

Hunting System of the Rukai Tribe in Taiwan, Republic of China

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ABSTRACT

The hunting system of the Rukai tribe in southern Taiwan was studied from January 1996 to January 1997. Based on interviews with tribal members, three characteristics in their hunting system were identified that may contribute to its sustainability in the present day: (1) they hunted only in winter months and mainly on hoofed animals, which with higher reproductive performance, allowed the game species to withstand prolonged hunting pressure without significant declining; (2) the scattered distribution of their hunting territories not only disperses their hunting activity, but also makes areas outside of the hunting territories function as wildlife protective areas; (3) the limited number of users for each hunting territory reduces the possibility of over-hunting.

INTRODUCTION

Taiwan, a mountainous island located south-east off the coast of the mainland China, is 36,000 km² in size. Currently, close to 60% of its land is covered by forests. Most of the mountain areas in Taiwan have been conventionally hunted by various Aboriginal tribes since at least one to two thousand years ago. As a result, the cultures of Aboriginal tribes in Taiwan are all closely related to hunting activities (Huon, 1995). The hunting systems or traditions of some, if not all, tribes seem sustainable in the modern concept since, in spite of such a long hunting history, most of these mountain areas are still rich in many kinds of natural and wildlife resources (Wang et al. 1989; Lee et al. 1988; Lin 1989; Alexander and

Lin, 1990; Wang and Sun, 1990; Chou, 1991, 1993).

In southern Taiwan, the area between Tsu-uin Mountain and the Northern Ta-wu Mountain have been hunted continuously by the Rukai tribe for more than one thousand years, to the present day (Fig. 1). The Republic of China (R.O.C.) Government has created 3 different, but adjacent, protected areas in this region, namely the Tsu-uin Mountain Nature Reserve, Twin-ghost-lake Nature Reserve and the Ta-wu Mountain Nature Reserve, for the preservation of their natural appearance and the existing diverse flora and fauna (Fig. 1). According to recent surveys, this area is not only rich in wildlife resources in general, but also is one of the few locations in Taiwan where the Formosan black bear (*Ursus thibetanus formosanus*) and the Formosan sambar deer (*Cervus unicolor swinhoei*) are still commonly seen (Wang and Sun, 1990; Wang, 1994; pers. obs.), and maybe the last place in Taiwan where the Formosan clouded leopard (*Neofelis nebulosa brachyurus*) still exists (Rabinowitz, 1988). In Taiwan, the black bear and clouded leopard are endangered species, while the sambar deer is a threatened species (The Council of Agriculture, 1994). It is possible that the clouded leopard is already extinct in Taiwan (Pei et al., 1988), but this is not certain.

Although the commercial game market has existed since Dutch times (A.D. 1624~1662), and has grown as Taiwan prosperity grew, hunting by Rukai hunters was primarily for the sustenance needs of tribal members and for ceremonial purposes only. This has been changed during the past 15 years in that a significant proportion (> 80%) of wild animals hunted from this area, mainly the Formosan Reeves' muntjac (*Muntiacus reevesi micrurus*), Formosan serow (*Capricornis crispus swinhoei*) and the wild boar (*Sus scrofa*), are sold to the game meat market to fulfill the demand of the Han Chinese who live in lowlands (Wang and Lin, 1987; Wang and In, 1990; Lin, 1992). It was estimated that as many as 986 muntjacs, 604 serows, and 506 wild boars were taken annually from the Wutai District alone (Pei and Luo, 1996).

According to a most active local hunter, this kind of hunting intensity has been maintained for at least 15 to 20 years due to the strong demand of the lowland markets (D. C. Luo, pers. comm.). The numbers of animals harvested, however, have not declined from earlier

estimations (Nowell, 1990; Lin, 1992; D. C. Luo, pers. comm.). Therefore, the hunting system of the Rukai tribe seems to possess certain mechanisms which have allow them to hunt continuously without depleting the regional populations of their major game species, even though most of the animals taken were sold to the game meat market in the lowland areas.

Recognizing that under current R.O.C. law the hunting of all wild game, except within designated areas and with permit, is forbidden (The Council of Agriculture, 1994), it became desireable to determine whether traditional hunting practices could be integrated with effective wildlife conservation programmes and so brought under governmental control and guidance. The present study was therefore aimed to understand the hunting system used by the Rukai tribe and the mechanism of its sustainability, and the result will help to develop a cooperative wildlife management framework for the future management of Rukai's hunting activity.

STUDY AREA

The present study was conducted in Wutai District (Fig. 2), Pingtung County, which is the largest of the three existing communities of the Rukai tribe in Taiwan. The total area of the Wutai District is around 28,000 ha., in which 80% is National Forest and 20% is the Aboriginal Reserve (Table 1; Fig. 2). Forests and agricultural lands comprise more than 85% of the total Aboriginal Reserve land in the District (Table 1). The National Forest is under the management of the Forest Bureau, Provincial Government of Taiwan. The forests within the Aboriginal Reserve are mostly inaccessible and, hence, can not be used. In general, the Wutai District is characterized by mountains and steep slopes, and its elevation ranges from 300 to 2,500 m with an average of 1,000 m. Annual precipitation in this area is about 2,572 mm with the most of the rain (2,435 mm; = 95%) occurring during the rainy season from May to October. The annual average of the temperature is 17.8 with the highest (= 22.1) occurring in July and lowest (= 11.6) occurring in January.

The Tai-22 is the only road that connects Wutai District with nearby Han Chinese communities today (Fig. 2). This road, constructed in 1942

by the Japanese government in Taiwan for the purpose of a better control of the local Aborigine community, created at the same time a new and more significant channel for cultural exchanges between the Rukai and other cultures. The road was abandoned and left un-maintained after the Second World War, reducing its use. In 1972, the Government of the Republic of China re-constructed the Tai-22, and vehicles were used the first time as the major transportation for the local Rukai community. Because of this late development of the transportation system in the Wutai District, the Rukai living in this area have had relatively less change in their cultures and traditions than other Aborigine communities in Taiwan (Cheng, 1968).

THE RUKAI COMMUNITY

The social system of the Rukai tribe is hierarchical. Three hierarchical levels, namely the Prime Chief, the Secondary Chiefs, and the civilians, are recognized in each community, and the status of the Prime and Secondary Chiefs are inherited (Shiu, 1986).

Present registered residents of the Wutai District are 2,839 people (1,616 males and 1,223 females) belonging to 685 families. Except very few Han Chinese (= 76), all the residents of the Wutai District are Rukai. Most of the registered residents either live in adjacent Han Chinese cities or work in places far away, with fewer than 1,200 staying in the district constantly.

Currently, they form 6 villages, namely Wutai, Ali, Chiamu, Tawu, Chunu, and Houcha, distributed in the Aboriginal Reserve (Fig. 2). According to the incomplete statistics provided by the District Office, the majority (= 51%) of the tribal members received only elementary or lower level of education (Table 2), and their occupations were primarily as laborers (= 54%) and farmers (= 27%). The education or occupation status of this Rukai community is not different from the most of other Aboriginal communities in Taiwan.

In Rukai, as to other Aboriginal tribes in Taiwan, hunting is important to a man. Most Rukai hunters have their own hunting territory (see later for the formation of a hunting territory), and each hunts exclusively within his area. A good hunter, especially a good wild boar hunter, will not only be respected by other tribal members, but he

can also attain an honorable and authoritative position in the community. A civilian whom has been recognized as a good hunter, has the special privilege of decorating himself as a Chief during ceremonies (Shih, 1989). This is an old tradition, still followed strictly by the tribal members at the present time.

Today, three types of the Rukai hunters can be distinguished based on their efforts in hunting (Pei and Luo, 1996). Type I hunters hunt regularly with proficient hunting skills. They usually set 150-200 snare traps, which are organized into 2 to 4 trap lines, during each hunting season, and check them regularly. Therefore, these hunters can bring in their catch fresh, so that they can be sold to the lowland market.

Type II hunters also hunt regularly but do not hunt as intensively as type I hunters. They usually set 70~80 snare traps. Because of the high jelly-fig or awkeotsang plant (*Ficus pumila* L. var. *awkeotsang*) productivity within the area, they spent roughly the same amount of time in collecting jelly-fig fruit as in hunting. Jelly-fig plant is a creeper that grows on tall trees and produces fruits in the winter time. It is a very popular food in Han Chinese society and has a higher market value than wild animals (Shih, 1989; Lin, 1992). Therefore, the hunting effort and number of animals trapped during one winter season for the type II hunters were negatively correlated with the quantity of jelly-fig fruit growth in the area. Animals hunted by type II hunter were also commonly sold to lowland markets in fresh condition.

Unlike type I and type II hunters, type III hunters spent most of their time in collecting jelly-fig fruit when they worked in the field, because the jelly-fig fruit productivity in their hunting territories is much higher in terms of both quantity and quality than that of the other two types of hunters. The number of traps they set vary greatly among individual hunters and between different years, but generally range from 50 to 150 traps. Furthermore, because it was necessary for type III hunters to stay in the field for a much longer period of time in order to collect enough jelly-fig fruits, wild animals they trapped could not be kept fresh for the lowland market and, therefore, were consumed mostly by themselves or shared with other tribal members.

THE HUNTING SYSTEM OF THE RUKAI TRIBE

I. Study Methods

From November 1995 to April 1996, intensive surveys of the villages of the Wutai District were conducted. A total of 27 tribal hunters and 9 chiefs and elder tribal members were interviewed and a series of questions concerning Rukai's hunting system, traditions and present hunting activities were asked. Usually more than one interview was necessary for one interviewee to complete the required information. The reliability of answers was routinely checked either during consequent interviews of the same hunter or with other hunters. Furthermore, whenever it was possible, young Rukai members who can speak Chinese were invited to join the interview as interpreters. This was important, especially for the elders, in order to eliminate the communication difficulties due to language or the strangeness of the interviewer.

In addition to the interviews conducted during this study, some of the hunting traditions of the Rukai tribe mentioned in this paper were compiled from existing literature (i.e., Shih, 1989; Huon, 1995).

II. The hunting system

The right to hunt

Traditionally, Rukai Chiefs owned all the lands and rivers, and all the resources within the territory of each community, while the civilians could use the lands and rivers for harvesting or production with the permission of the Chiefs. Each civilian hunter must present the best parts, such as the leg, heart, and liver, of the animals he hunted to the Chiefs after every successful hunting trip as the rent for hunting in the Chiefs' land (Shih, 1989).

Rukai hunters conventionally went to hunt singly or in small groups. The particular area where a hunter or a group of hunters constantly went would then be recognized by other tribal members as the hunting territory which could be used exclusively by him or them. Natural geographical features such as rivers and mountain ridges were frequently used as boundaries of a hunting territory. Since hunting has been practiced by the Rukainese in the study area for more than one thousand years, all areas which are accessible and rich in wildlife in the region have all been included in hunting territories.

Currently there are 21 hunting territories scattered in the National

Forest area of the Wutai District (Fig. 3). These hunting territories were used by a total of 40 hunters from 4 villages. Among these 40 hunters, 8 were type I hunters, 15 were type II and 17 were type III hunters. The total acreage of these 21 territories is about 5,100 ha., which is about 20% of the total area of the Wutai District. The average acreage of a hunting territory is 243 ha. Hunters from the other 2 villages (i.e., Chunu and Houcha) have their hunting territories outside of the District boundary.

Each of the National Forest hunting territories was used by 1~3 hunters only (Fig. 3). The right of use of the hunting territory could be transferred to their descendants. If there is no direct descendant willing to hunt or good in hunting, the hunting-right might be transferred to close relatives, but never another family (Shih, 1989). Rukai hunters with inherited right of use of a certain hunting territory will hunt in that particular area only. Those hunters who do not have such a heritage, however, can still hunt in a certain hunting territory with the permission of the hunting-right holder. All civilian hunters, including hunting-right holders and non-hunting-right holders, are obliged to present rents to the Chief of their community.

According to the Rukai's oral history, the Wutai community originally migrated from the area around the Small and Large Ghost Lakes (T. Du, pers. com.). To hunt or visit in the areas around these two lakes, therefore, are prohibited according to the Rukainese traditions to prevent the disturbance of their ancestors (Huong, 1995). Additionally, because of the area covered by traps involves only a portion of a hunting territory, there will be always part of the area within the territory left hunting-free in any one year. Trap lines will be shifted to other locations only when the trapping result from the previous year declines significantly.

Hunting season

Hunting season starts in October, which is right after the main farming season, and continues until March, before the other farming season starts. Hunting is done in the winter times not only because it is the season not suitable for farming, but also because animals trapped can remain fresh longer in the dry and cold weather. Type I hunters

visited their traps almost every week during this period and stayed in the field for 2~3 days each time. The number of traps they set (i.e., 150~200) is about the highest that a person can check within such a short time. Type II hunters visited their hunting territory every 10~14 days and stayed for 2~10 days each time, depending both on the number of animals trapped and the work load for jelly-fig fruit collection. Type III hunters usually stayed in their field as long as 1 month every time they went, and the interval between two trips for them ranged from several days to a couple of weeks depending on the productivity of the jelly-fig fruit in the field.

Hunting taboos and disciplines

Rukai hunters also are taught to follow various taboos and disciplines in order to assure their harvesting, as in most other Aborigines. For example, to share animals with other tribal members and to hunt only of muntjac size (ca. 10~16 kg) or larger are considered to be the fundamental duties of a hunter. Hunters with such virtues will always be blessed. Other important hunting taboos and disciplines include bird divination, bad physiological signs, and the prohibition of hunting clouded leopard.

Bird divination is practiced by hunters on their way to the hunting territory. Rukai hunters will concentrate in listening and watching for "masiang" birds they might come across, by which they can foretell the fortune of that hunting trip. A group of "masiang" birds moving from the right-side to the left-side of the trail in front of the hunter indicates bad luck, hence a stop sign, to the hunter. However, if a hunter saw the same kind of birds moving from the left-side to the right-side, it indicates a successful hunt.

According to the hunters' description, "masiang" birds consist of a number of species in the Timalinae Family. They are most likely the Alcippe morrisonia, A. brunnea, Liocichla steerii, Yuhina brunneiceps, and Y. zantholeuca, which are all small-sized thrushes. These species are commonly found in forest habitat throughout Taiwan from low to medium-high elevations (ca. 0 to 2,500 m). They are very noisy while moving and form large foraging groups in the winter time. However, direction of the bird flock movements is not predictable.

As for the physical signs, although making flatulence or sneezing is not necessarily a indication of any physiological incapacity for hunting, these are considered by Rukai hunters as bad signs. A hunter should not go hunting if either of these sounds is made before departure.

The clouded leopard, which is one of the highest consumer in the food-chain of Taiwan's fauna, is respected by Rukainese for, according to their oral history, it accompanied and led their ancestors to where they are right now. It is believed by the Rukainese that killing clouded leopard will bring disasters not only to the hunter himself but also to other tribal members, therefore, the killing of clouded leopard is forbidden.

Although most of these taboos and disciplines are not followed strictly by Rukai hunters anymore, they still believe that these traditions, especially the bird divination, are useful and important guidelines for their hunting activities.

Current status

As mentioned earlier, the Rukai tribe living in the Wutai District historically had rather limited cultural exchanges with the Han Chinese. Unlike other Aboriginal tribes in Taiwan, they still maintain many traditions. Interviews with active Rukai hunters revealed that they still keep the system of having individual or hunter-limited hunting territories, although the ownership of the Chiefs over all the natural resources and the virtue of sharing are no longer the rule in the community. As before, they hunt only in the winter time. Areas surrounding the Large and Small Ghost Lakes are still maintained free of hunting activities. Rukai hunters still depend largely on the shifting of the locations of the trapping lines within their hunting territories from time to time to ensure a sustained catch. Also, despite the fact that some small-sized species, such as the Swinhoe's pheasant (*Lophura swinhoei*), Taiwan hill partridge (*Arborphila crudigularis*), pangolins (*Manis pentadactyla*) and the Taiwan gem-faced civets (*Paguma larvata taivana*), are favored in the lowland game meat market (Wang and Lin, 1987; Wang and In, 1990), it is still not a custom for a Rukai hunter to trap such smaller animals.

III. Possible mechanism for the sustainability of hunting

Several characteristics in the hunting system of the Rukainese appear to contribute to its sustainability:

1 The species they hunt customarily, namely muntjac, serow and wild boar, are all hoofed animals with relatively high reproductive rates, and therefore able to withstand prolonged moderate hunting pressure without local population decline. In addition, since hunting is confined to the winter months, these game species are not disturbed for breeding during the Spring-Summer seasons.

2 The scattered distribution of the hunting territories (Fig. 3), each surrounded by un hunted lands, with the heavy-hunted areas spread evenly throughout the whole area, makes areas outside of the hunting territories function as wildlife protective areas or refuges, especially areas the surrounding the two Ghost Lakes, where hunting pressure is low or absent. This kind of spatial arrangement is very similar to the 'sink effect' described by Stearman & Redford (1995) and the 'spatial harvest control model' suggested by McCullough (1996) as a strategy for sustainable hunting management. In such cases, when there is a balance between areas of heavier and lighter hunting pressure, the continual flow of animals from less-hunted areas dispersing into heavy-hunted areas as a result of differences in game population density, it is possible to maintain stable game populations and stable harvesting. In the Wutai District, the 20% coverage of the total area as hunting territories is appears to be adequate for a sustainable game harvest at present rates.

3 The limited number of users and hence the total hunting effort, for each hunting territory under the Rukai tradition also reduces the possibility of over-hunting in any location. The hunting effort can be carried out by any hunter will be limited by the time available for traveling, checking traps and handling animals, and his own physical ability to carry animals out of the hunting area. Currently, 150 to 200 is the maximum number of traps one Rukai hunter will set, and this is probably the maximum number one hunter can set and handle efficiently in that environment.

Lastly, although it is not important anymore, some taboos and disciplines of Rukai hunters, such as bird divination and bad physiological signs, might have provided additional, through not central, control

mechanisms to their hunting activities in the past.

ACKNOWLEDGMENTS

This research was supported by the Sino-Germany Social Economic Foundation with funds provided by the Council of Agriculture of the Republic of China (project no.: 85ScTe-1.20-F-9 and 86ScTe-1.19-B-4-1). The author specifically thanks Miss. F. M. Luo and Mr. D. C. Luo for their help in collecting valuable information, and also thanks Dr. Paul Müller and Dr. Richard D. Taber for providing helpful comments and suggestions on this study.

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Table 1. Land use types in the Wutai District

Land Use Types	Area (hectares)	Percentage
Aboriginal Preserve	5,576.0	20.00
Agriculture	1,159.6	4.16
Housing	16.1	0.06
Forest	3,770.2	13.52
Others	630.1	2.26
National Forest	22,025.0	80.00
Total	27,880.0	100.00

Table 2. Education levels of the Wutai District residents
older than 15 years old

Education Levels	No. of residents	Percentage
Illiterate	114	4.6
Elementary School	1,146	46.4
Junior High School	453	18.3
High School	665	26.9
Junior College	77	3.1
College	16	0.7
Total	2,471	100.0

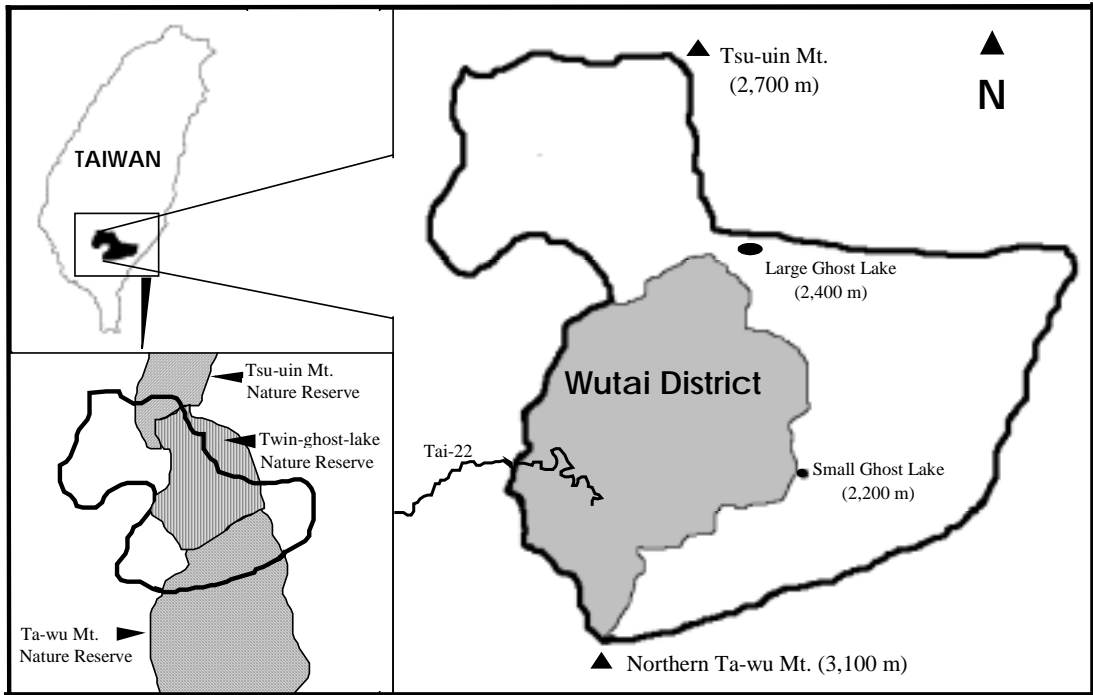


Figure 1. The geographic distribution of the Rukai Tribe in Taiwan and the location of the Wutai District.

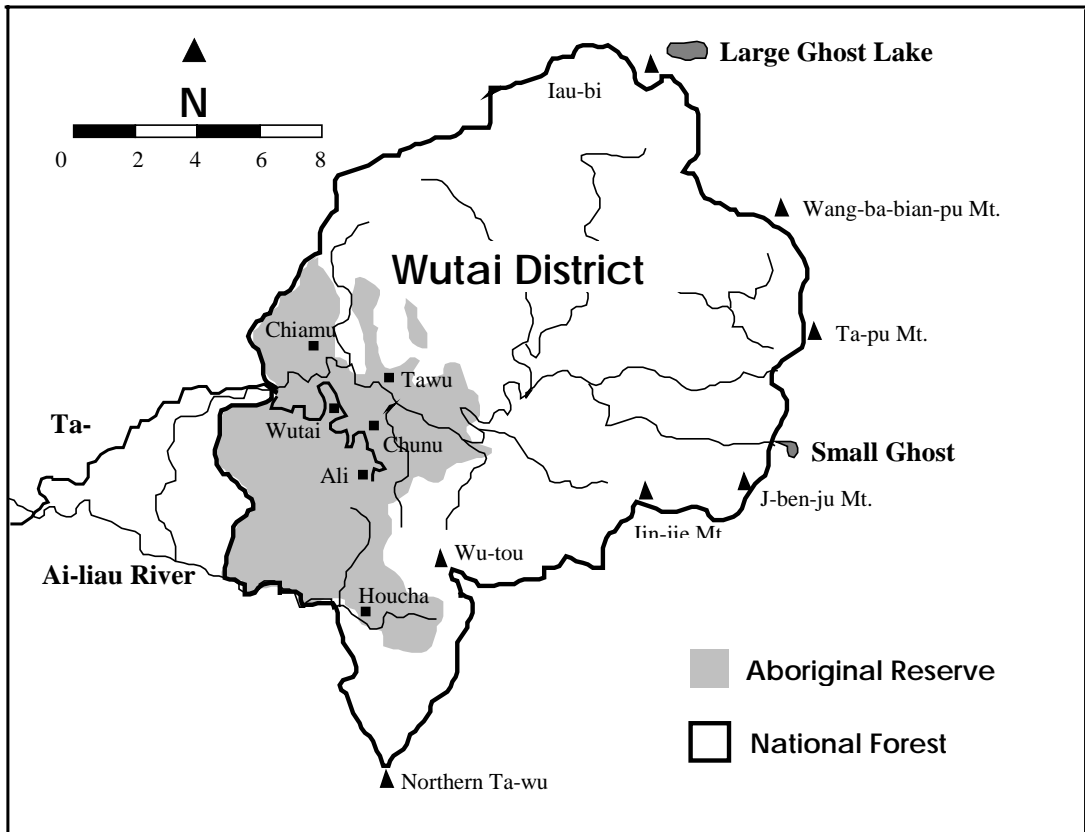


Figure 2. Map of the Wutai District.

