



# AGRICULTURE TECHNOLOGY PROGRAM (AgTech)

QUARTERLY REPORT II OF PROJECT YEAR IV  
(JANUARY 2014 – MARCH 2014)



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## ACRONYMS

|      |                                      |
|------|--------------------------------------|
| AI   | Artificial Insemination              |
| B2B  | Business-to-Business                 |
| GOT  | Government of Turkmenistan           |
| HH   | Household                            |
| IPM  | Integrated Pest Management           |
| LN   | Liquid Nitrogen                      |
| LNG  | Liquid Nitrogen Generator            |
| LOI  | Letter of Invitation                 |
| MoA  | Ministry of Agriculture              |
| MFA  | Ministry of Foreign Affairs          |
| PMEP | Project Monitoring & Evaluation Plan |
| SLU  | State Livestock Union                |
| TOT  | Training of Trainers                 |
| USG  | United States Government             |

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## PROJECT OVERVIEW

This report summarizes project activities conducted by Weidemann Associates, Inc., A Crown Agents USA Company, in implementing the Agriculture Technology Program (AgTech) for Turkmenistan during the period of January 2014 through March 2014.



The Project focused on training extension services and seminars for providing the Government of Turkmenistan (GoT) with the necessary support and technical assistance in preparation for the WTO accession. Thus the Project highlights from the Second Quarter included training seminars on OIE requirements and compliance as part of the preparation for WTO accession, supporting and strengthening the horticulture and livestock trade sectors, as well as implementing a pilot artificial insemination (AI) and heat detection training on US based commercial farms.

As required, AgTech submitted its Quarterly Report for Ministry of Foreign Affairs' (MFA) approval and was able to complete two international STTA activities that resulted in collaboration with State Associations of Turkmenistan. In addition, AgTech was able to produce and disseminated additional booklets and other multimedia of various subject matters. The Project continued to push forward for increased accessibility to services, training and advertising tools to promote best practices and celebrate the project's widespread impact.

Cumulatively, the project is on schedule to complete its activities and is currently revising its training activities to adapt to the current demands. With the support from our private sector partner, Chevron, the project is increasing the capacity for veterinarians and farmers to transform the dairy industry in Turkmenistan and support the high local demand for meat and dairy products.

As of April 30, 2014 the project estimates that \$2,687,829.84 has been spent of the obligated \$4,074,491 funds.

## LIVESTOCK COMPONENT

### Breeding Improvement: Supply Breeding Supplies and AI Training

The Second Quarter bore great success in breeding improvement activities for the USAID AgTech Project. By the end of Year Four Quarter Two, the number of cows inseminated by project AI specialists had reached 4,210. For the same reporting period, AgTech has recorded a total of 1,121 new born calves, although the actual number of calves born is likely to be significantly higher. This Quarter marked a milestone event: the calving of the first project heifers that were born as a result of artificial insemination (AI) activities during the second year of the Project. The data (Table 1) shows milk production (Liters) of the Project heifers and illustrates the difference in milk production of the 9 households before and after the calving of crossbred heifers. The data demonstrates an 80-90% milk increase on 9 livestock farms in the Ahal velayat. The milk was produced by cows which were born from Project AI activities using the semen procured from US suppliers. The Project expects the number of the Project produced heifers to increase 10 fold by the end of Project's activities. This achievement is beyond Project's expectations. In addition, the Project estimates that the numbers of cows born, as a result of Project AI activities and bull doses, is 2-3 times greater. However, due to the remote and sparse location of many livestock households and farmers' poor record keeping there are challenges in documenting all newborn calves. The Project only indicated milk yields for 9 heifers in Ahal due to difficulties in obtaining the necessary data, although as of the end of March 2014, there are an estimated 20 Project heifers across the country.

*"I am very grateful to USAID AgTech project for their work on AI. I have improved my breed...My local bred cow produced 7-10 liters of milk daily. The American bred cow ...increased [milk production] to 22 liters. Increase in milk production ... depends on a variety of measures such as feed improvement, health improvement, and living conditions"*  
- Charygeldi Abdurahmanov,  
Livestock Farmer, Bagir village,  
Ahal region

Throughout the life of the project, AgTech has been working with farmers to increase milk production and calving in heifers. The milk production increase in heifers is designed to demonstrate to small-holder farmers the economic benefits of AI and its best practices, which is expected to result in a surge of demand for AI services among rural households. In this effort, AgTech trained more than 60 AI specialists across the country and provided them with not only necessary tools and genetic materials, but with assistance in advertising their services to livestock farmers in order to increase awareness of AI breeding options.

Additionally, the introduction of other breeds such as Jerseys, Limousins and sexed female Brown Swiss and Holsteins proved to be beneficial. In Year Three, In order to create an initial demand for beef breeds and female sexed semen, AgTech has regularly provided each of the active AI specialists with a small amount of Limousin and sexed semen doses (15-20 doses) as compensation for their efforts in tracking and recording AI activities and new born calves in their respective regions. This practice has also captured the full potential of the local AI service market for project trained AI specialists and further contributed to the popularity of AI services

as a cattle breeding method among livestock farmers. Along with emerging interest and support of the AI activities from the State, triggered by the Project's activities, AgTech believes that AI business and services will have a chance to not only continue in Turkmenistan, but to expand and flourish in the long term. However, this will primarily depend on State's ability to leverage its support for the livestock sector.

#### SUCCESSSES:

- The much awaited event has occurred: project heifers produced milk. The results from project heifers are impressive, with a 90% increase in milk production alone (Table 1).
- Average milk yields of the 9 cows the Project was able to track have almost doubled. Additionally, according to project monitoring figures, by the end of the project (February 2015), it is expected that about 200 project heifers will calve.
- During the Second Quarter, AgTech has also noticed a rise in small-holder farmers' interest in AI services. At the end of Year Three, livestock farmers were noticing the Project's healthy new born calves in neighboring households and villages. As of that juncture the pace of AI service usage gained momentum across the country. With the current increase in milk yields, the project fully expects the number of small-holder farmers that reach out to AgTech trained AI specialists to grow steadily through the end of the project.
- AgTech provided AI services have also contributed to the demand for higher quality beef breeds. The feedback received from project AI specialists indicate that cattle farmers have become increasingly aware of the benefits of high quality cattle breeds and many of them are prepared to pay premium for top quality semen.
- AgTech has regularly provided each of the active Project AI specialists with a small amount of Limousin and sexed semen doses as compensation for their efforts in tracking and recording AI activities and new born calves in their respective regions. This practice has also captured the full potential of the local AI service market for project trained AI specialists and further contributed to the popularity of AI services.
- The Project learned that an increase in demand for beef breeds has been established among livestock farmers, including requests for other popular beef breeds such as Simmentals and Charolaise. Furthermore, a local owner of veterinary pharmacy and a long-term project collaborator, Mr. Ovezgeldi, recently imported 30,000 doses of Bro-estrophan (a heat inducing hormone in cows) as a result of an increase in local demand. He believes this demand was directly stemming from the increased popularity of AI services among cattle farmers.



- The project activities triggered interest and support from the GoT. Therefore, with GoT's collaboration and following the aforementioned successes, the results of AgTech activities demonstrate the first signs of potential market sustainability and indicate that despite country wide scale limitations, AI activities and services have now been established on a sustainable level; these activities are expected to continue in the near future after the project's completion.

#### **CHALLENGES:**

- Documenting all new born calves has been difficult. The record keeping by owners is of poorly maintained, if even available. Record keeping of milk yield and income increases as a result of increased use of AI services and improved breeds remains the primary challenge for capturing project impact.

#### **Supporting Artificial Insemination (AI) Centers and Farmers**

Throughout Quarter Two, AgTech has continued to provide support to existing AI Centres in Ahal, Mary and Dashoguz. The Project is providing them with marketing and promotional material, including AI booklets, leaflets regarding newly introduced breeds and contact numbers of all active AI specialists in their respective provinces. The Project has also provided AI Centres with a small amount of newly introduced beef breed and sexed semen doses to support their activities. AgTech also notes important changes of all AI Centres in order to keep farmers and AI clients aware of developments in their region. For instance, Nepes Karayev, Project's livestock partner and Ahal AI Centre manager, has now moved his AI Centre to a new location after the State repossessed his leased cattle farm. Additionally, Serdar Balakayev's cattle farm, located approximately 25 km East of Ashgabat, now hosts a new Ahal AI Centre and runs it jointly with the farm leaseholder and the acting manager.

There have been additional changes in the planned establishment of the AI Centre in the Lebap province. As a result of the changes in the GoT rules and regulations in relation to foreign technical aid, the efforts put forth for establishing the AI Centre in Lebap had to be redirected towards supporting local entrepreneurs interested in AI business. The Project is now prepared to provide assistance to two local entrepreneurs for obtaining AI license and establishing business links with foreign genetic material suppliers. As of March 2014, the Project identified two AI license candidates in Ahal and

### **Next Steps:**

*AgTech is planning a B2B trip for AI Center managers and AI businessmen. The aim of the activity will be to establish business linkages with suppliers and to research the market for AI goods.*

Dashoguz provinces and assisted them with completing all necessary forms and paperwork. The candidates are currently going through the application process with the State Livestock Union (SLU) and AgTech is in the process of identifying potential entrepreneurs in Lebap and other provinces who may be interested in AI business and trading.

The laboratory and training equipment procured for Lebap AI Centre in the previous Quarter will be sold at an auction organized by the US Embassy in Ashgabat in October 2014. The preference during the selection of potential buyers will be prescribed to Project trained AI specialists and entrepreneurs already prepared to work in AI business.

#### **SUCSESSES:**

- AgTech is providing continuous support to Project AI centers with marketing and promotional material as well as providing information on cattle breeds and foreign providers.
- The Project has provided assistance to two local entrepreneurs with obtaining an AI license and helped establish business links with foreign genetic material suppliers.

#### **CHALLENGES:**

- Since its reorganization in 2013, the SLU still has not fully developed or finalized requirements for the AI licensing process and procedure. In view of the current duration and decision criteria for issuing AI licenses for applicants by the SLU, the process development is uncertain.

#### **US Based AI and Heat Detection Training**

Based on Annual Work Plan for Year Four and Five, AgTech has commenced a planned one month-long US based pilot training on advancing AI and heat detection skills. AgTech selected a group of AI specialists representing each province of Turkmenistan to participate in the training. The first two participants of the US training representing Ahal and Mary regions, Ms. Yekaterina Chikhnyayeva and Mr. Nury Annayev, arrived in Sacramento, California, USA on March 15, 2014. The training was led by AgTech's international livestock consultant Dr. Thomas Graham and took place on a number of US commercial dairy farms. On a daily basis, the trainees received training primarily on heat detection and herd management while increasing their pregnancy detection skills and observing best farm management practices.



Trainee selection was designed to select individuals who would benefit the most from exposure to new technology, AI practices and training on a large number of heads of cattle. These individuals were identified as the most advanced practitioners in bovine reproduction in Ahal, Mary, Lebap and Dashoguz provinces. The objective of the training was to hone the practitioners' skills through advanced technology and regular training on a significantly higher number of heads of cattle than available on farms in Turkmenistan. Ultimately the training practice and instructions were designed to refine the participants' skills, allow them to master their craft and help improve human capital of the Turkmen livestock industry. Therefore, by working alongside dairy experts, on US commercial farms, on a daily basis, the participants are expected to become experts beyond a level possible to reach on smaller dairy farms in Turkmenistan.

While on U.S. commercial farms, the participants were expected to learn from technology and experiences not available in Turkmenistan. Two-thirds of the training was dedicated to manual palpation of animals in order to identify cows in estrus and the duration of pregnancy. In addition to manual palpation, a number of other activities will be performed on a daily basis; this includes observation of or participation in 5 - 10 calvings per day and 25-35 inseminations. Each trainee will also be equipped with an ultrasound that will be brought to Turkmenistan at the end of the training, for veterinary use in the velayats. The combination of palpation and ultrasound experience allows for an accelerated learning curve, even for experienced professionals, to receive a visual understanding while using tactile senses to detect a cow's status. The intensity of the training ensures sustainability of the use of this high-tech equipment for improved breeding practices in Turkmenistan that can be shared with other AI specialists.

#### **SUCCESSSES:**

- The Project has organized a pilot training unlike any other. AgTech provided the opportunity for Turkmenistan's leading veterinary experts to train on US commercial farms and hone their expertise with the use of advanced technology and techniques practiced in a setting unavailable in Turkmenistan

## **Next Steps:**

*The Project is planning a second US based training activity to and to send a second set of Participants to Davis, CA.*

*The Project is also planning a consultancy on designing dairy farm upgrades and improvements and to provide recommendations on sanitation, housing, etc.*

## HORTICULTURE COMPONENT

### Greenhouse Improvement Program

The Second quarter of Year Four marked a period of major developments in greenhouse improvements. A total of 16 new greenhouses were constructed or improved in all provinces except for the northern province of Dashoguz. This is in addition to the 19 greenhouses built and reconstructed earlier in the first quarter, bringing the total for Year Four to 35. Based on project observations and monitoring figures over the last three and a half years, the majority of horticulture farmers built or reconstructed greenhouses during the first and last quarters of the year. The farmers were also less involved in construction activities during the second and third quarters (from January through June) due to a peak in the growing and harvesting season. There is a project target of 50 newly built or reconstructed greenhouses for the fourth year and it is expected that during the remaining two quarters of this year, this target figure will be exceeded. Since the project's inception in 2010, a total of 329 greenhouses were either built or renovated by the participants of project held horticulture-training seminars.

The project specialists were involved in research activities on identifying, procuring and installing the relevant equipment and tools. However, following numerous discussions regarding the ability of AgTech to carry out this activity with the necessary approvals and given the current situation in the country, we have decided to postpone the activity and focus on enhancing trainings and STTA activities instead.

#### **SUCSESSES:**

- Following Project recommendations and activities, a total of 16 new greenhouses were constructed or improved in all provinces Akhal, Balkan, Lebap and Mary.

#### **CHALLENGES:**

- Following numerous discussions regarding the ability of AgTech to procure and install equipment with the necessary approvals and given the current situation in the country, we have decided to postpone the activity and focus on enhancing trainings and STTA activities instead.

### Horticulture Production and Improvement

As a result of changes in AgTech strategy for the Horticulture component, the main focus within this component is on extension training and supporting project partners. AgTech has already identified input suppliers who will be trained to become trainers and extension specialists. As part of this new strategy, in March 2014, project conducted a two-day training seminar on pesticide and fertilizer use and application for project horticulture partners in the project office in Ashgabat. The seminar was led by the local pesticide consultant, assisted by the Project's local Private Sector Agribusiness Specialist, while the participants included all the project

*"[The]Meeting was very helpful for all of us.... We will be qualified to provide pesticide safety training to fieldworkers and pesticide handlers in our area. I'd like to express my thanks to the USAID AgTech project and wish to participate in such Training of Trainers in the future."*

*- Hemra Orazgeldiyev, the Project partner*

horticulture partners from the regions. The event was a good opportunity for participants to discuss topics including input supplies, import-export issues, the greenhouse vegetable market, government regulations on chemical and fertilizer supplies, as well as challenges in the input-supply market. Participants were provided with an updated list of permitted pesticides and fertilizers issued by the Plant Protection Department of the Ministry of Agriculture as well as with the pocket field guide on pesticide and fertilizer

use and application developed by the Project. This reoccurring meeting, along with informational support provided to the horticulture partners by the Project, contributes to their extension skills and further expands the project impact as partners continue to provide their services to a large pool of greenhouse producers in their respective regions.

Following the study tour to the Ukrainian branch of the Dutch seed company, Rijk Zwaan, for project horticulture farmers organized last June, the project assisted participants in maintaining regular communication with the company and horticulture partners. After the study tour, participants, who previously tested new seeds from the Rijk Zwaan, have started to examine different ways for importing vegetable seeds from this company to Turkmenistan.

A number of options were studied by the project including: opening a distribution branch for Rijk Zwaan; obtaining an import license for Ahal horticulture partner; and becoming the Company's partner in the Ahal region; or importing seeds through the Company's existing contracted distributor in the Lebap region. After the cost-benefit analysis and considering terms and conditions of each option, Ahal partner has decided to use the license services of a distributor of the Dutch seeds from the Netherlands Embassy in Ashgabat. With AgTech's support all communication, negotiations, purchase and delivery conditions were conducted between the farmer and supplier. As of the end of this reporting period, the Project Ahal partner has placed an order for tomato and cucumber seeds with Rijk Zwaan worth

## Next Steps:

*The Project plans to organize a study tour to demonstrate how extension services are conducted in other countries, such as Turkey. This activity will benefit greenhouse producers and extension agents and provide business linkages opportunities, and information on the possibilities and significance of these activities.*

\$7,000 USD. It is expected that the seeds will be supplied directly from the Rijk Zwaan's global distribution warehouse in Germany and delivered to Ashgabat by the end of May 2014.



This transaction demonstrates the impact of the Ukrainian study tour organized by the Project in Year 3. The procurement creates opportunities for other horticulture farmers and producers to import additional seeds once the current import mechanism is successfully tested. Since the cost of Rijk Zwaan vegetable seeds is on average 20-30% higher than seeds from other suppliers available in Turkmenistan, the transaction also demonstrates how greenhouse farmers are prepared to pay a premium for better quality, disease resistant seeds if given the choice.

#### **SUCCESSSES:**

- The Project provided its participants with an updated list of permitted pesticides and fertilizers issued by the Plant Protection Department of the Ministry of Agriculture as well as with the pocket field guide on pesticide and fertilizer use and application developed by the Project. This activity contributed to the participants' extension skills and extends impact to a large pool of greenhouse producers in their respective regions.
- With AgTech's support all communication, negotiations, purchase and delivery conditions were conducted between the farmer and supplier which resulted in the purchase of high quality cucumber and tomato seeds from the Dutch Seed Company, Rijk Zwaan. The transaction demonstrates how greenhouse farmers are prepared to pay a premium for better quality, disease resistant seeds if given the choice.

#### **CHALLENGES:**

- Licensing rules and regulations in relation to vegetable seeds, pesticides and fertilizers import remain to be the main challenge in domestic input supply market. This is also one of the limiting factors in local horticulture producers' ability to significantly increase vegetable production and meet the local market's demand for fresh vegetable products.

### **PROGRAM DEVELOPMENT AND SUPPLIMENTARY ACTIVITIES**

#### **[Seminar on OIE Compliance and Training for the State Veterinary Service Lab Specialists](#)**

At the beginning of March, AgTech has carried out a presentation seminar on the World Organization for Animal Health (OIE) for veterinary and laboratory specialists from the Central Laboratory of the State Veterinary Service and the State Equine Association of Turkmenistan. This was the first, introductory part to project planned international consultancy on OIE compliance for the State Veterinary Service. The event took place in the building of the Central Lab of Veterinary Service in Kipchak village of Ahal region and was led by the project's local Agriculture Extension Specialist. A Power Point presentation was prepared by the project

specialists to illustrate the content of the seminar. Topics covered included an introduction to OIE objectives, structure, and recommendations. OIE's relationship with other similar organizations (including WTO) was included in the discussion.

The Project's short-term international consultant on OIE, the regional director of OIE for the Eastern Europe and Central Asia, Professor Kazimieras Lukauskas, continued the OIE activity at the end of March. During the 3-day training seminar at the Central Laboratory, the laboratory specialists from the Central Lab and Equine Association Lab participating in the seminar were trained on procedures and disease testing methodologies for a number of animal diseases in compliance with the OIE requirements. At the end of the training, participants were awarded certificates on completion of OIE training, which were signed and presented to participants by the USAID Turkmenistan Country Director Brandy Witthoft and Professor Lukauskas.



*"We have heard of many USAID projects ...and we are very grateful for the effort USAID's AgTech program put forward for this seminar. Every participant was looking forward to this day. We learned many new things." - Dr. Orazmyrat Yazzyev, Chief Veterinarian at Central Lab*

During his short consultancy mission to Turkmenistan, as part of the Agtech activity and upon request from the local government, Professor Lukauskas also held a number of high profile meetings including a meeting with the Minister of Turkmen Equine Association and one with the head of the International Department of the Ministry of Agriculture of Turkmenistan. Some of the topics discussed during these meetings were the issues of development of country's livestock sector, equine industry, improving veterinary services and capacity building for the local laboratory specialists.

#### SUCCESSSES:

- AgTech has carried out a presentation seminar on the World Organization for Animal Health (OIE) for veterinary and laboratory specialists from the Central Laboratory of the State Veterinary Service and the State Equine Association of Turkmenistan.
- The Project sent a short-term international consultant on OIE, the regional director of OIE for Eastern Europe and Central Asia, Professor Kazimieras Lukauskas, to complete the seminar on OIE compliance for the State Veterinary Service. The activity was such a success, that the local government requested Dr. Lukauskas to meet with the Minister of Turkmen Equine Association and the head of the International Department of the Ministry of Agriculture of Turkmenistan.

## Seminar on the WTO Sanitary and Phyto-Sanitary (SPS) Measures for MoA

At the end of March 2014, as part of MFA approved activities, AgTech conducted a seminar on the Sanitary and Phyto-Sanitary (SPS) measures that apply to the World Trade Organization (WTO). Participants of the training seminar included specialists of the Plant Protection and Quarantine Services of the Ministry of Agriculture (MoA), provincial representatives of these services, and representatives of the Ministry of Agriculture of Turkmenistan. Led by AgTech's short-term WTO SPS consultant Professor Gleyne Bledsoe, of the University of Idaho, USA, the seminar introduced participants to WTO regulations that guide food safety as well as animal and plant health. Participants were instructed on the key provisions of the WTO that relate to agriculture and to the protection of fish, forests, wild flora and wild fauna. The discussion also focused on how countries develop their own sanitary and phyto-sanitary standards based on scientific recommendations and international best practice.

### **SUCCESSSES:**

- Following the seminar per the request of the local government, follow-up meetings were held by Dr. Bledsoe with the Head of the Plant Protection Service of the Ministry, and other ministry specialists to better understand local regulations and procedures related to sanitary and phyto-sanitary measures. The Project consultant was requested to develop recommendations for the Ministry of Agriculture in relation to WTO SPS standards and requirements.

### Publications

AgTech has produced and disseminated a number of leaflets, booklets and brochures for horticulture farmers and participants of project-held training seminars throughout the duration of the project. The printed and distributed materials include leaflets on soil testing and drip irrigation systems, booklets on greenhouse construction and pest and disease control in greenhouse vegetables. As a result of an increased demand from horticulture producers for a smaller sized pesticide and fertilizer booklet, AgTech has developed an instructional pocket field guide on pesticide and fertilizer use and application for farmers in Russian and Turkmen languages so farmers can carry it with them while they work. In the second quarter, the project has printed more than 100 copies of those pocket field guides and distributed among greenhouse producers via its horticulture partners. Feedback coming from the project partners suggests that the pesticide and fertilizer pocket field guide is enormously popular among horticulture producers. Greenhouse producers and farmers appreciate its simple, yet very informative instructions and illustrations on proportions of pesticides to be used against certain common diseases as well as types of chemicals. AgTech is planning to print another few hundred copies of the pesticides and fertilizers pocket guide and distribute among growers in the regions in the next few months.



## MFA Approved Activities

This reporting period AgTech has also witnessed the approval of its four activities from the quarterly activity plan for January/February/March 2014 period submitted to MFA in November 2013. This is the second time that AgTech received a positive response and approval for its activities from the MFA, suggesting that project conducted activities in livestock and horticulture development are in line with the GoT priorities for the agriculture development in the country. The MFA approval also proposed AgTech to work with the Agriculture University in Ashgabat on the first two approved activities, international consultancies in livestock development and water saving irrigation technologies in horticulture. However, due to limited time for the preparation and a lack of clear communication between the local counterparts, AgTech and the MFA have agreed to postpone these activities for the next quarter. The remaining two approved activities have been successfully delivered by the project at the end of March 2014.

## **SUMMARY OF STAFFING MATTERS**

In the second quarter, AgTech hired an additional local specialist to support project staff with various technical matters and close out procedures. The Project has initially planned to hire an Administrative Assistant. However, given the increased level of activities and international consultancies as well as for the constant need of English language support, the Project has revised duties, responsibilities and thus the position title to Project Technical Support Specialist. Mr. Atajan Nazhmetdinov was hired for this position at the beginning of February 2014.

## **PMP TARGETS AND DEVIATIONS:**

| Performance Indicator  | Performance Indicator Definition  | Year 4 Proposed  | Year 4 Actual (Quarter 2) | Year 4 Total (Q1+Q2)              |
|--|---|------------------|---------------------------|-----------------------------------|
| 50% increase in HH income  | <i>Horticulture HHs and farms increasing income by 50%</i>  | 500              | 183                       | 236                               |
|  | <i>Livestock HHs and farms increasing their income by 50%</i>   | 500              | N/A*                      | N/A*                              |
| Person hours of training completed in private sector productive capacity supported by USG assistance | <i>Number of hours of training completed by beneficiaries and training participants, disaggregated by gender</i>  | 1600             | 900                       | 1337                              |
| Farmers, processors and others who have adopted new technologies or management practices             | <i>Number of beneficiaries and training participants using new technologies or practices as introduced by the project, disaggregated by gender and region</i> | 250              | 222                       | 519                               |
| Quantity of produce grown and/or sold  | <i>Farmers, buyers or labs are using AI, improved feed, vet services, greenhouses, drip irrigation, grading, post-harvest packaging practices training</i>    | Baseline + 300 % | Baseline+106%             | Cumulative will be provided in Q4 |
| Value of produce sold to local and international markets   | <i>USD value of goods in livestock and horticulture sector disaggregated by product and veleyat</i>   | Baseline + 50%   | Baseline+131%             | Cumulative will be provided in Q4 |
| Number of agriculture-related firms benefiting directly from USG supported interventions.            | <i>Number of input providers and buyers strengthened to provide farmers with necessary inputs.</i>  | 300              | 3                         | 3                                 |
| Number of greenhouses constructed or improved  | <i>Number greenhouses constructed and/or renovated in each veleyat</i>  | 50               | 16                        | 35                                |
| Land under improved technologies or management practices   | <i>Indicates the number of ha under greenhouse or livestock project activities (existing and new land).</i>   | 200              | .5                        | 1.5                               |

\*Quarter 2 of Year 4 is the first period in which data became available for milk production from 9 AgTech-introduced heifers (Table 1). However, due to the remote and sparse location of many livestock households, documenting all newborn calves remains one of the main challenges. Another major challenge is poor record keeping, if any, by farmers. Farmers rarely record increases in milk yields and income as a result of increased use of AI services and improved breeds.

**Table 1: Milk Yields for Y4 Q2 Heifers Inseminated with Project AI Technology**

| No                        | Insemination date | Breed | Mother       | D.o.B      | 1 <sup>st</sup> insemination | Milk yield per day | Farm avg. before |
|---------------------------|-------------------|-------|--------------|------------|------------------------------|--------------------|------------------|
| 1                         | 25.04.2011        | BS    | Local cow    | 27.01.2012 | Local bull                   | 12 L               | 7L               |
| 2                         | 10.05.2011        | HO    | Monbelliarde | 09.02.2012 | AI by Katya                  | 20 L               | 8-10L            |
| 3                         | 19.05.2011        | BS    | Local cow    | 24.03.2012 | Local bull                   | 12 L               | 8 L              |
| 4                         | 13.06.2011        | HO    | Local cow    | 02.04.2012 | Local bull                   | 15 L               | 7-8 L            |
| 5                         | 14.06.2011        | HO    | Local cow    | 28.02.2012 | Local bull                   | 15 L               | 8 L              |
| 6                         | 19.06.2011        | BS    | Monbelliarde | 23.03.2012 | AI by Katya                  | 18 L               | 8 L              |
| 7                         | 22.07.2011        | HO    | Local cow    | 23.04.2012 | AI by Katya                  | 10 L               | 7 L              |
| 8                         | 10.08.2011        | HO    | Local cow    | 17.05.2012 | Local bull                   | 13 L               | 7 L              |
| 9                         | Apr/2011          | HO    | Monbelliarde | Jan/2012   | AI by Katya                  | 22 L               | 9 L              |
| <b>Average milk yield</b> |                   |       |              |            |                              | <b>15.2 L</b>      | <b>8 L</b>       |

**Table 2: Number of Greenhouses Constructed and/or Renovated in Q2 Year 4 (disaggregated by velayat)**

| Velayat      | Q2        | Q1+Q2     |
|--------------|-----------|-----------|
| Ahal         | 1         | 6         |
| Mary         | 10        | 18        |
| Lebap        | 4         | 9         |
| Dashoguz     | 0         | 0         |
| Balkan       | 1         | 2         |
| <b>Total</b> | <b>16</b> | <b>35</b> |

**Table 3: Cumulative Number of Training Hours completed by beneficiaries and training participants Year 4 (disaggregated by gender and region)**

| Region           | Male       | Female     | Total for Y4 |
|------------------|------------|------------|--------------|
| Ahal             | 506        | 225        | 731          |
| Mary             | 116        | 130        | 246          |
| Lebap            | 136        | 143        | 279          |
| Dashoguz         | 39         | 6          | 45           |
| Balkan           | 28         | 8          | 36           |
| <b>Sub-total</b> | <b>825</b> | <b>512</b> | <b>1337</b>  |

**Table 4: Number of Training Hours completed by beneficiaries and training participants Q2 Year 4 (disaggregated by gender and region)**

| Velayat      | Male p/h   | Female p/h | Total      |
|--------------|------------|------------|------------|
| Ahal         | 408        | 202        | 610        |
| Mary         | 51         | 44         | 95         |
| Lebap        | 81         | 63         | 144        |
| Dashoguz     | 24         | 0          | 24         |
| Balkan       | 22         | 5          | 27         |
| <b>Total</b> | <b>586</b> | <b>314</b> | <b>900</b> |

**Table 5: Agriculture-related firms benefiting directly from USG supported interventions**

| Name   |
|--|
| 1 Turkmenmallary (Turkmen Livestock Association) |
| 2 Sahabatly (Private Livestock Farm)             |
| 3 Sha Yoly (State livestock farm)                |

## CHEVRON FUNDED ACTIVITIES

### LIQUID NITROGEN GENERATOR

The Chevron funded liquid nitrogen generator (LNG) - procured from a US-based manufacturer Kelvin International Corporation in Year Two by AgTech - has been supplying project AI activities and beneficiaries through Quarter Two of Year Four. The LN activities have continued through Q2. To date, the project AI centers and project participants have received around 50 L of LN per month. Targets and results remain the same as the previous quarter. The project looks forward to collaborating on new co-funded initiatives through the end of the year and into the final year of the project.

**Table 6: LN Distribution Q1 and Q2 of Year 4 (Liters)**

|                            | <b>Oct 13</b> | <b>Nov 13</b> | <b>Dec 13</b> | <b>Jan 14</b> | <b>Feb 14</b> | <b>Mar 14</b> | <b>Totals</b>     |
|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| Mary AI Centre             | 50            | 50            | 50            | 50            | 50            |               | <b>250</b>        |
| Lebap- Gurban              |               | 11            |               | 11            |               |               | <b>22</b>         |
| Dashoguz AI Centre         | 50            | 50            |               | 61            | 50            | 61            | <b>272</b>        |
| Yekaterina Chikhnyaeva     | 34            | 35            | 35            |               |               | 30            | <b>134</b>        |
| Sahabatly Livestock Farm   |               |               |               | 50            |               |               | <b>50</b>         |
| Sha yoly Livestock Farm    |               | 35            |               |               |               |               | <b>35</b>         |
| Altyn Halka Livestock Farm |               | 10            |               |               |               |               | <b>10</b>         |
| Turkmenmallery             |               |               | 10            |               |               |               | <b>10</b>         |
| AgTech Office Distribution | 20            | 20            | 20            | 20            | 20            | 20            | <b>120</b>        |
| <b>Total</b>               | <b>154</b>    | <b>211</b>    | <b>115</b>    | <b>192</b>    | <b>120</b>    | <b>111</b>    | <b>903 Liters</b> |