



Figure 2. Pulling out the system from the borewell.

unit closes due to the weight of water inside the PVC pipe. The next step is to remove water from the PVC pipe. The system is kept inside a bucket/vessel and the bolt projecting out of the foot valve is pressed, resulting in the valve being opened. Water from inside the PVC pipe flows out and is collected in a vessel. The system at Chelakkara is capable of drawing 5.5 litres of water at a time.

Since the system is lowered and pulled up using the pulley, its operation is simple and more comfortable than a hand pump. There are no mechanical parts for periodical replacement due to wear and tear like in a hand pump. Hence, maintenance cost is more or less zero. A further

advantage is that the mechanism and the components used are simple and can be repaired by a layman, which makes it attractive. If the diameter of the borewell is larger, a proportionally larger diameter PVC pipe can be used, which may draw larger quantity of water.

S. SAKTHI MURUGAN
D. S. C. THAMBI*

Central Ground Water Board,
Kerala Region,
Ministry of Water Resources,
Thiruvananthapuram 695 004, India
*e-mail: rdkr-cgwb@nic.in

Kawwal Wildlife Sanctuary needs the status of Tiger Reserve

The tiger, our national animal, has always occupied a position of awe and respect in our minds due to its royal splendour and elusive nature. Unfortunately, as an animal of national significance it has not received due treatment that it deserves. Owing to this perilous position, the Government of India launched the 'Project Tiger' in 1973, with an objective 'to ensure maintenance of viable population of tigers in India for scientific, economic, aesthetic, cultural and ecological values and to preserve for all times, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people'.

At present¹, there are 28 Tiger Reserves under Project Tiger in India located in 17 states, covering an area of 37,761 sq. km.

Kawwal Wildlife Sanctuary is situated in the Adilabad District, Andhra Pradesh. It is located 260 km from Hyderabad, between 19°05'N–19°20'N long. and 78°32'E–79°12'E lat., it occupies an area of 892.23 sq. km. Declared as a Wildlife Sanctuary in 1965, it is one of the oldest sanctuaries of the state. It is a perfect tiger habitat with dense bamboo undergrowth and adequate prey population. It harbours endangered fauna like the Indian gaur, four-horned antelope and grey jungle fowl². It is known for herds of spotted deer, sambar, blackbuck, nilgai and gaur which are important tiger prey. Vegetation in the sanctuary exhibits a classic example of southern tropical dry

deciduous forests with predominantly *Tectona grandis* and its associates like *Anogeissus latifolia*, *Terminalia alata*, *T. arjuna*, *Boswellia serrata*, *Cleistanthus collinus*, *Lannea coromandelica*, *Hardwickia binata*, *Adina cordifolia*, *Mitragyna parviflora*, *Strychnos nux-vomica*, *Chloroxylon swietenia*, *Bombax ceiba* and *Diospyros melanoxylon*³. It protects the catchment of numerous perennial streams that ultimately drain into the River Godavari. It has enormous potential for research in conservation of biodiversity and endangered flora and fauna. According to the 2006 census, 13 tigers were reported⁴. In recent years, the glory of the sanctuary is rapidly diminishing due to increasing anthropogenic pressure, heavy felling of trees by smugglers and ethnic natives who inhabit the sanctuary for their livelihood and also for making of agricultural equipment and firewood. This ultimately leads to habitat destruction of herbivores, which in turn has an adverse effect on the availability of prey for the tigers. Worldwide the number of big cats and other predators is plummeting. The tiger too is coming under increasing threat from intensification of agriculture and an upsurge in human population and livestock in the environs of the protected areas⁵. As Project Tiger is undisputedly the custodian of the major gene pool of the country and a repository for some of the most valuable ecosystems and habitats for wildlife; the Kawwal Sanctuary needs immediate at-

tention for the conservation of tigers. There has been no further declaration in the state after inclusion of the Nagarjunasagar–Srisailem Sanctuary under the Project Tiger. The Kawwal Sanctuary needs the status of a Tiger Reserve without any delay for better management of tiger habitat.

1. Annual Report, 2006–07, Ministry of Environment and Forests, Government of India.
2. Nagulu, V., Vasudeva Rao, V. and Srinivasulu, C., In Proceedings of the National Seminar on Conservation of Eastern Ghats, EPTRI, Hyderabad, 1998, pp. 6–35.
3. Champion, H. G. and Seth, S. K., *A Revised Survey of the Forest Types of India*, Government of India Publication, New Delhi, 1968.
4. Tiger Census Report, Jannaram Wildlife Division, Forest Department, Govt of Andhra Pradesh, 2006.
5. Pain, S., *New Sci.*, 2003, 37–39.

E. N. MURTHY^{1,*}
VATSAVAYA S. RAJU¹
A. RAGAN¹
G. RAVINDER²

¹Plant Systematics Laboratory,
Department of Botany,
Kakatiya University,
Warangal 506 009, India
²Wildlife Management Division,
Kawwal Wildlife Sanctuary,
Jannaram 504 205, India
*e-mail: murthyen@yahoo.co.in