

Offsetting Carbon Footprints in Southern Rajasthan

Quarter 2 Report

April - June 2020



MakeMyTrip Foundation
and Seva Mandir



Executive Summary

MakeMyTrip Foundation is supporting Seva Mandir to undertake afforestation activities and offset carbon footprints. During this year, 40,000 saplings will be planted in the rural and tribal areas in Udaipur and Rajsamand districts of southern Rajasthan.

Context

Southern Rajasthan is semi-arid region with a hilly terrain, having an erratic weather pattern making the region vulnerable to climatic variation. The region receives average rainfall of 640 mm annually during the monsoons. Due to erratic monsoon and undulating terrain, water harvesting is poor and has high soil erosion.

Common land such as pastures, forest and revenue land constitutes 72% of the total land area in our work area. Nearly 80-100% of rural poor depend on common lands for food, fuel and fodder. However due to anthropogenic pressure, encroachments have been happening on common lands of forests and village pastures. The private wastelands are also degraded, although in better conditions than commons, as families do not have expertise and resources to protect, restore and manage them.

The degradation of lands result in the loss of soil and water regime in the downstream areas lowering the net groundwater availability to critical category. A lack of trees and supporting fauna affects the local ecology. Degradation has led to low availability of fodder, fuel, wood and other forest produces affecting the livestock productivity and income and food security. And importantly, the interest of people to maintain them is lowering with time.

The work of afforestation therefore becomes crucial not only from the point of view of ecological restoration but also from providing sustainable livelihoods for the community and making them interested towards conservation of those lands.



Progress so far

Survey and Site selection

The plantation sites have been selected with consultation of local community of particular village involving block / zone team of Seva Mandir. The local Gram Panchayat was also consulted for their active involvement in planning and implementation of plantation. Apart from this, the Gram Panchayat also provided Non-objection certificate (NOC) to the Gram Vikas Samooh for protection and regeneration commons pastureland. A details technical survey was conducted of the sites for planning of physical activities like layout of pit digging and soil-water conservation measures, estimation of protection wall, GPS survey, etc. Frequent meetings with community and Gram Vikas Samooh is also conducted to discussion regarding to engage local people to completing task decided for plantation activities. Total Nine plantation sites were selected till reporting period, the details is given in Table 1.A

Site protection and Pit Digging

The area demarcation of each selected site was completed for estimation of protection of the site. Total 181 ha area of 9 sites has been protected by loose-stone wall fencing along with putting over thorny bushes available around for strengthening the protection of the site. The pit digging at selected sites has been completed, about 34,000 pits are ready for plantation.

S No.	Site Name	Ha	Block	No. of pits dug	Remarks
1	Lambapanwa	10	Kherwara	6,500	<ul style="list-style-type: none">- Pit digging is completed.- Boundary wall repair and construction is completed.- Soil & Water conservation is under progress – 49 check dam construction completed.
2	Nichla Talab	7	Kherwara	4,000	<ul style="list-style-type: none">- Consultation meetings held with community and local <i>gram panchayat</i> for their consent and willingness to protection of common pastureland and plantation by Gram Vikas Samooh.- Pit digging is completed.- Boundary wall repair and construction is completed.
3	Borikuwa	12	Girwa	3,500	<ul style="list-style-type: none">- Pit digging is completed.
4	Kachba	7	Badgaon	5,000	<ul style="list-style-type: none">- Boundary wall repair and construction is completed.- Soil & Water conservation activities are under progress.
5	Bhewadiya	29	Badgaon	3,000	
6	Naron Ka Kheda	62	Badgaon	3,000	<ul style="list-style-type: none">- Pit digging is completed.- Boundary wall repair and construction is completed.
7	Aamaliyar	30	Kumbhalgarh	4,000	<ul style="list-style-type: none">- Non-objection certificate (NoC) issued by Gram Panchayat to Gram Vikas Samooh for development and management of common pastureland.- Pit digging is completed.- Boundary wall repair and construction is completed.- Soil & Water conservation activities are completed.
8	Ranjitpura	19	Jhadol	4000	<ul style="list-style-type: none">- Boundary wall repair and construction is completed- Pit digging is completed.
9	Vanpura	5	Jhadol	1000	
	Total	181		34,000	



Completed pit digging at the selected sites

Soil-water conservation measures

The soil-water conservation measures like loose-stone check dam, contour stone bunds, continuous contour trenches, box trenches, etc. are completed to check runoff rainwater and soil erosion that further creates soil-moisture for growth of natural regeneration and better growth plantation to be undertaken.

Plantation

The plantation activity depends on sufficient rainfall and suitable soil moisture available for planting the saplings. The scheduled plantation will be around July first or second week while pits are once filled from runoff rainwater. The native species of multi-purpose uses has been selected for plantation. The required nos. of saplings of selected species has been booked at forest department nurseries. The site has been rapidly surveyed for plantation activity to be undertaken. At the time of reporting, plantation has been started at various sites. A landscape plan has been made for ecological plantation of species selected, given below.

क्र.सं.	पुस्तिका का स्थानीय नाम	पुस्तिका का स्थानीय नाम	कृष् एव झाड़ा प्रजातीया का पोधारोपण				चारागाह बाँधी लेतो की मेड़, आदि	वर्षिय वरिण / टिप्पणी
			ऊँचाई पर / लैडू ढाल पर या पथरीली जगह	छोटी पहाड़िया / मध्य वाले ढाल पर / घाटियाँ	नीचे वाले ढाल पर या समतल जगह	नमी वाला जगह / नदी नाले किनारे / गली फूला या छोटे चेकडेम के सहारे		
1	बेमजतास / कसता	<i>Cassia fistula</i>	W	W	W		इसका फला का मुदा का उपयोग पर दूध, कृन्ता में काया जाता है। लोक मान्यता है की इसकी काली फली को सिरहारे रखकर सोने से बुरे स्वप्न नहीं आते है।	
2	आंवला	<i>Emblica officinalis</i>	W	W	W		इसका फला का परत के रांगे के लिए औषधीय उपयोग काया जाता है।	
3	आम	<i>Mangifera indica</i>		W	W	W	महतद्वयुग फलदार पौधा मुठता एवं छाल का औषधीय उपयोग।	
4	श्रीला	<i>Sapindus trifolatus</i>	W	W	W		इसका फल का उपयोग शर्षु के रूप में सार धान के लिए केत है।	
5	बईला	<i>Terminalia belerica</i>		W	W	W	फल छाल का औषधीय महत्व है।	
6	बांस	<i>Dendroclamus strictus</i>		W	W	W	इमारता लकड़ा के तौर पर एवं कृषा उपकरण में सहायक उपयोग।	
7	बैर	<i>Ziziphus mauritiana</i>	W	W	W	W	इसका फल बाँस के रूप में फल बकरी के चारे के रूप में उपयोग काया जाता है।	
8	बलितस	<i>Aegle marmelos</i>		W	W	W	फल के मुद का उपयोग पर दूध, दस्त आदि रोगों में काया जाता है।	
9	चुंरा / कुन्दा / बन्दर बाटी / पापडी	<i>Holoptelea integrifolia</i>	W	W			इमारता लकड़ा के अलावा छाल का औषधीय गुण।	
10	दोला फूल	<i>Acacia nilotica</i>		W	W	W	महतद्वयुग इमारता लकड़ा के अलावा गाद एवं छाल का औषधीय उपयोग।	
11	हवन	<i>Gmelina arborea</i>		W	W	W	अच्छा इमारता लकड़ा के साथ छाल का औषधीय गुण।	
12	गोदल	<i>Lannea coromandalica</i>	W	W	W		इसका पतल अच्छे चारे के रूप में उपयोग के अलावा औषधीय गुण है।	
13	इमली / ईख	<i>Tamarindus indica</i>		W	W	W	फल भारताय खाद्यचारे / दूधजनन में महत्वपूर्ण उपयोग।	
14	जामुन	<i>Syzygium cumini</i>		W	W	W	बाँस छाल एवं फल का महत्वपूर्ण औषधीय उपयोग।	
15	कुंदू / कुदू	<i>Hollarhena antidysenterica</i>		W	W	W	इसका छाल का उपयोग दस्त रोग के लिए काया जाता है।	
16	करज	<i>Pongamia pinnata</i>		W	W	W	इसका बाँस का तेल औषधीय उपयोग एवं बाँस डोजल बनाने में प्रयोग होता है।	
17	करकरज	<i>Caesalpinia bonduc</i>		W	W	W	कार्टदार औषधीय झाड़ा, खत/वारागाह का फसाग बाँझा के सहारे लगा सकन है।	
18	काला सरिस/सफ़ेद सरिस	<i>Albizia odoratissima</i>		W	W		इसका लकड़ा सागवान से भी मजबूत होता है, छाल का औषधीय उपयोग	
19	कोकर / जमल जलेबी	<i>Pithecellobium dulce</i>		W	W		पका हुआ फलना खाते योग्य पतल बकरा के लिए उपयुक्त चारा	
20	खावा/गिलास	<i>Butea monosperma</i>	W	W	W	W	फुला का हाता का रंग के अलावा भूरा रंग में महत्वपूर्ण औषधीय उपयोग	
21	खैर	<i>Acacia catechu</i>		W	W		इमारता लकड़ा के अलावा छाल का औषधीय गुण	
22	खिजड़ी /	<i>Prosopis cineria</i>	W	W	W		यह राजस्थान का राज्य कृष् है, जासका कृष् फला का सागो, हासल के नाम से जानते है एवं इसको सब्जी बनाई जाती है। शमी कृष् भी कहते है जिसकी धारुकि पूजा की जाती है।	
23	खाली	<i>Wrightia tinctoria</i>	W	W	W		महतद्वयुग इमारता लकड़ा, छाल का औषधीय उपयोग	
24	महुआ	<i>Madhua indica</i>		W	W	W	बाँस का पोषक तेल खान में प्रयोग होता है।	
25	नीम	<i>Azadirachta indica</i>		W	W	W	महतद्वयुग इमारता लकड़ा एवं मसूरक औषधीय गुण।	
26	मिर्च/मिर्जवा	<i>Acacia leucophoea</i>	W	W	W		पतला का बकरी के चारे के रूप में एवं लकड़ा का कृषा उपकरण बनाने में महत्वपूर्ण उपयोग।	
27	शोकाकई	<i>Acacia simuta</i>		W	W	W	कार्टदार महत्वपूर्ण औषधीय झाड़ा जासका खत/वारागाह का फसाग बाँझा के सहारे लगा सकन है।	
28	सागवान	<i>Tectona grandis</i>		W	W	W	इमारता लकड़ा के रूप में उपयोग होता है।	
29	सांताफ्रन	<i>Annona squamosa</i>		W	W	W	पोषक फल, खत/वारागाह का फसाग बाँझा के सहारे लगा सकन है।	
30	विंदू / बाईपतता	<i>Diospyros melanoxon</i>	W	W	W	W	बाँस पतला के अलावा पोषक फल एवं छाल का औषधीय महत्व। पतला का चारे के रूप में प्रयोग।	

Capacity Building Events

To enhance the capacity and orientation of the community and the field teams, different programmes of trainings, meetings, etc. were conducted at the field level, following social distancing norms. The details of capacity building sessions are as below.

S No.	Date of event	Place	Details of programme	Participants
1.	17/06/2020	Lambapanwa - Kherwara Block	<ul style="list-style-type: none"> Orientation of Gram Vikas Samooh for plantation and its protection management. On-site demo of stump plantation and direct seeding initiative. Orientation for follow-up landscape plan for plantation 	19
2.	25/06/2020	Borikuwa - Girwa block	<ul style="list-style-type: none"> On-site demo of direct seeding initiative. Orientation for follow-up landscape plan for plantation. 	10
3.	26/06/2020	Nichla Talab - Kherwara Block		13



Community meetings being conducted by Seva Mandir's staff at the selected plantation sites

Carbon sequestration potential created through afforestation work

As per the carbon sequestration methodology used by Seva Mandir which is an adapted version of Intergovernmental Panel on Climate Change (IPCC) guidelines on National Greenhouse Gas Inventories and United Nation Framework on Climate Change (UNFCCC). The following has been estimated:

With support from Make My Trip since 2009 till date (2020), approx. 10 lacs trees have been planted in an area of 1650 hectares. This year 180 hectares of pastureland has been prepared to plant 40,000 plants.

The annual carbon sequestration created in 1650 hectares is 21,400 CO₂ ton/yr. Using the framework in www.myclimate.org we have calculated the carbon footprint in the following way:

Carbon Footprint Calculation vis-à-vis human consumption

- Considering the per capita carbon footprint got an average Indian is 2.7 ton/yr. The per capita for the world is 7 ton/yr. (www.carbonbrief.org/the-carbon-brief-profile-india)
- Accordingly, we are able to offset carbon footprint of 7926 people in India in a year or 3057 people in the world in a year as per capita rate mentioned above.

The table below gives the Assumptions for per capita carbon footprint over flight travel from the following destination.

Particular	Delhi to Udaipur	Delhi to Kolkata	Delhi to Mumbai	Delhi to Channai	Delhi to Bengaluru
Distance (Km)	500	1300	1100	1800	1700
Person	1	1	1	1	1
Co2 (ton)/ person	0.153	0.225	0.232	0.324	0.315
Per Km/person	0.000306	0.000173077	0.000210909	0.00018	0.000185294

The table below gives the calculation per person (s) over flight travel for various scenarios. With MMT support, 21,400 tons of Annual Co₂ sequestration is created to offset carbon footprint.

Per capita (ton/km)	Distance	Footprint (ton) per person	Footprint (ton) per 100 people	Footprint (ton) per 150 people	Footprint (ton) per 200 people
0.153	500	77	7,650	11,475	15,300
0.232	1,000	232	23,200	34,800	46,400
0.225	1,500	338	33,750	50,625	67,500
0.324	2,000	648	64,800	97,200	1,29,600
0.325	2,500	813	81,250	1,21,875	1,62,500
0.325	3,000	975	97,500	1,46,250	1,95,000
0.350	5,000	1,750	1,75,000	2,62,500	3,50,000
0.350	10,000	3,500	3,50,000	5,25,000	7,00,000

Promoting Bio-fuel /oil seed tree plantation

Earlier the Bio-fuel authority, govt. of Rajasthan and Zila Parishad, Udaipur has been supported to conduct capacity building programme for community and sensitizes them towards promoting Bio-fuel / oil seed tree plantation at village commons and owned pastureland as a livelihood option and climate change risk mitigation action. The capacity building programme has been conducted at 6 plantation sites out of above 9 selected sites under the project. The demonstration of direct seeding, branch cutting plantation of Bio-fuel tree e.g. Ratanjot (*Jatropha curcas*), Karanj (*Pongamia pinnata*) was undertaken at the selected plantation sites.



Direct seeding and branch cutting demonstrations at the selected plantation sites

Ecosystem services and Biodiversity conservation

Above common land selected as plantation sites are playing an important role for maintaining ecological balance and contributing to provide ecological services as a both Abiotic (Air, water and land) and Biotic (wild flora & fauna) in the geographical coverage. These protected sites also supports to biodiversity conservation in the area in 180 hectares. The protection of the site is naturally regenerate existing flora and provide natural habitat to wild fauna migrates in the area. The physical interventions like soil-water conservation measures increases biomass of the area, check runoff rainwater, prevent soil erosion which also support to recharge the ground water in the area 530 hectares at downstream of watershed.

The wild fruits trees e.g. Ber (*Zizyphus numularia*), Kikar (*Pithecellobium dulce*), Tendu (*Diospyros melanoxylon*), etc. which are growing naturally in protected sites provides food to birds migrating and nesting there. There are several fodder trees e.g. Salar (*Boswellia serrata*), Siras (*Albizia odoratissima*), Palash (*Butea monosperma*), etc. which provides leaf fodder to approx. 3500 domestic animals (livestock) benefitting 880 families in nine villages. The most palatable grasses and herbs like Heran (*Sehima nervosum*), Durwa (*Cynodon dactylon*), Khargu ghaas (*Glossocardia sp.*) etc. provides green fodder for herbivores like wild hare migrating in the area.

Birds are good ecological indicators of any ecosystem. As they are also known as good pollinators, seed dispersers and natural insect and rodent pest controllers, above all their feeding habits helps in maintaining balance in our ecosystem. It is the food habits of a Koel, Parakeet, Barbet or Hornbill that preferably feed on fruits and helps in dispersing the seeds that allow new germination of a plant at different locations and sites. Similarly Purple sunbird is a small bird but its feeding on nectar helps in pollination, one of the major phenomenon of the existence of life on earth.

Mammalian fauna has its own significance in all layers of the ecosystem, it starts from seed disperser to top predator that regulates the population of other small animals. In this area Indian Flying Fox, Five-stripped Palm Squirrel and Jackal is the possible seed disperser, while Stripped Hyena act as the top-predator in absence of Common Leopard but some of protected plantation sites where found movement of common leopard.



Examples of the types of animals being protected by enhanced biodiversity in the region. Clockwise from top left: Indian Grey Hornbill, Peacock Pansey, Rounded Pierrot, Crested Eagle, Jackal.

Covid -19 impact on plantation activity

The target of planting 40,000 saplings was affected due to the outbreak of Covid-19 leading to lockdown in the months of April and May. Initially, it became difficult to deploy the labour during the lockdown for pit digging activity however after lockdown was released, this become an opportunity for migrant workers and youth to get employment and developed their further interest to protect commons, natural resources for sustainable livelihood.

KPI - Quarter 2

S. No	Outputs	Unit			
1	Survey & site selection	Hectare s	180	0	190
2	Area of sites protected	Hectare s	180	0	190
3	Soil –water conservation work	Hectare s	180	0	190
4	No. of saplings planted	Number s	0	40,000	40,000
5	No.ofcapacitybuilding programmes conducted	Number s	6	1	4

Plan for Quarter 3

- Completion of target plantation of saplings (40,000).
- Field trainings and regular meetings with local community, groups and field team on protection and management of the pastureland /plantation sites.
- Weeding – hoeing of completed plantation.
- Survey and identification of new sites for next year plantation.