



Funded

HIAL Desert Greening Initiative

Progress Report

Jan – Mar 2021 (9th Project Quarter)



HIMALAYAN INSTITUTE OF ALTERNATIVES, LADAKH

An Alternative Institute for Mountain Development

Pioneering



02 April 2021

HIAL Campus, Phyang, Ladakh UT
SECMOL Office, PO Box 4, Leh, Ladakh UT

Executive Summary

This quarter we were able to bridge the manpower gap that HIAL was struggling with in the past 6 months. Majority of the work done this quarter was towards preparing for the spring plantation. We celebrated the world plantation day with planting 130 sapling of 4 drought-tolerant species each (*Kikar, Sarsingh, Sea-buck and Syah*) – a total of 520 saplings. However, the lack of rainfall in the last summer and almost no snow in the low-lying areas this winter has created a drought like situation for the entire Ladakh and HIAL too felt its brunt. Yet, at HIAL we have sourced close to 35000 saplings for this spring plantation and are in the process of acquiring another 32000 for plantation this autumn. We are envisaging several water solution options including repairing the bore-well that broke down 3 weeks ago, salvaging the 2nd borewell that we began digging 5 months ago, and identifying a place for the third borewell where water is expected to be found at 300 ft compared to the existing ones where the water table was found at 500 ft. Simultaneously, we are planning for three 40,000 litres reservoirs - 2 of them made from recycled containers that can be lifted and moved as per requirement and one on the ground.

The table below summarises the plantation done so far and the plan for the upcoming quarters.

	2018-2019	2019-2020	2020-2021	Total Planted till Date	Survival count	Upcoming Apr- Jun 2021	Upcoming Jul-Dec 2021	Upcoming Jan – April 2022
Apple Orchard	264			264	180			
Miyawaki Plantation		2,400		2400	761			
Apple-Apricot Orchard		35	9	44	44			
Bio-Fence Plantation		4,700		4700	200			
Bio-Fence Extension			500	500	500			
Kargil Plantation			10,000	10,000	10,000*			4,000
Nubra			1,500	1,500	1,500*			1,000
Apple Orchard Extension						792		1,056
Wind break Forest plantation						25,000		15,000
Saplings from Nursery Scheme						10,500		
Along Bio-Fence							33,000	25,000
Yearly Total				19,408	13,185	36,292	33,000	46,056
Cumulative				19,408		55,700	88,700	1,34,756
Survival % till date					68%			

*Survival Count to be done in May or June end

The table below presents the summary of the funds released from MMT and utilised by HIAL. MMT has released approx. Rs 1.67 crores towards this project and HIAL has utilise Rs 1.56 crores since the start of the project till Jan – Mar 2021. Majority of the expenses have occurred in accessing water, improving the soil quality and creating the infrastructure like Nurseries & Greenhouses required for storing the cuttings and saplings before planting them at the right time. Being a cold and dry climate, the saplings need to be kept in greenhouses to endure the extreme winter and get ready for early winter plantation. Similarly, the soil at HIAL site is of poor quality and would require a lot of water to sustain plant growth by itself. But, we have invested in digging borewells, improving soil by adding manure and clay in a proportion proposed by the Miyawaki technique of soil amendment. This will reduce the water requirement of the plants. Most of our investments can be seen as gestation

investments which have been chosen considering the difficult task of greening a desert that has been barren for thousands of years and in a climate that is unique in every manner.

Expense details so far:

Quarter	Received from MMT	Spent by HIAL	Balance with HIAL	Expense Details
Jan - Mar 2019	11,48,800	236,280	912,520	Staff Salaries & Consulting Fees: Rs 193,500 Saplings: Rs 32,694 Nursery Infrastructure: Rs 10,086
Apr - Jun 2019	44,47,300	19,07,673	34,52,147	Staff Salary & Consulting Fees: Rs 238,800 Manure and Clay for Soil amendments: Rs 170,973 Nursery Infrastructure: Rs 339,424 Earthworks for Plantation: Rs 118,660 Pick-up truck: Rs 800,000
Jul - Sep 2019	50,06,000	12,36,214	72,21,933	Staff Salaries & Consulting Fees: Rs 330,000 Apple and Apricot Orchard Fencing and Irrigation labor: Rs 44,588 Main Apple Orchard Fencing: Rs 27,727 Nursery (Trenches, fabrication, shade netting, installation): Rs 654,364
Oct - Dec 2019	-	62,78,410	943,523	Staff Salaries & Consulting Fees: Rs 368,750 Soil Preparation Work for Spring of '20: Rs 26,44,660 (Manure from Changthang, Clay from Basgo, JCB and Labour) Tools: Rs 155,570 Greenhouse 1 Construction: Rs 15,25,955 Boundary Fencing: Rs 16,89,270
Jan - Mar 2020	36,22,584	30,07,424	15,58,683	Staff Salaries & Consulting Fees: Rs 859,726 Kargil and Nubra Plantation: Rs 559,000 (Initial Part that was Done through Volunteers) Labor for plant propagation and Irrigation system in Nursery: Rs 195,877 Labor and Sapling cost for BioFence: Rs 336,590 Borewell 2 Drilling: Rs 10,00,000
Apr - Jun 2020	-	645,503	913,180	Staff Salaries & Consulting Fees: Rs 368,833 Materials: Rs 7,780 Equipment: Rs 8,340 Manure and Other Soil Amendments: Rs 91,550 Labor cost (Nursery and BioFence Plantation): Rs 169,000
Jul - Dec 2020	25,00,000	17,52,277	16,60,903	Cowshed: Rs 138,125 Root Cellar + Pipe Burial: Rs 31,000 Tools, Equipment: Rs 16,580 Materials: Rs 21,082 Manure and Saplings: Rs 84,040 Labor Cost: Rs 75,000 JCB for Earth work and Consultancy: 275,900 Staff Salaries & Consulting Fees: Rs 670,669 Repairs and Maintenance: Rs 14,935 Greenhouse Repairs: Rs 36,421 Fuel: Rs 28,525 Post Harvest Course: Rs 360,000
Jan - Mar 2021	-	585,992	10,74,911	Consultancy: Rs 60,000 Consumables (Fuel, water, seed/saplings): Rs 216,939 Equipment: Rs 23,151 Labor for pre-plantation work: Rs 18,902 Plantation expenses: Rs 110,000 Salary: Rs 157,000
Total	1,67,24,684	1,56,49,773		

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Project Progress Report

Biofence Extension Plantation

520 plants of 4 different drought resistant species were planted in March 2021 on World plantation day. The 4 species are *Kikar*, *Syah*, *Seabuck* thorn and *Sarsing* – 130 each. These are flowering plant trees with small leaves that require a less amount of water for survival, making it perfect for a dry mountain region like Ladakh.



Figure 1: Plantation along the BioFence this year

HIAL's boundary is roughly 3 km and all of it is planned to have a bio fence around it. The Bio-Fence will consist of trees interspersed with thorny shrubs that will act as the natural fence in the long term. The Bio-Fence plantation done last year is still in dormancy (picture below).



Figure 2: Old BioFence Plantation along Boundary of HIAL

Miyawaki Pilot Plantation

Since the last survival count of the plants, we had increased the frequency of the watering of the plants to ensure enough irrigational water availability to the plants. We didn't notice any severe change since the Jun 2020 survival count and hence didn't do the survival count. Some growth can definitely be seen in the pilot plantation, but its too early in the spring to say anything about the survival count.

Below is the list of the 10 species which were planted in the Miyawaki Pilot Plantation Forest in April 2019. Five out of ten species have suffered moderate to severe losses and range between 3% to 38% survival. Four species have shown no survival whilst one species, *Lepidium latifolium*, has proliferated,

nearly doubling itself from the original number planted. The survival count of the plants cannot happen in peak winter as they enter dormancy and any count would not yield correct results. It will be done in summer this year.

Table 1: Miyawaki Pilot Plantation Species-wise Numbers Surviving & Percentage

S. No.	Botanical name	Common name	Survival Jun 2020		
			No.	No.	Percentage
1	<i>Juniperus excelsa polycarpos</i>	Juniper, 'Shukpa'	336	128	38
2	<i>Rosa webbiana</i>	Wild Rose, 'Siah'	336	11	3
3	<i>Hippophae rhamnoides</i>	Seabuckthorn, 'Tsermang'	336	37	11
4	<i>Lepidium latifolium</i>	'Shangsho'	288	568	197
5	<i>Tanacetum gracile</i>	'Burtsay'	120	0	0
6	<i>Ephedra intermedia</i>	'Chapat'	144	0	0
7	<i>Peganum harmala</i>	Wild Rue	144	12	8
8	<i>Krascheinnikovia sp.</i>	---	192	5	3
9	<i>Artemisia brevifolia</i>	'Khamchu'	72	0	0
10	<i>Carex sp.</i> - Unidentified grass		432	0	0
		Total	2,400	761	32%

We expect the survival rates to be much higher than this, close to 90 percent as we are making significant changes in our approach based on our learnings from this pilot!



Figure 3: Some Plants in the Miyawaki Plantation going green



Figure 4: Miyawaki Pilot Plantation - Most Plants still in Dormant Stage

Apple Orchards

Apple Orchard work consisted of watering the plants in early spring of this quarter. The wind breaks were repaired before the onset of spring when high speed wind occurs.

We are still waiting for the roads to open to source the 792 saplings to be planted as the extension of the apple orchard.

Greenhouse, Nursery Propagation and Outsourcing of Saplings

Watering of the cuttings in the nursery and greenhouse was continued this quarter. They will be planted as soon as the water issue at HIAL is resolved. We were constantly in touch with the people to whom sapling growth were outsourced.



Figure 5: Cuttings being propagated at the Greenhouse and Nursery at HIAL

Fencing

The Fencing work of the boundary of HIAL continued this quarter. It is almost finished. The delay was due to initial lock down followed by unavailability of laborers in the working season.



Figure 6: HIAL Boundary Fencing work continues

Cow shed and Root Cellar

The construction activities were at hold due to the winter season. No progress was made since the last work. These activities will be restarted in April and will be finished in this quarter.



Figure 7: Last status of Cowshed (left) and Root Cellar (right)

Challenges this Quarter

Borewell Breakdown

We suffered a serious set-back when our borewell broke down right before the spring season causing serious water availability issues. We are currently sourcing water through tankers.



Figure 8: Borewell Repair work in Progress

Financial Updates & Plans

Opening Balance of MMT funds as on 01st January 2021: Rs 16,60,903

Funds disbursed from MMT this quarter: Nil

Total Funds available with HIAL for Quarter Jan – Mar 2021: Rs 16,60,903

Expenses incurred this quarter:

Table 2: Expenses incurred in Jan – Mar 2021

Budget Head	Value (Rs)
Salary	157,000
Consultancy	60,000
Consumable	1,059
Consumable - Fuel	12,540
Consumable - Seed/Sapling	3,340
Consumable - Water	200,000
Equipment	23,151
Labour	18,902
Plantation cost including saplings, labour, water and soil	110,000
Total	5,85,992

Balance with HIAL as on 1st April 2021 = Rs 10,74,911.

Plans for the Next Quarter, Apr – Jun, 2021

Target plantation in the next quarter:

Table 3: Plantation Plan for Apr – Jun 2021 Quarter

Plantation	Number
Apple Orchard Extension	792
Wind break Forest plantation	25,000
Saplings from Nursery Scheme	10,500
Total	36,292

Bio fence Plantation

HIAL will source around 10,500 saplings this spring to plant along the biofence from one of its suppliers. The breakdown of the plants is as below:

Table 4: Species wise breakdown of Saplings Outsourced

Species	No.
Seabuck thorn	3,994
Umbu	1,016
Set	3,555
Syah	980
Sarsing	860
Unknown (Local herb)	25
Akskut	47

Windbreak plantations

With the consultancy expertise of the former Divisional Forest Officer of Leh, we plan to plant 25,000 fast-growing, drought-tolerant trees strategically around the HIAL site to reduce wind velocity. The number of these plants can be increased provided the site can match the water requirements. This will be decided upon after the first 25,000 plants have been planted.



Figure 9: Representative Image of Upcoming Wind Break Plantation

Apple Orchard Extension

Plantation of this extension of the orchard will happen after the roads from Srinagar open in spring. We'll have to source laborers and machines to finish the plantation.



Figure 10: Location for Apple Orchard Extension

Sapling sourcing for Autumn Plantation

We aim to plant around 33,000 plants in autumn of 2021. The breakdown of this number of plants is presented in the table below. For this, the saplings need to be sourced in spring-end and allowed to propagate in nurseries at HIAL. They will be transplanted along the biofence in autumn of 2021.

Table 5: Breakdown of plants to be sourced in Apr – Jun 2021 quarter for plantation in Autumn

Plant	Quantity
Seabuckthorn	30,000
Verbascum thapsus	500
Inula racemose	500
Rheum	200
Ulmus	400
Willow	200
Poplar	200
Other medical plants	1,000
Total	33,000

To support this target of plantation and already planted saplings, the following activities are planned:

- Greenhouse 2 construction
- Saplings sourcing by HIAL staff for Greenhouses for autumn and next spring plantation
- Spring transplant from greenhouse to outside
- Sapling sourcing from “Nursery Scheme”
- Root cellar Construction
- Cow shed construction
- Apple Orchard extension
- Windbreak plantations
- Biofence plantations
- Water Reservoir Construction
- Borewell Drilling and Irrigational channel set-up.

New Borewells

Two borewells will become operational this month ensuring 80,000 litres of water per day.

Water Reservoirs

Learning from the borewell-related challenges faced this quarter, we have understood that water reservoirs at HIAL campus is a must to avoid water shortages in the future. We plan on making three (2 container based and one fixed) reservoirs in the next quarter to ensure enough water availability in peak spring and summer season.



Figure 11: Representative image of a Reservoir in Ladakh

Fencing

The fencing work that started last year will be completed in April this year. The fence will protect plantations from potential damage, particularly from animals. This site-wide fencing will be more efficient than individually fencing each individual plantation when 70% of our campus is supposed to be green.

Greenhouse and Nursery Propagation

These are important to propagate and grow saplings for Autumn 2021 & Spring 2022 plantation. The design of the second greenhouse is finalised and work will begin as soon as construction season starts. Greenhouses are critical to store saplings in winter so that they can be planted in spring also. This would also need setting up of irrigational systems within these structures.

Cowshed

The shed to house the cows will be finished this season. This will contribute, not only to self-sufficiency in dairy products for HIAL staff and students, but to the necessary development of a closed-loop soil fertility system for future plantations. The dung and urine of the cows are a very important component of our organic fertilisers and having them in campus will ensure proper and continuous supply of them.

Root Cellar

The root cellar work began in last quarter. It will be completed after the construction season starts. They will be executed by HIALs construction team and contract labour. They are crucial for long term storage of the produce of fruits from the orchards. It will ensure the food and nutrition security of staff and visitors during winter and is an essential facility of any Ladakhi household or residential institution.

Finances for Next quarter

The Table below presents the expenses planned in the next quarter:

Table 6: Budget of Activities planned for Apr – Jun 2021 Quarter

Next Quarter Planned Activities	Cost
Capital Expenditure	
3rd Borewell	18,00,000
Cow shed	10,61,875
Root cellar	500,000
Water Reservoir	12,00,000
<i>Sub-Total</i>	<i>45,61,875</i>
Material	
Saplings Transportation and plantation from Srinagar	25,00,000
Saplings from Nurseries in Ladakh	302,500
Apple Orchard	575,000
Biodegradable bags	75,000
<i>Sub Total</i>	<i>34,52,500</i>
Labour Cost	
Labour Cost	80,000
Equipment	
Secateurs	4,490
Admin Cost	
Direct Salaries	375,000
Repairs and Maintenance	100,000
Fuel	30,000
Project Management Personnel	75,000
Transportation	50,000
Misc	10,000
<i>Sub Total</i>	<i>640,000</i>
Skill Development Pre-Harvest Course	360,000
Grand Total	90,98,865

Amount needed for Apr- Jun 2021 = Rs 90,98,865

Balance with HIAL as on 1st April 2021 = 10,74,911

Amount Requested from MMT for Quarter Apr - Jun 2021 = Rs 80,23,954 (**Rs 80.3 Lakhs round off**)

HIAL-MMT Ladakh Desert Greening Project - About the project

The Himalayan Institute of Alternatives, Ladakh (HIAL) is undertaking a massive Desert Greening initiative with the immense support of the Make My Trip Foundation (MMT Foundation). The campus of this new education institute is situated on a desert area of 125 acres in a valley of Ladakh, approximately 20 kilometres from the region's main city of Leh. HIAL's vision is to create an alternative and sustainable development model for the Hindukush Himalayas and to mountain regions beyond. HIAL is focused on creating new paradigms of 'learning by doing' whilst creating a platform for the rejuvenation and incorporation of indigenous knowledge and contextual-based learning.

The Make My Trip Foundation is a public charitable trust and is passionate about sustainable and responsible development in India. The Foundation hand selects initiatives to support which are working to promote and ensure environmental sustainability, carbon sequestration and responsible tourism. They believe in inclusively supporting disadvantaged communities throughout India across sectors like education as well as ecological restoration. In funding the formative stages of HIAL's Desert Greening initiative, they are helping to establish the foundation for ongoing carbon sequestration and biodiverse land generation which will have impacts far beyond the campus boundary.

The greening of HIAL's campus, funded by the MMT Foundation, will provide a strong platform and hub for research and development of desert afforestation techniques and methodologies that seeks to inspire and inform other high-altitude mountain regions of the Himalayas and the world. The Forestation team at HIAL is parallelly working on building up the capacity of the site's infrastructure, knowledge base and planting material resources to support large scale plantations on this campus. With this strong foundation, the Forestation project is working towards greening 70% of HIAL's campus with perennial and native plant species. This greening will have a plethora of localised benefits: from sequestering carbon; providing enhanced human habitat for staff and student residents; creating new ecological habitat for wildlife including birds, insects and reptiles; increase the water-holding capacity of the landscape - allowing for water conservation and reducing the water run-off and soil erosion which can contribute to catastrophic flooding events in mountain valleys.

As the capacity of HIAL's Forestation initiatives advances, through the support of the MMT Foundation, these localised approaches, experiments and successes can be spread throughout similar regions to produce widespread benefits. This alternative educational institute can be one of the many catalysts necessary to create a stronger movement towards localised solutions to global and shared problems.