



REPORT

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Guardians of the Indus: Conserving the Ecosystem



Lessons Learned from Partnership Fund Supported Projects



INDUS FOR ALL PROGRAMME
WWF - PAKISTAN
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Foreword

It gives me an immense pleasure that the Indus for All Programme Partnership Fund, being implemented by WWF - Pakistan in collaboration with numerous stakeholders, has successfully published the 'lessons learned' study 2012. It is heartening to note that the Indus for All Programme has smoothly steered its course towards making remarkable progress in all realms of its four fundamental themes including Partnership Fund. These projects were carried out under the supervision of the Scientific Committee which was made responsible to award Partnership Funded projects falling under the category of less than a million rupees.

It is pertinent to acknowledge that fund has enabled better alignment and collaboration with stakeholders for the strategic interventions in the Indus for All Programme. As the Chair of the Scientific Committee (SC), governing body of WWF - Pakistan's Small Grants, I have been intimately associated with this Fund. It is worth mentioning to acknowledge the valuable guidance and profound support provided by the members of the Scientific Committee to the Fund.

The Fund has supported biodiversity, habitat conservation and alternative livelihood initiatives to the partners including NGOs/CBOs, Government and Academia in order strengthening institutional cooperation in the light of Indus Ecoregion Conservation plan. I am impressed to see the effectiveness of the approach adopted by the Programme by engaging stakeholders.

The present lessons learnt study 'Guardians of the Indus: Conserving the Ecosystem' provides a glance into achievements of various projects supported by the Indus for All Programme Partnership Fund. These admirable achievements of the Fund will go a long way towards protection of natural resources and biodiversity. The SC is renowned towards supporting the science based smaller scale projects in the Pakistan. Working on the similar lines the Committee Awarded project which were helpful to collect the significant information about the ecologically significant species such as Hog Deer, Critically endangered White back vultures, Marsh crocodile, Indus river dolphin and Common leopard. The grant also supported the first ever GIS based forest cover assessment of Pakistan which will be helpful to determine the existing forested area of the country and will provide valuable information towards future forest conservation. Besides some outstanding projects were awarded to the Woman CBOs of Pai forest that has successfully engaged the forest dependent females in alternative livelihood opportunities.

The content of this publication is evidence that much has been achieved in a short span of time, which would have not been possible without diligent planning and careful implementation of the fund. I hope that other stakeholders working in conservation of natural resources would benefit from this publication and replicate these successful initiatives.



Dr. Anwar Nasim
Chairman Scientific Committee
WWF - Pakistan

Preface

Recognizing the fact that no development programme can be successful unless it has support from grassroots level, WWF - Pakistan, through its Indus for All Programme, strived to involve local communities through a small-grants programme in its bid to conserve and sustain the Indus Ecoregion.

Named after the mighty Indus River, the prime source of fresh water for Pakistan, the Indus Ecoregion is one of forty most significant Ecoregions of the world. Unfortunately, the waters of this great river have been diminishing steadily over the years because of extensive damming of the river for irrigation and power generation. Added to this, widespread deforestation, industrial pollution, seawater intrusion and global warming have been adversely affecting this vast Ecoregion.

To halt further degradation of the Ecoregion, WWF - Pakistan as part of its 50-year venture launched the Indus for All Programme and included provincial governments and semi-autonomous bodies in its efforts to save the Indus Ecoregion.

Taking a new approach to conservation, the Programme developed a two-pronged strategy: one, to create a sense of ownership among the communities inhabiting these areas by generating awareness of the dangers of habitat destruction, and two, creating links between communities and environmental conservation groups as well as government departments to ensure sustainability of the projects.

As part of its initiative, eleven projects were identified. Five of these ventures- saving the urial in the Ladakh valley, the mahaseer fish in the Poonch River, the Black partridge in Sindh, parakeets in the wilds of Punjab and Sindh and the Gyps vultures in Punjab-were related to the conservation of species all over Pakistan. Two others, National Forest Assessment and Carbon Stock Assessment, aimed at providing vital data regarding the forests of Pakistan while three in Sindh aimed at conservation of the Pai Forest and Keenjhar Lake and the last, experimentation in algal fuel, aims at finding alternative sources of energy.

Each of these ventures, through the small grants programme, has proved successful in its own way. Whether it was through using the most current technology to assess forest coverage in Pakistan or through lab experiments in finding an algal specimen fit enough for mass production of biofuel, or surveys to assess the country's parakeet population-each project helped strengthen the ecosystem of the Ecoregion in its own way.

It is through these innovative ideas, commitment of communities and determined individuals that small grants can go on to make big impacts.



Rab Nawaz
Regional Director
WWF - Pakistan
Karachi



Algae:

an alternative energy source

With the ongoing energy crisis in the world and the quick depletion of our fossil fuels there is a dire need for renewable energy. Biofuels are often looked at as alternative energy sources, and algae in particular are being seen as a source for producing such fuels.

Other than the fast depletion of a natural resource, there are some other reasons for concern about the use of fossil fuels. Perhaps the most pertinent one is that the combustion of fossil releases large amounts of carbon dioxide in the atmosphere. Carbon dioxide is one of the greenhouse gases which is contributing

to global warming. The burning of fossil fuels also produces other air pollutants, such as nitrogen oxide, sulfur dioxide, volatile organic compounds and heavy metals.

The benefits of using algae as biomass to produce biofuels are many. Algae have ten times more productivity than other feed stocks; they do not need fertile land as they can grow in wastewater unlike traditional feed stocks of palm, sunflower, rapeseed and soya. Also, whereas plants only store oil in their seeds, algae

store oil in each and every cell. This is what made algae the perfect choice for Umarah Mubeen, a lecturer at the Forman Christian College in Lahore, to start research on.

Mubeen, who used an Indus for All Programme grant to set up her research, was successfully able to identify a suitable alga that had high growth rate and increased biomass. Not being able to find a type of alga that has both these characteristics and is economically beneficial is why algal fuel has not yet become commercially viable. Mubeen is, however, hopeful that her study on this strain of algae will start giving commercial results.

For her research, Mubeen chose the alga strain *Botrydiopsis arhiza* known for its high oil productivity. The first half of her experiment was conducted indoors in a laboratory to create an optimized environment by controlling environmental variables, i.e., temperature, light and pH levels besides regulating the most important element in the experiment-optimal nutrient concentration, for a high growth rate.

The next step was to take the experiment outdoors to a native growing environment to assess growth rates without laboratory controls. *Botrydiopsis arhiza* was 'able to shine under native environments,' said Mubeen, but its growth was four times less than in a controlled environment. The system used by her was a plug-and-flow system, which was economical.

With the help of the experiment, Mubeen was able to determine that *Botrydiopsis arhiza* can become a suitable candidate for mass cultivation of biofuels. Plus it can act to capture carbon through carbon sequestration and be a revenue generator in terms of carbon trading in Pakistan. Besides, carbon sequestration is also an important contributor towards lowering the levels of CO₂.

As her results show, in controlled stages the species has 60 per cent lipid content and a 2.914 g/L carbon a day through the process of carbon sequestration rate. Outdoor conditions, too, yielded good results with 0.639g/L carbon a day.

Since the cultivation of the cell mass during the experiment was done photoautotrophically, using light and inorganic carbon as the energy source, the cultivation of the algae becomes even more economical.

While this study is still in its early stages, it is in



fact a great step in the search for alternative, and renewable, energy sources. Mubeen's research has found a source of biofuel that requires neither clean water nor fertile land; and because its growth is photoautotrophic, the generation of *Botrydiopsis arhiza* can be a cheap and non-burdensome supply of renewable energy.



Carbon stock assessment

As climate change and debate on carbon emissions dominate talks on environment around the world, Pakistan too has taken a step to become part of the solution. This step has been in the form of a research carried out in Ayubia National Park which resulted in the development of a mechanism to calculate carbon

content of the moist temperate forests. This is the first time such a study has been conducted in the country.

The solution is to use REDD+ (Reducing Emissions from Deforestation and Forest Degradation) as a catalyst in not only protecting the very little forest cover we have, but also in enhancing the country's carbon sink.

With the introduction of REDD+, a financial mechanism has been created which gives incentives to local communities and countries for (a) the conservation of forests; (b) the enhancement of carbon stocks; and (c) the avoidance of deforestation.

REDD+ thus acts as a barter system of sorts. In simple terms, industries can pay money for the conservation of forests to offset their own emissions once they know the value of a forest's carbon pool. For example, based on the current REDD+ scenario the voluntary market price for carbon per ton is five to seven US dollars. Thus, once the mean carbon stock of a forest is calculated as 'x' carbon tons per hectare, simple



mathematics can give a monetary value to different areas in different forests.

With this new global concept, a window has opened for local communities to have reasons to conserve the forests around them-economic reasons.

However, for Pakistan and its people to fully utilize REDD+ we needed to calculate our carbon stocks and develop a mechanism to do this. Such a system was developed by Mohammad Qasim for moist temperate forests with the help of the Indus for All Programme.

After looking at various sites, Qasim and the team of WWF-Pakistan narrowed down on Ayubia National Park (ANP) in Khyber Pakhtunkhwa (KP) as the place to research and test their calculation methods.

Ayubia National Park comprises three separate ecotypes: the Sub-Tropical Chir Pine Forests, the Himalayan Moist Temperate Forests and the Sub-Alpine Meadows.

The research was conducted in the Moist Temperate Forests and the Sub-Tropical Chir Pine Forests, which have rich biodiversity and are one of the most productive ecosystems of Ayubia National Park.

Through random sampling of five different carbon pools-above-ground biomass, below-ground biomass, litter, deadwood and soil-the team was successful in calculating the carbon worth of Ayubia National Park. This was the first time in Pakistan that carbon stocks had been calculated and a protocol developed to



assess carbon stocks in Pakistan. Among other factors that contributed to the success of this project, one was the close coordination between the Ministry of Environment (Forestry Wing) and the WWF.

This is the first step, and a great one, for the conservation of forests in Pakistan. By adding a number to the carbon worth, Qasim and his team have made possible the potential of using REDD+ in Pakistan. The next step is to use this calculation method in other forested areas of the country. This initiative will have to come through the forest departments of all the provinces so that it can be done in a regulated manner throughout the country.

A guide will have to be developed on the use of revenue generated through REDD+ in ways that communities residing by forests and dependent on them can benefit from it thereby making them active partners in the task of forest preservation.

The appropriate ministries and relevant departments now need to start assessing various forest types in their jurisdictions and courting national and international companies to buy carbon points from forests in Pakistan; Ayubia National Park can be the first of the many forest areas that can be utilized for this purpose.

Mohammad Qasim and his team have shown the way; they have developed a system that provides others with a standardized methodology to assess carbon stocks in the rest of the country. Only time will tell how this methodology will be used in the future to benefit local communities and preserve Pakistan's precious forest cover.



Saving the Ladakh urial

A project in the Shigar valley of Gilgit-Baltistan for the conservation of the Ladakh urial and associated biodiversity has proven that community engagement, empowerment and awareness is a significant factor in wildlife conservation.

The Shigar valley is located 32 kilometres north of Skardu city and has a population of 50,000. The area is rich in natural resources, a perfect place to launch eco-tourism and is home to wildlife such as the Ladakh urials, snow leopards, Himalyan ibex and wolves. It was thus the perfect spot to teach local communities the importance of conservation and give them skills to start up other livelihood schemes.

The Ladakh urial, which has been listed as vulnerable on the IUCN red list as of 2010, was discovered in isolated pockets in Kharpocho in the Shigar valley. It is also on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), an international treaty to protect illegal trade of endangered and threatened species. The Ladakh urial and the Himalayan ibex are both facing population pressure because of reckless killings as well as through habitat degradation.



To protect the dwindling population of the urial through community participation, WWF - Pakistan formed a Community Based

Organization (CBO) called the Sundus-Sarfaranga-Nansoq Valley Conservation and Development Organization (SSNVCO) covering the area that falls under the jurisdiction of the Central Karakorum National Park (CKNP). The project also helped the CBO in developing its bylaws for registration with the district government as a legal entity. This was the first conservation effort to take place in the Shigar valley and over a course of two years would prove to be extremely successful.

As Babar Khan, head of WWF - Pakistan in Gilgit-Baltistan who also supervised this particular project explained, the process of convincing locals to stop killing the urial was a slow one. Khan and his team used four main arguments to convince people to not kill the urial. These were:

- 1) Moral: every living thing has a right to live
- 2) Religious: Islam does not allow the unjustified killing of any creature and conservation is mentioned in the Quran; this step was implemented with the help of booklets and sermons by local religious leaders.
- 3) Social: inducting the community in actively protecting this species by starting a CBO. This proved to be a driving force in mobilizing the community. Once the people felt they had a say in what was happening they were willing to support conservation efforts. This step has been especially rewarding in that community members have learnt how to utilize their own resources to work for themselves. Joining together for saving a species has thus become a first step to many other projects the communities are now embarking on.
- 4) Economic: the communities have been taught the benefits of sustainable harvest of wildlife species. Instead of random killing of these beautiful animals and wiping out the entire population, the communities have been shown how sustainable population of these animals can be used for trophy hunting. A Himalayan ibex at the moment fetches about US \$5000 while the blue sheep gets about US \$8000.

For over two years, WWF - Pakistan and SSNVCO struggled to get the message across. This was done through environmental education in schools, through the forming of nature clubs to deliver the conservation message to the youth, through the publication of awareness-raising material such as booklets, seminars and lectures, and by inducting the local clergy.

Through the project, wildlife movements were recorded for the first time in Shigar valley. This monitoring



سکردو: پہاڑوں کے عالمی دن کے حوالے سے منعقدہ تقریب سے محمد حسن حسرت، محمد علی یوگوی اور دیگر مقررین خطاب کر رہے ہیں۔ فوٹو احمد خان جوہر

showed that the urial was moving across the Indus River due to grazing and hunting pressures—a factor that was contributing to its declining population as the young often drown in the river. SSNVCDO was successful in convincing the Sundus community to stop grazing their livestock in the habitat of the urial. Ensuring a nurturing environment for the urial has been another feather in the cap for WWF and SSNVCDO.

But while the campaign has been hugely successful as far as the local communities go, army officers continue to hunt the urial. The difficulty in getting the message across here is because of the fluid nature of army postings. As postings change every so often it is difficult to get a sustained campaign going. The SSNVCDO needs to consider a way to get the message across to army officers that wildlife species have to remain protected.

The training provided by the WWF to 'community watchers' to survey wildlife has meant that wildlife movements are being recorded for the first time in Shigar valley. The training has also benefitted the 'watchers' as they can now

distinguish different types of horns through which they can identify different species and estimate the age of the ibex and urial—skills they can use for conservation and trophy hunting missions as well as monitor illegal hunting of these animals.

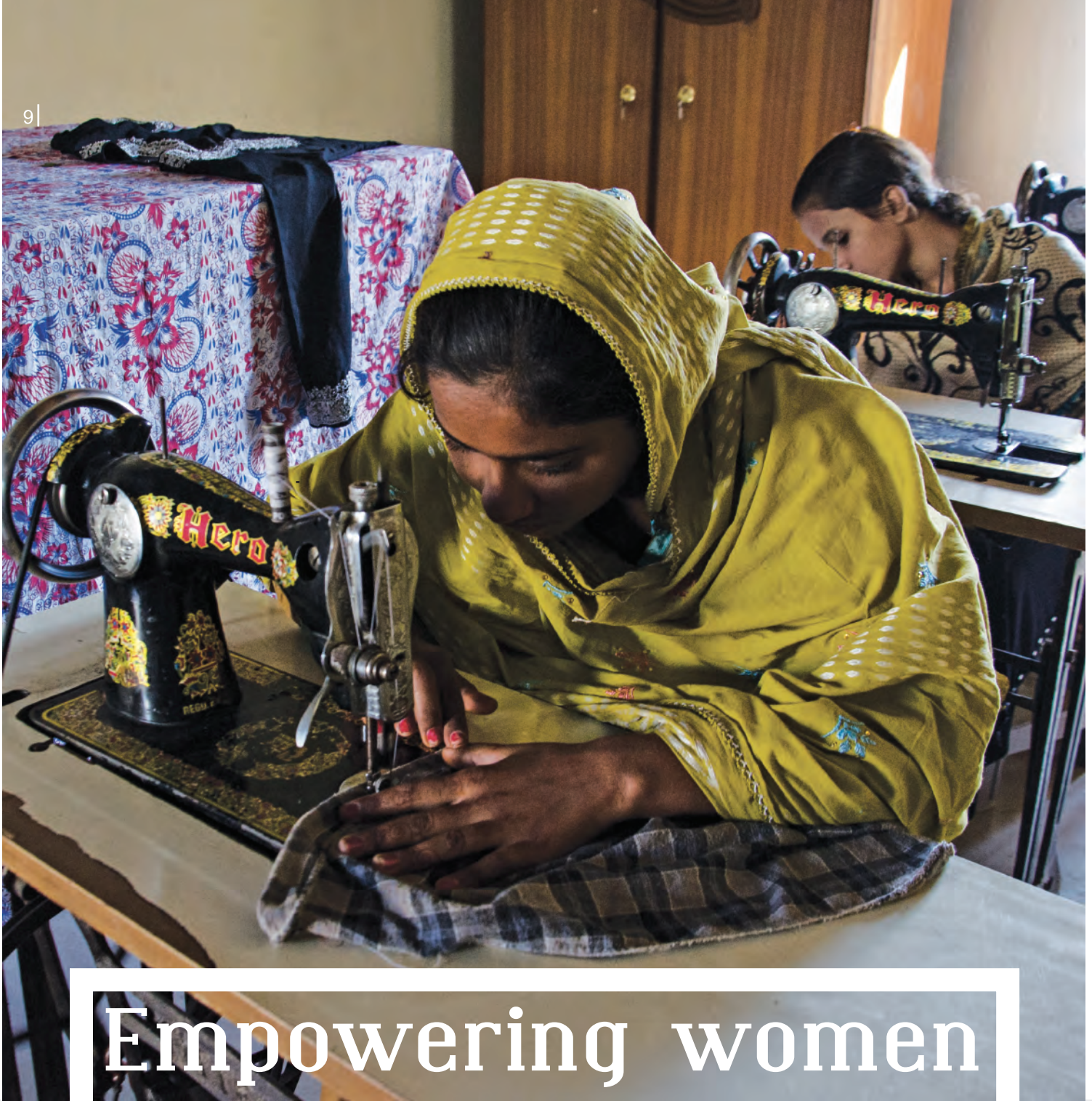
The project also continued to monitor the Ladakh urial and ibex population during these two years. The main aim of these surveys was to have a record of ibex and the Ladakh urial and to collect scientific population data, which can give a picture of either increase or decrease in populations to suggest conservation measures for these species.

Over a span of two years, the CBO with the help of the WWF developed a conservation plan for the Shigar valley and its adjoining areas; this plan was then taken up to the District Conservation Committee (DCC) and turned it into a legal document. Once approved, conservation will become a liability on all members of the DCC and the local communities.

To have come this far is a great achievement in a region where just two years ago conservation was an unheard of concept. Learning from his experience, Khan says, 'Community involvement is a must, but development is imperative as well because communities are poor.'

This is the key to conservation in Pakistan. While long-term change can only be achieved with sustained efforts over a period of time, the Indus for All Programme has successfully initiated the effort in the Shigar valley.





Empowering women and conserving forest resources

Situated on the outskirts of Pai Forest near Sakrand, Talli village, in District Shaheed Benazir Abad is much like others in the vicinity except for a small revolution worked by the Kiran Aurat Taraqati Tanzeem.

Pai forest is a game reserve, home to the hog deer and grey partridge. The forest has been facing several anthropogenic pressures. Illegal tree extraction is one of the major threats to the forest. A large number of women from around the Pai forest area are associated with the tree cutting business. One woman can earn

up to Rs.2,000/- a month from the selling of wood which she collects from the forest. This was the main source of livelihood for these women till the setting up of Kiran.

Kiran is an organization that was started to teach women alternative livelihood skills so as to minimize the pressure on woodcutting and collection in Pai forest by these women. Hameeda Keerio, President of Kiran, talks about how she began the organization and its impact on the lives of the women of Talli:

There was a time when we women lived very restricted lives. We used to go to Pai forest to collect wood for sale in the market; we also worked in the fields cultivating vegetables and looking after livestock but we were not allowed to go anywhere on our own and an overnight stay was an unheard of thing. It was then that I heard some NGOs were working in nearby villages telling people not to cut wood from the forest. They said the forest is a natural resource to be conserved and they were suggesting alternative livelihoods to forest dependent communities. I was very impressed with the work being done and I wanted them to come here and help us too.

Although I very much wished for change and talked about it, I was shy and timid. When the WWF/ Indus for All Programme team came to visit our village, I ran and hid. But Madam Rukhsana, the social organizer involved in community development, persuaded me to start Kiran. She saw the work we did at home, all sorts of embroidery and handicrafts: patchwork quilts, mirror work, *hurmich*, hand appliqué, *aari* and much more. But she said our designs were outdated and the use of low quality material and poor colour coordination would not be appreciated in the marketplace.'

A series of meetings were held with the WWF and it was decided that women from Talli and four surrounding villages would be dissuaded from cutting wood; instead their earning capacity would be enhanced through training in handicraft and entrepreneurship.

A vocational centre would be set up in Talli to train 100 local women from five villages, Talli, Saifal Keerio, Sand Keerio, Mian and Haji Keerio, in handicraft development and ten women (two from each village) in entrepreneurial skills for small enterprises. A designer was hired to update the women on market trends. A small room was constructed, sewing machines bought-pedal ones for sewing and automatic machines for embroidery-a teacher was hired from Hala, a city known for the production of traditional handicrafts, and classes started. Once the first batch graduated, the best girls were employed by the organization on a stipend of Rs. 2000/- per month to train others.

The project has been an immense success but it was not easy getting started. When a training session was held in Hyderabad, the men objected to their women going out of the village on their own. 'There were lots of fights and tears but we persisted,' says Hameeda, 'and got our way.' In this the personnel from the Indus for All Programme were a great help in helping the men change their minds.

Some men, mostly brothers of the girls,





پروجیکٹ جو نالو

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کرن عورت ترقیاتی تنظیم

کرن عورت ترقیاتی تنظیم



would even object to the girls coming to the Centre. But success begets success and once the first few batches graduated and started working from home, the villagers became eager for their girls to learn.

Today girls from far away villages, and even from Sakrand town, come to the Centre to learn sewing and embroidery and sell their products through the Centre. Initially the girls are provided the essentials by the Centre but once they have learnt the basics they tend to bring their own clothes to sew or embroider. Some have become so good at the work that they have managed to buy their own sewing machines and operate from their homes. Reema is one such girl. One of the star students of the Centre, Reema saved enough to buy her own sewing machine. She now works from home and charges her clients Rs. 150/- for a simple *shalwar kameez* and Rs. 200/- for more complex designs. She has so much work that she is now teaching her younger sister to sew so that some day they can expand the business. She has stopped going to the forest to collect wood.

The centre charges a fee of Rs. 200/- a month and operates in two shifts of twenty to twenty-five girls each. This nominal fee helps sustain the centre, and will do so even after the project is complete. Work done for the Centre is sold through exhibitions and local festivals. So far Kiran has participated in four exhibitions at local festivals, one each in Bhit Shah and Matiari and two in Nawabshah City. Money raised through sales is used to meet the expenses of the Centre. The success of the sewing centre created a demand for trimmings such as ribbons, laces, thread, etc., leading to the starting of yet another home-based enterprise. Four women have set up shops in their homes selling accessories, saving others the time and expense of a trip to town.

Kiran is an amazing success story; not only has the organization succeeded in every goal it set out for itself, it has created an immense feeling of confidence among the women and girls of Talli by empowering them with a skill that has enabled them to contribute substantially to the family income and at the same time earned them the respect of their menfolk. The organization has also decisively proven that given the chance to an alternative livelihood, women and men will take the opportunity for a better livelihood thereby reducing pressure on the country's dwindling natural resources.



More trees equal more rain

The massive flood of 2010 was a wake-up call for the people of Sindh alerting them to the reality of climate change and the havoc it can bring in its wake. The Jhole Maari Welfare and Development Organization (JMWDO) was formed in the aftermath of the disaster, with the aim of trying to stop further ecological degradation by increasing plantation and constructing pit latrines for better sanitation.

The villagers living around Keenjhar Lake and dependent on it for their life and livelihood complain that the waters of the lake have been turning an ugly yellow over the years. This is hardly surprising as waste from all habitation around the lake, flows untreated into lake. Testing of the waters of the lake shows the presence of high levels of organic and inorganic pollutants. The situation is all the more scary as Keenjhar is the sole source of freshwater in the area.



JMWDO with help from the Indus For All programme decided to tackle the problem by targeting two villages, Aaz Muhammad Jakhro and Yaar Muhammad Jakhro through the construction of 18 pit latrines, ten in Aaz Muhammad Jakhro and eight in Yaar Muhammad Jakhro. Other than the ease it has brought to the lives of the residents it has for the first time made people conscious of the importance of safe sanitation and the health hazard involved in letting untreated effluents seep into the ground.

The second goal of the society was increased plantation. In this regard the society decided to plant 7000 trees. The plan was well thought out. It was decided that each family in the village would be given 15 to 20 saplings along with the responsibility to look after them. But although the plan was good on paper the JMWDO ran into snags in the implementation stage. First, the unprecedented rains of 2011, washed away a good part of the nursery and second, JMWDO was unable to motivate fellow villagers to invest time and effort into the growing of trees.





'All the good, irrigated land around here belongs to the landlords,' says Abdul Rauf Palari, ex-President of JMWDO and the force behind the creation of the organization. 'The land that belongs to the villagers is unfertile and dependent on rain for cultivation.'

Though JMWDO had the foresight to choose indigenous trees that grow well in semi-arid conditions rather than fruit trees which require more water and care, the time and effort needed to be expended on nurturing the trees proved to be too much for the villagers. Watering the trees meant fetching water from a gully some four kilometers away. Moreover, the approach to the gully with its steep sides was difficult especially in the summer months when the water was low. Boring tube wells was never an option as the village is built on a bedrock of coal and underground water is brackish, unfit for human consumption or agriculture.

Nature, too, seems to have conspired against the efforts of the JMWDO. Where one year it rained so much as to literally wash away the nursery, the next year it did not rain at all creating drought-like conditions, further damaging the trees that managed to survive.

There was also the problem of guarding the trees from wild animals once they were planted. For men living already living life on the edge it was not practical to expect them to spend time





guarding trees and paying for a guard was next to impossible. Thus, most of the trees that were planted have been lost to neglect.

While the immediate results of the project may have been disappointing there is little doubt that the JMWDO has succeeded in making people aware of the dangers of apathy and of ignoring the effects of environment degradation. The three disastrous years in which devastating floods were followed by torrential rains and then a year of no rain have made the people receptive to the work being done by JMWDO.

The JMWDO is not disheartened by its partial success. They take their experience of the last two and a half years as a learning experience. If anything, it has increased their determination to continue with the work of planting trees. 'We have noticed more trees equal more rain,' says Abdul Rauf simply, voicing his determination to continue with the crusade to plant more trees.



Keenjhar is ours

A blue litter bin and the slogan, 'Keenjhar hamara hai' [Keenjhar is ours] has done wonders in promoting awareness about the need for a clean environment in Keenjhar and its environs.

Situated some 122 kilometers northeast of Karachi, Keenjhar Lake is a major tourist attraction. A Ramsar site and a wildlife sanctuary, Keenjhar is the winter home of migratory birds like ducks, geese, flamingos, cormorants, herons, egrets, terns, coots and others.

The lake is also an important source of freshwater supply to Karachi and Thatta and provides a livelihood to the fishermen living on its periphery.

Each year some 40,000 to 60,000 visitors come to the lake to enjoy its pristine beauty. Unfortunately, they do not always leave it in the same state. For lack of awareness as much as for lack of proper facilities to discard garbage, tourists dump leftover food, cartons, bottles and other waste in the lake or leave it lying in the open, creating a mess of a once pure environment.

Concerned about the harm pollution was causing to human beings as well as to fish in the lake the fishermen of Sohneri Village decided to take matters into their own hands. Irshad Ali, President of Keenjhar Dost Welfare and Development Society (KDWS) talks about how the residents of Sohneri got organized.

'Most people around here are fishermen and the lake is our mainstay. We watched the growing pollution with concern and worried how that would impact on our livelihood; we finally came to the conclusion that no one from outside was going to come help us and we needed to help ourselves. We formed our CBO in 2002 and we registered it in 2005.'

After having worked with different NGOs on health related issues, KDWS teamed up with the Indus For All programme to save Keenjhar Lake from further degradation. It identified two major problems that were leading to pollution: lack of facilities for waste disposal and a lack of awareness of the harm ecological degradation causes.

As the first step, KDWS decided to put up litter bins all around the lake so tourists would no longer have an excuse for littering. So far 115 litter bins with the WWF, Indus For All and the District Government's logos have been put up in various locations. Litter guards were appointed from neighbouring villages to ensure the emptying out of the bins and to gently encourage tourists and locals to use the bins. An agreement was reached with the district government in Thatta to provide for a regular, twice a week, collection and disposal of solid waste collected in the bins.

The project was tremendously successful so much so that other organizations and individuals began approaching KDWS requesting them to put up bins in their localities. Thus one bin was put up outside the Shahjahan Mosque, a major tourist attraction, and another in a park outside the EDO's residence in Thatta.

KDWS also determined to end the washing of cars and busses in the lake. Picnickers and bus drivers would drive their vehicles into the shallows and proceed to wash them thoroughly. This apparent harmless activity was a major cause of contamination of the lake through the release of oil and grease in the water. KDWS persuaded the Thatta government to pass a law, albeit temporarily, banning the washing of cars and busses in the lake. To ensure the law was implemented five men from KDWS worked on a voluntary basis with the DCO office monitoring the lake.

The most important accomplishment of the project however has been its success in raising awareness among the local population about the importance of saving and honoring the biodiversity of the area.

'We started work with the aim of creating awareness among local people as well as visitors for long term conservation of Keenjhar Lake. For this we coined the slogan 'Keenjhar hamara hai' [Keenjhar is ours] to create a sense of ownership and responsibility,' says Irshad Ali.

The target audience was neighbouring villages, tourists, students, government officials as well as the corporate sector. As a result of this campaign and the efforts of the volunteer litter guards most people are now aware of the importance of environmental issues. School children from as far away as Karachi have come to Keenjhar on cleaning campaigns. When others see school children so committed to the task of protecting the environment, they too get encouraged to get involved.

Since there is strength in numbers, the Keenjhar Dost Welfare and Development Society has joined the Keenjhar Conservation Network which is an umbrella organization of nine CBOs extending over 37 villages. The Network itself is part of the District Coordination Committee which is headed by the DCO. The Network meets every six months.

The Keenjhar Dost Welfare and Development Society is also a member of the Area Coordination Committee.

Lately, the Project has been facing some difficulties in that the District Government has become lax in the weekly collection of garbage. The volunteers have now taken to emptying the refuse in a large pit nearby. 'We can only do so much,' says Irshad Ali. 'We started this as a pilot project and it has been a success; it is now for the Government to continue the task and take it to the next level.'





Missing vultures

The vulture or *gidh* as it is locally known is not a very pretty bird. It feeds on carcasses; its humped look and curved, hairless neck gives the creature a menacing, brooding look.

Perhaps this is why the fast-declining vulture population-at the rate of about 48 per cent a year- is not given much thought, even though experts fear the species of the vulture found in Pakistan may not survive the next decade.

Thanks to WWF - Pakistan however, conservation efforts to save the vulture have been made. A conservation and breeding centre has been set up for the *Gyps* vulture in Changa Manga Forest. The facility is meant to house a safe population of vultures and breed the birds and eventually release them into the wild so that the vulture can continue to perform their role as scavengers in the ecosystem. The WWF, through the Indus for All Programme has also made a short documentary, *Missing Vultures*, to highlight the importance of the vulture in Pakistan.

Associated with bad luck and ill omen, the vulture is not the bird of choice for most people. In fact, people



on the street who were interviewed for WWF's *Missing Vultures* documentary seemed not to care about losing the vulture from our skies.

Confusion and misinformation surrounds the creature, which is why this insightful documentary, is essential to educate people about the need to save this bird from extinction in Pakistan.

Through a careful narration, interspersed between experts and the common man, *Missing Vultures* shows the extremely quick decline of this bird, the reasons behind its disappearance and the myths surrounding it.

'I wanted to make a documentary on the vulture that included not only the impact of its disappearance on our environment but to also show how its departure from our landscape can create many environmental and health hazards and even impact on our culture,' says documentary maker Ali Ijaz.

The vulture has become so elusive that for Ali and his crew a week in Nagarpakar to shoot the birds was unfruitful. There were no vultures in sight. It wasn't until they were leaving the area that they stumbled on a few, feeding on dead camels. This was a lucky break because the vulture has all but disappeared from Pakistan.

In 2001, the Changa Manga Forest had a population of around 750 vultures; today it stands at less than fifty, according to Uzma Khan, Director Biodiversity of the WWF and one of the people interviewed in the documentary. What is true of Changa Manga is also true for all of Pakistan which has seen a major decline in the vulture population.

This population crash has affected three species of vultures: The white-backed vulture (*Gyps bengalensis*), slender-billed vulture (*Gyps tenuirostris*), and the long-billed vulture (*Gyps indicus*)

The documentary maker asks ordinary citizens why they think the vulture is disappearing and gets to hear answers ranging from 'water shortage' to 'nuclear testing' to 'they killed them and fed them to us.' The real reasons are, however, neither so mundane nor so bizarre.

Although there is more than one cause to the decimation of vultures, the singular major cause in its decline

is *diclofenac sodium*, a chemical used in painkillers and injected into livestock by veterinarians. *Diclofenac sodium* is poison to the vulture. If a vulture feeds on a carcass of an animal that had been injected with *diclofenac sodium* but had died despite the medication and before the medicine had been flushed out of its system, the vulture goes into kidney failure and dies. This was discovered after a series of autopsies were conducted on dead birds and the discovery of a white substance inside the animal was traced back to the usage of *diclofenac sodium* in livestock. Eighty-five per cent of vulture deaths were traced to this chemical.

The documentary acts as a myth buster by demystifying the decline of the vulture population, but the question remains: so what if the vulture is dying?

This is the common reaction among people who may not understand the importance of maintaining the balance of the ecological system on this planet

Professor Z.B Mirza, wildlife biologist and author of the *Birds of Pakistan*, explains it best when he compares the ecosystem to a tent.

When one rope is cut out of the many that are holding a tent up, the tent loses a bit of support; when this continues and one rope after another is cut away, the support system begins to weaken and the tent sags until eventually it gives away altogether. The ecosystem, explains Mirza, is like the tent, and every species we lose, weakens our ecosystem.

A simple, beautiful explanation on why conservation is so important. And when it comes to saving the vulture there are many reasons to do so, as this documentary illustrates.

Vultures can be thought of as nature's sanitation officers. By devouring the meat from a rotting carcass its contribution to the prevention of disease is tangible, but with no vultures around to eat dead animals, carcasses now lie rotting in the open for as many as twenty to twenty-five days, explains a farmer. This not only creates a noxious odour but the carcass becomes a breeding ground for disease.

The demise of the vulture has seen the increase in the populations of other scavengers such as wild dogs. Next in line as scavengers, wild dogs have taken over the task of vultures; this has in turn drastically

increased the population of wild dogs and an increase in dog bites cases and rabies.

From the ecological impact to health issues, there is yet another angle to missing vultures that the documentary tackles-culture.

In literature, birds and animals have been used as metaphors for human characteristics for hundreds of years now. The vulture is a metaphor for selfishness and vice. In the documentary, Professor Arfa Syeda talks about how symbols and metaphors are vital for enriching literature; with the disappearance of these birds and animals the use of these symbols and metaphors too will disappear, depriving literature of its beauty and insight.

This discerning and thought-provoking documentary has now become a teaching tool on conservation for WWF - Pakistan; it is screened as part of the curriculum of eco-internship programme and is also shown to students of the green schools.

The film was showcased on several international festivals and has won the best documentary award at Alpavirama South Asian Film festival 2011. Its real success, however, lies in acting as an eye-opener and making the audience understand how important these creatures are to all of us.





Saving the mahseer

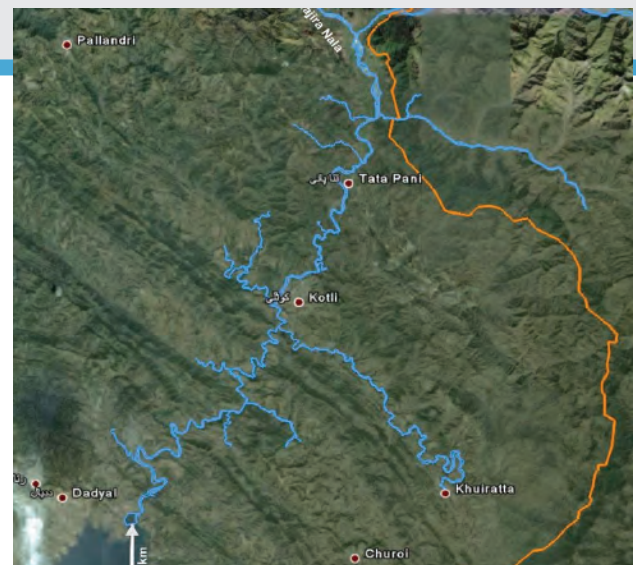
One of the most important food and sport fish of the subcontinent, the mahseer, was declared an endangered species by the IUCN in 2010. A large, migratory fish, weighing up to 60 kg and growing to a length of 2.7 m, the mahseer breeds mainly in the rivers and streams in the foothills of the Himalayas where the riverbed is sandy and graveled.

Till the sixties and seventies the mahseer was found in all the five rivers of the Punjab and in Azad Kashmir but recent years have shown a rapid decline in the population of the fish as well as a diminution in size. The main reasons for the decline have been identified as:





- Poaching during the breeding season when fishing was banned. This is when the fish migrates upstream for spawning.
- Unscientific methods of fishing such as building temporary stone dams across hill streams and the use of fine-mesh net or cloth by local poachers to evacuate the streams of all fish sizes.
- Use of dynamite/hand grenades intended for killing fish but results in large scale slaughter of all fish in the range of the explosion. This practice is more intensive during the winter and pre-monsoon season when water is low in the rivers and the fish collect in the deeper pools along the edges of the river.
- Similar to the above practice is the poisoning of streams and rivulets to catch whole schools of fish, mahseer and others.
- Fragmentation of habitat: the building of dams has affected the mahseer in two ways. One, the dams act as barriers disrupting the migration routes of the fish and secondly, by affecting the flow





of water especially in the summers when the rivers become dry as water is diverted to be conserved in dams.

- Disturbing the spawning grounds of the fish by extraction of stones, gravel, pebbles, sand, etc. from the riverbeds soon after the swollen rivers recede.
- Last but not least is the lack of research and interest in learning about indigenous fish fauna.

While there has been decimation in the population of the mahseer all over Pakistan, the decline has been more pronounced in the Punjab. There is, however, reason to hope for a reversal of the situation. The Poonch River is still home to a reasonably good population of mahseer and the fish has been successfully breeding in the upper and middle reaches of the Poonch River, especially in the Ban Nullah, Rangar Nullah, Nehl Nullah, Hajeera Nullah, Mendhar Nullah and the Titreenote areas, where the river enters from Indian Held Kashmir.

There is also another reason for hope. The mahseer matures at two years and its average lifespan is ten to twelve years; the egg laying capacity of a mature female is a few million and total fecundity anywhere from 6,000 to 22,000 depending upon its age and size. Therefore, given some measures at conservation there is no reason why the decline in its population should not be halted. Once this is done, it can in turn support sustainable harvesting of the fish, both to create livelihoods and promote tourism through sport-fishing.



The WWF through its small grants programme decided to intervene in stabilizing the population of the mahseer in the Poonch River and protecting its environment from further degradation.

The project has been successful in its main objective which was to have a National Park in Azad Jammu and Kashmir, designated specifically for the conservation of the mahseer. A preliminary management strategy for the preservation of this species has been formulated and key baseline data sets have been established for the protected area covering the physical description of the study area, water quality, habitat classification and characterization, as well as fish fauna with special reference to mahseer *tor putitora*, and other fish species of concern.

The project was also successful in mobilizing and organizing communities to participate actively in the



management of the Park and its resources through the formation of mahseer Hifazati Tanzeems [Organizations for the Protection of the mahseer]. The personnel of these organizations and local administrative officials were trained so as to enable them to actively participate in the conservation and management process. A social baseline survey of villages in these regions has been completed which can be used for planning income generating activities for the communities.

A serious effort is underway to loosen the ban on fishing which led to intense poaching and to integrate the community in commercial and domestic fishing under license, thus maintaining a regulatory system and awareness about the capture of large males and release of egg-bearing females to ensure the future of fish in the eco system. In this the Fisheries Department's river guards are being helped by the Project guards who monitor the river for violations related to habitat destruction and fishing.

A permit system for controlled and managed harvesting of mahseer fish was agreed upon with the communities through consultation, and has been approved by the GoAJK. Sec 144 was implemented to curb stone extracting from the riverbed and its tributaries where the mahseer breeds but there are still some regulatory issues that need to be resolved before this can be fully implemented.



District-wise forest cover assessment of Pakistan

Forests are the earth's lungs. They provide natural protection to the environment and are vital to maintaining healthy ecosystems-on which humanity depends. Forests play an important role in providing a natural habitat to plants, animals and microorganisms (biotic components). These interact with all the non-living physical (abiotic) components of the environment and collectively form what is called the 'forest ecosystem'-perhaps one of earth's oldest surviving ecosystems (Christopherson, 2009).

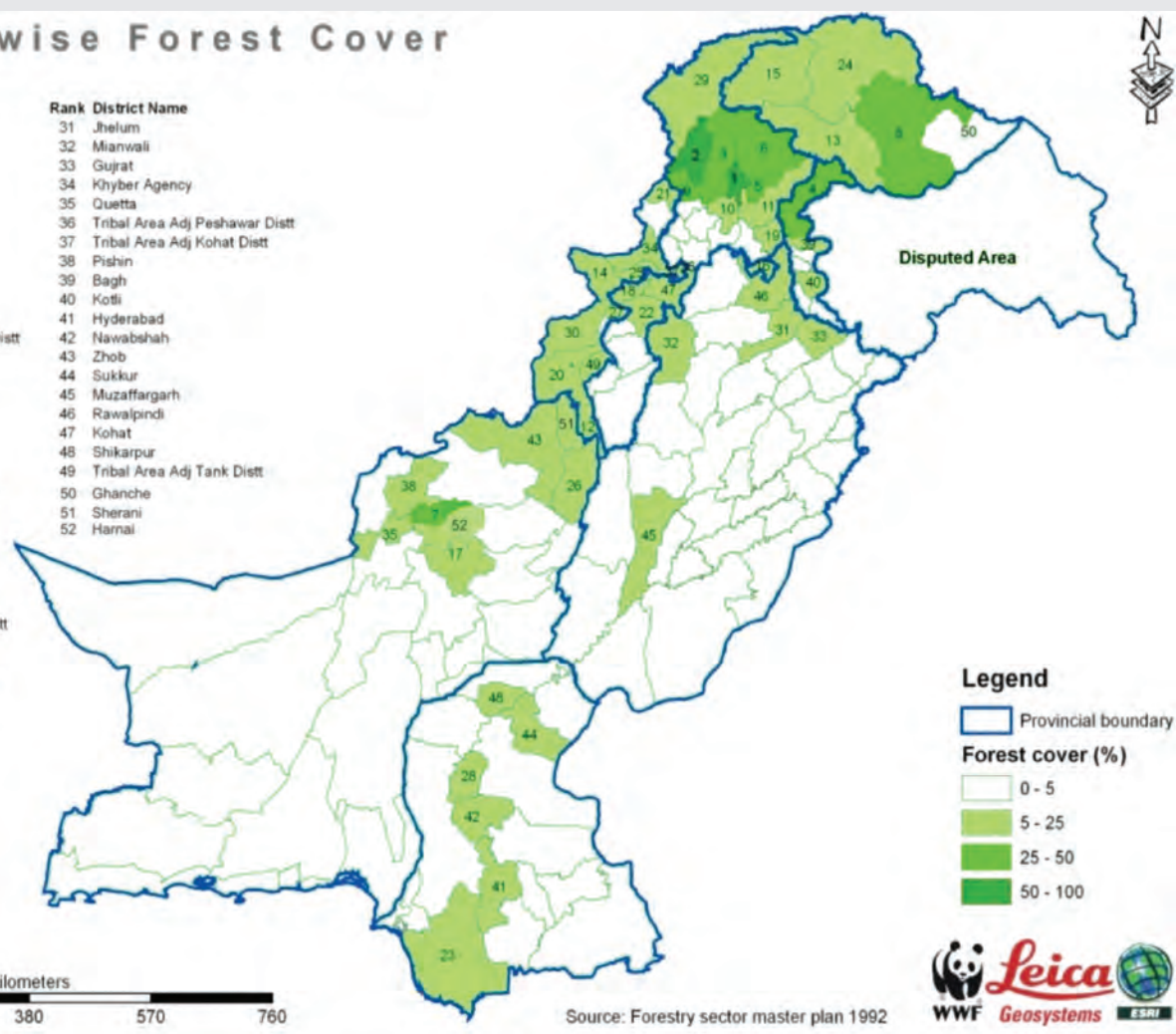
Recent research has shown that overwhelming pressure on land due to increasing population, unscientific practices in agriculture and a lack of awareness, in particular amongst the tribal natives, about the importance of forests are the prime causes for deforestation / degradation of forests.

The rate of depletion of forests and the factors responsible for their deterioration must be determined prior to carrying out an accurate assessment of the forest cover in any terrain. Pakistan has a forested area of 4.8 per cent but under the UN's Millennium Development Goals, in 2005 it pledged to increase this cover to 6.0 per cent by 2015. Pakistan is obligated to report on the status of forests in a transparent manner to various international conventions and UN agencies.

District wise Forest Cover

Rank	District Name
1	Shangla
2	Upper Dir
3	Swat
4	Muzaffarabad
5	Batagram
6	Kohistan
7	Ziarat
8	Baltistan
9	Lower Dir
10	Buner
11	Mansehra
12	Tribal Area Adj D i Khan Distt
13	Diamir
14	Kurum Agency
15	Ghizer
16	Islamabad
17	Sibi
18	Hangu
19	Abbottabad
20	South Waziristan Agency
21	Bajaur Agency
22	Karak
23	Thatta
24	Gilgit
25	Orakzai Agency
26	Musakhel
27	Tribal Area Adj Bannu Distt
28	Naushahro Feroze
29	Chitral
30	North Waziristan Agency

Rank	District Name
31	Jhelum
32	Mianwali
33	Gujrat
34	Khyber Agency
35	Quetta
36	Tribal Area Adj Peshawar Distt
37	Tribal Area Adj Kohat Distt
38	Pishin
39	Bagh
40	Kotli
41	Hyderabad
42	Nawabshah
43	Zhob
44	Sukkur
45	Muzaffargarh
46	Rawalpindi
47	Kohat
48	Shikarpur
49	Tribal Area Adj Tank Distt
50	Ghanche
51	Sherani
52	Harnai



Source: Forestry sector master plan 1992

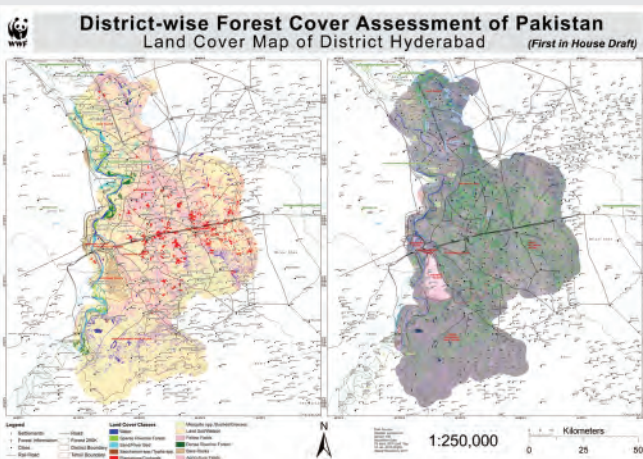
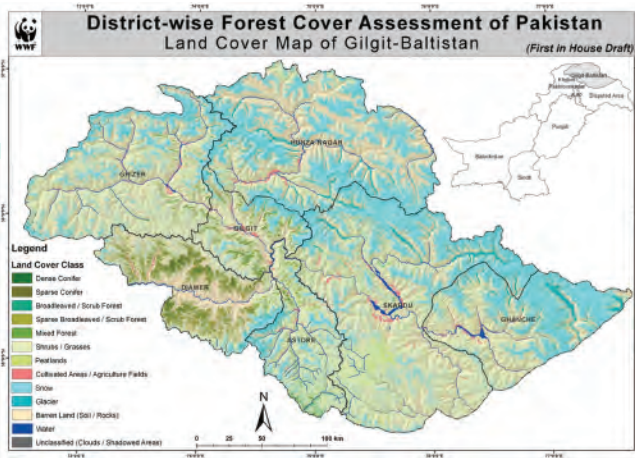
At the federal government level, reliable information on forest biomass and changes over time is required for planning, policy making and the financing of the forestry sector. At the provincial level, forest inventory is the sole responsibility of the forest departments who undertake field surveys at 10-20 year intervals, primarily for revision of work plans.

Aerial and satellite imagery is used to monitor the spatial extent of changes in land cover or land conditions. Global scale datasets from coarse resolution sensors have made it possible to monitor and measures changes in land cover, including phenology, net primary production (NPP) and other dynamic properties. Similar advances have been made in the use of high-resolution earth observation data for quantification of forest cover conversion rates, land encroachment, and to a more limited extent, for assessing the dynamics of land-use change at watershed or habitat level.

Geographical Information Systems (GIS) and remote-sensing-based tools and technologies have been in use for the last two decades to assess the forest cover in Pakistan. The national forest-cover studies based upon satellite images include the Forestry Sector Master Plan (1992) and National Forest & Range Resources Study (2004). The aim of the aforementioned forest mapping was to estimate the total national forest cover which could then be broken down for each province. The results of such studies-which presented relatively coarser details-provided baseline information that was helpful for policy level awareness and decision making. However, no organized baseline data dismantled down to the level of local administrative boundaries of districts and tehsils was available to accurately measure the current extent of forest cover or the deforestation rate of individual districts.

During the 11th meeting of the Pakistan Environmental Protection Committee (PEPC), chaired by the prime minister of Pakistan, held on 29 March 2010, it was agreed that WWF - Pakistan will assist the government in making an assessment of the state of natural forests in the country. It was decided to develop a comprehensive forest-cover inventory that was primarily focused on districts, ultimately leading to the national-scale mapping of forest resources in Pakistan. This study aimed to assess the district-wise forest cover of Pakistan to determine the current forest cover, disintegrated down to the local administrative boundaries.

As a first step, a national consultative workshop on 'District-wise Forest Cover Assessment of Pakistan' was held from 31 May to 4 June, 2010 in Islamabad. Twenty-five (25) professionals from the ministry of environment, provincial planning & development departments, provincial forest departments, national space



applications agency, and NGOs participated in the training. A collaborative framework of the study was prepared for the National Forest Assessment of Pakistan.

Forty-nine (49) districts were selected on the basis of a specified criterion, i.e., districts with a forest area 5 per cent with respect to its total area. Of these forty-nine districts, fifteen were from KPK, nine from FATA, six from Sindh, six from Balochistan, five from Punjab, four from GB and three from AJK and Islamabad. It was agreed in the workshop that satellite images acquired after 2007 with a spatial resolution of not less than 30m that mainly corresponds to the Landsat TM specifications, would be used for the study. While

considering the suggested minimum spatial resolution (30m) and expected scale of output maps (1:100,000 - 1:50,000), it was suggested to use 1 ha as the minimum mapping unit for the study.

Latest Landsat TM and SPOT satellite images were acquired and processed with pixel-based classification and semi-automatic, object-based image analysis techniques. The minimum mapping unit, as agreed in the aforementioned workshop, was 1 ha while Universal Transverse Mercator (UTM) projection system was used in map production. A subset of the LCCS-based land-cover legend (developed during the consultative workshop) was adopted for the current study to harmonize the different land-cover categories for District-wise Forest Cover Assessment of Pakistan.

The preliminary, draft land-cover maps developed during the study were shared with the respective forest departments in the provincial consultative workshops. Field verification surveys were organized to improve the accuracy of the land-cover maps. In addition, high resolution satellite images available through Google Earth were also used for the identification of land-cover class. Corrections observed during field visits were incorporated in the final forest-cover maps. Design and compilation of a District-wise Forest Atlas both in digital and paper format is in process.





Palari:

hunters turned conservationists

The Palaris are a hunting community. For generations they have used their skills in

hunting to fend for themselves and to provide service as guides to other hunters. Given the rapid degradation of the natural habitat in Sindh, the Indus for All Programme decided to harness the hunting communities for the protection of wildlife. One such project was focused on the protection of the partridge population of the province.

Once found in abundance in Sindh, the black and grey partridges are fast vanishing from their habitat due to wanton hunting, excessive use of pesticide and land-use changes. Especially threatened is the black partridge which has recently been declared the provincial bird of Sindh.

In September 2009, with the help of the Indus for All Programme the Keenjhar Maroonara Welfare and Development Organization (KMWDO) was set up in the village of Amirpir near Jhimpir, Thatta. The organization was awarded with a project under the Partnership Fund with the aim of improving the natural habitat for the conservation of the grey and black partridge by establishing a protective environment with the help of the hunting communities; promoting environmental awareness by focusing on nature conservation; providing alternative livelihood options to the hunting communities in jobs such as eco-guards; and establishing a partridges rescue and rehabilitation centre.

To achieve its goals, KMWDO inducted representatives of local communities from nine villages and a project committee was set up to implement and supervise the project activities.

Kamal Palari, Chief Patron and former President of KMWDO, speaks of how communities were mobilized to declare a no-hunting zone to protect wildlife and partridges in particular.

We are Palaris, hunters by profession. The people from WWF would come and sit among us and talk to us. Gradually we became friends and little by little we got convinced by what they had to say. Once we started supporting the WWF cause it was not difficult to get others to listen to us because we are renowned as hunters and people respect what we have to say about wildlife.'

The Palaris were helped in their quest to protect the partridge by the Dars community whose community conventions forbade them to hunt partridges; they were also encouraged in their mission by the Syeds who traditionally capture partridges from different areas and release them in their own lands.

An initial survey was carried out by KMWDO to determine the population of the partridges in their area but the survey methods were faulty since the people involved in the survey had no training in taking surveys nor did they have any previous experience. After receiving some training to assess the population of partridge from WWF, a second and more accurate survey was carried out in 2011, which showed that there were 11,500 grey partridges and only 300 black partridges in the surveyed area.

According to Kamal Palari one reason for the low number of black partridges is their poor rate of survival. Of the eight or ten chicks hatched from one brood, only three or four survive, the gender ratio of survival being two per cent for male and three per cent for female chicks. The chief threat to the chicks is the male partridge which kills its young; to preserve its chicks the female hides herself and her litter from the male and other predators. Once mature, the male is still prey to its own kind in that males are prone to fighting and injuring each other leaving themselves vulnerable to being killed by reptiles and animals such as snakes, monitor lizards, mongoose, jackals, jungle cat, civet and foxes.

While the KMWDO was quickly able to win over the residents of the area and establish a no-hunting zone it has not been easy keeping hunters out. The hunting parties which descend on the area in winter are often made up of influential people—Members of National Assembly (MNAs), Members of Provincial Assembly (MPAs), judges, army officers, foreigners and high ranking bureaucrats—and KMWDO comes under great pressure to allow them to hunt.

In the last two years, conflicts with hunters have escalated to the point that the police have had to intervene. Since the other side is more powerful, the police usually favour the hunters. With not much to fall back on, Kamal Palari says the Palaris have to use their personal resources to fight back.

A great accomplishment of the KMWDO has been the construction of a partridge rehabilitation facility. Completed in July 2011, the rescue centre is a 40 feet by 150 feet enclosure covered by a fishing net set on bamboo poles. Great care has been taken to ensure a natural environment inside the enclosure. The land for the rescue centre was donated by Zahid Palari, a member of the community. So far the centre has been home to fifteen grey partridges: six female and nine male; one black female partridge, and a sandgrouse. All the birds, with the exception of the black partridge, were rescued from hunting parties; the black partridge was injured and rescued from the wild. Eco-guards are responsible for the care of the rescue centre.

The KMWDO has had great success in creating awareness and putting an effective control on partridge hunting. Left to themselves they have no doubt that their efforts at conservation will bear fruit in time but they are up against some powerful forces. They worry, and rightly so, that without proper backing from other environmentalist groups and the Provincial Wildlife Department they may lose the fight in the long run.





**Parakeets:
losing to the
export market**

The Common Parakeet in Pakistan was once considered common enough to be exported: 25,000 a year to be exact. That was until it was realized that the common parakeet, would no longer remain 'common' if exports were to continue at this rate.

It started when the National Council for Conservation of Wildlife (NCCW), which regulates the trade of wild fauna in the country, asked the Zoological Survey Department (ZSD) whether a quota of 25,000 parakeets a year was causing a decrease in the parakeet population.

The ZSD said 'yes' and a ban on export was imposed by the NCCW in 2008. However, a news report rightly published an article stating that no survey had been conducted to determine the population of the parakeet and therefore there was no way of determining if there was an actual decrease in its population and the ban thus had no documentation to validate it.

This is where the WWF stepped in. Through its Indus for All Programme it agreed to support a survey of the parakeet populations in 23 districts of Sindh and Punjab. Accordingly, ZSD was given a grant and with the help of the Wildlife Departments of both provinces a survey was conducted.

Meharban Ali Barohi one of the surveyors of the ZSD said, 'in some areas their populations of parakeets seemed so huge that hunters would insist that large populations exist and numbers are not falling.'

However, the survey proved otherwise.

Having surveyed 13 districts in Punjab, the study showed that the total parakeet population, Rose Ringed and Alexandrine combined, was an estimated 58,818, yet the yearly quota to export these birds stood at 25,000.

In Sindh, where only the Rose Ringed parakeet was observed the estimated population in 15 districts was 18,688 only.

This project allowed the NCCW to sustain the 2008 ban until now; it also suggested that the ban remain in force until a countrywide survey could be conducted.

The reason for a countrywide survey is extremely important as in the earlier survey ZSD only surveyed the Rose Ringed and Alexandrine parakeets in two provinces, yet Pakistan is home to four different species of parakeets, the other two being the Plum-headed parakeet and the Slaty-headed parakeet. A countrywide survey will provide a population estimation of all the species, providing more information to determine their conservation status.

Controlling exports is not always easy because the parakeet has a popular market. An adult Rose Ringed or Alexandrine parakeet, which are the most commonly exported, will bring in quite a good sum of money for sellers. According to market surveys an Alexandrine chick fetches as much as Rs. 8000/- and an adult about Rs12,000/- to Rs16,000/- while the Rose-ringed chick is sold for about Rs. 2000/- .According to Meharban Ali Barohi there is a real lure in the hunting and capture of these birds.

The seemingly abundant population of this common bird combined with easy sale may prove the undoing of this charming bird unless people are educated through an awareness campaign of the need to protect the parakeet. As Meharban Ali Barohi puts it, local populations need to understand how saving this species is beneficial to them too.

With the survey concluded and the NCCW now with proper proof of sustaining the ban, a countrywide survey needs to be undertaken to have proper data on the parakeet population.

In the meantime authorities need to strictly monitor the export and illegal smuggling of these birds. If this is not done, soon people all over the world may enjoy having a talking parakeet as a pet in their homes, but Pakistan will have lost this precious bird in its natural habitat.

Acronyms

AJK	Azad Jammu and Kashmir
ANP	Ayubia National Park
CBO	Community Based Organization
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CKNP	Central Karakorum National Park
CO ₂	Carbon dioxide
DCC	District Conservation Committee
DCO	District Coordination Officer
EDO	Executive District Officer
FATA	Federally Administered Tribal Area
GB	GilgitBaltistan
GIS	Geographical Information System
IUCN	International Union for Conservation of Nature
JMWDO	JholeMaari Welfare and Development Organization
KDWS	Keenjhar Dost Welfare and Development Society
KMWDO	Keenjhar Maroonara Welfare and Development Organization
KP	Khyber Pakhtunkhwa
MNA	Member of National Assembly
MPA	Member of Provincial Assembly
NCCW	National Council for Conservation of Wildlife
NGO	Non-Governmental Organization
NPP	Net Primary Production
PEPC	Pakistan Environmental Protection Committee
PF	Partnership Fund
PIU	Programme Implementation Unit
PMU	Programme Management Unit
REDD	Reducing Emissions from Deforestation and Forest Degradation
SC	Scientific Committee
SSNVCDO	Sundus-Sarfaranga-Nansoq Valley Conservation and Development Organization
UN	United Nations
UPM	Universal Transverse Mercator
WWF	World Wide Fund for Nature
ZSD	Zoological Survey Department

Our Mission

WWF - Pakistan aims to conserve nature and ecological processes by:

- Preserving genetic, species and ecosystem diversity
- Ensuring that the use of renewable natural resources is sustainable, both now and in the longer term
- Promoting actions to reduce pollution and the wasteful exploitation and consumption of resources and energy

Vision of the Indus Ecoregion Programme

"People coexist with nature in complete harmony and biodiversity flourishes in its entirety"

Indus For All Programme, WWF - Pakistan Programme Management Unit (PMU)

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Keti Bunder

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Gharo City, District Thatta, Sindh

Tel: +92-29863306

Keenjar Lake

Keenjar Conservation and Information Centre

P.O 73120, Village Abdullah Gandhro

Taluka and District Thatta, Sindh

Tel: +92-298624571



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