IJIAET International Journal of Innovative Analyses and Emerging Technology

| eISSN: 27924025 | http://openaccessjournals.eu | Volume: 1 Issue: 4

Advanced Peanut Harvesting Technology

M. T. Mansurov – DSc, B. S. Otahanov – PhD, B. R. Xojiyev
Namangan Engineering Construction Institute, Namangan, Republic of Uzbekistan

ABSTRACT: The technology used for harvesting peanuts in the modern conditions of agricultural production in the Republic of Uzbekistan does not allow the maximum mechanization of this process with obtaining high-quality peanuts in a short time. The results of field experiments made practical conclusions. The developed cleaning technology, which is based on the patent of the Republic of Uzbekistan, takes into account new forms of management. Farms received practical advice on how to harvest the required quality crop in a short time. In general, they will be acceptable for other neighboring republics with Uzbekistan.

Keywords: peanut harvester, peanut harvesting technology, peanut weed..

Peanuts are a widespread crop in the world. According to the FAO (Food and Agriculture Organization of the United Nations), the areas sown with peanuts in the world are constantly increasing, the cultivation technology is improving, ensuring an increase in yields and gross production. At present, about 20-25 million hectares are sown with peanuts annually, about 25-30 million tons of peanuts are harvested with a yield of up to 30 centners per hectare. About 65% of the total production is in Asia, 25% in the African continent, 6% in North and Central America and 2% of world production in South America. For Europe, peanuts are a rare crop. [1]

The United States is a major producer and exporter of peanuts, 550-600 thousand hectares are sown annually, the yield is 1.6-1.8 million tons. The high level of technical equipment of production, selection work allows you to get very high yields of 25-32 c / ha. Planting in March-April, harvest in September-October,

Let's take a closer look at the largest peanut producers in the Asian region.

Currently, China is ahead of the United States and India in terms of peanut production. Over the past three decades, the production of peanuts in China has increased more than tenfold and in 2020 reached 17 million tons, i.e. 37% of all world production. Growth in peanut production in China is driven by the expansion of cultivated areas. It should also be noted that China has one of the best yield indicators of 26-28 c / ha, which is twice the world average.

India sows 7-8 million hectares annually, produces about 8 million tons of peanuts, which is more than 20% of world production. The indicator of the productivity of Indian peanuts is 9-11 c / ha. Two crops are harvested per year, 75% in October, 25% in May. Production problems include low yields due to inefficient cultivation methods and a high risk of aflatoxin formation due to climatic conditions.

Indonesia is the third largest peanut producer in the Asian region. Every year 650 thousand hectares are sown here, about 0.9-1.1 million tons are harvested, with an average yield of 15.4 c / ha, which is 15% higher than the world average.

In Vietnam, 270 thousand hectares are sown annually. Harvested about 380 thousand tons, the average yield indicator of the world is 13-14 c / ha. Harvested in May. The quality of hand-picked Vietnamese peanuts does not meet European standards; therefore, its main consumers in the foreign market are Eastern European and Far Eastern countries.

The problems of peanut production in these countries include low yields due to inefficient cultivation methods and a high risk of aflatoxin formation due to climatic conditions.

In the Central Asian republics, peanuts are not a technical crop and therefore the technical equipment and cultivation technology lagged behind other agricultural crops, it is carried out with the adaptation of the machines of the main industrial crops, primitive tools of labor are used in the harvesting and largely dependent on climatic conditions. The production volumes are shown below in the table [2].

Peanut production volumes in the Central Asian republics

Country	Production (Tons)	Production per person (kg)	Area (ha)	Yield (kg / ha)
Uzbekistan	7 024	0,215	1 634	4 298,4
Tajikistan	8 673	0,971	2 891	3 000,1
Kyrgyzstan	230	0,036	190	1 208,9
Kazakhstan	43	0,002	30	1 434,1

ISSN 27924025 (online), Published under Volume: 1 Issue: 4 in September2021

Research Objective – development of an effective harvesting technology, an increase in the level of mechanization and a reduction in the harvest time due to the use of peanut harvesters that meet the requirements of agricultural technology and soil and climatic conditions. This is achieved by designing machines that meet the above requirements.

Expected effect:

- obtaining additional cash proceeds due to an increase in the quantity and quality of peanuts harvested by machines;
- reduction of the harvesting period;
- complete clearing of the field from peanut beans and tops, which allows to carry out subsequent agrotechnical measures at the optimum time;
- exemption from heavy manual labor when harvesting peanuts;
- reducing the environmental load on the soil (using a 4-wheel tractor).

Materials and methods. More and more attention is paid today not only to the creation of modern, satisfying the interests of farmers and private producers of small-scale production of peanut harvesters manufactured in the Republic of Uzbekistan, but also to the technology of their use.

It is known that the harvesting of peanuts is carried out in conditions of high humidity, since the process of ripening and subsequent harvesting of these crops falls on a time period with the maximum amount of precipitation.

The harvesting of peanuts is the final link in the complex chain of their production.

According to the nomenclature of operations performed by harvesting machines, there are two options for machine harvesting technologies:

- direct combining (digging, lifting, separating the beans from the rhizomes, cleaning and collecting into the hopper);
- separate harvesting (removing the plant from the soil, shaking the bushes, laying in a swath, drying in the field, harvesting operations are performed by various machines).

Peanut harvesting technology in Uzbekistan is produced in a separate way. Peanut harvesting uses machines that remove the plants from the soil, shake off the bushes and put them in swaths for drying. The separation of the beans from the rhizomes is done manually (see figure).

After drying to a certain moisture content, the beans are separated from the roots. To perform this operation, a special box of 2X3 m size is built with an open top and bottom.On the inside of the box and the bottom, they are lined with fabric material. The beans are separated from the rhizomes by striking the top edge of the box just above the peanut root system.

Results and discussion. The applied and existing technology does not allow the entire grown crop to be efficiently harvested in the conditions of the Central Asian region in a short time.

The existing China-made peanut harvesting machine has the following disadvantages: low productivity, single row, tracked and very expensive.

Experiments carried out at the Namangan Civil Engineering Institute have shown that the peanut harvester, created by the scientists of this institute, collects 95-97% of the total crop in a short time. These indicators meet the requirements of farmers.

The most important problem in the implementation of any technology is the reduction of labor costs, energy and resource conservation with a simultaneous increase in the yield of cultivated crops and, as a consequence, a decrease in the cost of production [1-3]. Many scientists and specialists in agricultural mechanization have established that

ISSN 27924025 (online), Published under Volume: 1 Issue: 4 in September2021

IJIAET International Journal of Innovative Analyses and Emerging Technology

| eISSN: 27924025 | http://openaccessjournals.eu | Volume: 1 Issue: 4

a)

б)

c)

д)

e)

Drawing. Production of works with the applied technology

in the Central Asian region:

a) drying in an open field;

b) dragging to the box;

c) separating the beans from the rhizomes;

e) cleaning from beans from impurities;

f) drying the beans in the open air

the use of saving technologies will reduce the number of unit passes through the field, preserve soil fertility, and minimize environmental pollution from fuel combustion products. So, as modern agricultural enterprises are the largest

ISSN 27924025 (online), Published under Volume: 1 Issue: 4 in September2021

consumers of all resources, including labor and energy. The most energy-intensive branch of agriculture remains crop production, which accounts for 70% of all costs, including more than 40% for operations related to harvesting [4-6].

Experiments carried out at the Namangan Civil Engineering Institute have shown that the peanut harvester, created by the scientists of this institute, collects 95-97% of the total crop in a short time. These indicators meet the requirements of farmers.

conclusions

1. Efficiency when harvesting peanuts in conditions of high soil moisture is possible with simultaneous digging operations, separation of beans from rhizomes, separation from soil and plant impurities.
2. The proven technology of peanut harvesting ensures the completeness of harvesting by a peanut harvester in one pass - 95-97% of the crop.
3. The harvesting period is reduced by 12-15 days, ensuring the release of the field from crop residues guaranteed by mid-October.

References

1. [Electronic resource]. - Access mode: https://arahis.com/ mirovoe- proizvodstvo.htm]
2. [Electronic resource]. - Access mode: https://www.atlasbig.com/ru/
3. R. Rustamov, Sh. Xalimov, B.S. Otaxanov, F. Nishonov, B. Xojiev. International scientific and scientific-technical conference "Collection of scientific works" on improving the machine for harvesting walnuts. Toshkent, 2020. - Б. 124-127.
4. R.Rustamov, Sh.A.Xalimov, B.S.Otaxonov, F. Nishonov, B. Xojiev. Problems and solutions of the nut harvesting machine Collection of materials of the Republican scientific-practical conference "Problems and solutions". Namangan, 2020. - B. 177-178.
5. Otahanov B.S., Kirgizov H.T., Ashurbekov Z.K., Mamazhonov E.H. The machine for trashing flaps of mung bean // Интерактивная наука. – №6, 2018. С. 50-53.
6. Otahanov B.S., Pajziev G.K., Fajziev S.G., Toshpulatov B.B. Determination of the thickness of the beater blade when interacting with the rods of topremoving conveyor // Интерактивная наука. – №6, 2018. – С. 50-53.
7. Тухтакузиев, А., Мансуров, М. Т., & Тошпулатов, Б. У. (2019). ИССЛЕДОВАНИЕ РАВНОМЕРНОСТИ ГЛУБИНЫ ОБРАБОТКИ ПОЧВЫ ПОЧВООБРАБАТЫВАЮЩИМИ МАШИНАМИ. In ВКЛАД УНИВЕРСИТЕТСКОЙ АГРАРНОЙ НАУКИ В ИННОВАЦИОННОЕ РАЗВИТИЕ АГРОПРОМЫШЛЕННОГО КОМПЛЕКСА (pp. 382-387).
8. Ботиров, А. Г., Негматуллаев, С. Э., & Мансуров, М. Т. (2018). ГНЕЗДУЮЩИЙ АППАРАТ СЕЯЛКИ. Экономика и социум, (5), 223-227.
9. Ботиров, А. Г., & Мансуров, М. Т. (2017). УСОВЕРШЕНСТВОВАНИЕ ПОСЕВНОЙ СЕКЦИИ. Научное знание современности, (6), 48-51.
10. Абдулхаев, Х. Г., & Мансуров, М. Т. (2017). ВЛИЯНИЕ УГЛА НАКЛОНА К ГОРИЗОНТУ ТЯГИ РОТАЦИОННОГО РЫХЛИТЕЛЯ НА ПОКАЗАТЕЛИ ЕГО РАБОТЫ. In Научно-практические пути повышения экологической устойчивости и социально-экономическое обеспечение сельскохозяйственного производства (pp. 1219-1221).
11. Мансуров, М. Т., & Расулов, А. Д. (2016). Теоретическое обоснование параметров выравнивателя-уплотнителя комбинированной машины по системе push-pull для предпосевной обработки почвы. Молодой ученый, (8), 256-259.
12. Tukhtakuziyev, A., & Mansurov, M. T. (2015). Research of stability of tractor with frontand rear-mounted tools against sidewise skidding. Tractors and Agricultural Machinery, (9), 34-35.
13. Tuhtakuziev, A., & Mansurov, M. T. (2015). Issledovanie ustojchivosti traktora s orudijami perednej i zadnej naveski protiv bokovogo zanosa. Traktory i sel'hozmashiny, (9), 34-35.
14. Tukhtakuziev, A., & Mansurov, M. T. (2015). Research of resistance on the tractor equipped with implements at front and backside lift hitch contrarily the sidewise skidding. Europaische Fachhochschule, (6), 76-77.
15. Tuhtakuziev, A., & Mansurov, M. T. (2015). Issledovanie ustojchivosti traktora s orudijami perednej i zadnej naveski protiv bokovogo zanosa. Traktory i sel'hozmashiny, (9), 34-35.

ISSN 27924025 (online), Published under Volume: 1 Issue: 4 in September2021

16. Мансуров, М. Т., & Тухтакузтев, А. (2015). Исследование устойчивости трактора с орудиями передней и задней навески против бокового заноса. Тракторы и сельхозмашины.-2015.-№ 10.-С. 34-35.
17. Тухтакузиев, А., & Мансуров, М. Т. (2015). Исследование устойчивости трактора с орудиями передней и задней навески против бокового заноса. Тракторы и сельхозмашины, (9), 34-35.
18. Тухтакузиев, А., & Мансуров, М. Т. (2015). Исследование устойчивости прямолинейного движения трактора с орудиями передней и задней навески. In Интеллектуальные машинные технологии и техника для реализации Государственной программы развития сельского хозяйства (pp. 125-128).
19. Тухтакузиев, А., & Мансуров, М. Т. (2015). Исследование устойчивости прямолинейного движения трактора с орудиями передней и задней навески. In Интеллектуальные машинные технологии и техника для реализации Государственной программы развития сельского хозяйства (pp. 125-128).
20. Тухтакузиев, А., Мансуров, М., Расулжонов, А., & Каримова, Д. Научные основы обеспечения равномерности глубины работы почвообрабатывающих машин. Ташкент: Издательство TURON-IQBOL.– 2020.
21. Абдулхаев, Х. Г., & Мансуров, М. Т. (2017). Влияние угла наклона к горизонту тяги ротационного рыхлителя на показатели его работы. In Научно-практические пути повышения экологической устойчивости и социально-экономическое обеспечение сельскохозяйственного производства (pp. 1219-1221).
22. Мансуров, М. Т., & Тухтакузтев, А. (2015). Исследование устойчивости трактора с орудиями передней и задней навески против бокового заноса. Тракторы и сельхозмашины.-2015.-№ 10.-С. 34-35.
23. Tukhtakuziev, A., & Mansurov, M. T. (2015). Research of resistance on the tractor equipped with implements at front and backside lift hitch contrarily the sidewise skidding. Europaische Fachhochschule, (6), 76-77.
24. Тухтакузиев, А., Мансуров, М., Расулжонов, А., & Каримова, Д. Научные основы обеспечения равномерности глубины работы почво-обрабатывающих машин. Ташкент: Издательство TURON-IQBOL.– 2020
25. Мансуров М.Т. Научно-технические решения агрегатирования почвообработывающих машин, состоящих из рабочих частей, навешиваемых спереди и сзади на колесные тракторы. Автореферат дисс. ... доктора техн. наук (DSc). – Ташкент, 2018. – 54 с.
26. Qosimov K., Yuldashev Sh. Erosion of the working surface of the metal to weld sheeting with the metal powder and surpassing solid for metals' erosion. International Journal of Advanced Research in Science, Engineering and Technology. vol. 6, Issue 10, October 2019.- h. 11147-11152.
27. Mansurov M.T, Nabijanov M.M. Factors influencing the work of parts and its exclusion methods // The collection includes scientific-materials of the International conference participants on the theme of "Innovation in mechanical engineering, energy saving technologies and increasing the efficiency of using resources". Part 1, May 28-29, 2021 Namangan city. – PP 119-124.
28. Mansurov M.T, Yusubjanova M. // Modern methods of diagnostics of main pipelines analysis // The collection includes scientific-materials of the International conference participants on the theme of "Innovation in mechanical engineering, energy saving technologies and increasing the efficiency of using resources". Part 1, May 28-29, 2021 Namangan city. – PP 475-476.
29. MT Mansurov, ON Toshpulatov - Innovative Technologica: Methodical Research Journal, 2021
30. K Qosimov, MT Mansurov, D Begmatov, U Xaydarov - Academic Journal of Digital Economics and Stability, 2021
31. K Qosimov, MT Mansurov, D Begmatov, U Xaydarov - Academic Journal of Digital Economics and Stability, 2021
32. V Turdaliev, M Mansurov, I Sheralie - Academic Journal of Digital Economics and Stability, 2021
33. MT Mansurov, NT Nabixo'jaeva - ResearchJet Journal of Analysis and Inventions, 2021
34. MT Mansurov, ON Toshpolatov, JA Yigitaliyev - Экономика и социум, 2021
35. A Tukhtakuziev, MT Mansurov, ON Toshpulatov… - ACADEMICIA: An International Multidisciplinary …, 2021

ISSN 27924025 (online), Published under Volume: 1 Issue: 4 in September2021