



Գերմանական
համագործակցություն
DEUTSCHE ZUSAMMENARBEIT

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giz Deutsche Gesellschaft
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Greenovation Challenge Armenia



**Climate Uturn;
Green Age NGO;
Birdlink NGO**

Climate Uturn Program for Future Leaders



Executive summary

The 1st interim narrative report will present all the preliminary work done by Climate Uturn before the launch of the Program for Future leaders.

The program covers 3 regions of Armenia: Tavush, Syunik and Armavir. Final beneficiaries &/or target groups will be 70 high school students, 7 schools and communities of those regions.

The second part of the report illustrated what have been done for the improvement of the program, media coverage and its promotion.

Activities and results

The program for future leaders by Climate Uturn (hereinafter the program) is an educational program that aims to change the environment with the help of initiative teenagers and their sustainable projects for their schools and/or communities.

For that a series of lectures was developed to render high-school students ecologically literate which will afterwards support them for their sustainable projects.

Thus, the program consists of 2 parts:

- The series of lectures, which is more theoretical but also contains critical thinking and project work skill development activities and discussions.
- The project work, during which students elaborate on their ideas with the trainer and implement their sustainable projects with the assistance of the trainers.

Hence, the objective of the program is to give students appropriate knowledge and tools and assist them during the implementation of their sustainable projects to create a positive impact on the environment.

Before the launch of the program, main actions have been taken on the following topics:

- Agreement with high school administrations
- Student engagement
- Trainer recruitment and training
- Content finalization
- Social media coverage

1. Schools



1.1 Agreements with the administration

Contacts of all the high schools of Armenia (except Yerevan) were found through research and were contacted firstly by a phone call with the headmaster or a representative. The short description of the program was presented to them after what a more detailed call was arranged with those, who expressed their interest in the program.

A special pitch was prepared alongside with a presentation to introduce the program details and the outcomes. After a two-week work, an agreement with the administration of 7 schools was reached and all the details were fixed in an email.

The full list of schools is provided in the Annex 1, [Table 1](#).

1.2 Student engagement

After reaching a consensus with all 7 high schools, an announcement for students was created and sent to the administration of each school to be forwarded to all the students of 10th-12th grades (mostly from the natural science stream).

For two weeks school administration representative shared the announcement with all 10-12 grade students, collected all the necessary information of those who expressed their will to participate (e.g. name, age, phone number and email) and shared the list with the program manager.

By 20.09.2021 the number of registered students is 54.

2. Trainers



2.1 Trainer recruitment

For this project Armenian trainers were needed for each school.

In order to give this process a start, a [vacancy](#) and a [post](#) were created in Climate Uturn Facebook account and promoted. Furthermore, the vacancy was shared in appropriate university groups. Moreover, the best universities of the country were contacted and given the vacancy announcement to share with the students via email. Apart from that, different influencers of the sector were contacted as well and asked to share the announcement in their social media accounts. Up to 15 influencers were engaged. People working in the environment domain, related to the ecology or people, who are involved in PR and communications were selected for that.

The list of influencers engaged in the trainer vacancy announcement sharing process is provided in Annex 2.1, [Table 2](#).

More than 70 CVs and video resumes were received during that period.

Trainer selection process was divided into 3 main phases:

- CV review and shortlisting

- Test lesson with a student
- Feedback assessment

Certain criteria were determined to facilitate the shortlisting procedure like efficiency in Armenian, experience in working with teenagers, knowledge of basic ecological concepts (for CVs) and speech coherence, literate speech, enthusiasm, energy etc. (for video resumes).

Each CV and video resume was thoroughly reviewed, corresponding candidates were contacted for an interview. The objectives were to better understand the background of each candidate, to see if they have experience in teaching especially teenagers as well as to assess their knowledge in ecology and science.

Thereafter, candidates with a solid background and appropriate experience were offered to conduct a test lesson. The assessment of that lesson was done by the manager of the program and a student, who already passed the program before and who is aware of the requirements for the position of a trainer in the program.

The candidates carried out the test lesson as if it was real with a class of students. The student was freely interacting with each candidate, was asking challenging questions to ensure their expertise and the ability to cope with fortuitous questions of students.

Each test lesson was repeatedly reviewed by the assessment team and feedback was given on the knowledge, engagement skills, relationships with the audience, material delivery, resources and environment of the lesson and the trainer. Based on the feedback and final discussions with other team members best 6 trainers were selected (among them University of Cambridge and UCL alumnae) to carry out the program in 6 schools in Armenian and 1 trainer from the team joined them for Russian lessons for the last school.

The short professional profiles of selected candidates are provided in [Annex 2.2](#).

Before the launch of the program group chats were created for each group and the trainer to maintain a constant communication platform between the trainer and the students alongside for the announcements concerning sessions. Additionally, kids and trainers share useful links, additional materials, visual content, and ideas through those communication platforms.

Furthermore, an onboarding meeting was organized with all the students, trainers, and other members of Climate Uturn team with a view to introduce everyone and break the ice. During the meeting the program and the team were presented to the participants (students) as well as the participants presented themselves.

By 27.10.2021 two modules (4 sessions each) were discussed with 6 Armenian and 1 Russian group alongside with the potential project ideas. At this point 59 students are taking part to the program. The number of participants has changed from the initial announced 54 due to the interest of other students from the schools and their initiative to ask for the permission to join. The additional statistics can be found in the second subchapter below.

2.2 Onboarding

After being recruited, trainers were invited to a series of online meetings with Climate Uturn team members to discuss administrative and communication questions with the team as well as to discuss each module of the program.

2.3 Training

Before the launch of the program, trainers will pass an offline training (21.09.2021) *“Introduction*

to *Project Based Learning Paradigms and Methodology*” with Dagen Valentine, the American Councils Country Director.

The short professional profile of Dagen Valentine is provided in [Annex 2.3](#).

The objectives of this eight-hour training are to state the difference between student and teacher centered pedagogy, to utilize strategies of instruction within PBL framework and methodology, to use strategies for effective and timely feedback in live sessions on zoom (synchronous) and in project documents in the cloud and chat (asynchronous) and to reflect on their personal style and identify behaviors they need to focus on when implementing program.

The topics of the training include:

- Student centered approaches
- Brain Break activities
- Basics of PBL
- The art of the question
- Project work
- Strategies to support student work in PBL
- Establishing rapport in online engagements
- Participants practice skills with others on their projects

After the training a finalizing meeting will be held to make sure everything is ready for the launch of the program.

3. Content finalization

Before the launch of the program the content is being carefully reviewed and updated. The facts and science-related definitions are being double-checked with the specialists of the sphere (with doctors, scientists, case representatives, psychologists etc.).

4. Social media coverage

From the very beginning everything about the program, schools and teenagers will be published in social media to enlarge the awareness of people about the program, participants and its outcomes.

Therefore, an SMM manager in Armenia was needed. [Vacancy](#) and a [post](#) were created in Climate Uturn Facebook account and promoted. Furthermore, the vacancy was shared in appropriate university groups and other related groups.

Each CV was carefully reviewed, corresponding candidates were given a task to complete, an SMM manager was hired.

From the launch of the program the SMM manager will visit schools, create visual content with students (videos and photos about their projects) which will thereafter be published in social media.

Annexes

Annex 1

Table 1: Participating schools

| Institution | City | Region |
|--|--------------|---------------|
| Dilijan high school | Dilijan | Tavush |
| Berd No 1 high school | Berd | Tavush |
| Noyemberyan high school | Noyemberyan | Tavush |
| Goris No 1 high school after A. Bakunts | Goris | Syunik |
| Kapan No 2 high school | Kapan | Syunik |
| Sisian high school | Sisian | Syunik |
| Vagharshapat No 5 high school after M. Gorki | Vagharshapat | Armavir |

Annex 2.1

Table 2: The list of influencers engaged in the trainer vacancy announcement sharing process.

| No | Name and Surname | Company/project |
|-----------|-------------------------|---|
| 1 | Tigran Sukiasyan | Senior Adviser, Climate Finance & Institutions |
| 2 | Haik Kazaryan | Smart Apaga |
| 3 | Hayarpi Sahakyan | Licensee, Curator and Lead Organizer at Fuckup Nights Armenia |
| 4 | Mariam Movsisyan | Former PR manager at IDEA Foundation |
| 5 | Hermine Hakobyan | Deutsche Gesellschaft für Internationale Zusammenarbeit |
| 6 | Mhitar Avetisyan | President, Co- founder ISSD |
| 7 | Vasiliy Bardadymov | UWC |
| 8 | Marianna Vardanyan | Organiser at PechaKucha Yerevan |
| 9 | Emma Petrosyan | Project Coordinator at Organic Armenia |
| 10 | Irina Balasyan | GIZ |
| 11 | Katerina Danekina | Former Head of Event & Guest Management at WCIT 2019 Yerevan |
| 12 | Harutyun Alpetyan | Waste Management Expert, Adjunct Lecturer at AUA |
| 13 | Lilit Midoyan | Project Coordinator at UNDP in Armenia |
| 14 | Siran Yeghikyan | Founder, "Qareren" |
| 15 | Aloyan Masha | Aurora volunteer coordinator |

Annex 2.2

The short professional profiles of selected candidates

1) **Trainer:** *Dyshlyuk Maria*

Group language: Russian

Professional background: Currently studying in Israel, MACA program from Israel experience. In the framework of the program studies educational initiatives, writes reviews on Israel-based cell-meat production companies

Bachelors' degree in Philosophy, Department of Cultural Studies, National Research University Higher School of Economics, Moscow. Collège universitaire français de Saint-Pétersbourg, History and literature department.

Organized educational events and programs at Hermitage Museum for 3+ years, lead History of cinema classes for students, lectures about contemporary art, tours on contemporary art.

Eco-activist, organized waste management systems in offices, shares her experience in sustainable lifestyle.

2) **Trainer:** *Simonian Emilia*

Group language: Armenian

Professional background: Fourth year veterinary medicine student at the University of Cambridge. AYB school alumna. Has a degree in Neuroscience, University of Cambridge.

Accomplished projects like Food Forest in a Box Project; Neuroscience Research Project on Computational Approaches to Visual Discrimination Learning, University of Cambridge; MIT Global Teaching Labs Programs in Cell biology and Genetics and Epigenetics (2016).

Has awards in Cell Biology (MIT) and in Genetics and Epigenetics (MIT). National Olympiads awardee.

Practices permaculture and is especially interested in designing, planting, and maintaining food forests.

3) **Trainer:** *Nalbandyan Mariam*

Group language: Armenian

Professional background: Bachelor's degree in Management, University Jean Moulin Lyon III, Bachelor's degree of Economics by profession trade/commerce, French University in Armenia.

Currently working as a Marketing manager in food industry.

Has teenager mentoring experience for 4+ years at Manana youth center (leading journalism trainings for teenagers from every region of Armenia, guiding them through the article writing process, teaching them storytelling principles, and proofreading their articles).

4) Trainer: *Hakobyan Hasmik*

Group language: Armenian

Professional background: Bachelor's degree in Chemistry, University College London, London. AYB school alumna.

Worked on the Development/Testing of PGT Resources for Chemical Skills (UCL), was a transition mentor (UCL), math tutor for an online program, science lab club member.

National Olympiads awardee.

5) Trainer: *Adamyán Aram*

Group language: Armenian

Professional background: Second year student in American University of Armenia, bachelor's in data science. AYB alumnus.

Aram is data scientist and currently works at SoloLearn. Previously was laboratory chemist at "Arides" LLC..

During his high school studies implemented diverse sustainable projects.

6) Trainer: *Sargsyan Anna*

Group language: Armenian

Professional background: Advanced Master of Arts in European Interdisciplinary Studies College of Europe/ Collège d'Europe, Warsaw (Poland) - field of Study: Europe and its Neighbors, Environmental and Climate Change Policy in an International Context, EU Institutions and Decision-making Processes, Interest Representation in the EU.

Master of Political Science Public Administration Academy of RA, Yerevan (Armenia). Bachelor's Degree in Linguistics in the Field of Translation Brusov State University.

Anna is the Economic development projects assistant at the Fund for Armenian Relief. She has also accomplished a European Solidarity Corps (ESC) Project on Climate Awareness-raising and Local Sustainable Development Solidarités Jeunesses (SJ) (Paris, France). Has experience in awareness raising, PR and communications.

She also tries to maintain a sustainable lifestyle and share her experience with others.

7) Trainer: *Bilbulyan Hayk*

Group language: Armenian

Professional background: Bachelor's degree of Economics by profession trade/commerce, French University in Armenia.

Hayk is an eco-activist. One of his biggest projects was a hiking project around lake Sevan to detect its environmental problems.

He was also forest ranger in Dilijan forests, hiking club founder and promoter for domestic tourism in Armenia. Has experience in working with teenagers and informal education. Organizes cleanups in his city Metsamor.

Annex 2.3

The short professional profile of Dagen Valentine

Dagen Valentine serves as Country Director for [American Councils for International Education](#) in Armenia. In this role, he supports and implements programs to support cultural exchange programs and Alumni programs in Armenia.

Dagen hails from the University of Nebraska-Lincoln (UNL), a land-grant university. At UNL Dagen led state and federally funded programs across Nebraska that increased collaboration between UNL and communities, increasing capacity & agency amongst rural community and youth. Dagen also has developed curriculum and programs in collaboration with other HEI's and private industry.

He is an experienced teacher in dual language programs, served as a TEFL Peace Corps Volunteer in Shnuhayr, Armenia. Mr. Valentine has published curriculum around Wearable Technologies; and journal articles regarding informal learning; makerspaces; and virtual reality. Dagen earned a BA in Elementary Education from Mount Mary College in Yankton, SD, US and an MAS in Youth Development from University of Nebraska-Lincoln, US and speaks Armenian.

Executive summary

The 2nd Interim narrative report is to reflect the ongoing operations and the interim results of the Program for Future Leaders by 27.10.2021. The report includes data and activities, trainer and participant assessment, improvement processes as well as media coverage for the 04.10.2021 – 27.10.2021 period.

The first part of the report demonstrates the lecture-related operations, some statistics including the subsequent assessment and feedback.

The second part of the report illustrated what have been done for the improvement of the program, media coverage and its promotion.

Part 1

5. Program sessions and participation

5.1 Program sessions

The launch of the program occurred on the 04.10.2021 as planned with 7 schools in 3 regions of Armenia which are Tavush, Syunik and Armavir. All the 7 schools that admitted their participation to the Program remain involved in the program.

The full list of schools with the number of participants is provided Annexes, [Table 1](#).

1.5-hour sessions take place with each group 3 times a week.

Before the launch of the program group chats were created for each group and the trainer to maintain a constant communication platform between the trainer and the students alongside for the announcements concerning sessions. Additionally, kids and trainers share useful links, additional materials, visual content, and ideas through those communication platforms.

Furthermore, an onboarding meeting was organized with all the students, trainers, and other members of Climate Uturn team with a view to introduce everyone and break the ice. During the meeting the Program and the team were presented to the participants (students) as well as the participants presented themselves.

By 27.10.2021 two modules (4 sessions each) were discussed with 6 Armenian and 1 Russian group alongside with the potential project ideas. At this point 59 students are taking part to the program. The number of participants has changed from the initial announced 54 due to the interest of other students from the schools and their initiative to ask for the permission to join.

Throughout the duration of the program participants discover new environmental issues and solution opportunities for themselves which raises their awareness about the environment and ecology. Moreover, students share the knowledge they gained during the Program with their peers, classmates, and family members, share Climate Uturn the social media publications which also have an awareness-raising purpose.

In addition to that, school administrations collaborate with Climate Uturn in the framework of the Program to find ways of incorporating environmental aspects to the school curriculum.

Additional statistics can be found in the second subchapter below.

5.2 Program participation statistics

By 27.10.2021:

The number of students equals 59 in total. Among those 41 regularly attend the sessions including 26 leader participants.

Therefore, the attendance rate for the program as well as per group equals 69%. On top of that, 44% of participants are considered as the leaders of the group.

Each group consists of 8-9 students with an average 3 leader participants per group.

6. Assessment

6.1 Student assessment

A periodical assessment of the students is being done in order to evaluate the efficiency of the content and its delivery. Therefore, 3 types of assessments are elaborated: a pre-session, at-the-time, and post-session evaluations.

For all 3 periods a meticulously developed questionnaire on the module is being prepared and provided to each group before the beginning of the sessions (during the onboarding meeting), after each module (after 4 sessions) and in the end of the program. The aim of the questionnaires is to detect what topics were efficiently delivered to students and which ones require a more profound discussion with them.

The questionnaire includes questions related to ecological basics like CO₂ emissions, carbon footprint, plastic production, green energy etc., practical knowledge questions where they think of the implementation of sustainable solutions in our daily lives. Moreover, the questionnaire includes critical thinking and project work related questions to track the progress of the students from the very first lesson, when the majority did not have a project-work experience.

6.2 Trainer assessment

All the preparatory activities mentioned in the 1st interim narrative report were held before the launch of the program.

An eight-hour offline training was conducted for the trainers on 21.09.2021 to state the difference between student and teacher centered pedagogy, to utilize strategies of instruction within PBL framework and methodology, to use strategies for effective and timely feedback in live sessions on zoom (synchronous) and in project documents in the cloud and chat (asynchronous) and to reflect on their personal style and identify behaviors they need to focus on when implementing program. The training was held on the announced date and each of the trainers got personal feedback.

Moreover, a finalizing online meeting mentioned in the 1st report was organized and conducted by the Climate Uturn team. The objective was to finish the organizational part and have everything ready for the launch. All 7 trainers took part in the meeting alongside with Climate Uturn CEO and program manager.

The topics covered in the framework of the meeting were the following:

- Program duration and structure finalization
- Program modules, content and questions discussion
- Brainstorm on project ideas for each module
- Technical arrangements and testing

Apart from that, all the content (both text and visual) was reviewed, updated, and finalized.

Furthermore, before each session, each trainer goes through a specially elaborated preparation process which includes research done by the trainer to strengthen their knowledge; and a check-up questionnaire which is given to each trainer to guarantee their accurate comprehension of the content and to make them even more confident during the session. Those procedures are done before each session.

In addition to the pre-session preparatory work done with the trainers, a post-session assessment is being operated to ameliorate trainer's skills and to improve the subsequent lesson.

For the post-session evaluation, the recordings of last sessions are being reviewed by the quality control team and detailed feedback is given to each trainer. Those operations are being completed regularly to ensure an error-free and accurate content delivery.

In conjunction with the above-mentioned procedures, systematic discussions are being held with the trainers in the working chat and during meetings, feedback on the group and their ideas is being received.

Part 2

2.1 Program evaluation

In order to ameliorate the program (approach and content-wise) feedback will be received from students about the content, its delivery by the trainers, project work etc. This procedure is done regularly after each program to ensure the continuous amelioration of the Program.

2.2 Media coverage

As previously mentioned in the 1st interim narrative report, from the very beginning everything about the program, schools and teenagers is being published in social media to enlarge the awareness of people about the program, participants, and its outcomes.

Therefore, an SMM manager and a photographer in Armenia is recruited.

Starting from the launch of the program the photographer arranges visits to schools and meetings with program participants to create the required visual content with students (videos and photos) which is thereafter be published in Climate Uturn [social media](#) (in stories and [post](#) format).

There have already been 6 visits to Vagharshapat, Berd, Noyemberyan, Sisian, Kapan and Goris.

Apart from that, PR and communication negotiations are being carried out including meetings with journalists alongside with press release creation and provision to appropriate media representatives (there are not any publications yet, since we are in the negotiation phase with the media representatives).

Conclusions

The results of the program by 27.10.2021 are the following:

The program consists of 3 modules (Food industry, Fashion and Beauty industries, Cities) from which 8 topics of 2 modules (Food industry, Fashion and Beauty industries) have already been covered. Therefore, 8 sessions 1,5 hour each were conducted for each group (7 groups in total). Thus, overall, 56 sessions were conducted covering aforementioned 2 modules.

Considering the preparatory work done by Climate Uturn before the launch of the program and the results by 27.10.2021 with 69% attendance rate, we can clearly state that the content itself and its delivery is very efficient. Having professional trainers and an efficient preliminary activity ensured the successful launch and the course of the Program.

Written feedback will be collected from each group after the end of the program which is 15.11.2021. By the date of the report only positive feedback was received from the students expressing their interest and engagement in the program, topics and discussions with the trainer. Furthermore, the increasing number of other (non-registered) students, willing to participate to the program indicates the raising interest among teenagers to the environmental problems.

Moreover, continuous feedback collection and improvement increases the Program efficiency.

The project work in the framework of the Program and the planned media coverage operations results will be presented in the Final narrative report by the date.

Annexes

Table 1: Number of participants per school

| Institution | Number of participants | City | Region |
|--|-------------------------------|--------------|---------------|
| Dilijan high school | 8 | Dilijan | Tavush |
| Berd No 1 high school | 8 | Berd | Tavush |
| Noyemberyan high school | 10 | Noyemberyan | Tavush |
| Goris No 1 high school after A. Bakunts | 8 | Goris | Syunik |
| Kapan No 2 high school | 7 | Kapan | Syunik |
| Sisian high school | 6 | Sisian | Syunik |
| Vagharshapat No 5 high school after M. Gorki | 12 | Vagharshapat | Armavir |

Green Age NGO
Manure-Based Hydroponic Fodder Production
Final Report

Executive summary

Implementing Organization: Green Age NGO

Title: Manure-Based Hydroponic Fodder Production

Location: Agarak village, Kapan Community, Armenia

Status: The beneficiary is a motivated farmer in the bordering village of Agarak of Kapan Community.

- Purpose of the project
- Targets of the project, beneficiaries
- Solutions (sustainable food systems, green agricultural solutions, water saving technologies, etc)
- Results: points..

A system of 156 linear meters of production has been set up including a watering system. The growing tables are 3 rows each 2 columns each 3 levels (with a possibility to add 4th and 5th layers - no welding involved - everything is planned to be handy and universal for duplication).

Currently, the "pots" are on the way to the farm, we are waiting for simple delivery and to put in the seeds.

Introduction

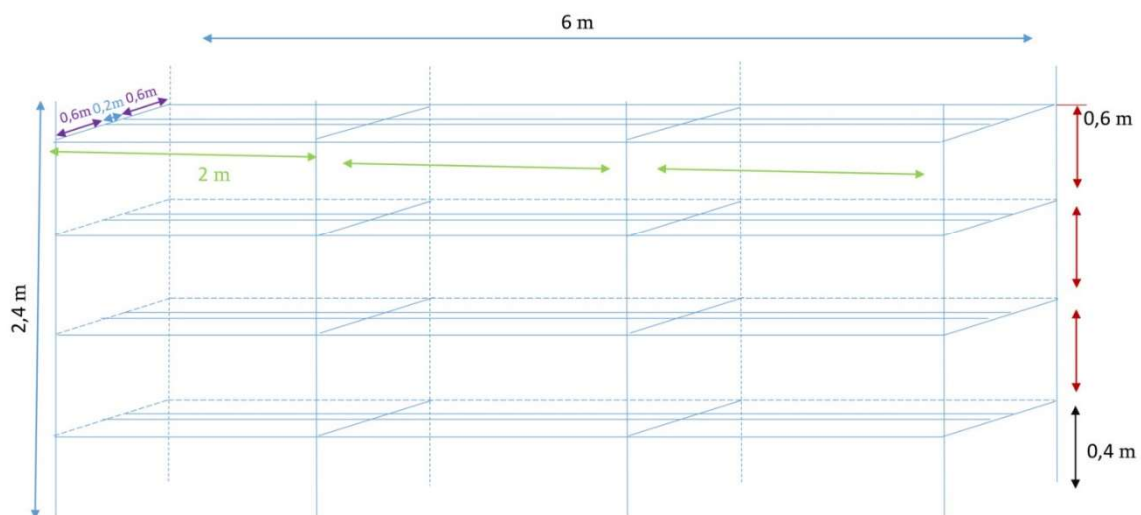
Green Age NGO has been one of the first finalists of the GIZ Greenovation project competition in Armenia conducted in 2021. Starting autumn 2021 Green Age NGO has started the implementation of innovative and sustainable fodder production pilot project in the village of Agarak of Kapan region.

The main idea of the project is to introduce a fast growing sustainable fodder production system for the village farmers which can be used for producing fodder on year-around basis, limiting the dependency of the farmer on seasonal yield.

The project has nested at the peasant greenhouse, previously constructed as a pure aquaponics unit. The greenhouse area is around 70 sqm, with allowance of vertical farming, primitive cooling and heating systems.

1. Chapter - Initial phase

The project planning started with calculation of productive area creation for the fodder using fundamental vertical farming techniques, particularly using grow-bed based vertical farming.



For the grow beds' base, specific fodder production plates have been installed, in the size of 40cmx60cmx5cm considering these, as one of the best solutions towards using galvanized steel – which would be food-unsafe alternative in the relative price range. Unlike common practices of growing fodder in closed environment with heavy support of auxiliary equipment such as UV lights, Ozone generators, filters etc., the project considers the use of natural sunlight for the growing, using natural resources as pest preventing mechanisms for the production. In the logic of aquaponics farming the water is cleaned out of hazardous biological matter in the water through cycling and non-stop aeration of the water utilizing natural cycle of bio-filtration, through creating populations nitrification bacteria on the biological surfaces available in the system.

The nitrification bacteria through absorbing and digestion of biological matter are cleaning the water at same time creating a vast collection of chelated nutrients to be later effectively used by plants growing watered by latter.

As a sum, through constant aeration of the water, using natural resources (sunlight, biological residues in the water etc) – the water is being converted to the nutrient solution for effective growth of the fodder. As shown in the figure above the frame for the grow beds have been constructed using steel (black steel), placed over water reservoir as shown below:



In total, the growing tables are 3 rows each on 2 columns, each consisting of 3 levels of growing beds - no welding involved in the construction of frame, this is done for the future mobility of systems, as to allow the possibility to add 4th and 5th layers.

As a result, 156 linear meters of growing area has been created in the greenhouse. For the initial test of growing the fodder different bases of seeds have been used, namely barley and wheat.

As have been previously researched by a number of international researches barley has shown faster growing stats in conjunction with creating more biomass. Since the greenhouse heating system is not an automated heating solution, growing speed has shown diversity with linear relevancy to the environmental temperature from 6 days (November) to 11 days (January) to a full cycle.



Chapter 2. Pitfalls/Bottlenecks



By the reports of the beneficiary the preliminary preparation of seeds plays a crucial role in prospective progress in the growing cycle of the fodder. Particularly, temperature, dryness and content of the solution of rinsing the seeds prior to start the growing cycle, significantly affect the percentage of germination (up to 40% difference) when implemented correctly. For this purposes a separate washing unit has been installed in the greenhouse for proper seed preparation.

Additionally, in case if the fodder is kept in growing more than it reaches the “yield age” additional risks arise for fungi development in the root systems.

As by plan, the watering of the grow beds has been implemented through heavy drip-mist system, the system showed high efficiency in germination stage of the process, however it is believed that root watering will be much more effective pest-preventive watering system at the later stages of the

cycle. Currently the works are being done with involvement of NGO and peasant financial resources to pilot the change of the watering systems.

Final Results

As a result, the piloted project has proven to be successful in using manure based solution supported by constant aeration, in preventing early development of fungi in the root system, and with proper preparation of seeds, without major auxiliary equipment use – full growing cycle is proven to be fungi free – limited to the correct time of yield.

Executive summary

- During the project implementation period, the model pasturelands with total area of 145 ha were selected in premises of the village Khachik in Vayots Dzor province of Armenia.
- In the selected areas the transects – routes for counting birds and butterflies have been selected.
- The species composition of Birds and Butterflies, which inhabit the selected area have been compiled.
- The guideline for data collection has been developed.
- Three counters have been trained in data collection.
- Then collection of the data on Birds and Butterflies on the selected transects was conducted and the collected data are stored in the database.
- Analysis of the data was performed and the states of the various pasturelands have been evaluated and compared.
- The training course on identification of indicator species of birds and butterflies and data collection was prepared.
- Two instructors have been trained in delivery of the course.
- 12 schoolchildren of Khachik village have been trained in indicator birds and butterflies' identification and data collection.
- Six rangers and administrative staff of the Arpa Protected Landscape have been trained in indicator birds and butterflies' identification and data collection.
- Negotiations with Yeghegnadzor college and Syunik NGO were conducted for delivery of the trainings in indicator birds and butterflies' identification and data collection.
- The manuscript on use of birds and butterflies as bioindicators of the state of the pasturelands is in progress.

Results achieved

Selection of the model pastureland

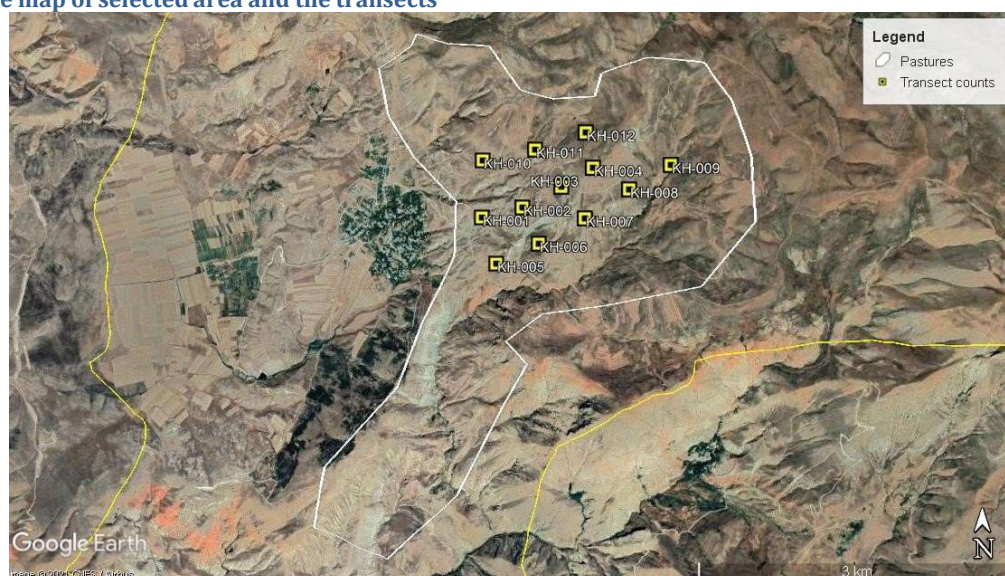
The model pasturelands were selected in premises of the village Khachik in Vayots Dzor province of Armenia. The area is characterized as following:

1. The type of the natural habitat can be considered as xerophytic meadows / mountain steppes.
2. The area is being grazed and used for hay-making for at least last 10 years.

The total area that is being monitored makes 145 ha, including 101 ha of pastures and 44 ha for hay making. Out of it, the areas, where the livestock grazes regularly and rarely are selected for sampling.

In the selected areas the transects – routes for counting birds and butterflies have been selected.

Figure 1: The map of selected area and the transects



Implementation of the monitoring of Birds and Butterflies

Within the selected areas, we have at first analyzed the database of BirdLinks on Birds and Butterflies and made an extract of the species, which are inhabiting the area. Then we have developed the guideline for data collection and have trained three potential counters (who already passed the Bird and Butterfly identification courses) in data collection. Then we have conducted the collection of the data on Birds and Butterflies on the selected transects.

The collected data are stored in the database.

Publication of the results

Analysis of the collected data demonstrated the following results:

1. The pastures, which are systematically grazed by cow only, have higher rate of species diversity in general and the higher number of the bioindicators, then the pastures, which are

systematically grazed by the sheep only, while the pastures grazed by the mixture of cow and sheep take the intermediate position between the abovementioned two.

2. The selected bioindicator species, demonstrate the pastures' general productivity as well as representativeness of Gramineae and Legume plants (except of thorny *Astracantha* and *Onobrychis* species).
3. The overgrazing is an issue which is affecting species diversity and can become a serious issue for Important Bird Areas and Prime Butterfly Areas of Armenia.

The obtained results:

1. Have been used in preparation of the article on Important Bird areas of Armenia. The reference is: Aghababayan K., Khanamirian G., Khachatryan A., Grigoryan V., Tamazyan T., Baloyan S. 2022. Revision of Important Bird and Biodiversity Areas of Armenia. *International Journal of Zoology and Animal Biology*. 5(1): 1-27. DOI: 10.23880/izab-16000348
2. Are being formalized now in the form of the article with the tentative name "Birds and butterflies as bioindicators of sustainable pasture management".

Figure 2: Black-headed Bunting – the indicator bird species



Figure 3: Ortolan Bunting – the indicator bird species



Figure 4: Southern Clouded Yellow Butterfly (*Colias alfacariensis*) – the indicator butterfly species



Figure 5: Large Blue Butterfly (*Polyommatus bellargus*) – the indicator butterfly species



Figure 5: Data collection



Preparation and implementation of trainings

During reporting period, the training course on identification of indicator species of birds and butterflies, and the data collection was developed.

The course consists of three sections:

First section is dedicated to identification of indicator bird species. The trainees firstly learn identification features of seven different species of birds and then try to identify the species via photos, within a restricted timeframe (10 sec per species). At first the trainees were feeling difficulties with identification but with repeating of the training exercises their ability was improved up to 90% of accuracy.

Second section was dedicated to the identification of the indicator butterfly species, and was constructed in the same way. Among the trainees there is an obvious difference in learning abilities, and some of them were learning the identification skills very fast. In the meantime, the others have been learning the identification with a regular (compared to all the previous trainings implemented by BirdLinks) speed.

Third part of the training was dedicated to development of the counting skills and organization of the monitoring process throughout the year.

Originally, the training course was aimed for implementation for the farmers. However, the focus group implemented in Khachik village demonstrated that it would be more rational to work with the schoolchildren and develop the next generation of the monitoring volunteers. Taking that into account, we decided to expand the range of trainees and to include also staff of the Arpa Protected Landscape intercommunity organization. Thus, we have implemented the training for

12 schoolchildren of the school of Khachik village and 7 staff members of Arpa Protected Landscape. Once the training was implemented, it appears that the potential counters need also training in the field. Thus, we have negotiated implementation of the supervised data collection actions in May (after finalizing of the current project).

After implementation of the training, it emerged, that such activity is also demanded by the Syunik NGO and by Yeghegnadzor college. Seeing that demand, we also negotiated implementation of the trainings with those organizations, after completing the current project.

Figure 6: Training with the staff of Arpa Protected Landscape





ENVIRONMENT, CLIMATE, OPPORTUNITIES
for people and nature

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for sustainable rural development in the South Caucasus (ECOserve)**

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