

**ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
ОЛИЙ ВАЎРТА МАХСУС ТАЪЛИМ
ВАЗИРЛИГИ**

**ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
ҚИШЛОҚ ХЎЖАЛИГИ ВАЗИРЛИГИ**

**ТОШКЕНТ ДАВЛАТ АГРАР
УНИВЕРСИТЕТИ**



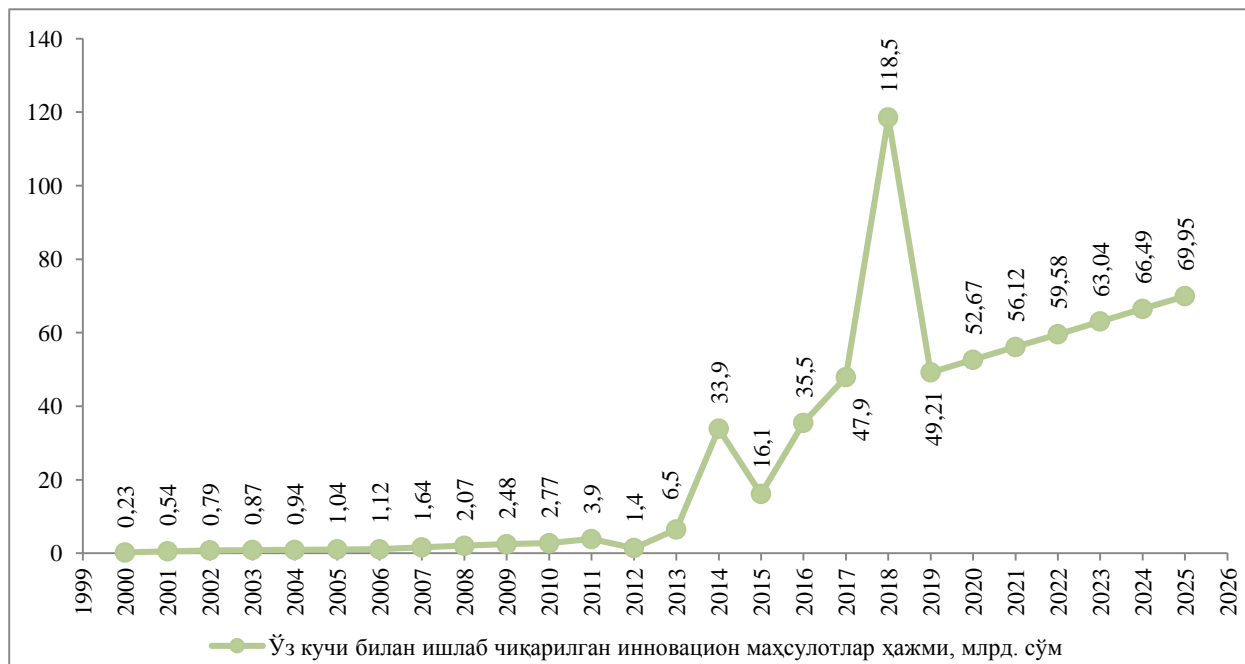
**«АГРАР СЕКТОРНИ ИННОВАЦИОН
РИВОЖЛАНТИРИШНИНГ МЕЪЁРИЙ-
ҲУҚУҚИЙ, ТАШКИЛИЙ-ИҚТИСОДИЙ,
АХБОРОТ ТАЪМИНОТИНИ
ТАКОМИЛЛАШТИРИШ»**

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Бу ижобий ўзгаришлар сўнгги йилларда ҳукуратимиз ва мамлакатимиз Президенти томонидан қабул қилинган, шу соҳага бевосита тааллуқли меъёрий-ҳуқуқий ҳужжатлар таъсирида содир бўлганлигини таъкидлаш лозим.



2-расм. Ўзбекистон Республикаси қишлоқ хўжалигида ўз кучи билан ишлаб чиқарилган инновацион маҳсулотлар ҳажмининг 2000-2018 йиллардаги динамикаси ва 2019-2025 йилларга прогноз қийматлари, (млрд. сўм)

Прогноз даврида қишлоқ хўжалигида ўз кучи билан ишлаб чиқарилган инновацион маҳсулотлар ҳажми йиллик ўртача 4,0 млрд. сўмдан кўпроқни ташкил этмоқда. 2010 йилда қишлоқ хўжалигида ўз кучи билан ишлаб чиқарилган инновацион маҳсулотлар ҳажми 2,07 млрд. сўм бўлган бўлса, 2025 йилга келиб 69,95 млрд. сўмни ташкил этмоқда. Ўсиш 33,8 баробарни ташкил этмоқда.

Хулоса қилиб айтганда республикаимиз қишлоқ хўжалигини инновацион ривожлантириш – бу асосан қишлоқ хўжалигида илм кўп талаб қиладиган йўналишларда илмий-тадқиқот ишларини олиб боришни талаб қилади.

Унинг натижаси эса ўз набатида қишлоқ хўжалиги ялпи маҳсулотини ошишига ҳамда қишлоқ аҳолисининг фаровонлигини ўсишига олиб келади.

DRONE TECHNOLOGY AS A TOOL FOR IMPROVING AGRICULTURAL PRODUCTIVITY

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In particular, drones will be used for the measurement and observing of crops, including vegetables, melons, grapes, potatoes, and gardens as well as

evaluation of germination. In addition, while using drones it can be helpful to identify the areas of the arable land, assess the condition of the soil to plan the level of complexity for agricultural technological work to achieve the scheduled harvest, inventory and mapping of agricultural land.

In Uzbekistan, unmanned aerial vehicles or drones are using to monitor agricultural crops on fields under control by the Ministry of Agriculture. According to Jensen (2019), farmers today have a variety of complex factors that influence the success of their farms. From water access to changing the climate, wind, soil quality, the presence of weeds and insects, variable growing seasons and others. As a result, farmers are turning to high-level drone technology to help approach these problems and provide fast as well as efficient solutions. By implementing drone technology, farms and agriculture enterprises can improve crop yields, save time and easy make land management decisions that will improve their long-term success. Furthermore, agricultural drones can further help farmers to increase crop yields and profitability while lowering the levels of traditional inputs needed to grow crops (land, water, fertilizer, herbicides, and insecticides) (Jensen, 2019).

Economic factors will lead to the adoption of this technology in Uzbekistan

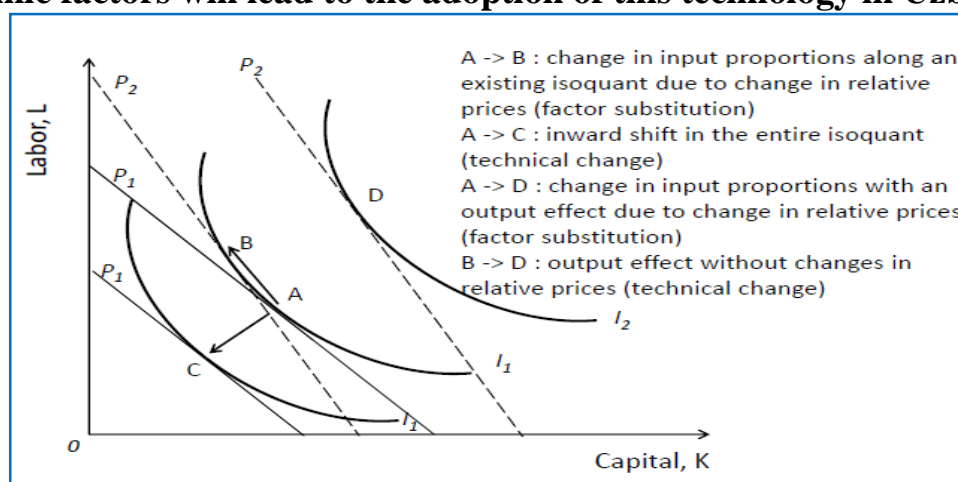


Figure 1. Induced Technical Change

When farmers start using drones, capital and labor costs decrease from I_2 to I_1 line. In here I_1 and I_2 are outputs and outputs remain the same, but the costs and price for products decrease.

In the I_1 case, before farmers adopt technology, as farmers hired more labor, the costs increased. And the second case, when they use the drone, they don't need more labor and at the same time, this causes the decreasing of the costs associated with labor and other input costs.

Main characteristics of adopters and non-adopters of this technology:

In the present era, there are too many developments in precision agriculture for increasing crop productivity. Especially, in developing countries like Uzbekistan, over 60% of the rural people depend upon the agriculture fields. The agriculture field faces dramatic losses due to diseases, climate changes, and other negative factors.

As much as Uzbekistan depends upon agriculture, still it is far short from adopting the latest technologies in it to get a good farm. Developed countries have already started the use of drones in their precision agriculture, photogrammetry, and remote sensing. It is very fast and it could reduce the workload of a farmer.

It is critical to recognize that modern technologies are not homogeneous in their effects on the agrarian structure. Advances in modern technology are usually accompanied by scale economies, resulting in the economy in management effort as well as in the use of labor in production. The relation between new technology and income distribution is closely related to the characteristics of both the new technology and the structure of the economy into which it is introduced. But, in rural communities of poor and/or developing countries, a major cause of inequality in income distribution has often been the inequitable distribution of land ownership.

The majority of farmers in Uzbekistan are small farmers rather than large farmers. And most of the farmers have not enough financial reserves to implement drones. Besides that, we know according to Roger's conclusion there are three types of adopters: early adopters, late adopters, and laggards. And according to the above-mentioned majority of farmers in Uzbekistan are late adopters because of their small enterprises in agriculture. But we cannot disclaim the existence of early adopters who are evidently richer and have bigger lands, so it gives more chances to implement drones and get more benefits.

Besides that, there is another reason for agricultural controversy in agriculture, especially in drone tech adoption, law prohibition of drone use in Uzbekistan. That factor also makes a huge influence on drone tech adoption. In conclusion, we can say in order to implement sufficiently drone technology in Uzbekistan agriculture small and medium farmers need government support, as subsidies or giving quotas for new tech adoption.

Why this technology will not be adopted despite it is better than alternatives?

Why does drone adoption of better alternatives fail? What kind of factors could be reasons for that? The answer can be that the drones' tech diffusion process in Uzbekistan proceeds very bad. Such a process can be reviewed on the diffusion process figure.

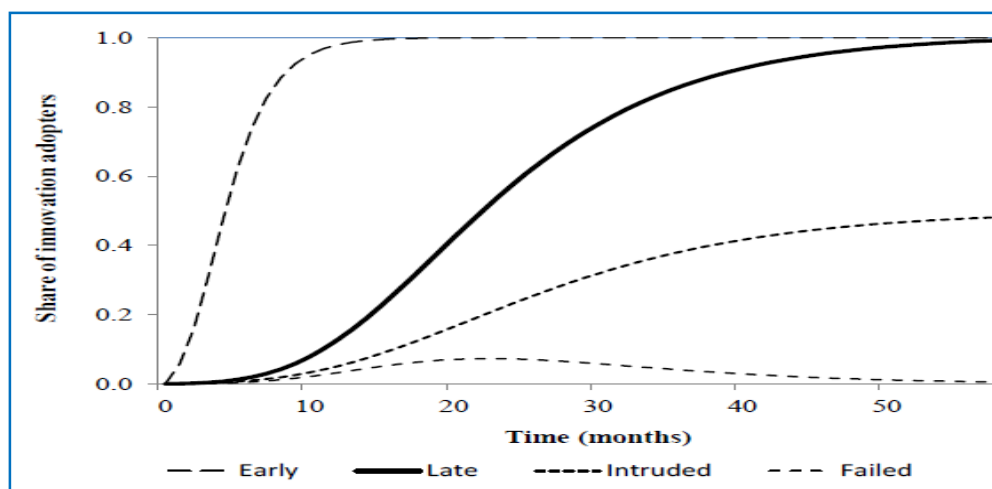


Figure 2.Technology Lock-in

According to figure because of lack of innovation adoption share new tech like drone tech are adopted very lately, which causes loss of time and loss of benefit in agriculture-related too bad implementation of innovations. According to Rogers, conclusions adoption of new technologies behavior differs across social-economic groups which are related to agricultural producer's plans, objectives and goals, farmer's learning style and education, beliefs and opinions, lack of acceptance and low trust to innovation tech advisers that leads to negative presumed assumption.

According to theory lock-in has a meaning that drones are dominant and besides that technology lock-in arises from systemic interactions among technologies and institutions. And institutions consist of two types: formal and informal. So development of informal institutions can make influences informal institutions which can lead to expanding of new tech implementation easily and after that farmers can be committed to the dominant technology and create lock-in at their own level, farmers tend to focus preferentially on existing competencies, they make an investment to reduce production costs and incrementally perfect existing products and etc.

Because it leads to benefit and increases crop so it means more profit. If we compare drones and people, it is evident that drones are more useful in all contents. First of all, it decreases extra expenses, it has very easy channel remote control which decreases labor expenses, and it does not need rest so it can be used anytime and anywhere.

Possible consequences of the adoption of this technology:

When referring to our national legislation

As a rule, fines are not small for unauthorized delivery of drones to Uzbekistan, sale and use was banned from January 1, 2015. According to law No. 436 of 13 July 2017 unauthorized use of the devices may result in criminal or administrative liability. That is, fines are from 4,054,600 UZB sum to up to 50,682,500 sum. If this is a serious cause of death, loss of life and other the consequences are punishable by up to 10 years' imprisonment.

Permission

Access to use and bring to the territory of the Republic of Uzbekistan of drones are permitted by the Cabinet of Ministers of the Republic of Uzbekistan based on law dated November 26, 2014 No. 322 with the separate decision.

Drones are available at the «Geo-innovation Center» of the Republic of Uzbekistan. The center is given authority for the sale and rent of drones. Generally, a long-term contract is made and every flight pre-ordered. Because they also need to get their flights booking permission in advance.

Price changes can induce the development and spread of new technologies

Price competition: In the case of the fruit and vegetables, low seed quality, high input costs, labor, taxes, and high pre and post-harvest losses are the main causes of price increase in Uzbekistan. Even in the season, the prices are high for local consumers. Export opportunities are available despite some challenges, but in

world markets, it is being difficult for Uzbek producers to compete with other major players (countries) both in quality and price.

To decrease the cost of goods produced and sold, Uzbek farmers need to adopt new technologies such as Drones. Using drones help farmers mapping, manage inputs' usage, quick assessment of field elevation to create positive returns for their operations.

Drones provide estimated yield increase

Assumption: Current crop yields are not achieving their maximum potential. Yield is, on average, about 20% less than it could be under the optimal circumstance. For our estimation drones can reduce the management yield gap by up to 25 %.

Drones provide input savings and reduce cost prices of products

Assumption: Farmers tend to over-apply resources and with accurate calculation, they manage misuse of inputs and reduce extra costs. Remote-controlled drones are estimated to improve efficiency by between 40-60 times compared to manual labor, and up to 5 times faster than tractor application of pesticides. Spraying by agriculture drones is estimated to save up to 90% of water usage irrigation and could save from 30% to 50% of chemicals in crop spraying. Drones provide information that enhances variable rate technology, reducing input costs. Studies show that there is a 5% additional input saving by using the information collected by a drone.

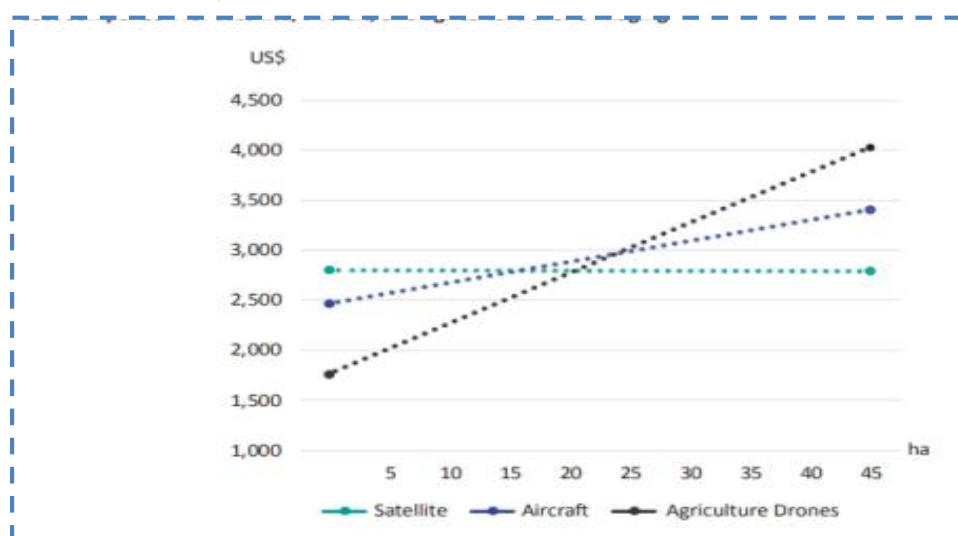


Figure 3. Cost comparison for satellite, aircraft and agricultural imaging

Source: <https://www.precisionhawk.com/blog/media/topic/quantifying-the-economic-value-of-agriculture-drones>

Possible winners and losers from the adoption of this technology

If we look globally, there are many developed countries are already adopted modern technologies for agricultural purposes. In the case of Uzbekistan, large-scale farmers and agricultural organizations will be winners whilst operating drone technologies due to enhancing their farming system and production operations in order to achieve a multitude of goals. While implementing drone technology farmers and agricultural enterprises can greatly reduce costs, they are able to

provide 24/7 monitoring their fields and compute overall soil and field health to determine if improvements are needed before planting. Besides that, using agricultural drone modern farmers can spray faster, more accurately and more efficiently all the crops. Moreover, agricultural drones allow farmers to obtain access to a wealth of data they can use to make better management decisions, improve crop yields, and increase overall profitability.

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1. Jeremy Jensen, (2019): Agricultural Drones: How Drones Are Revolutionizing Agriculture and How to Break into this Booming Market, available on: <https://uavcoach.com/agricultural-drones/>

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1. <https://en.trend.az/casia/uzbekistan/>
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«АҚЛЛИ ҚИШЛОҚ ХЎЖАЛИГИ» ТЕХНОЛОГИЯЛАРИ КЕЛАЖАГИМИЗ РАВНАҚИ

Собирова Д.А. - ТДИУ ҳузуридаги ПКҚТУМО

Тармоқ маркази катта ўқитувчиси

*Азизов О.М. - ТДАУ Бухгалтерия ҳисоби, таҳлил
ва аудит кафедраси катта ўқитувчиси*

Ўзбекистонда ҳукумат, иқтисодиёт, таълим, соғлиқни сақлаш каби соҳалар билан бир қаторда қишлоқ хўжалигини ҳам рақамлаштириш жараёни амалга ошмоқда. “Рақамли қишлоқ хўжалиги”, “Ақлли дала”, “Ақлли ферма”, “Ақлли иссиқхона” тушунчалари рақамлаштириш, сунъий ақл технологияларидан фойдаланган ҳолда қишлоқ хўжалигида маҳсулот етиштириш жараёнларини автоматлаштиришни назарда тутди.

Соҳани такомиллаштиришнинг жаҳон тажрибасини қараб чиқсак, қишлоқ хўжалигида инновацион технологияларнинг қўлланилиши деҳқон ва чорвадорнинг машаққатли меҳнатини енгиллаштириш, фаолият натижаси самарадорлигини ошириш ва шу билан бирга инсон турмуш тарзининг ошишига хизмат қилаётгани гувоҳи бўламиз.

2017 йилдан 2022 йилгача бутун дунё бўйлаб “ақлли” қишлоқ хўжалиги учун автоматлаштирилган тизимлар ва технологияларнинг оммаланиши тахмин қилинмоқда. Хусусан, VRT (ўзгарувчан тезликдаги технология) тизими ва GPS - қабул қилувчи қурилмалар ушбу тармоқ ўсишида салмоқли ҳисса қўшади.

Олимларнинг тахминларига кўра, 2050 йилга бориб Ер сайёраси аҳолиси 9,6 миллиардга етиб, уларни озиқ - овқат билан таъминлаш учун бугунгига нисбатан 70 фоиз кўп маҳсулот керак бўлар экан. Ушбу муаммони деҳқончилик фаолиятини ўзгача усуллар асосида бошқариш, хусусан, соҳага **буюмлар интернет (IoT)** концепцияси каби замонавий технологиялар ва

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