

LAND RESOURCE CONSERVATION

LAND, the most scarce resource of Bangladesh, receives the least attention from those who live on it.

In the absence of a land resource conservation policy degradation of land has been continuing for centuries.

Bangladesh has a total land surface of about 13.51 million hectares. Almost all the land areas are being used for agriculture, industry, forestry, settlements or for meeting other socio-economic needs. Practically, there is no land left, that can be reclaimed for profitable use. On the other hand, productivity of a good portion of land is being degraded every year because of various reasons.

According to the first Land Resource Inventory of Bangladesh at reconnaissance level, conducted during 1963-1974 by the Department of Soil Survey (now Soil Resources Development Institute (SRDI)), Bangladesh possesses only 1.5 per cent very good agricultural land, 34.5 per cent good agricultural land, 34.4 per cent moderately good agricultural land, 15.7 per cent poor agricultural land and 8.9 per cent very poor agricultural land.

Broadly, Bangladesh has three landscapes, floodplains, terraces and hills.

Floodplains constitute about 80 per cent of the total land surface, whereas terraces and hills constitute about 8 and 12 per cent, respectively.

Apart from human interferences and natural factors, population pressure in a predominantly agrarian economy has posed a serious threat to the conservation of land resources. The current trend is towards an increase in land degradation. The present land tenure

and land ownership patterns are highly favourable for land degradation, notes a recent report on land management in Bangladesh by Rezaur Rahman, former director of SRDI.

According to the report in 1977 about 50 per cent of the total agricultural land was owned by about 10 per cent of the families. The number of landless families has been increasing with the passage of time. In 1960, there was 28.1 per cent landless families and the figure has increased to 56.5 per cent in 1988.

The report on the land management identifies as many as 18 major factors that contribute to the degradation of land, 14 of them are caused by human interferences.

These factors are:
(a) Improper cultivation of sloping land resulting in landslides, topsoil erosion and deposition of eroded sediments on the riverbeds, depressions and on the agricultural land of the low lying areas. This human action causes land degradation like rising unproductivity in eroded land and blocking waterways preventing easy drainage and raising the reservoir beds.

(b) Sifting cultivation by clearing and burning forests denude forest areas and make the land unproductive.

(c) Unplanned but intensive rural network of roads, particularly in the floodplains has caused drainage congestion resulting in localized man-made floods during peak monsoon period.

(d) Uncontrolled growth of brick fields, active or abandoned, have been consuming a substantial area of good agricultural land.

(e) Urbanization without a land-use policy often grabs

good agricultural land. Vertical expansion of district and Upazila Headquarters could have saved much of the land now used for horizontal expansion.

(f) Most of the industrial estates and industrial units are being established on good agricultural land.

(g) The present unplanned rural settlements, occupy 15 to 20 per cent of the total land surface of Bangladesh. There is no regulation that can control unplanned settlement in the rural areas.

(h) Over exploitation of bio-

Shamsul Huq Zahid

mass from the agricultural land, particularly in the barind tract, has been making the fertile land unproductive. As a result most of the agricultural land is now facing sulphur deficiency. According to Dr. Zahurul Karim, Member (Soil and Irrigation), Bangladesh Agricultural Research Council, about 4 million hectares of land is now deficient in sulphur. The shortage of fuelwood and fodder has been the major cause of the over exploitation of bio-mass from the fields.

(i) The most serious land degradation in Bangladesh has been the river-bank erosion. Apart from land loss, thousands of families are made homeless every year by erosion, particularly along the major river banks.

(j) The year-round transplanted rice cultivation keeps the land continuously water-

logged for years together. This causes land degradation through the deposition of toxic compounds in the soil and loss of essential nutrients through deep percolation.

The Report prepared by Rezaur Rahman recommends formulation of a comprehensive land resources conservation policy that would give a direction for sustained land management. It says, most of the existing legislations relate to land administration, not to economic and productive use of land. The report stresses that adequate institutional arrangement and appropriate technology for effective land resources conservation programme should be ensured through inter-agency co-ordinations on land utilization.

It is suggested in the report that sustained land resource conservation should receive priority in land management in all agricultural research institutes in the country.

Dr. Zahurul Karim thinks that some basic issues of land-use should be looked into by the policy planners. The issues are: increased afforestation to reduce environmental change in the existing practice of continuous irrigated agriculture in the upland areas, move to raise productivity in the coastal areas through improved management of polders.

He says that the massive embankments constructed over the years have no relevance to the ecology and efficient land-use. Because of higher cropping intensity in many areas, depletion of soil nutrients has been going on at an alarming rate. Deficiency of sulphur and zinc is the result

of the high cropping intensity. He points out that in these areas, annual replacement of nutrients has been only 10 per cent.

Dr. Haroun er Rashid of Bangladesh National Conservation Strategy, says though a number of Government agencies and ministries have expressed their concern about the present land-use pattern, the Ministry of Land, the lead agency in this respect, has shown little interest.

Dr. Rashid feels that for evolving an appropriate land-use programme, pilot projects should be undertaken in at least six Upazilas situated in different eco-systems. He suggests that to reduce the impact of land degradation on the environment, afforestation should get top most priority.

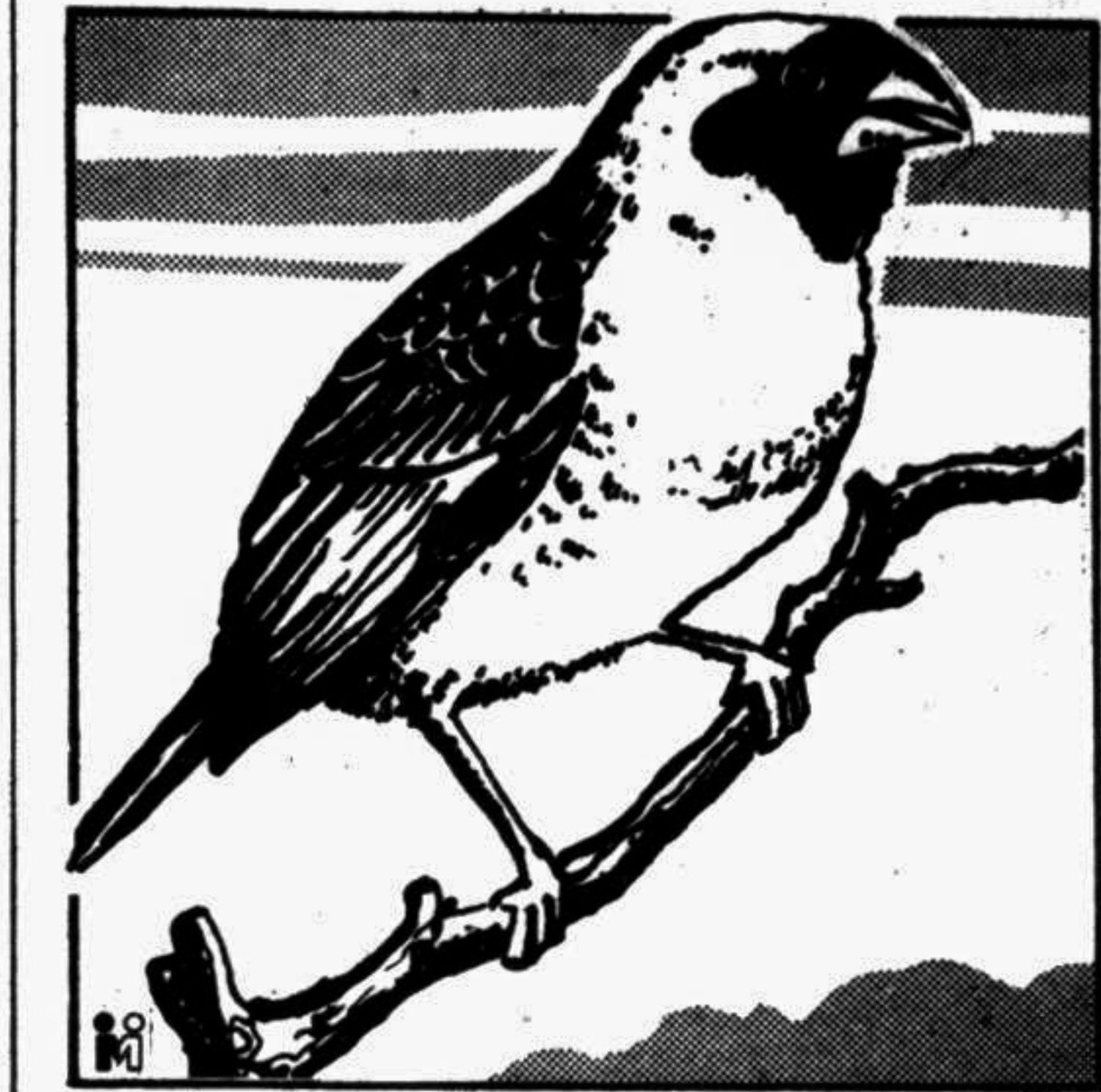
He says, denudation of forests in many parts of the country has resulted in topsoil erosion, since indiscriminate felling of trees increases the rate of topsoil erosion by about 20 times. In this context he refers to Madhupur Tract where topsoil erosion has become a serious problem.

According to a soil expert, "Politicians, decision-makers and planners often do not see the land as a natural body as the scientists see it".

The warnings of Bangladesh scientists with respect to continuous irrigation and application of chemical fertilizers, use of good agricultural land for non-agricultural purposes and lack of integrated approach towards development of physical infrastructures and coastal polders are on record. But awareness among the decision makers, planners and the people in general in this regard is lacking.

Tiny Pest Bird is Ravaging Food Crops Again

Increased human population is decimating wild grass in some areas of Kenya and depriving the quelea bird of its natural food — the grass seeds. As a result the bird, a pest in many parts of Africa, is ravaging crops. It is invading farms, eating large quantities of wheat, rice, millet and sorghum and, reports Gemini News Service, threatening efforts to make Kenya self-sufficient in food, by Charles M. Ngugi.



RED-BILLED QUELEA
Nests by the million

THE quelea bird is on the rampage in Kenya again. It is ravaging crops because it is not getting enough of its natural food — the seeds of wild grass. Pressure of human settlement on river terraces, plains and seasonal wetlands has decimated the grass.

The bird, known as the red-billed quelea, and scientifically called *quelea quelea*, is native to tropical Africa. It forms enormous breeding colonies, often of millions of nests in grasses and papyrus.

Scientists say it is monogamous. Each pair produces two to four young in a brood, and each female anything from two to 15 young in a year. The quelea is 11-12 cm long and looks like a sparrow, brown but with a bright red beak. It can eat three times its weight in grain in a day.

It is now hitting agriculture at its weakest point — by invading farms, eating large quantities of wheat, rice, millet and sorghum, and threatening efforts to make Kenya self-sufficient in food.

The demand for wheat and rice is rising steadily because of increased urbanisation and changing eating habits. The country still imports large quantities of both crops.

Sorghum and millet are being vigorously promoted as indigenous crops with great nutritional value and as suitable

crops for the country's huge tracts of marginal land. The quelea has been upsetting these aspirations.

In January, the birds were reported in Nyanza rice schemes to the west of the country. They were also in Central Kenya at Mwea irrigation scheme where the crop protection department in the Ministry of Agriculture spent the entire Christmas week fighting the birds with chemicals.

Late last year, quelea birds struck Nanyuki, attacking wheat crops being grown by small-scale farmers. They are a major menace to wheat farms in Narok, the most important wheat-growing district in the country, as well as Nakuru, Uasin Gishu, Laikipia and Samburu districts.

Estimates of damage are not dependable, but many people say they are "colossal." The birds take cereal seeds only from the ripening heads of plants, and quelea are rarely implicated in losses of planted seed.

Generally, the seeds are removed whole, but in the case of the larger sorghum they are broken by the bird's beak. Damage is generally uneven within a field, being greatest in those areas adjoining thick cover provided by trees or bushes.

Although quelea damage is distinguishable from rodent

damage, it is not distinguishable from that caused by a large number of other bird species. For this reason, the presence of large numbers of quelea in an area, scientists warn, does not necessarily mean the bird damage seen in fields can be attributed to this species.

This is because quelea seriously damage cultivated crops only when they cannot obtain enough wild grass seed.

Scientists have identified major breeding areas in the sprawling Tsavo National Park, the area around Lake Magadi, Huli Hills in Marsabit, and the Meru National Park.

In the dry season — a crucial time in the farming calendar as most cereals are then drying in the fields awaiting harvest — quelea feed in flocks of hundreds or thousands.

Each night flocks assemble in huge communal roosts in trees, bushes or fall grasses. At the end of the dry season, quelea migrate, mainly to breed. The length of their migration distance varies according to locality.

In East Africa the flight may be up to 2,000 kilometres, whereas in West Africa a different species migrates only 500 km.

No method of biological control of the quelea is known. Hawks and falcons eat them, but they are always in very small numbers compared with the density of the quelea.

One way to control the pests is to destroy roosts and colonies whenever found, but such a strategy is unlikely to succeed.

The method of control adopted in Kenya is aerial application of a chemical called fenthion (queletox) to bird concentrations at dusk when they are asleep in tree roosts.

Aircraft are provided by the Desert Locust Control Organisation, a UN-affiliated organisation based in Addis Ababa, of which Kenya is a member.

Scientists also recommend avoiding crop damage by adopting certain cultural practices, such as planting so that the harvest coincides with a period when the birds have ample wild food, or when they are away on migration.

The efficiency of such avoidance is limited, scientists warn, since in most regions planting time is largely dictated by the timing of the rains. - GEMINI NEWS

Benin's Garbage Transformed Into Bounty

by Ruth Massey

PORTO Novo, the capital of Benin, has a population of just 150,000 and a run-down, ramshackle look to it.

Its narrow streets are lined with the red earth walls of 16th Century homes that once belonged to Portuguese who sold slaves and tobacco to the Americas.

These once-grand colonial buildings are crumbling now, vying in decay with the mountains of garbage that lie rotting in the streets.

There used to be even more garbage in Porto Novo. It was never collected, and one heap grew as high as a four-storey house.

The stench drove people from the neighbourhood, and the health hazard was growing too.

Then a rural development expert, Veronique Gnanih, suggested creating a composting centre in order to transform the garbage into fertilizer. This would, she argued, help enrich the poor soil of the Porto Novo region, and create jobs.

Veronique obtained funding for the project from the Centre Panafricain de Prospective Sociale (CPPS).

Her first challenge was to procure a site on which to recycle the rubbish, and CPPS bought seven hectares of land in the village of Tohoue to launch the project on an experimental basis.

The scheme was then joined by Emmaus International, a French NGO, which provided a tractor and two trailers.

Says Veronique: "We parked the trailers in two locations — one near the station and the other near the football stadium — and people started dumping their rubbish in them. It was as if they knew instinctively what the trailers were there for."

Every evening the tractor tows the trailers back to the recycling centre in Tohoue.

where 21 once-jobless youth sort the garbage.

First, they remove plastic, metal, glass and all other substances that do not decompose biologically. They sell the metal to a blacksmith. The glass is crafted into jewellery by local artisans. They keep aside plastic because they cannot find a use for it.

The organic refuse is thrown into pits and covered with palm fronds. As the fronds rot, they turn the garbage into compost. Humidity, air flow and heat are checked regularly to ensure that fermentation takes place correctly. After two months the compost is ready for use.

Gnanih says: "Samples sent to a laboratory at Toulouse University revealed that the compost did not contain enough nitrogen to allow adequate fermentation. The laboratory proposed adding water hyacinths to the compost."

As it turned out, water hyacinths with a high nitrogen content were found growing in abundance on the lagoon outside Porto Novo. In fact, they were depriving fish of oxygen, a fact which was worrying local fishermen. "Now, when we take hyacinths for our compost," says Gnanih, "we're doing the fishermen a favour."

Also on the recommendation of Toulouse University, the centre built a latrine with a small wastewater purification tank, which doubles as a nursery for fish. The latrine empties into a long, shallow tank lined with blue plastic.

The staff periodically add water hyacinths, which proliferate in the nitrogen-rich water. Besides being used for compost, the plants, which are rich in Vitamin A make nourishing fodder for pigs and chickens.

Chickens fed on the plants produce eggs with harder

shells and yellow yolks. The tank is kept relatively free of flies, thanks to frogs that live in the web of water hyacinth leaves and feast on flies and mosquitoes that are attracted to the pond.

Tilapia and catfish thrive on the pond's fecal matter, acting as purification agents and helping render the tank free of odours.

In addition to producing the compost, for which they are paid \$1 a week, the youths employed by the scheme have branched out into market gardening. With funds from the UNDP's (United Nations Development Programme) Partners in Development, which supports small, innovative NGO projects, the centre bought seeds and extra hectare of land.

Malnutrition, illiteracy and poverty are endemic to this region of Benin. Its sandy soil, never rich, has become still

poorer due to over-use.

Yet in one year 18-year-old Kodjo Gato, who works at the centre, proved that the soil of Tohoue can produce lots of tasty vegetables. He says: "My father and friends told me it was useless even to try growing anything on this land."

"They couldn't believe their eyes when they saw our spinach. Using five wheelbarrows of compost, we got three crops from a plot of 120 square metres."

The villagers are now paying \$2 for a wheelbarrow of compost to use on their own gardens. Gnanih says: "They were amazed at the amount of corn and manioc they could produce on what they thought was infertile soil."

In addition to spinach, the youths grow cucumbers, green beans, cabbage, peppers and onions.

Because meat is expensive in Tohoue, the project organisers are also cultivating vegetables rich in protein, such as "ablat", a bean that requires very little water to grow.

"We just put in a bit of compost around the foot of the plant and it produces beans all year round," says Gato, who has learned to make seed beds and keep records of plantings, harvests and sales.

Many who buy the produce say it is of higher quality than vegetables found on the local market. It also keeps longer. "We were able to keep cucumbers for one month without refrigeration," says Gato, adding that cucumbers usually start to rot after a week. "Now we are experimenting with cabbage to see if it too will keep longer."

As with other young men selected to work at the centre, Gato says he has learned enough about market gardening to be able to train others.

Among others, the purpose of the training is to train people from these countries who will be able to advance and promote the use of biological control techniques in their own countries. Dr. Talekar says.

More and more, chemicals are proving worthless and traditional enemies of the pest seem to be the only resort to turn to, he adds. He also lamented the hazards brought about by chemical and the dangers they pose on the environment.

Dr. Talekar is supervising a two-month training of eight crop protection specialists from Thailand, Philippines, Malaysia and Indonesia on the integrated pest management of diamondback moth, with emphasis on biological control using the three parasites. It includes mass rearing and management of the parasites as well as using natural control methods against the insect pest.



Attacking the garbage: Benin workers separate the non-biodegradable materials. Inset: Veronique Gnanih

Parasites, Not Chemicals, Help Save Cabbage Patches

by Michael A. Bengwayan

gists) at the Asian Vegetable Research and Development Centre (AVRDC), based here. The AVRDC is the only research centre in the world which specialises on vegetables. Its work includes researches on breeding, cropping systems, germplasm banking, pest and disease prevention and control and training.

In two major vegetable raising countries in Taiwan, the three parasites were found to be most effective against the diamondback moth. Farmers reported a US\$4,000 savings per hectare by using the parasites instead of the previous

practice of using chemicals. "Although research has been increasing, the problem is becoming worse daily," Dr. Talekar says. "Man-made chemicals have not eliminated nor stabilised diamondback moth infestation in vegetable fields. In Taiwan alone, 33 chemicals have been introduced against the insect pest to no avail."

The reason is that the moth easily builds resistance to any chemical used against it more than once. In the northern part of the Philippines, which is dubbed as the vegetable bowl of the country, it has become impossible to raise cabbages

with out losing half of cabbage plants due to diamondback moth attack during summer. All the chemicals against the moth in that country have little effect.

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Living Plant and Animal Museum Planned as Giant Park

TWO huge parks in Nepal and Tibet would be joined to a region of unspoiled forest and valleys under a plan to save one of the last pristine and varied ecosystems in the Himalaya region.

Nepali botanist Dr Tirtha Bahadur Shrestha, who headed the task force that proposed the project, says the area "is like a living museum of diverse animal and plant species."

His team recorded more than 3,000 species of flowering plants, including an oak species never recorded in Nepal before. Wildlife include endangered species like the red panda, the musk deer, the Himalayan black bear and the world's most elusive cat — the snow leopard.

Two bird species, the spotted were babbler and olive ground warbler, were also seen there for the first time. The forests are home to another 14 endangered bird species.

Under the project the two adjacent preserves in Nepal and the Tibetan Autonomous Region of China together total about 40,000 square kilometres of protected area.

The Gomolangma (Everest in Tibetan) Nature Preserve, north of the world's tallest peak, stretches over 35,000 square kilometres in the high plateau. It was set up in 1989.

The establishment of a similar high-altitude park in Nepal is being proposed by the task force to the department of National Parks and Wildlife Conservation, supported by the US-based Woodlands Mountain Institute. It will be called the Makalu-Barun National Park and Conservation Area.

Two existing parks — the Mount Everest National Park and Langtang National Park to the north of the Nepal capital — will be joined to the new area. Some parts of the region are yet to be permanently inhabited.

The region's unique topography climbs from about 435 metres near the confluence of

the Rivers Arun and Sankhua to the peak of Mount Makalu (8,463 metres). Within 40 kilometres it takes in subtropical foothills and alpine slopes.

Among seven valleys radiating from Mount Makalu, the Barun Valley contains plant and species ranging from tropical evergreens to alpine shrubs.

The task force says eight bio-climatic zones in a single sweep of mountain slope produce unique interaction among species and communities of plants and animals.

The proximity of the pristine forest habitats of the Barun Valley in Nepal and the Kama Valley in Tibet also enables constant biological interchanges along the cross-border corridor.

The Nepal Himalaya is visited by about one-third of the 250,000 tourists who come here every year. This and a rising local population in the foothills have put tremendous pressure on the local resources.

Scientists fear that, once the tourists reach here, the Barun Valley could end up with the infamous "toilet paper trails" and "garbage mounts" seen in the Everest foothills.

Demographers say that at present growth rates of 2.6 per cent Nepal's 18 million population will double in two decades. This will increase pressure on the forests.

The report has found that the per capita consumption of firewood per family in the area is 1,000 kilograms against the Nepal average of 600 kilograms.

Hunting also threatens the wildlife. Black bear gall bladders sell for \$330 — a substantial sum for villagers living off \$130 a year.

The proposed conservation region is also the catchment

area for Arun River in Nepal, on which a major hydro-electricity project is being built. The project, supported by the World Bank and a consortium of donors, is of great economic importance to impoverished Nepal, which plans to sell the power to India.

About 80 per cent of the Arun catchment is in Tibet and the Makalu-Barun area covers about half the Arun drainage has in. Unless the park is established now, it will be difficult to cope with the problems and the people that will come here once construction of the 402 megawatt project starts.

Communities of indigenous Nepali highlanders, the Rais, Sherpas and Shingsawa farmers, live in the lower reaches of the Makalu-Barun region. Even though economically isolated, they are rich in traditions still unspoiled by external influences.

The conservation plan would preserve the local traditions and improve rural living in the hinterland. The report proposes zoning "strictly preserved areas, protected areas and special sites and trails."

It also suggests a conservation area with community forests, grazing land and agricultural and human settlements. Shrestha says: "This will be a people-protected park." There are 32,000 people living in the conservation area.

Some experts in Kathmandu are not so sure everything will be as easy as it sounds in the document.

The big question is, "Who is going to pay for it?" Bob David, of Woodlands Mountain Institute, says the first phase till 1995 will cost US\$7,827,000.

He assures: "The commitments have already been made and the money will come." Hunting for funds for the second phase will have to start soon. — GEMINI NEWS

TAINAN (Taiwan): What 33 chemicals could not do, three lowly parasites can.

And so it seems with these insect parasites found effective against the diamondback moth, the most destructive pest of cabbage worldwide.

The larvae of the diamondback moth is the most destructive stage of the pest. An infestation of the larvae can easily wipe out thousands of cabbage patches by defoliating the leaves.

Two parasites—*Diadegma eurocephala* and *Apanteles plutellae*—lay their eggs in the diamondback moth larvae, killing the larvae in the process.

The other parasite—*Trichogramma chacoensis*—kills the eggs of the diamondback moth. Of the three parasites, *D. eurocephala* is the most effective, says Dr. N.S. Talekar.

Dr. Talekar is the chief insect scientist for entomolo-