Other countries have increased their share in world production of millet from 16.1 to 28.9%, or by 12.8 points.

The main producers of mustard are North America, Asia and Europe. However, if Asia increased the harvest area of this crop by raising its share from 25 to 36%, then two other continents decreased from 32.6 to 25.6%, from 42.3 to 37.6%, and gross collections - from 251.2 to 211.2 and from 270.4 to 231.9 thousand tons.

At the same time, if the share of North America and Europe in 1990 in the gross production of mustard was 40.2 and 42.2% respectively, then in 2014 it declined to 22.4 and 28.6%, with a corresponding increase in the share of Asia from 17.5 to 48.4%. In industrial volumes, the mustard grew in Africa, and the total number of countries cultivating mustard grew from 18 to 22.

In 1990, the leaders in the production of mustard were two countries - Canada and the USSR, whose share in the world totaled almost 73%. In 2014, the leaders also had two countries - Nepal and Canada, but their share decreased to 51.3%.

In 2014, the group of countries that have grown more than 10 thousand tons of mustard, included China (+14 thousand tons) and France (+13.1 thousand tons), and left Germany and Hungary. In Ukraine, the production of mustard in 2014 reached 79.4 thousand tons.

As for buckwheat, the main role in the decline of world production of mustard was played by the main producer countries, which reduced the volume from 612 to 556.7 thousand tons, or by 55,3 thousand tons, which is more than the global fall (- 51 thousand tons).

With regard to the widespread culture of the past, such as oats, the main consumer of which was and remains the horse breeding industry, then for some increasing interest in its cultivation in South America, where gross fees increased by 480 thousand tons, and the share in the world from 1,9 to 7,1%, then in other geographic regions of the planet there is a clear tendency to decrease such interest. In North America, harvest areas have decreased by 3.4 million hectares, and the gross tax is almost 7.8 million tons, in Asia - 161 thousand hectares and 258.6 thousand tons, respectively, in Europe - even more than 8 , 1 and 13.1 million tons.

In all geographic regions of the planet, the yield of oats increased: in Africa - by 2.2 centners per hectare; South America - 1.5; Asia - 1; East Asia - 6.3; Europe - by 4.7 centners per hectare.

The main producers of oats in the world in 1990 were 2 geographic regions - North America and Europe, the share of which in the world totaled 89.2%, but in 2014 North America replaced Southern, the gross oats, which, together with Europe, was 16.2 million tons, and the share of these two regions - 71.5%.

Out of production volumes of oats in 1 million tons in 1990 it was overcome by 8 countries, in 2014 - 6. At the same time, if in 1990 the leader was the former USSR with its 15.5 million tons, then in 2014 it Russia occupied the place with a total of 5.3 million tons. They left the group of leaders Germany, which reduced the gross tax from 2.1 to 0.6 million tons, Sweden - reduced the fee by almost 900 thousand tons.

The analysis of oats production also indicates a repetition of the situation with buckwheat: the reduction of production by leading countries by 16.4 million tons, a decline in their share from 73.4 to 43.4%, or by 26 points, thereby causing 95% the decrease in oat output in the world - 17.2 million tons.

At the same time, the number of countries that grew oats in 2014 increased to 76 compared with 54 in 1990.

Another situation with the production of peas. So, if in 1990 most of the harvesting areas (57.3%) and more than 42% of the gross charges accounted for Asia, then in 2014, due to the reduction of harvesting areas in European countries, almost 190,000 hectares of peas gathered in this the region decreased from 3.6 to 2.9 million tons, or by 0.7 million tons, and its share in the world declined to 11.5%. In Asia, the area under peas has increased by almost 650 thousand hectares, and gross fees, combined with a rise in yields (+9,2 centners / hectare) - by 16 million tons, which provided for an increase in the proportion of this region to 77.8% in of world production of peas (+35,6 points).

Indicators also increased in Africa: the area - by 15.9 thousand hectares, the yield - by 5.2 centners per hectare, and gross fees - by 380 thousand tons.

The main producer of pea in Asia was and remains the geographic region of East Asia - 18 , 8 million tons in 2014, where in the first place China - 18.1 million tons.

Another type of food is green peas, which is mainly grown in Asia, its share in world production increased from 43.1% in 1990 to 85.5% in 2014 for the main producers - the countries of East Asia - more than 10.7 million tons.

The limit on the production of green peas in 1 million tons in 1990 and in 2014, overcame only 3 and two countries respectively. So, if India and China maintained their leadership, only nine-time (from 1.1 to 10.7 million tons) increase in green peas growing in China was expected to change due to Iran's growth of almost 2.7 million tons, then The US has left the leading group, reducing its harvest from 1.2 to 0.2 million tons.

The main thing here is not only more than doubling the production of green peas, but that it was achieved mainly by a significant increase (+26) in the number of countries cultivating This kind of agricultural products.

Contrary to the trend of changes in the production of some of the crops discussed above, due to the repeated increase in green peas in China, the leaders have not only raised production volumes from 4.2 to 14.5 million tons, but also their share in world volumes from 56, 4 to 81.5%, or 25.1 points.

The production of sorghum, which is used to a large extent in the diet of people in many countries of Africa and Asia, has been increased on the African continent both due to the increase in harvesting areas of over 3.3 million hectares and the increase in yields (+2.6 per hectare), per the reduction of the area in Asia by 9.7 million hectares, and production - by almost 8.9 million tons.

At the same time, if in the countries of North America, due to the reduction of the area of over 1.1 million hectares for some increase in yields (+2.8 c / ha) the gross harvest of sorghum has decreased by more than 3.5 million tons, then in the countries of South America, the growth of the area (+902 thousand Ha) and yields (7 kg / ha) resulted in an increase in gross fees of about 3.6 to more than 7.5 million tons.

Accordingly, the share in the world increased from 6.3 to 10.9% for the decline in the share of North America from 25.6 to 15.9%. Also, the share of the Asian continent decreased from 32.7% to 10%.

At the same time, the number of countries cultivating over 1 million tonnes of sorghum has increased from 7 in 1990 to 12 in 2014, when Ethiopia (+ more than 3.3 million tonnes), Australia (+ more than 3.3 million tonnes) and Brazil (+ more than 2 million tonnes). In general, million millionaires raised 45.4 million tonnes of sorghum in 1990, or 49.9 million tonnes in 2014, or 79.9% and 72.4% respectively in world volumes. As with other crops, the number of countries cultivating sorghum has grown significantly - from 94 to 106.

The analysis of rye production shows that in all the regions of the planet have a clear tendency to reduce the harvest area of this crop for the most notable in Europe - by 10.5 million hectares and, accordingly, gross crop - by 20.4 million tons, although this region, as in 1990, remained in 2014 the leader among all regions with a specific weight of 89.8% to world volumes. It should be noted that due to a significant increase in the yield of rye on the African continent (+15.5 c / ha), even with a reduction in harvesting area, gross crop has increased by 73.6 thousand tons.

As for the assessment of changes in rye production by leading countries, the main factor A significant drop in the world's rye production (-22.9 million tons) is a decrease in its production (-26.1 million tons) by the leaders-leaders (the limit is at least 200 thousand tons).

Conclusions

In the last decades of the last century and the first in the specialist literature, the term "niche cultures" for a group of cereals and legumes that play a less important role in the human food chain compared to wheat, barley, corn, in the world and its regions has taken place significant changes in the production of individual niche crops, due to changes in harvesting areas and increase yields. Growing the interest of producers in the cultivation of such crops such as chickpeas, peas (black and green peas) and sorghum is primarily due to changes in the needs of regional and world markets, as well as an increase in the average yield of these crops.

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