

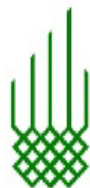


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KYRGYZSTAN



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Livestock Breed Improvement to Increase Farmers' Incomes and Prevent Pasture Degradation: Shifting from Livestock Quantity to Quality

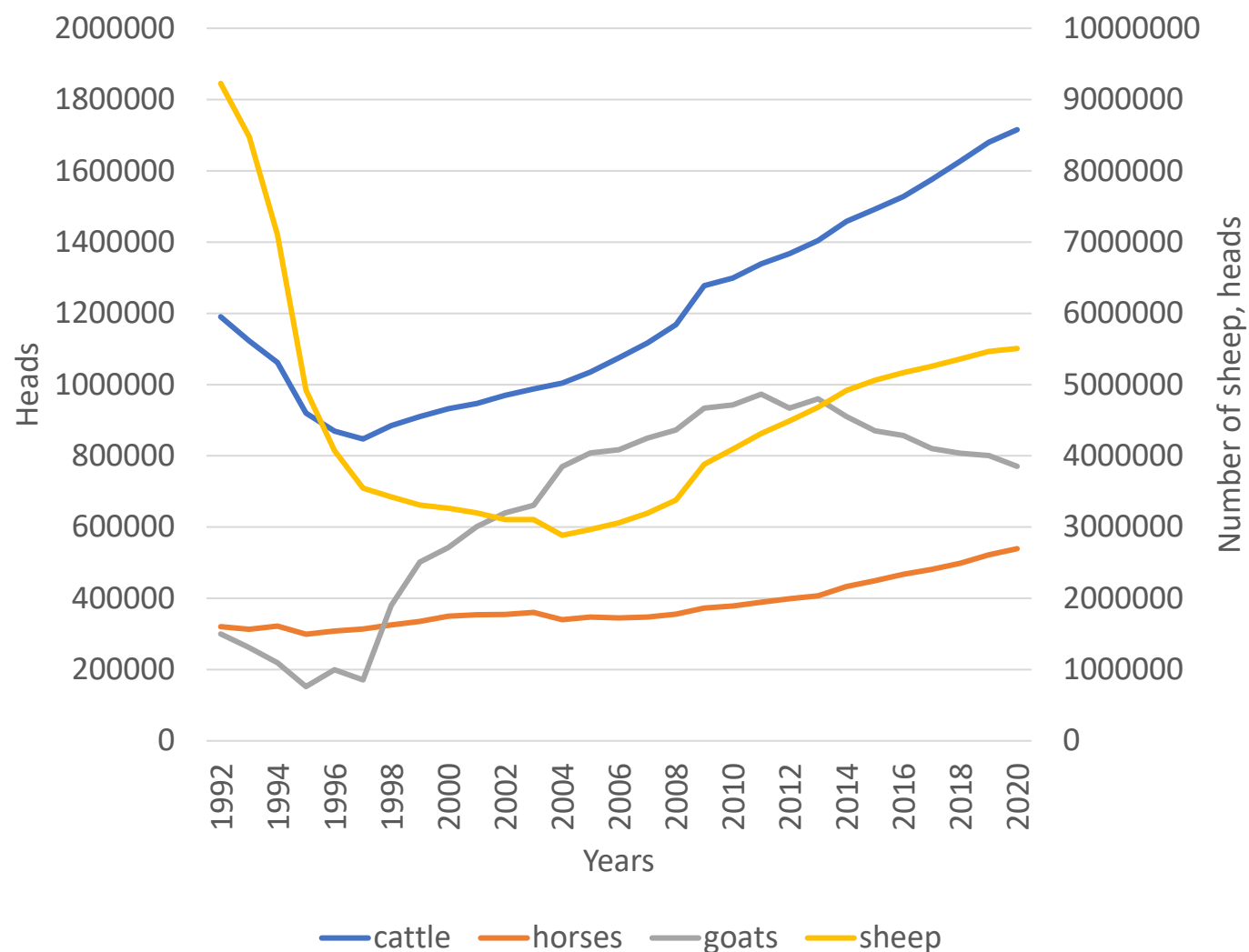
Prepared by: Dilbara Kirbasheva, MSDSP KG

Outline

- Livestock population trends
- Impact on environment
- Government measures and policies on livestock breeding
- Information about the Bai-Alay project (the BAP)
- Methodology of the study
- Results of the study
- Conclusions, lessons learned and recommendations

Livestock population trends in Kyrgyzstan and impact on environment

- An increase in the number of livestock and the deterioration of natural forage lands have led to an excessive pressure on pastures.
- Average annual milk yield per cow decreased from 3070 kg in 1990 to 2009 kg in 2021
- 82.3% of winter, 33.5% of spring, 43.2% of summer and 29.4 of autumn pastures are degraded

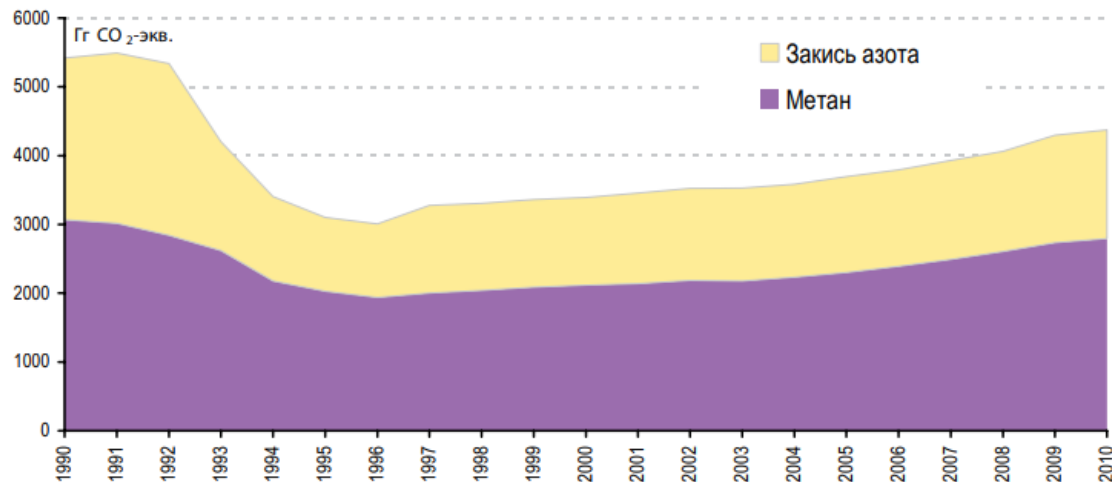


Source: FAO stat

Impact on environment

According to the Third National Communication of the Kyrgyz Republic under the UN Framework Convention on Climate Change, the agricultural sector ranks second in terms of greenhouse gas emissions from all emissions in Kyrgyzstan (33.5%, about 62.5% of which is livestock).

Trends in GHG emissions on gases of the Agriculture sector



Source: Third National Communication of the Kyrgyz Republic under the UN Framework Convention on Climate Change

The livestock/grassland ecosystem is trapped in a vicious cycle of productivity collapse: overgrazing and degradation of pastures lead to lower forage availability, which reduces animal productivity, forcing households to increase the number of animals to compensate for the decline in productivity, which in turn increases pressure on pastures and leads to their further degradation.

Government measures and policies on livestock breeding (cattle)

Laws and regulations

- LAW OF THE KYRGYZ REPUBLIC dated April 27, 2009, N 133 "On breeding in animal husbandry of the Kyrgyz Republic"
- Decree of the Government of the Kyrgyz Republic dated July 22, 2015, No. 516 "On approval of the procedure for assigning and depriving the status of breeding plants and farms in the Kyrgyz Republic"
- Decree of the Government of December 15, 2017, No. 812 "On the payment of state subsidies to business entities that have been assigned the status of a breeding plant and breeding farm by the Government of the Kyrgyz Republic"

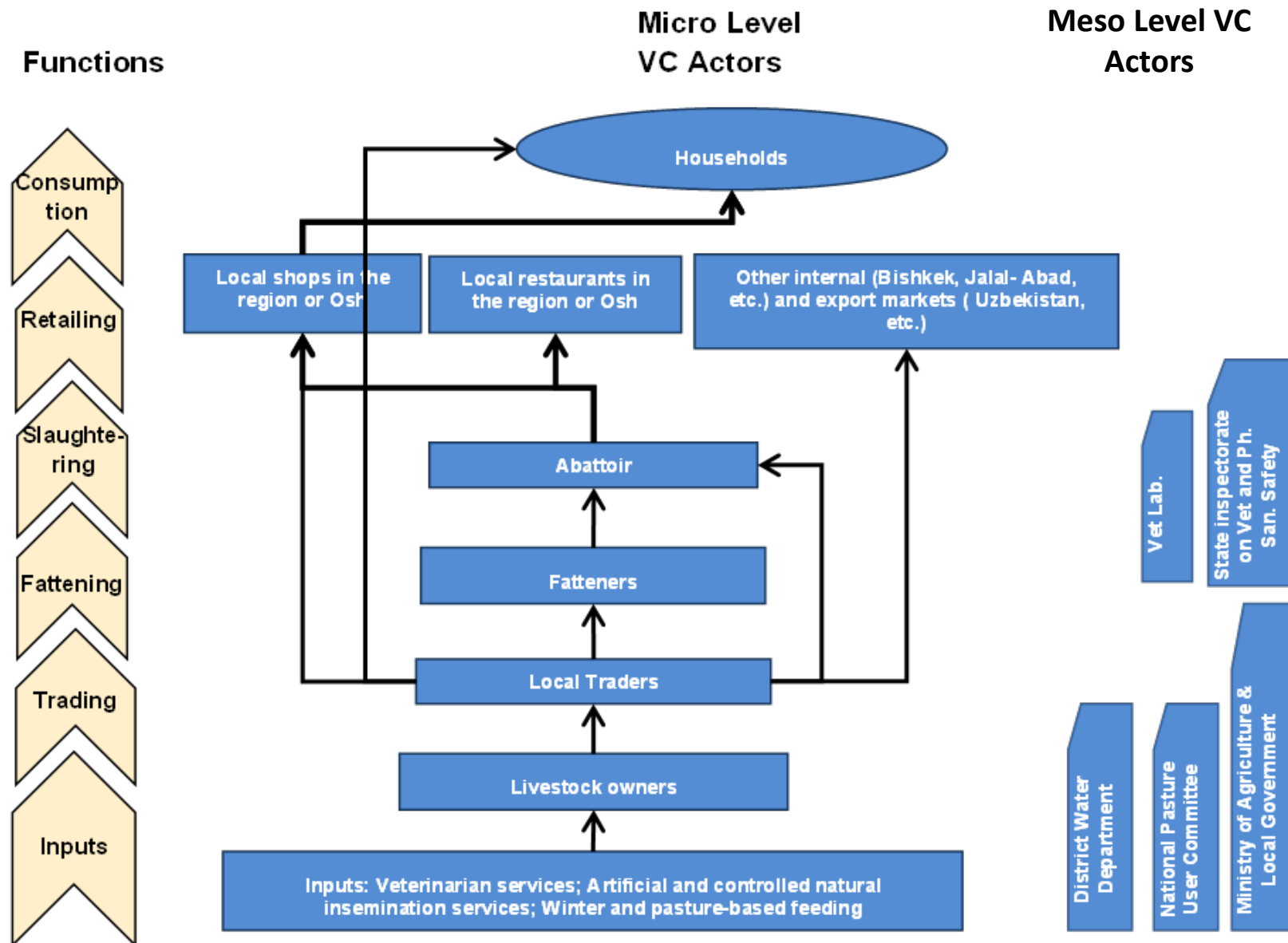
State programs

- (draft) Program for the development of pasture farming and livestock breeding in the Kyrgyz Republic for 2020-2024.
- The pilot project program for the development of the dairy industry in the Issyk-Kul region for 2016-2019 with an extension until 2021-2024.
- Program and Action Plan for Adaptation of Agriculture and Water Resources to Climate Change for 2016-2020

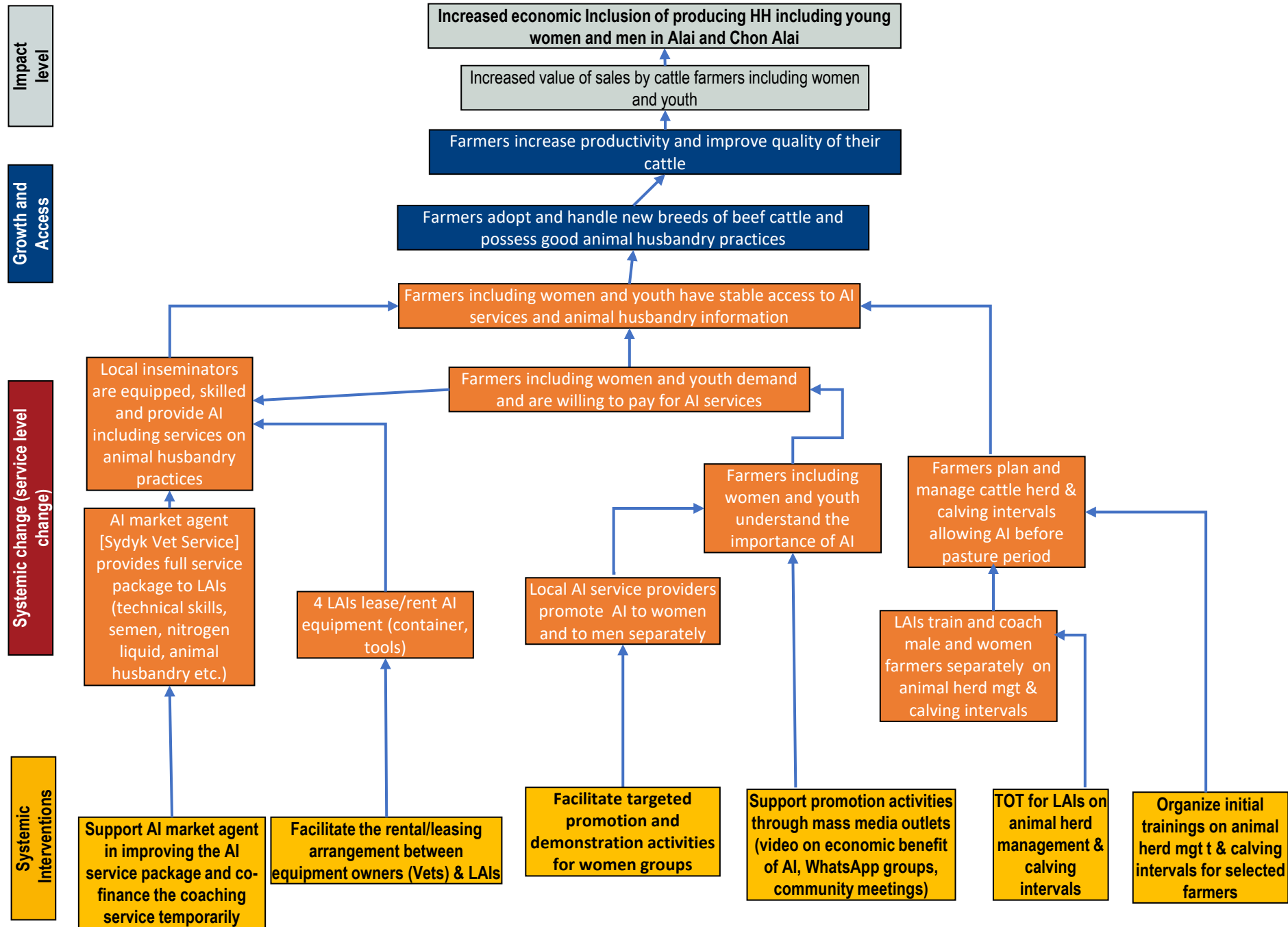
Information about the BAP project

- The overall goal of the Project is to reduce poverty in Alai and Chon Alai through increased income and employment (including self-employment) – in particular for women and youth.
- The second phase of the project was implemented from 2018 to 2022 in Alay and Chon-Alay districts and covered 4 sectors: Cattle, Apiculture, Handicraft and Tourism.
- The main activities of the project were aimed at developing value chains, namely, supporting/creating new services for farmers and marketing their products.
- The Bai Alai project was concentrated its efforts on the following cattle sector-specific services:
 1. Breeding (NI, AI) & Veterinarian Services
 2. Pasture management (Summer feeding)
 3. Winter Feeding and Skilled Animal Husbandry
 4. Marketing

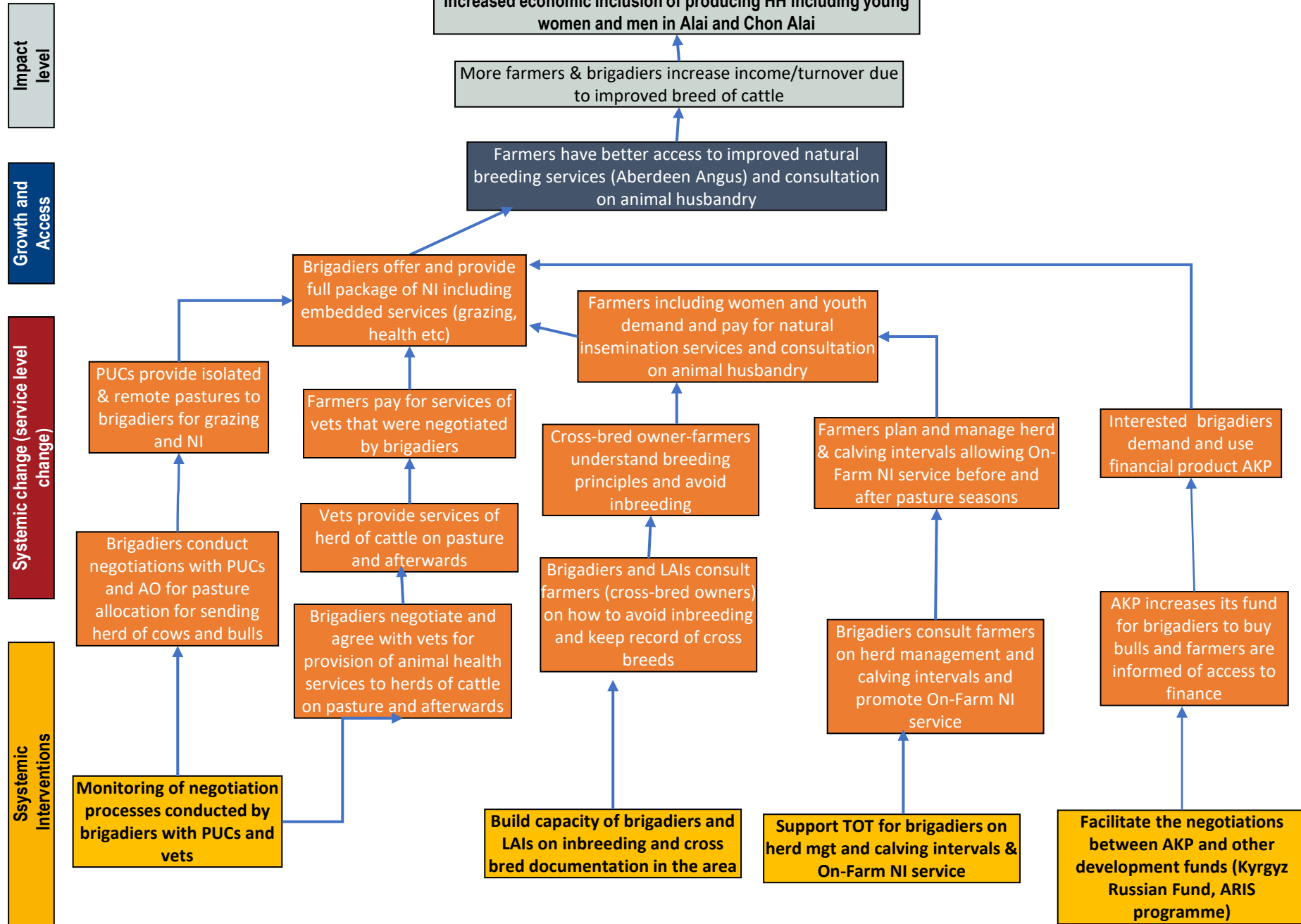
Information about the BAP project (Cattle VC structure)



Cattle Sector: Artificial Insemination



Cattle Sector: Natural Insemination



Information about the BAP project (results of the project)

Natural insemination services: about **60** brigadiers trained during project lifetime, **64** Aberdeen Angus bulls were brought into the region with the financial assistance of the project. On average, about **200** farmers per year used natural insemination services and about **300** cows were inseminated per year. Price per one insemination is 1000 KGS.

Artificial insemination: **11** local Artificial Insemination Technicians (LAIT) provide services in the projected area. On average, about **100-150** farmers per year used artificial insemination services and about **150-200** cows were inseminated per year. Price per one insemination is varied from **800 KGS to 1500 KGS**. LAIT's understand necessity of cooperation, formal union was established.

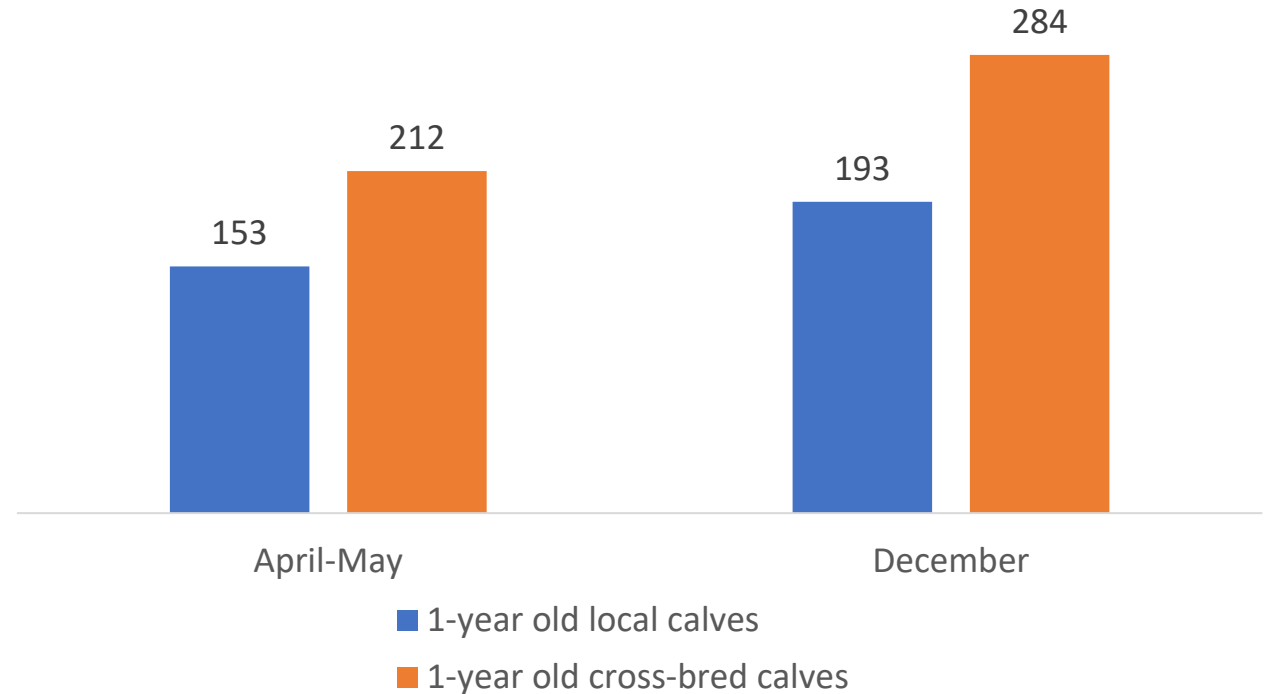


Information about the BAP project (results of the project)

- **Feeding component:** Creation / support of seed funds in Chon-Alay and Alay, the main purpose of which is to increase feed production, as well as the sale of certified seeds (2000 mt. of additional fodder produced). 48 shepherds were trained on pasture usage (rotation) and basic animal health.
- Other region farmers and donor funded programs started replicating the BAP intervention model (e.g. GIZ)
- Farmers have understanding of breed improvement (e.g. started importing Angus breeds)



The results of monitoring the weight of calves



- The average weight of 1-year-old half-breed bulls in December 2020 was 284 kg, local 1-year-old bulls 193 kg.
- The weight of 1-year-old half-breed bulls increased (by 34%), the weight of 1-year-old local bulls by 28%.
- In this regard, half-breed calves are sold on the market for 15-20 thousand KGS more expensive.

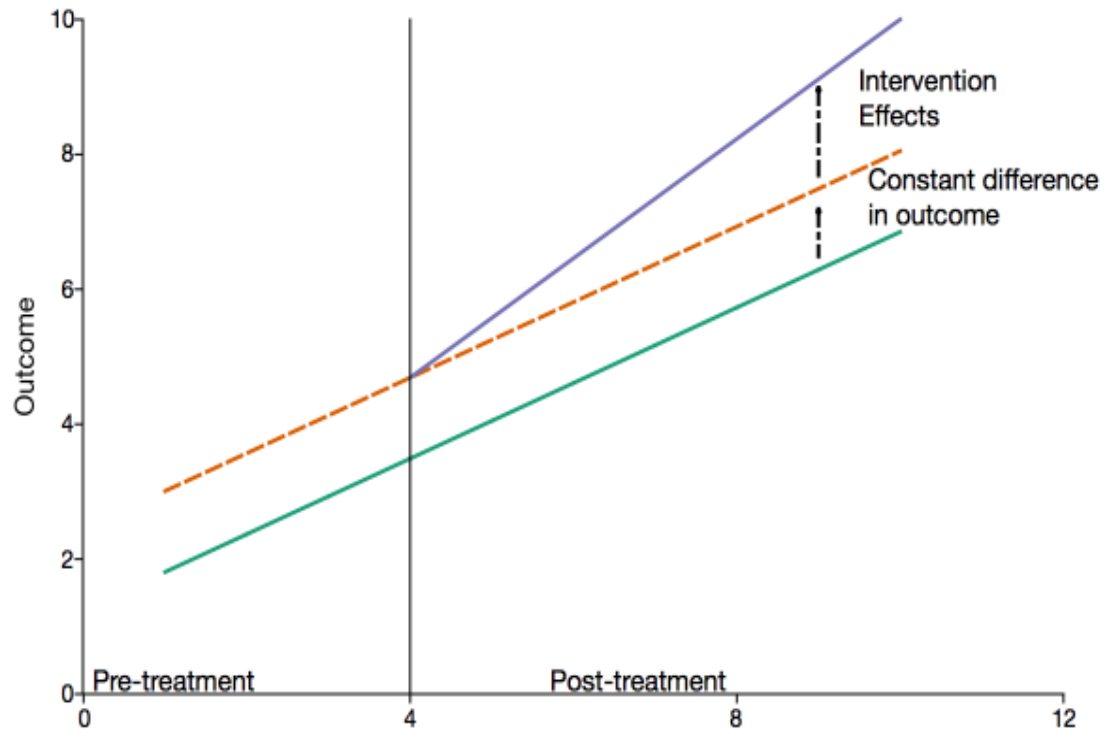
Methodology of the Household survey

- The aim of the survey was to measure the impact of the project on households' income and number of cattle in households.
- Sample size of the study was **236 farmers** from **pilot group** (users of insemination services) and **216 farmers** from **control group** (non-users of insemination services). Respondents for pilot group were randomly selected from the lists of insemination service users. 95% confidence level and 5% margin error were used for calculation of the sample size. Respondents for control group were selected from the same villages and from lists provided by local government.
- There were 2 data collections in 2020 and 2021 (panel data). When collecting data in 2020, data for 2018 and 2019 were also collected using a retrospective method.
- **Difference-in-difference method** was used to estimate the impact of the project on farmers' income and number of cattle in household.

Difference-in-difference method

H0: the project interventions do not cause statistically significant effect on the target population.

H1: the project interventions cause statistically significant effect on the target population.



The DiD method estimated according to the following specification:

$$Y_i = \beta_0 + \beta_1 * T + \beta_2 * P + \beta_3 * T * P + \varepsilon,$$

where,

Y_i – value of project indicator number i ;

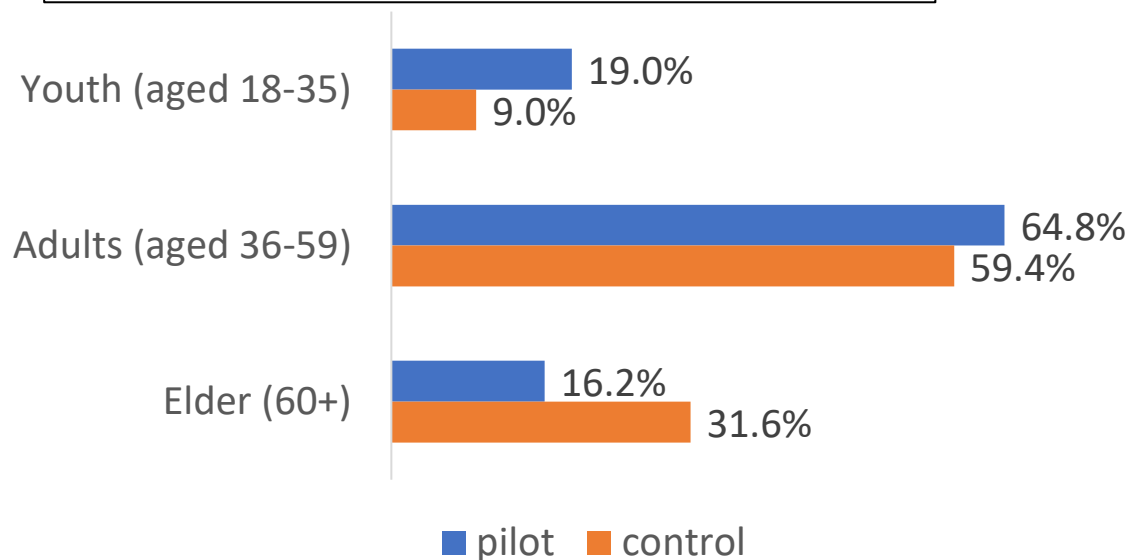
T – dummy variable for the different time periods (0-for measurements in the period 1, 1- for measurements in the period 2).

P – dummy variable for indicating households from pilot group (Pilot group-1, Control group -0);

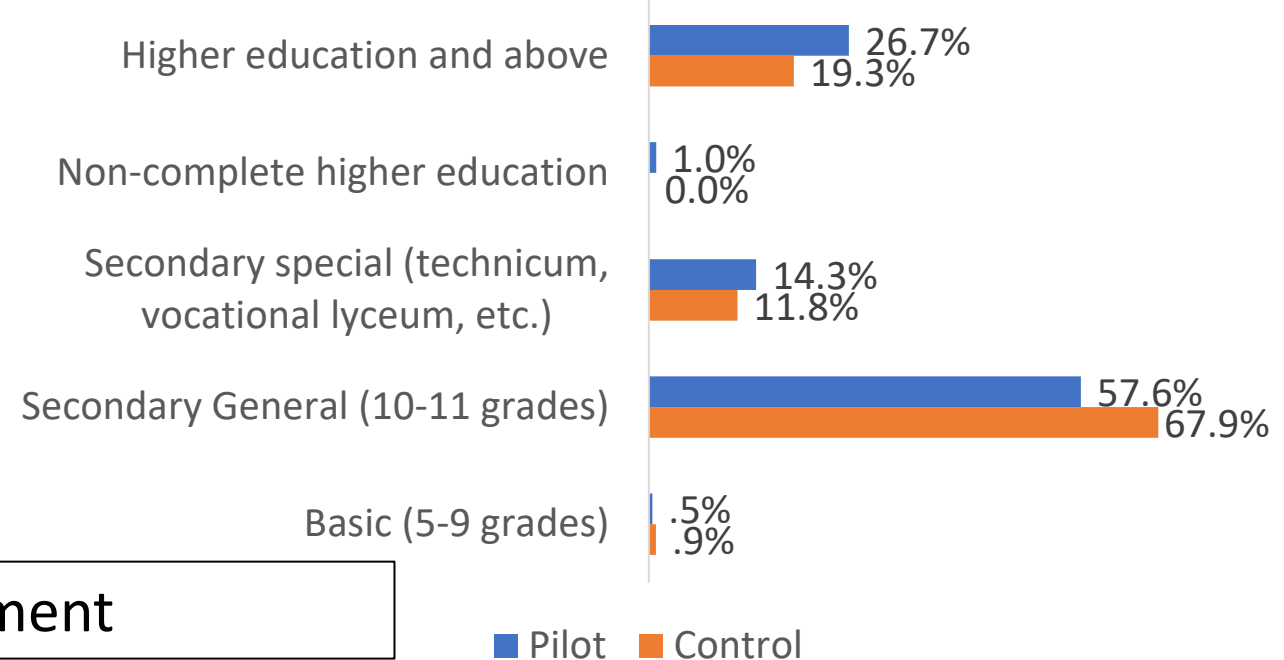
$(P * T)$ – composite dummy variable indicating when $T = P = 1$;

Demographic characteristics of respondents

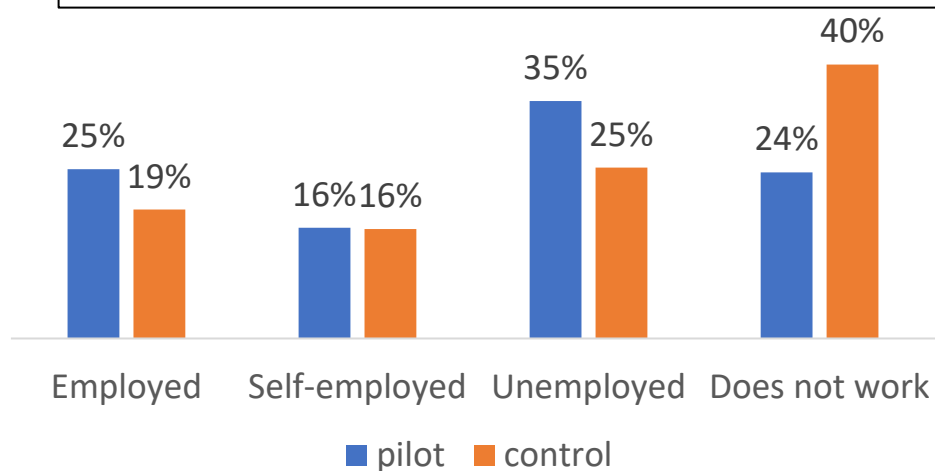
Age



Education



Employment

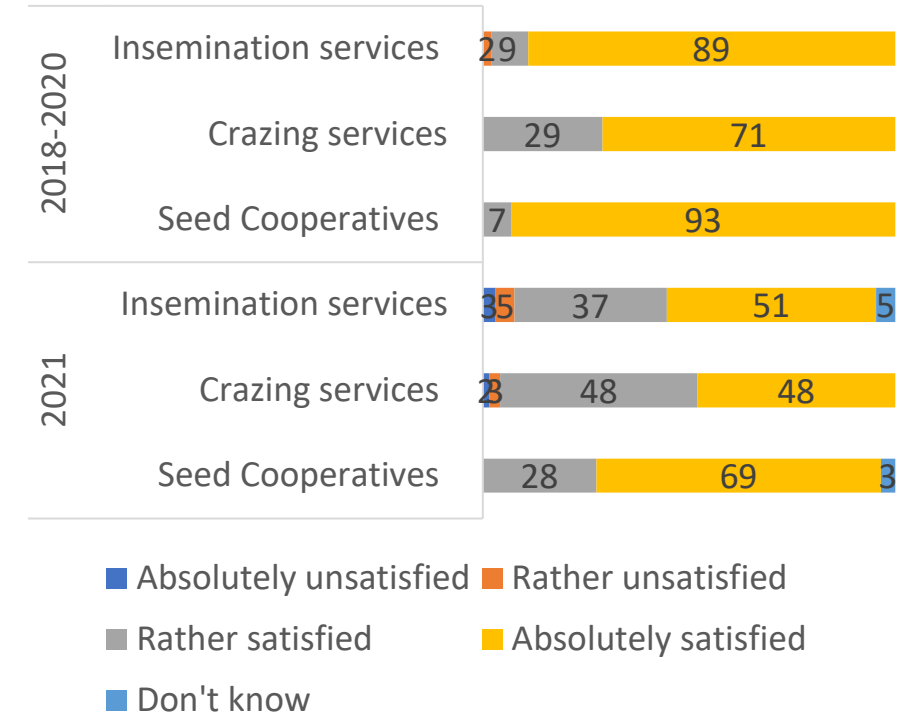


Usage of new and improved services by respondents

Number and % of users

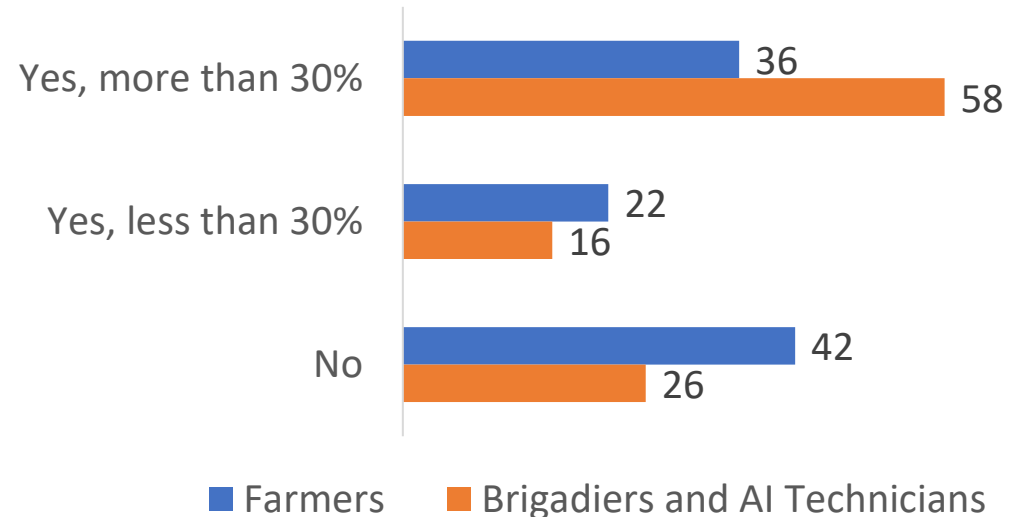
| | | Pilot, n | Pilot (%) | Control, n | Control, % |
|--|------|----------|-----------|------------|------------|
| Number and % of farmers used insemination services (NI and AI) | 2018 | 74 | 31% | 0 | 0% |
| | 2019 | 142 | 60% | 6 | 3% |
| | 2020 | 142 | 60% | 7 | 3% |
| | 2021 | 71 | 30% | 6 | 3% |
| Number and % of farmers used shepherd services | 2018 | 60 | 25% | 60 | 27% |
| | 2019 | 60 | 25% | 63 | 27% |
| | 2020 | 60 | 25% | 59 | 27% |
| | 2021 | 62 | 26% | 57 | 26% |
| Number and % of farmers used Seed funds services | 2018 | 4 | 2% | | 0% |
| | 2019 | 5 | 2% | 2 | 1% |
| | 2020 | 2 | 1% | 3 | 1% |
| | 2021 | 17 | 7% | 12 | 6% |

Satisfaction with the services, %



Indicators for assessing the project impact

- **Value of sales** by local producers and entrepreneurs = Monetary value of cattle sales (cows, bulls, heifers, calves) + monetary value of sales of dairy products
- **Net income** of local producers and entrepreneurs = Value of sales – Costs
- **Costs** = Fodder + payment for shepherd's service + payment veterinarian services + vaccination costs + expenses for breeding services + payment for training/consultations + loan installments + other
- **Number of cattle per household** = number of cows + number of bulls + number of heifers + number of calves
- **Respondents' assessment of changes in their income:**



Difference-in-difference results (2018 vs. 2021)

| Indicator | 2018 | 2021 | DiD coefficient | SE | t-statistics | p-value | Sample |
|---|---|--|-----------------|-------|--------------|-------------|--------|
| Value of sales by local producers and entrepreneurs in the selected sectors (USD) | Pilot: 913 Control: 645 Difference: 267 | Pilot: 1240 Control: 592 Difference: 648 | 381.2 | 249.0 | 1.53 | 0.12 | 870 |
| Net income of local producers and entrepreneurs in the selected sectors (USD) | Pilot: 496 Control: 296 Difference: 200 | Pilot: 615 Control: 194 Difference: 420 | 200.9 | 216.5 | 1.02 | 0.31 | 870 |
| Average number of cattle heads per household | Pilot: 10 Control: 6 Difference: 4 | Pilot: 13 Control: 7 Difference: 6 | 2.5 | 1.12 | 8.13 | 0.01 | 870 |

Source: author's calculations, HH survey

Difference-in-difference results (2018 vs. 2021), Artificial Insemination

| Indicator | 2018 | 2021 | DiD coefficient | SE | t-statistics | p-value | Sample |
|--|--|---|-----------------|-----|--------------|-------------|--------|
| Value of sales by local producers and entrepreneurs in the selected sectors (USD) | Pilot: 835 Control: 645 Difference: 190 | Pilot: 1504 Control: 592 Difference: 911 | 721 | 316 | 2.27 | 0.02 | 666 |
| Net income of local producers and entrepreneurs in the selected sectors (USD) | Pilot: 464 Control: 296 Difference: 171 | Pilot: 824 Control: 194 Difference: 631 | 460 | 269 | 1.7 | 0.08 | 666 |

Source: author's calculations, HH survey

Conclusions, lessons learned and recommendations

- According to the data of the Ministry of Agriculture for 2021, there are 75 officially registered breeding farms for breeding cattle in the republic, and the ratio of breeding stock to the total was 0.87%. At the moment, animal husbandry in Kyrgyzstan is characterized by low productivity, and it is necessary to increase productivity not by increasing the number of heads, but by improving the breed of animals.
- The use of insemination services to date has led to a significant increase of farmers sales, but the increase in the number of cattle in households continues. The method of artificial insemination has proven to be significantly profitable for farmers.
- Reducing the number of cattle and the rate of cattle growth (average by 2.9% year) may take a long time (over 5 years), without large-scale introduction of animal breed improvement services.

Conclusions, lessons learned and recommendations

Artificial Insemination

- It is necessary to develop legal acts regulating the work of insemination points and local artificial insemination technicians
- Work to build the capacity of existing LAITs, train interested private veterinarians to provide this service, increase the number of LAITs
- The cost of one artificial insemination is from 800 to 1500 soms, which does not always cover all the costs that go to one insemination. Farmers are not willing to pay more than this price for insemination. It is necessary to **develop government mechanisms to support artificial inseminators (subsidies, assistance with the purchase of equipment, etc.)**, as well as to promote their cooperation.
- It is necessary to work on improving access to the inputs necessary for insemination (liquid nitrogen, semen, etc.)

Conclusions, lessons learned and recommendations

Farmers

- The shifting from quantity to quality of livestock requires **dissemination of information about the insemination services, climate change and pasture degradation problems** among farmers in order to accelerate the transition. Also, some farmers have doubts on usage of artificial insemination based on local beliefs, therefore, it is necessary to develop mechanisms to improve the trust of farmers in this service.
- Improve farmers' awareness of the availability of breeding cattle in breeding farms and availability of insemination services.
- Improve access for farmers and breeding farms to low-interest loans with flexible return period for the purchase of breeding cattle