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## **The Irula tribal snake venom extraction cooperative**

### **1. GENERAL INFORMATION**

#### *1.1 Title & practice or experience*

The Irula tribal snake venom extraction cooperative

#### *1.2 Category of practice/experience and brief description*

The Irula Cooperative Venom Centre is a unique social institution that was set up to rehabilitate the Irula tribe of South India once the new Indian Wildlife Protection Act, 1972 came into force. Among other things, the Act banned the capture and killing of snakes.

The Irulas are a tribal society in South India which, for decades, has specialised in the capture of snakes for their skins. The skins were exported. Once the trade was banned under the Act, the Irulas became law-breakers every time they caught a snake. Of the total population of 20,000 Irulas, about 10% were regular catchers when the snake-skin industry flourished.

Romulus Whitaker, one of the persons who have been working with snakes for several decades, decided to set up a cooperative in which the traditional skills of the Irulas would be used for conservation of snakes and for production of snake venom. The Irula Cooperative is today one of the most outstanding examples of social innovation and good practice from the South. As an economic enterprise, it is successful, for it brings in good money for the Irulas, who are traditionally one of the most disadvantaged groups within Indian society.

The Cooperative is composed of Irulas and is run by them. The entire enterprise is based on the skills and knowledge possessed by the community. The Cooperative has been so successful it has spawned a few other cooperatives for the same tribals in other spheres of activity as well, including reforestation schemes and plant nurseries. The Irula Cooperative is an excellent example of development which utilises indigenous skills and expertise, helps

improve people's lives and living standards, and yet maintains the ecosystem, in this case, of snake habitats in balance. This combination of all-round benefits is decidedly difficult to associate with many modern technologies.

*1.3 Name of person or institution responsible for the practice or experience*

Irula Cooperative Venom Centre

*1.4 Name and position of key or relevant persons or officials involved*

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## **2. THE PROBLEM OR SITUATION BEING ADDRESSED BY THE PRACTICE/INNOVATIVE EXPERIENCE**

In 1976, the export of snake skins from India was banned to protect the ecological role of snakes as rodent predators. The ban left destitute many of the 20,000 Irulas of Tamil Nadu who were the main suppliers of snake skins to the export industries. The Irulas are the aboriginal inhabitants of the plains and scrubjungles of Chinglepet District in Tamil Nadu. Most of these tribals still subsist largely on hunting and food-gathering. Their expertise in hunting

deadly snakes is almost legendary. With the ban on the export of snake skins and the snake-skin dealers no longer needing the services of the Irulas, the principal occupation of this largely disadvantaged class of people came to a standstill, almost overnight.

Besides rendering a large number of Irulas jobless, the ban also had other serious repercussions, namely a severe shortage of snake venom, which is the most effective cure to treat potentially fatal snake bites. Worldwide, about 30,000 to 40,000 people die annually of snake bite. Of these, 25% or about 10,000 people die in India. The only effective cure for serious snake bites is anti-venom serum made by immunising horses with gradually increasing doses of raw snake venom. Consequently, stocks of snake venom of the medically important species are always needed. In India, the four types of snake that cause the vast majority of fatal bites are the cobra, the krait, the Russells viper and the saw-scaled viper. All these species are found distributed throughout much of the territory of the country. However, snakes are neither easy to find nor easily captured. The Irulas are the only local people in South India with the skills (and the bravery) to catch such poisonous snakes and over the years, they have finetuned their snake-catching techniques almost to perfection.

Since under the Wildlife Protection Act, 1972, all snakes are protected (with the venomous ones being at the top of the list of protected species) and, more especially, since there was a ban on the selling of snake skins since 1976, it was no longer possible for the Irulas to catch snakes without violating the law.

Nevertheless, catching snakes in the wild was necessary in the country's interests because rearing snakes in captivity for the purpose of obtaining venom has proved to be not only expensive but also difficult. Moreover, large numbers of snakes are needed to collect venom in the quantities required for anti-venom production. Most venom production schemes involve local people who may be specialised snake catchers or tribals involved in the collection of snakes who sell the raw venom or the snakes to the venom laboratory. However, all these schemes imply that once caught, the snakes are kept in captivity for the purpose of extraction of venom till they die. Unfortunately, the snakes, which have an average lifespan of 10-20 years in the wild, would last not more than a few months when kept in captivity.

A delicate situation thus arose with the passing of the Wildlife Protection Act. Snake venom was badly needed to produce the anti-venom required to treat potentially fatal snake bites. At the same time, it was necessary to ensure that the snakes that were caught for this purpose were not eventually slaughtered for their skins. Moreover, providing venom for medicinal purposes should not result in the snake itself losing its life within a few months as this would also result in the gradual extinction of the venomous species which also hap-

pen to be at the top of the list of protected species of snakes.

The Irulas were the only people who were traditionally self-trained and accustomed to catching and handling these venomous snakes. These snake hunters have very few alternative ways of earning a livelihood. Moreover, their respect for wildlife and their knowledge of natural history made them ideal candidates for ensuring that all the above three objectives could be met if combined into a harmonious scheme that would be beneficial both to the Irulas as well as to the society while at the same time not endangering the wild snake population. Thus, the problem was threefold:

- (a) To ensure that sufficient quantities of snake venom were available.
- (b) To ensure that the protection given to snakes under the Wildlife Protection Act was in no way compromised, i.e., snakes caught in the wild for purposes of extraction of snake venom needed for medicinal purposes would be released without harm after the venom was extracted.
- (c) To ensure that the Irula people had a gainful and profitable occupation which at the same time would allow them to nurture the skills that they alone have mastered over the years.

### **3. DESCRIPTION OF THE PRACTICE/INNOVATIVE EXPERIENCE AND ITS MAIN FEATURES**

In 1978, Romulus Whitaker, the legendary snake man of India, got together a group of Irulas with whom he had been working for a decade and decided to form a registered cooperative society. The primary objective of this initiative was to establish a venom centre. A cooperative was considered the best system of management of a tribal business because it ensures equal income opportunities for all its members. The Irula Cooperative's Venom Centre was intended to provide the Irula tribe with income-generating employment that used their traditional skills without overexploiting the wildlife that the tribe was so dependent on for its livelihood and survival. A snake venom centre was also an obvious choice because Irulas caught snakes with unrivalled skill and knowledge of snakes' natural history.

The Cooperative obtained a licence from the Forest Department to enable the Irulas to bring freshly caught venomous snakes to the Centre for venom extraction. The extracted venom would be dried and sold to Indian anti-venom serum manufacturers. The snakes would be returned to the wild in good condition after the extraction of venom was performed.

Snakes are not easy to find or capture. Contrary to popular belief, snake populations are probably much higher in disturbed habitats such as farmlands, degraded scrub forests and hedgerows than in pristine habitats such as forests.

This is because the former contain an abundance of small prey animals such as rodents and amphibians (both of which benefit from rice farming and therefore inhabit farmlands in abundance), which provide the snakes with year-round supply of food. The conversion of forest to farmland seems to have benefited three of the four venomous species cited above which are exploited by the Irulas. The cobra and the krait are hole dwellers and rat holes are ideally suited to them. The saw-scaled viper prefers dry rocky areas and small thorn bushes for its habitat and seems to benefit greatly from the conversion of scrub jungle to open wasteland. Only the Russells viper seems fairly vulnerable to degradation of its original habitat and does not prefer farmlands, unless bounded by dense hedgerows of cactus and agave. The habitat of the three species (cobra, krait and saw-scaled viper) actually seems to be increasing in area as forests give way to farmlands or are converted to agricultural land, as is the case with low-lying areas irrigated for rice farming.

Each Irula hunts the area radiating from his village or encampment as far as the distance he can easily walk with his family in one day. Usually, the area is within a 10-km radius of their villages. The Irulas find the snakes mainly by looking for tracks and other signs (faeces, shed skins) at rat holes, termite mounds and dense hedgerows. They dig out the snakes with short crowbars, then pin them down and bag them. They usually get one to three large snakes in a good day's hunt, which they sell to the Cooperative.

Irulas have no formal methods of locating or catching snakes. However, their sensitivity to changes in habitat and changes of season, together with knowledge of the biology of the species, all allow them to be effective exploiters, while the fact that they greatly benefit from having a thriving snake population ensures that they will not overexploit the snake population. For example, they will not hunt in depleted areas for the simple fact that it is not energy-effective. Similarly, neither will they over-collect an area because as soon as the Irula family has made enough money to sustain itself for a week or so, it tends to pursue non-income-generating activities. The normal pattern is that the Irula family hunts snakes intensively for a few days, which is enough to earn them sufficient money to meet the needs of the family for the following few weeks. Then they are likely to concentrate on hunting food animals like field rats, mongooses, monitor lizards and turtles and on gathering edible tubers, roots and medicinal plants. Until the need for money re-emerges, they rarely set out to hunt for snakes. Irulas also rarely go out on several-day hunts to un hunted potential hot spots. And the fact that the radius within which they work is limited to walking distance from base is in itself a natural limitation on any overexploitation of the wildlife.

The State Government licensing authority decides how many Irulas to license and the number of snakes permitted to be caught. This practice, which was started when the Cooperative commenced in the 70s, is still rigorously followed. On average, 6,000 snakes a year are caught by the 101 licensed Cooperative members from an area totalling 546 sq. km, helping to ensure that there is no heavy drain on any single genetic population of the four target species.

To detect and prevent premature recapture of snakes, all snakes (except saw-scaled vipers, which, at 30 cm, are too small) are coded by clipping the ventral scales. Records are kept for each of the three larger species. Clip-codes last from six months to two years. The rate of recapture during this period has been found to be extremely low. Of more than 13,000 of the large species that have been caught, only 20 were found to have had the codes.

The duration of the captivity of the snakes is limited to three weeks, and milking them for venom is performed only once each week. The snakes are kept in mud pots which allow quick and easy handling. The habitat also keeps the snakes cool and keeps infrastructural and maintenance costs low. Care is taken to ensure that the extractor is gentle and careful in pinning and the entire process of venom extraction takes no longer than two minutes per snake. The animals are given water but not food. It may be noted that healthy snakes can survive very well without food for several weeks.

The three-week period of captivity, during which there are three to four venom extractions only, was arrived at because snakes start losing weight if they are kept any longer. It is important that the snakes are healthy and strong at the time of release. The captivity of snakes and extraction of venom by the Irula Cooperative results in a mere 1% mortality of snakes during captivity. Thus, close to 100% of the targeted snake species are eventually released after the commercial product (venom) has been extracted.

The snakes are usually released in Reserve Forests which consist of degraded scrub forest and plantations of cashew nut and eucalyptus. Most of the forest land surrounding the agricultural land in the district where the Irulas operate is Reserve Forest. As such, it is completely protected and is a good repository of snake populations.

Surveys maintained by the project indicate that the survival rate of the released snakes is very high. A brief pilot study was carried out in 1991. About 100 kraits were released with fluorescent paint marks on their backs. Searches were conducted by day and by night for a week following the release. Very few snakes were seen and even then only by night, suggesting that all (except one found dead) had found shelter in the scrub forest or migrated to rat holes in the nearby crop lands.

#### **4. DESCRIPTION OF THE INSTITUTION RESPONSIBLE AND ITS ORGANISATIONAL ASPECTS**

The Irula Cooperative is a society registered under the Cooperative Societies Act. During the past 15 years of the project's existence, the Irulas have learned to undertake most of the management of the Cooperative and all the work, from the skilled and dangerous job of capturing the snakes and extracting their venom, to operating the state-of-the-art lyophilizer (freeze drier) which processes the venom.

The Cooperative is now the largest producer of venom in India. Except for three years, the project has chalked up profits since its inception. Since 1984, the Cooperative has been financially self-sufficient in meeting basic costs (salaries and administrative costs) through its venom sales, which generate 95% of the income, and through the sale of tickets to the members of the public who wish to observe the venom extraction process, which accounts for the remaining 5% of the income.

With the cooperation of the State Forest Department, the Irula Cooperative has worked out a legal framework for licensing and accounting of the snakes caught, the amount of venom collected and the supervised return of the snakes to the wild. The Forest Department also insists on an exact up-to-date inventory of all snakes caught and maintained for venom extraction, so detailed records are maintained as a matter of routine.

The success of this project has led the Cooperative to think of other projects related to the Irulas' skills and which can help them earn a livelihood. For instance, the Irulas are also skilled rat catchers. Rats form the largest source of protein for the community. This skill has led to them being hired by farmers desperate to cut the tremendous annual losses of rice to the field rodents. A pilot project to demonstrate the cost-effectiveness of the Irula approach to rat control as compared to standard pesticide use was carried out in 1984, after which the Government of India gave a grant for a larger project over a two-year period.

The results were so encouraging (200,000 rats caught, tons of grain saved) that the establishment of an Irula-operated pest-control agency is now being contemplated.

The Irula Tribal Women's Society was set up in 1986, initially to establish nurseries of forest trees and reforest fallow public and private lands. The Society has over 175 members and with a grant received from the National Wastelands Development Board, its focus is now directed on growing and marketing medicinal plants. The Irula Cooperative is a good example of how one tribe of skilled naturalists can be trained to use wildlife sustainably and earn a living using traditional knowledge.

## 5. PROBLEMS OR OBSTACLES ENCOUNTERED AND HOW THEY WERE OVERCOME

The chief problem was how to avoid excessive collection of snakes, since snake populations, like all wildlife species, are vulnerable to overcollection. To address this problem, a system of capture, extraction of venom and release was evolved by the Irula Cooperative. It was also acceptable to the Government licensing authorities, i.e., the State Forest Departments which needed to be convinced that the exploitation of snakes for extraction of venom would have minimal impact on their population. The experience of the Cooperative has been that a mere 1% mortality of snakes has resulted during captivity. Thus, this system poses no threat to the future use potential or the long-term viability of the animals.

Another method adopted to ensure that only a limited number of snakes are caught was by having limits set by the licensing authority. The State Government Forest Department imposes restrictions on the number of licensed catchers as well as on the number of snakes a licensed catcher can catch on his licence every year. However, these regulations are an obstacle as they are arbitrary; hence they need to be based on solid information about the species and habitats. The snake population management system which was adopted in the 70s is still followed without much changes simply because there is no research done on the population statistics and dynamics of the four medically important snakes in Chinglepet taluk (the area of licensed snake-hunting by the Irulas), i.e., there is yet no determination of how big a harvest can be sustained by populations in various habitats. In the absence of baseline data on the impact of the project on the target species and the habitat, it is not feasible to revise the limits set for fear of upsetting the ecological balance.

The other major problem has been to ensure that the snakes which are captured are cared for well enough during captivity to enable them to re-establish themselves in the wild when they are released. Since the Irulas benefit directly from capturing the snakes and selling them to the Cooperative, it is in their interest to ensure that the snakes are as little damaged as possible from the time they are caught to the time they are released. Thus, care is taken to ensure that the extractor is gentle and careful whilst pinning the animal, and the snakes are monitored and watched for any signs of failing health during captivity. They are also released as soon as possible.

The Cooperative does not accept juvenile snakes and members are discouraged from collecting gravid females. Various improvements in keeping the snakes have been made over the years to minimise mortality. During the summer months when the temperatures are between 38 and 41 degrees centigrade, generous sprinklings of water keep the snake pits cool and techniques

such as these have helped the snakes to successfully tide over the period of captivity.

Associated with the efforts made to care for the snakes in captivity is the task of finding suitable spots to release them into once they are no longer required to be held captive for their venom. Snakes are generally found in crop lands and farmlands where small prey abound. Ideally, therefore, the snakes should be released in the same areas where they were taken from because they will once more be in familiar surroundings and this will help them overcome any trauma they might have experienced while in captivity.

However, the Cooperative has found it difficult to release them in the places from which they were captured because the local people do not want them back. Village people are very frightened of venomous snakes, many having witnessed or experienced painful bites. They are happy that the Irulas take the snakes away from around their houses and farmlands and have no desire to conserve them. Because of this fear, they strongly resist the snakes' being returned to their territories. So the snakes are released in the nearby Reserve Forests from where, no doubt, they migrate back to their preferred crop-land habitat but it is possible that some may die before they reach familiar territory. It is also possible that snakes taken to unfamiliar territories may have a hard time adapting to these areas. However, in the present circumstances and till the village people are willing to recognise the snakes as more a friend than a foe, release into the Reserve Forests, which are protected areas and where the snakes cannot be harmed by humans, is the best that can be done for the snakes at the time of release.

Although prior to 1972 when the snake-skin industry was banned, Irulas caught and killed millions of snakes, primarily cobras and Russells vipers, from the same area in which they now catch a few thousand a year for their venom, it is possible that even this greatly reduced use of snakes may cause some imbalance in the agricultural areas. Many species of snakes, including the cobra, krait and Russells viper, eat a lot of rodents. Removing snakes from crop lands for venom extraction could favour rodents and therefore crop destruction. Snakes also prey on amphibians which are beneficial to crops. These relationships need to be examined thoroughly and evaluated in order to correctly decide on quotas of snakes permitted to be caught, areas for release, etc.

The Irula Cooperative has the potential to expand, but has been able to do so only very slowly due to financial crunch and lack of scientific data which will allow proper decisions to be made on different aspects of the project. Lack of research is, in fact, a major hindrance to the expansion and further development of the Irula Cooperative. The Irulas have only a vague concept

of sustainability since their only related experiences are shortages of snakes (different species, different seasons) and an occasional drop in numbers in places where a major habitat change may have taken place.

Few studies, if any, have been undertaken on the impact of collecting large numbers of snakes for commercial use. Similarly, not much published data exist to support the contention that snakes prefer disturbed habitats to pristine ones although the experience of the Irulas and the observations of snake specialists appear to bear this out. But information of this nature is vital for the long-term sustainability of the project. Although at present the Irula snake venom project appears to have little impact on the populations of target species, factors like changes in snake habitat, prey abundance, snake mortality in captivity, climatic changes, effect of agricultural chemicals on snake populations, and even the numbers of snakes needed for India's venom requirements need to be carefully studied so that the Cooperative and the Government authorities can take proper decisions on the management practices to be followed. Without adequate data on snake populations, it is difficult to know how to establish or recommend additional safeguards.

It is also essential that the Irula people be provided assistance and support in helping them to cope with the cash economy they have been placed in as a result of the formation of the Cooperative. Suddenly introducing or substantially expanding a cash economy can do a lot of damage to isolated or long-impooverished communities. They have to learn to use their income carefully and avoid difficulties from go-betweens, con artists and money lenders. Unless they are provided with training in managing money or tools to help them manage the cash, they will become victims of the very situations it was sought to liberate them from. Too often, lucrative projects are politicised or taken over by intermediaries or other exploiters from the larger society. An assessment procedure is therefore essential for recognising such socio-economic issues since the long-term sustainability of such projects will depend also on their resolution.

The Irula Cooperative has also faced direct problems with the Tamil Nadu Government over royalties payable to the Government on venom extracted from snakes. It is inconceivable that a government should attempt to levy a royalty on income derived from the value of venom extracted from snakes. The snakes are considered the property of the state where underprivileged tribals are involved, but bureaucracies are notoriously wooden in many countries of the South over such issues. The Irula Cooperative went to the High Court to get the royalty demand quashed and succeeded in getting a court order to this effect.

## 6. EFFECTS OF THE PRACTICE/INNOVATIVE EXPERIENCE

The Irula snake venom project has made it possible for snake venom to be readily available once again for treatment of potentially fatal snake bites. Thus, a very important role is being performed by this tribal community for the benefit of the country. That it is able to achieve this with the minimum amount of trauma and damage to the snakes and without causing loss of life to these protected species is indeed highly commendable.

Another extremely important achievement of the Irula Cooperative is the application of tribal technology to generate income and use wild snakes sustainably. This particular commercial use does not change tribal tradition, and the only imported technology is the simple one of venom extraction and processing. The Irulas who once caught and killed snakes for the unlicensed and therefore uncontrolled snake-skin industry now have their own cooperative society which they manage entirely on their own and the profits of which they take a share in. Although presently small, it is a flourishing example of how a tribal community can maintain its traditional skills and lifestyle through the sustained-yield use of wildlife.

The project has had an educative role as well. Part of the work of the Irula Cooperative is to publicise the use of anti-venom serum. It stresses the facts that the great majority of snakes are harmless and that it is fairly simple to identify the four medically important species. The Cooperative also points out to visitors, and to the farmers with whom the Irulas interact daily, that snakes are extremely valuable “friends of the farmer” due to all the destructive rodents they consume.

The Irula Cooperative hopes to expand its activities to other parts of the state and increase venom production. The Cooperative may also start collecting venom from other species of snakes as well as exporting venom. Although at present the Irula snake venom project probably has little impact on populations of the target species, assessing the snake resource and other factors is considered important for the project’s long-term sustainability.

## 7. SUITABILITY AND POSSIBILITY FOR UPSCALING

The absence of research-based data and insufficient funds (as touched on in Section 5) both inhibit the growth and expansion of the project. If larger **quotas** of snakes were granted, snake venom could be exported for medicinal and research uses. Other species of snakes (for example, sea snakes and pit vipers) with valuable venom could also be used. Income from the sale of venom and the viability of the project could be considerably enhanced by developing an export market and encouraging increased production, distribu-

tion and sale of anti-venom serum.

Research needs to be done, both related directly to the Venom Centre's operations and on snakes and rodents in general. The Cooperative intends to identify research personnel and seek grants from national and international agencies to carry out the necessary studies. It intends to make long-term monitoring of snake populations and continued research and development its responsibility. Towards this end, its members have already been briefed on the need to establish a fund for research from the Cooperative's profits to provide local logistical support for researchers. In addition, the State and Central Wildlife Departments, the Government of India's Department of Science and Technology and the Department of Tribal Welfare have been requested to provide research permits, equipment and, where possible, financial support.

## **8. SIGNIFICANCE FOR (AND IMPACT ON) POLICY-MAKING**

Hitherto, development and welfare policies have been based on training tribal communities in skills and programmes in which they have little competence or interest. Even today, bureaucrats discount indigenous skills and knowledge. The prevailing and dominant tendency continues to insist on teaching tribal communities new skills, under the assumption that tribals have nothing to offer for creating their own niche in the modern world. The Irula Cooperative and its evolution carries important lessons for policy-makers and planners. The Cooperative's success has proved that on every count, development based on indigenous resources, knowledge and skills is far more effective than development based on imported skills and technology. It is also far less expensive and is, in addition, as the Irulas have shown, ecologically sustainable. The economic benefits accrue directly to the tribals themselves as they own the Cooperative.

## **9. POSSIBILITY AND SCOPE OF TRANSFERRING TO OTHER COMMUNITIES OR COUNTRIES**

The Irula Cooperative is in many ways a unique institution possible perhaps only in a country like India, where thousands of social groups maintain survival by exploiting specific natural niches. Within India, of course, the Irulas are not the only tribe dedicated to snake-hunting. There are others as well. The principles behind the organisation of the Venom Centre and its managerial precepts can well be replicated in other tribal communities since they are based on respect for the knowledge and skills of the tribals and respect for nature as well.