Building Greenhouses at 4000m+ Altitude: Promoting Ecological Peace Through Education And Eco-friendly Economic Practices at Dho Tarap Valley, Nepal

Asmod Khakurel, Kenyon College (4 June - 6 August 2021)

Background:

After walking for three days from the headquarter, Dunai, one reaches Dho Tarap valley(4080 m), one of the highest human settlements in the world. Surrounded by snow-capped mountains and decorated by ancient Buddhist culture, the valley has a tremendous possibility for the tourism industry. However, the extreme geographical and climatic conditions here make the life of people challenging to an extent that they have to struggle for basic needs such as food, water, and education. The major economic activity other than tourism is collecting *yarsagumba*[1] which because of the poor market conditions and uncertain production is not always a reliable source of income. Recently, operations of local homestays have added new dynamics to tourism and soon will become a promising income source. One of the problems people who run these homestays face is the food. Because of the extreme climate, it is very hard to grow vegetables and crops on normal land. Similar is the problem with education and nutrition among the children. The relentless effort of Vision Dolpo[2] supported by Action Dolpo, a French NGO, has done some significant work there and many are on their way. One of their outstanding work was the establishment of Crystal Mountain School, which despite the short academic year (~ seven months) is providing excellent education up to grade seven. After grade seven, the students head to the nation's capital for further studies. The school is mostly run by volunteers as the teachers do not tend to stay there for a long time. One of the demotivating factors for teachers is the lack of proper food. Therefore, with this project, we will build three greenhouses in CMS which will largely increase the amount and variety of food produced ultimately supporting the education at CMS and homestays in Dho Tarap. Similarly, we will conduct an eco-consciousness workshop at CMS to educate students about their role in understanding and preserving the environment around them to mitigate the alarming consequences of climate change (which is affecting the mountain belt of the nation) and promote eco-tourism in Dolpo.

Greenhouse

The picture shows a greenhouse that was built in Ladakh (India) a topography similar to that of Dho Tarap. The success of this model in Ladakh India motivated us to apply it in Dho Tarap. The dimensions, structure, and materials of the greenhouse can be modified according to the need. We will raise short brick walls on the two sides of the structure to support the greenhouse. The two walls also help to resist the wind that can otherwise blow the greenhouse away. Glass Fibers will be used for the roof of the greenhouse. It covers the entire house and plays a crucial role in preserving the heat necessary for the cultivation of vegetables. Our technical advisers, Tom and Yogi will guide us on technical aspects of greenhouse construction.

The successful construction of greenhouses will be a game-changing move towards ensuring food security and improving access to nutritious foods at CMS. CMS will sell its surplus vegetables to the homestays so that they can offer better dining facilities to the tourists. This way both CMS and homestays will gain economic benefits.

Eco-consciousness workshops and programs:

When we advocate for infrastructural development, it is very important to talk about the environment and ecology. Keeping the present climate crisis in mind, we have designed a comprehensive program that is aimed to educate the children at CMS and people in Dho Tarap about the effects of climate change in the mountain region. This program will help them cultivate an understanding of their role from a multidimensional perspective in mitigating the problem and inspire them to become the ambassador for eco-tourism and ecological peace. Laxman (workshop

[1] colloquially known as caterpillar fungus.

[2] A local organization, https://visiondolpo.org/about-us/

coordinator) will help us design and deliver these programs as he has previously been involved with designing an eco-curriculum for children of 10 to 15 years of age in Nepal. We will conduct a series of workshops for 50 students within the natural settings of the valley. We also plan (depending on the weather conditions) to take some selected students on an immersion trip to Shey Phoksundo National Park and Shey Phoksundo lake. In this weeklong trip, we will do camping, study the medicinal plants in the region, and observe the ecosystem of the surrounding. During the tour, we will divide the students into small groups who will research specific topics, and finally present their observations and findings to the community members.

Timeline of our actions:

The project will start from the first week of June and will last for 9 weeks. The necessary building materials will be transported to Dunai with the help of Mr. Phurwa and Mr. Gyalpo. It will be done in mutual coordination with Action Dolpo and the local community in Dho Tarap.

Week 1: Transportation of materials from Dunai to Dho-Tarap on mules, site visit, introductory interaction with local people, Action Dolpo, and students at CMS as well as the briefing of the project goals.

Weeks 2, 3, 4: Eco workshops and programs. It includes a trek to Shey-Phoksundo National Park and Shey-Phoksundo Lake*. Study of foods consumed in CMS to prepare for the Greenhouse building project.

Weeks 5, 6, 7: Building Greenhouses with the active engagement of school children and locals, plant seeds

Week 8: A session to educate students and locals about the science and utility of greenhouses, discussion session with Action Dolpo to ensure the sustainability and regular maintenance of the greenhouses, School and Community survey to assess the project and understand the possible projects that can be launched in the future.

Week 9: handing the greenhouses to CMS, return to Kathmandu, prepare the final report of the project

People to be involved(Qualifications):

Asmod Khakurel is an international student at Kenyon College who has previously worked to build Greenhouses in rural Nepal. Intended to double major in Economics and Mathematics, he aspires to uplift the living standards of rural communities by promoting microcredits for homestay tourism. He grew up in rural Nepal and is familiar with the practices of agriculture at the grassroots level.

Laxman Bist is a King Scholar at Dartmouth College dedicated to his efforts to alleviate poverty and establish peace on the planet**.** He will design the eco workshops and programs.

Technical advisers: Tom Wagner and Yogi Kayastha (http://tomwagnergreen.com/), have over 20 years of experience in building Greenhouses in upper mountain regions.

Connection with a local organization: Gyalpo Thapa Bhote (Coordinator at Vision Dolpo)

Mentors: Pawan Dhakal(Curriculum designer at CMS, has worked in Dho Tarap in the past), Bikash Deshar (Academic Director at CMS, currently working there).

Sustainability

After the end of our project, we will hand over the greenhouses to CMS which will be responsible for their management and maintenance. The students and staff at CMS will grow vegetables there. The grown vegetables will mainly feed the students who live there. And by selling the surplus vegetables to homestays in Dho Tarap, CMS will earn money to manage the greenhouses and other resources of the school. Hence, we envision that our greenhouses will ensure food security, support homestays, and generate income throughout the year. Similarly, after we finish our eco-consciousness workshop, we will have a discussion with Mr. Bikash, Mr. Pawan, and the CMS administration to see if we can include the theme of our eco-consciousness program into the school's curriculum and make it a part of mainstream academics. This will educate the children about climate change and their role to promote eco-tourism. Through this project, we hope to deliver long term self-sustainable resources to CMS. CMS will provide regular updates on our work. If our work becomes successful, we envision taking this initiative to a larger scale empowering many other schools of the mountain belt with similar problems.

*We are flexible with the timeline because the trekking to Shey-Phoksundo Lake will depend on the favorability of weather conditions, and we will adjust other activities accordingly.