

Feature

Environment

# Survival of Gayal Relates to Economy and Environment

THE Gayal is one of the most important animals in Bangladesh and could be used in a breeding programme to develop some beef cattle lines. This animal has prominent beef-type character and has acclimatized in this country. It is reported to be very hardy and capable of thriving in any adverse environmental situation. It belongs to the family Bovidae, tribe Bovini, group Bovina, genus Bibos and species Bibos Frontalis. The Gayal is found as a semi-domestic cattle in the hilly area of Bangladesh.

The range of distribution of Gayal includes eastern India (Mishmis, Mize, Nagas), the Chittagong Hill Tracts (Bandarban) and some of the Burmese hill ranges (Arakan and Chin hills). A Gayal farm has been established with about 150 heads of Gayal at the Keukerdang hill of Ramu Thana in Bandarban district. Gayals are maintained naturally as a grazing animal, some times they brows freely in the forest. They remain in a group that includes Gayal cows, bulls, heifer and calves. They are reported to breed naturally among themselves. The cows are calving, nursing and giving milk to their calves naturally in the forest. The villagers (tribal people) can easily catch Gayal with salt. At present eight Gayals consisting of three bulls, two cows, two male and a female calves are kept in a confined condition in the regional research station of Bangladesh Livestock Research Institute, Naikhonsory, Bandarban for the purpose of studying their behavior, feeding practices, physiology and other economic characteristics.

Biology

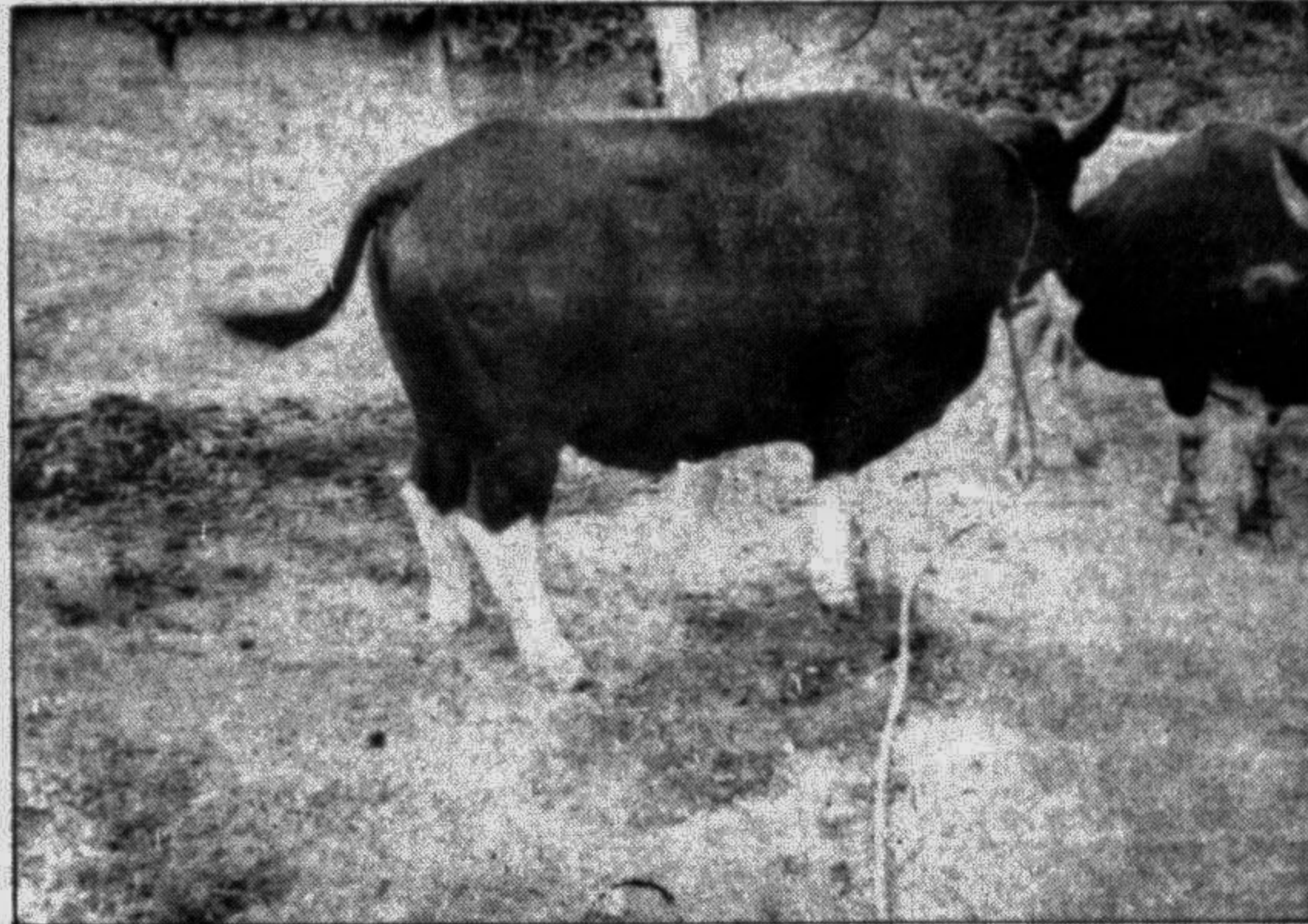
According to some scientists Gayals are found to be fully fertile among themselves, interbred freely with some other wild species such as gaur, banteng, yak and cattle of taurus and jebu species.

Reports showed that the Gayals are narrowly different from the cattle of Bangladesh both morphologically, physiologically and genetically. The body size of this species was reported to be about 1.5 metre tall and 540 kg in weight. They

by Dr M A Majid  
from that of cattle. The number of chromosome in Gayal is 2n=68 where in cattle this is 2n=60.  
Utility  
The Gayal is considered to be one of the most important

which are excellent for draft power and 'Jatshum' which are female hybrid excellent for milk production.

Need for Conservation  
The Gayal, no doubt a promising treasure of



Gayal Bull at Naikhonsory.

have a dorsal ridge on the crest of the shoulder and almost flat forehead. Their horns are straight and gently curving which are more massive than that of native cattle. The adult Gayals are black in colour with white stockings on all four legs but the calves are brown. The gestation period of Gayal varies between 293 to 303 days, which is higher than 270-280 days for Bangladesh native cattle. The Gayal chromosome complement is also different

animal genetic resources in Bangladesh. At present, it is used as a high priced zoo animal internationally. It serves as a sacrificial animal for Muslim religious festival in Chittagong area of Bangladesh, northeast India and Burma.  
The Gayal cattle hybrids are used as draft animals. In Bhutan, the livestock breeders have produced profitable hybrid offspring (called 'Jatsha') by crossing Gayal bull with sire cows (Bosautus) from India

Bangladesh, is needed to be protected and conserved. This valuable wealth is going to be extinct due to continuous hunting by the tribal people, indiscriminate crossing with native cattle and lack of sufficient efforts to retain its purity. Now it is time to realise the importance of its conservation.  
Approaches for Conservation  
The following steps should be taken in order to conserve

- Gayals in Bangladesh:
1. Systematic survey on the total number of Gayal available in Bangladesh.
  2. Characterization, evaluation and cataloguing its genetic constitution.
  3. Establishment of two gene pools of Gayal, one at their natural habitats and the other in BLRI research station at Savar HQ.
  4. Developing methodology for conservation of genetic material through 'cryo preservation technique'.
  5. Multiplication of the existing Gayal stock through multiple ovulation and embryo transfer (MOET) system.
  6. Conducting basic and applied research related to physiology, nutrition, cytogenetics, biochemical genetics for undertaking appropriate breeding programme.
  7. Launching campaign for protecting Gayal through mass media.
  8. Stopping destruction of forests to increase its habitat.
  9. Banning on any kind of Gayal killing in order to create nature reserves.
  10. Making arrangements to establish a Gayal conservation programme among its habitat countries i.e. India, Bhutan and Bangladesh.

Other considerations  
Gayals could be considered as an excellent meat animal. Their body size and weight are comparable with some beef-type cattle. Moreover, Gayals have developed an adaptation to the local environment which enables them to produce and reproduce where imported breed have serious survival problems. With the above advantages, it could be used for developing a beef-type cattle breed in Bangladesh.  
Effective measures should be taken to save and conserve the Gayal.

# Walk by the Lake that Can Lead to Death

by Judith Perera from Moscow

THE Russian government is planning to spend billion of roubles in an unprecedented clean-up of the Urals region, where nearly half a million people have been exposed to lethal doses of radiation for 40 years.  
Although the programme is seen by environmental activists as long-overdue, there is no indication that years of contamination from explosions, leaks and tests at nearby nuclear plants can be reversed.  
Help will be directed to the 450,000 people who suffered as a result of contamination arising from the activities of the Mayak Combine at Kyshtym, also known as Chelyabinsk, in the 1940s and 1950s. The multi-reactor facility was the centre of Soviet nuclear weapons production. The territories most af-

ected are Chelyabinsk, Sverdlovsk, Kurgan and Tyumenak, covering 26,700 square kilometres.

Total expenditure for the programme up till 1995 are 11.7 billion roubles, of which R4.2 billion is earmarked for compensation and benefits to the population, R3.2 billion for social and economic rehabilitation and R1.6 billion for health protection.

Some 8,015 people in the region have already died from radioactive discharges from the Mayak facility, according to a report by the Institute of Biophysics at the former Soviet Health Ministry in Chelyabinsk.

The nearby River Techa and Lake Kyshtym which was used to cool the oldest of five plutonium-producing reactors, are seriously contaminated with

people to high radiation levels. Details of three nuclear accidents at the site emerged in a long controversy over plans to build a new fast-breeder reactor to generate electricity for civilian purposes. Despite the nuclear industry's track record, local authorities have approved the plant and building is scheduled to begin shortly.

The most serious accident was on September 29, 1957 when an explosion released the contents of a tank containing radioactive waste, contaminating 23,000 sq km. More than 10,000 people were evacuated.

Losses resulting from the withdrawal of 247,000 acres of land from agricultural use are estimated at R7 million and a further R200 million was

## Soviet nuclear legacy



SHORTLY after the war for the reunification of Vietnam ended in 1975, Vietnamese scientists tried to begin replanting what had once been the magnificent Ma Da Forest — 20,000 hectares of which had been completely destroyed by the US military's herbicide spraying programme.

Initial attempts to re-establish the indigenous trees failed, however, mainly because young saplings were reduced to ashes in constant grass fires sparked during the dry season. The defoliants used by the military had turned the primary forest into a vast field of easily flammable Pennisetum polystachyum, known now to local people as 'American grass' (just as similar fields in the Philippines after the Second World War came to be called 'Japanese grass').

'We never knew the name of the grass before,' explains Tran Ba Dang, director of the Ma Da Forest Farm. But wherever the Americans went and sprayed, only that grass grew.

After the war ended, we tried to replant Hopea odorata and Dipterocarpus dyeri, but the saplings could not grow. The topsoil was very thin and poor, the humidity was very low, the temperature and the light were very high, and at last the seedlings burned up in grass fires. Finally, in 1981, we realised that we needed to establish a forest canopy under which the indigenous species could survive. We had to copy the conditions in which they used to grow in the forest.

'After we remove big areas of pernicious grass, we plant (fast-growing) shade trees, including Indigofera tenesmani, Acacia auriculiformes and Eucalyptus tereticornis. When these shade trees gain sufficient height, which takes about three years, we plant the native trees underneath them.'

Today, more than 1,000 ha of Acacia, Indigofera and Eucalyptus trees give shelter to up to three different species of dipterocarp, including Dipterocarpus alatus, D. dyeri and Hopea odorata.

Tran Ba Dang adds: 'In the nursery, we have created the special conditions that young seedlings require, moisture and shade. This year we have about 100,000 seedlings. We also collect wild saplings and seeds from the untouched patches of the forest and cultivate these in the nursery. But it is not easy to collect the seeds of dipterocarps and reproduce them in this way. We expect the returning birds and other animals will also help the forest by scattering seeds.'

The Ma Da Forest experiment offers great promise for Vietnam, but it also demonstrates how difficult, as well as time- and labour-consuming, the process of rehabilitating tropical woodland is — and the vast scale of the work still required to heal the war-scarred country. Thousands of hectares that were once cool, moist, temperate and fertile are now

# Vietnam: Healing the War's Environmental Damage

by Vo Quy

characterised by compacted, leached earth and dry, blazing climate.

Continuous Warfare  
The period from 1945 to 1975 was one of almost continuous warfare in Vietnam, involving Japanese, French, American and Vietnamese armies. In the American phase, US forces employed deliberate destruction of the environment as a military tactic on a scale never seen before. This included:

- spraying 72 million litres of herbicides (Agents Orange, White and Blue) on forests and croplands (Operation Ranch Hand), resulting in the destruction of vegetation and the residual contaminant poisoning of the land by dioxin (TCDD). An estimated 22,000 square kilometres of tropical forest and farmland were destroyed, mainly in the south of the country;
- clearing large tracts of forest, agricultural land and villages with giant bulldozers (Rome plows) that removed even the topsoil (Operation Paul Bunyan);



Some 25 million bomb craters displaced Vietnam's earth and topsoil, caused health hazards, disrupted water flow and increased erosion.

burning flammable Melaleuca forests by napalm bombing in the Mekong Delta; • damaging land and forests via saturation bombing with more than 13 million tons of bombs, equivalent to 450 times the energy of the Hiroshima atom bomb, or an average of 265 kilograms per person in Indochina. These actions resulted in

the immediate loss of more than 20 million cubic metres of commercial timber, 300 million kilograms of food, 135,000 ha of rubber plantations, and the elimination of much of the nation's wildlife and fisheries. The long-term effects are more serious, because, more than 20 years after, the forests have yet to recover.

Defoliation literally changed the face of large swaths of Vietnamese terrain. Some of the most biologically rich, and environmentally fragile, ecosystems in the world were devastated.  
Millions of hectares of mountainside were once a dense tropical hardwood jungle, where tigers, elephants and gaur roamed in the forests and beautiful pheasants presented their bright colours and fantastic adornments on their display grounds. Herbicides subverted the environment; now the jungle is transmuted, as at Ma Da Forest, into savannah. The habi-

lity of the forest loss are particularly serious, because the country is mountainous. The resultant erosion, changes in water flow, floods and droughts are far more severe than in other countries. Most deforested areas have become barren. Almost 40% of the country is now classified as unproductive wasteland.

### A New Revolution

But a new revolution is being plotted in Vietnam: to turn the country green again. Recalling a campaign — Tree Planting Tet (New Year) — launched by President Ho Chi Minh as long ago as 1959, the people are carrying out a great tree planting programme, whose goal is to bring the extent of forest cover back to 50% of the nation by the 21st century, in order to re-establish the ecological balance, preserve biological diversity and do their part in delaying global warming. This re-greening effort is the biggest challenge facing the country since its reunification in 1975.

In 1990, 400 million trees are reported to have been planted. At 1,000 trees per hectare, this is equivalent to 400,000 ha. For the entire period 1961-1990, an area equal to 5.7 million ha is reported to have been planted. The goal is to replant some 500 million trees each year, but even this is not enough to compensate for ongoing forest destruction. Millions and millions of hectares still await replanting — and the people are forced to work on a shoestring budget.  
In 1987, the Vietnamese

'Black Death' of Europe's history, has spread rapidly in southern Vietnam since 1965. The damage from 25 million bomb craters, which caused displacement of 3,000 million cubic metres of earth and topsoil, has also caused health hazards, the disruption of water flow, and an increase in erosion. Particles of shrapnel embedded in living trees render their wood less valuable.

Forest cover has declined even more rapidly since hostilities ceased, principally owing to agricultural clearing, forest fires, extraction of timber and firewood, and urban expansion. This has occurred first in the coastal and low-lying areas, and then gradually higher in the hills and mountains.  
The process is accelerating as a result of population growth. Since 1943, when 43% of the nation's tree cover remained, forest cover has steadily declined — to 29% in 1975-76 and to only 24% by 1983.

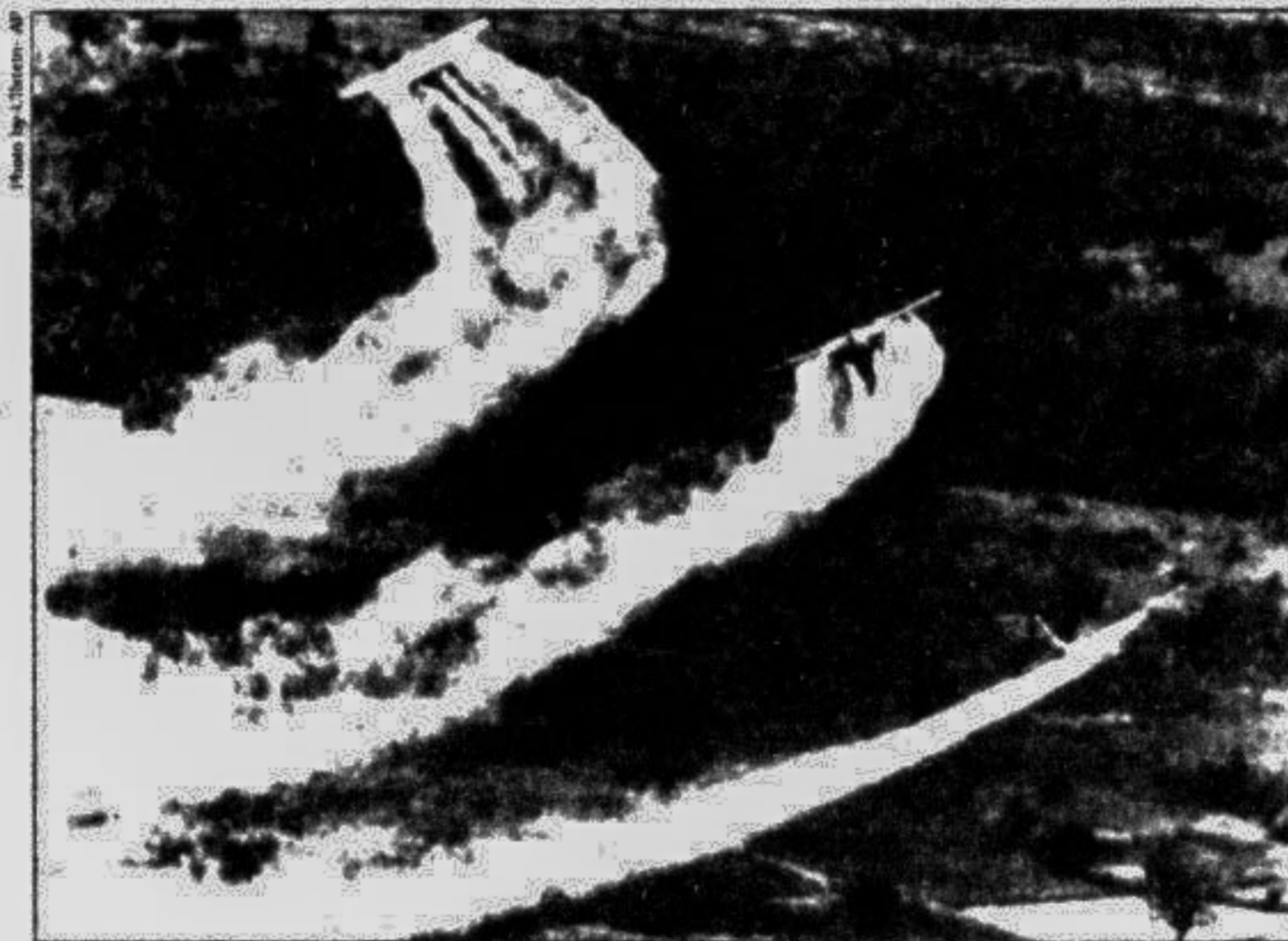
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Ministry of Forestry developed a plan to replant 1.5 million ha of barren hills and to step up the rehabilitation of degraded forests. Unfortunately, lack of funding and resources has thwarted these efforts.  
The mangrove and Melaleuca forests in the Mekong Delta were perhaps more seriously damaged in the war than any other forest type. They were repeatedly sprayed with Agent Orange herbicide and proved particularly susceptible to its effects.  
In all, defoliants eliminated 124,000 ha of mangrove in southern Vietnam, about 50% of the mangrove forest of the country. Almost all of the Rhizophora, Sonnerata, Brugiera and Nypa formations died. As a result, the fisheries and shrimp catches also collapsed.

University of Montana zoology professor Egbert W Pfeiffer visited the defoliated areas in 1969, 1971 and 1973. Of his boat journey through a mangrove area, he said: 'It was one of the most shocking experiences of my life. We saw virtu-



Spraying of Agent Orange and other herbicides during the Vietnam War destroyed an estimated 22,000 square kilometres of forests and farmland.

ally no green living plants anywhere. It was just a solid gray scene of death.'  
The Melaleuca forests on the peaty soil behind the mangroves proved flammable in the dry season and many were also destroyed by napalm burning.  
These two most badly damaged forest ecosystems are in a more advanced state of recovery than the inland tropical forests. After the war, a programme was launched to replant the mangrove forests on the areas destroyed by herbicides. Large areas were replanted with seedlings of Rhizophora apiculata, but few trees survived, probably because the soil was too compacted for their roots to take hold.  
In the early 1980s, a new programme replanted the area and today 70,000 of these

seedlings survive. The mangroves now yield a self-sustaining and profit-making source of fuel and construction wood.

The leaves of Rhizophora are an important link in the food chain of fish and shellfish. Fallen leaves, decomposing in the mud or tidal water, supply an enormous amount of nutrients and thus support a great variety of life, especially such invertebrates as snails, crabs, shrimp and molluscs.  
As a result, the fisheries are coming back and the shrimp catch rises each year. Wetland birds that had completely disappeared from their roosts during the war have also returned. More than seven major bird roosts are now protected, and new roosts appear each year.

### Unique Flooded Forest

Melaleuca, a 10- to 20-metre-tall with a straight trunk and small, tough leaves, forms a unique type of flooded forest in the Mekong Delta. It once covered an area of 250,000 ha in low-lying, seasonally-inundated areas. But now there are only about 116,000 ha left.  
In early 1986, with the help of researchers at Hanoi University, the people of Tam Nong District set up a reserve for the cranes. Now covering about 5,000 ha, it may soon be expanded to about 9,000 ha. The number of returning

cranes has increased each year, and now more than 1,000 birds have been counted.  
There is a Vietnamese saying: 'Birds only stay in good lands.' Apparently, the efforts of the people of the Plain of Reeds and Tam Nong District to restore the land of the Tram Chim Reserve have begun to pay off.  
The crane is a symbol of happiness and longevity in Vietnam, as in China, Japan and many other Asian countries, and its stylised image can be found in almost all pagodas, temples and other Buddhist places of worship in Vietnam. Now that this bird has returned, the country may again become a beautiful land of peace. — Third World Network Features

radioactive materials, as are several large artificial reservoirs.  
Soviet scientists estimate that the site contains wastes with a radioactivity around 1,000 million curies, an alarming level given that regions with a radiation level greater than even one curie per sq km would be declared 'controlled areas,' requiring safety precautions.  
At first, wastes were poured directly into an artificial reservoir, Lake Karachai, which drained into the River Techa. The river became so severely contaminated by the early 1950s that 8,000 people had to be evacuated from its shores. Radioactive contaminants carried by the river were later detected in the Arctic Ocean.  
Subsequently, the most highly radioactive wastes were stored in steel containers and this continued until a plant that converts waste to glass was built in 1978. But Lake Kara-

spent on clean-up. About 80 per cent of the affected region was working normally again by 1978 and the remaining 41,000 acres became a nature reserve where scientists are still studying the effects of radioactive elements like strontium, caesium, tritium and plutonium on trees, animals and insects.

The experts' report says the accident was caused by the overheating of a radioactive liquid waste container which exploded, releasing 20 million curies of radioactive compounds into the atmosphere.  
Nearly 18 million curies of the fall-out settled near the depository, while the remainder was dispersed widely.  
About 10,200 of the area's 272,000 residents were resettled from the most seriously contaminated areas. Many people affected by the 1957 accident have still not been treated.

A second disaster followed 10 years later. During April and May 1967, Lake Karachai began to dry out and radioactive dust amounting to 600 curies was carried by the wind up to 76 km away. The dust contaminated 2,700 sq km, where 41,500 people lived.  
In addition to those who died, during a 32-year observation period, 28,000 were 'severely irradiated,' said the report.  
There were 37 observed cases of leukaemia, which far exceeds the number expected in an uncontaminated population. Medical studies done several years after radiation exposure were 'under-equipped, under-staffed... (and) discouraged by the government.'

The problem of these waste remains to be tackled. It is an increasingly urgent problem as contaminants from Lake Karachai are seeping into the groundwater and putting at risk the huge River Ob, which ultimately leads to the Arctic Sea.  
Work is already under way to fill in the lake with rocks and concrete, but critics say this will not solve the problem.  
Concern is growing among local residents, many of whom are only now learning the truth about the area they live in.  
When the Techa River was badly polluted in 1952, it was fenced off. There was nothing to indicate the danger, and the fence was broken. Children have regularly swum and fished in its waters. Now they know why the fence was there, but it is too late.

Communism may have almost disappeared in Russia, but the Soviet military machine seems to have left behind everlasting: unclear radiation as a by-product. Across the Urals, test sites, dumping stations and waterways have been contaminated with extremely high levels of radiation. Hundreds of thousands of citizens are now threatened. A Gemini News Service correspondent reports on salvage efforts at Russia's hot spots.

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The report says that since 1949, more than 150 million curies of radioactive substances have been discharged into the environment as a result of Mayak's activities, including 'repeated planned discharges of radioactivity into the Techa River' as well as 'many unexpected, so-called 'wild overflows' and break-downs.'  
Between 1949 and 1956, some 76 million cubic metres of liquid radioactive waste was poured directly into the river, 'the major, and in certain places, the only source of drinking water for residents'.  
Almost 95 per cent of this entered the river in the relatively brief interval between March 1950 and November 1951, the report says. During this period, the average daily release of radioactivity was 4,300 curies. On some days the level soared to 100,000 curies.  
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About the Author: Judith Perera is a British freelance writer. She was previously a senior editor, responsible for politics, of Middle East magazine.