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REPORT OF A SURVEY ON SAIGA HORN IN MARKETS IN CHINA

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# **REPORT OF A SURVEY ON SAIGA HORN IN MARKETS IN CHINA**

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## **Summary**

Between February 2006 and January 2007, a survey of saiga horn in markets in China was conducted by the Wildlife Conservation Society (WCS). Surveys were conducted in 14 provinces and one municipality, and covered a total of 262 shops in all 12 of the best known TCM wholesale markets, 195 TCM retail pharmacies in six large cities, and 10 boundary ports.

In wholesale markets, 3,099 whole saiga horns weighing 383.26 kg were seen directly. More than 50% of the sampled retail market pharmacies sold saiga horn and/or its derivatives. In addition to formal TCM channels, saiga horn for personal use is being obtained through varied channels, rendering management difficult. High prices are stimulating smuggled imports and underground markets. For example, the boundary surveys showed that Heihe, Heilongjiang province, currently has a significant underground cross-border trade in saiga horn. By changing to increasing frequency of smuggling trips while reducing the amount carried each time, detection becomes more difficult.

Saiga is listed as a Class 1 state special protected species in China, so any commercial trade is illegal unless a permit from national-level authorities is granted. However, perceptions of this are apparently unclear, with horns obtained from stockpiles or from outside China perceived as being not as strongly legally protected, or else as having already been given legal clearance. The lack of clarity in legal interpretation is confusing to consumers and management officers, and means that horns from various sources can leak into the market.

Recommendations to the CITES Secretariat are that: Research should be initiated on how to identify real from fake saiga, the subspecies of saiga being traded and, if possible, its population of origin; the units by which CITES imports and exports are reported should be standardized; and research on reducing the use of saiga horn in TCM should be encouraged.

Recommendations to CITES parties are that: Stockpiles of saiga horns in all CITES member countries should be recorded, registered with relevant management agencies, and an effective system of marking and monitoring the chain of custody established; capacity building projects for enhancing enforcement of illegal hunting and trade of saiga should be supported, especially in saiga range countries and core consuming countries; and remaining wild populations of saiga should be monitored regularly.

Recommendations to China are that: The legal status of trade in saiga should be clarified, and the information disseminated to enforcement agencies and the public; current stockpiles of saiga horns in China, including those in private hands, should be recorded, and a foolproof chain of custody system developed; possession and sales of unregistered saiga items made legal offences, and severe penalties levied on offenders; before any legal trade in saiga horns from registered stockpiles is allowed, the full trade chain and chain of custody must be proven to be strictly managed, with no possibility of saiga from other sources entering the chain; if such a system can be implemented, and if any legal trade is then allowed, TCM products should specify clearly if they contain saiga parts and derivatives, not just the more generic term *lingyang jiao*, and also that saiga is an endangered species; capacity building programs for enforcement of saiga horn trade legislation should be supported, focusing initially on saiga trade hotspots; education programs should be conducted in major consumption areas, to raise public awareness and reduce the demand for saiga horn; and the saiga horn trade should continue to be monitored.

## 1. Background

The saiga antelope *Saiga tatarica* L. is a nomadic species of the semi-arid rangelands of Central Asia (Milner-Gulland *et al.*, 2001). Its distribution is restricted to three populations (*S. t. tatarica*) in Kazakhstan (periodically ranging into Turkmenistan and Uzbekistan), one population of *S.t. tatarica* in Kalmykia, Russia, and one of *S. t. mongolica* in Mongolia. The population of *S.t. tatarica* in northwest China became extinct by the 1960s.

### *Status of saiga in the wild*

The saiga antelope (*Saiga tatarica*) once roamed the semi-arid steppes of Central Asia in numbers of more than one million animals. This unusual and unique migratory ungulate has suffered a sudden and catastrophic decline, losing over 95% of its total population in the past 15 years. Estimated saiga numbers in Kazakhstan dropped from 976,000 in 1993 to 21,000 in 2003 (Milner-Gulland *et al.*, 2001). A recent survey in Mongolia revealed that the population has been subject to poaching and has declined from a high of 5,200 before year 2000 to perhaps as few as 2000 in 2006. The latest data of saiga population in all range counties collected for the 2006 Convention on Migratory Species (CMS) meeting show that the total global population of saiga is around 64,400-69,400.

Saiga populations have fluctuated dramatically over the last century, principally as a result of hunting for meat and horns, habitat loss and fragmentation and climatic variability (Bekenov *et al.*, 1998). According to trade data in UNEP-WCMC database reported by parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 67 tonnes of saiga parts and derivatives were legally traded between 1995 and 2004. This is estimated to represent around 280,000 animals. In addition, an unknown amount of saiga horn is traded illegally.

### *Legal status of saiga*

As a result of such declines, the saiga was placed on Appendix II of CITES in 1995; the IUCN Red List added it as a Critically Endangered species; CMS included it into its own Appendix II in 2002, and the continued decline led to nine decisions adopted by CITES in 2004 mainly to address concerns related to non-sustainable or illegal trade in, and use of, saiga. The IUCN World Conservation Congress in 2004 also adopted a comprehensive resolution on saiga conservation urging increased international action.

International trade in saiga and products, parts and derivatives thereof is authorized but strictly regulated under the terms of CITES. Since 2001, recommendations have been in place to suspend imports to China of saiga from Kazakhstan and the Russian Federation. Saiga is also legally protected in all its range countries of Kazakhstan, Mongolia, Russian Federation, Turkmenistan and Uzbekistan. No licence has been issued for hunting saiga in these countries since 2004.

In China, its former range country as well as a major consuming country, saiga is listed as a Class 1 state special protected species, which means that any sale and purchase is illegal, and classified as a “very grievous” crime (Proclamation from the Highest Court of China, December 2000). Hence all sales are illegal unless a permit from national-level authorities is granted. However, the legal situation is apparently seen as ambiguous. Because saiga is thought to be extinct in China, different agencies have various perception of legality of its trade, such as there is some perception that sales of parts from stockpiles or from outside China are not as strongly legally protected, or else already have been given legal clearance. This is in spite of a decree from the High Court (Proclamation from the Highest Court of China, December 2000) which states clearly that animals from outside China have the same legal status as those within it.

### *The captive breeding of saiga*

The captive population of saiga is small, and breeding success is limited. The Centre for the Conservation of Wild Animals of Kalmykia is the one program recognized with successful breeding; the Russian Federation has around 110 saigas kept in four facilities.

The Endangered Animal Breeding Center of Gansu Province located in Wuwei City, China, established a breeding herd of saiga in 1980s. It currently has 51 animals originating from 30 saigas imported separately 3 times from San Diego (USA), Germany, Kazakstan and Russia. Mongolia attempted to establish a captive breeding herd in the 1970s but had no success.

Also, a number of zoos and collections have kept saiga, but with little success. Between 1962 and 1996, the Zoological Society of San Diego bred captive saiga from 1962 to 1996, with cooperation from facilities in Europe and the United States, and produced 118 offspring.

### *The use of saiga horn in TCM*

One of the most important causes of the recent dramatic decline of saiga is believed to be the market demand for saiga horns for use in Traditional Chinese Medicines (TCM). Only male saiga bear horns, so pressure is predominantly on the males

In TCM, Linyang Jiao (directly translated as “antelope horn”) is the medicine name for saiga horn. According to the translation version of the Drug Administration Law of the People’s Republic of China (2001), whole horn and horn parts should be categorized as crude TCM, while slices/ strands/ powder are prepared slices of Chinese crude drugs which can be used by a patient directly, and TCM preparations are drugs containing saiga horn component.

Linyang Jiao was first recorded as a medicine in “Shennong’s Materia Medicine” which was the earliest professional pharmacology monograph in China with a history of about 2,000 years. In history, there are a lot of prescriptions with Linyang Jiao, especially after the Qing Dynasty (Zang, 1990).

It is believed that Linyang Jiao has medical effects in reducing body heat, detoxification, releasing infant fevers, assuaging epilepsy, and is also good for the liver (Zang, 1990). Currently, TCM preparations made from traditional famous prescriptions containing Linyang Jiao are produced by many medicine factories around the country. According to calculations from published reports and from the database website of State Food and Drug Administration of the People’s Republic of China (SFDA), 535 TCM preparations containing saiga horn ingredients are registered in SFDA. They are produced in 31 provinces, autonomous regions and municipalities, covering almost all provincial level administrative regions except for Hainan Province.

Besides traditional use in prepared medicines, people use crude Linyang Jiao for home use to treat relevant symptoms. This personal use of Linyang Jiao is a significant component of overall consumption of saiga horn, although the quantities used are difficult to estimate.

Historically, before 1991 when the Soviet Union disbanded, the import of saiga horn into China was limited. In 1990, the price was about US\$750/kg. After that, poaching increased dramatically for both saiga meat and horn, because of local economic collapse, dissolution of enforcement mechanisms, and increased commercial hunting. Although there is no

accurate record of the emerging import volume of saiga horn to China at that time, the price recorded during 1991-1992 dropped to below US\$100/kg (Guo *et al.* 1996).

In 1994, TRAFFIC conducted a survey of saiga horn markets in four countries (Chan *et al.*, 1995) and documented that China was the main consumer. The State Species Committee of China conducted a survey of six TCM markets in 1996 (Guo *et al.* 1996). The report showed saiga horns were available in four markets, and the consumption in four medicine factories sampled was estimated at more than 800 kg/ year.

The demand for saiga horn in China is also indicated by smuggling cases. At least 15 cases of smuggled saiga horns were reported between 2000 and 2003. The total amount of confiscated horns was 4,955.83 kg, which represents more than 14,867 male saigas. The price of saiga horn in TCM markets was US\$500 per 1000 kg during 2002-2004, representing an increasing trend (<http://www.cntcm.com.cn>). Further major seizures continue. In November 2006, 108 saiga horns were seized in Mongolia, heading for its southern border with China. On 19<sup>th</sup> January 2007, Russian authorities seized 531 saiga horns near its border with China. No wild saiga populations occur in this area, so the horns are clearly being transported over significant distances (WCS Mongolia Program information, 2007). The selective hunting of males has resulted in a sex bias in wild populations, in some cases with only one male per 30 to more than 100 females (Milner-Gulland *et al.*, 2003). Given a total world population of perhaps 69,400 animals at most in 2006 (CMS estimation 64,400-69,400) and an even more optimistic adult male ratio of about 10% (according to the Milner-Gulland *et al.* estimation of 8-10% in 2001), the most optimistic assessment gives us a maximum global population of 6,940 males. Seizures in 2006 alone were from 320 males or, at the most conservative estimate of sex ratios, 4.6% of the total world population of males of the species.

However, the current state of sales remains unknown and no specific surveys have been conducted for saiga horn in TCM markets since 1994. Hence, WCS conducted this project aiming to investigate and evaluate the current market status of saiga horn in China. Information from this study will assist the Chinese Government and the CITES Secretariat to determine appropriate interventions for management of the saiga horn trade, and for the conservation of saiga.

## **2. Aims of current survey**

This project aimed to:

- Understand the market demand for saiga horn and related products in China, especially markets for individual buyers, including the types and quantities of horn for sale, and reasons for purchase;
- Analyze the market information based on individual level sales;
- Evaluate the pressure of the saiga trade on wild populations;
- Provide government decision-makers, the CITES Secretariat, and the broader conservation community with recommendations on how to ensure conservation of the saiga in the face of current levels and patterns of trade.

## **3. Methods**

### *Investigators*

The survey team comprised three principal investigators (PIs) and 21 local investigators (LIs) from each surveyed region. The PIs formulated the investigation plan for every surveyed region, conducted pre-surveys and main surveys themselves, and trained and guided the LIs to use a modified questionnaire, based on information from the pre-survey.

The three PIs were Lishu Li, Yao Zhao and Ablimiti Abdukdir, all of whom have experience in conducting wildlife trade surveys. The LIs were local college student volunteers. To ensure the consistency of survey methods, the PIs trained the LIs fully on detailed methods and skills, including identification of saiga horn, before and after going to markets. All original records (including voice records, original record tables, and photographs) were sent to the PIs who conducted all of the analyses.

#### Location selection

Locations of investigation sites were selected according to pre-survey interviews and information from literature and the internet. All survey locations are marked in Figure 1, and listed in Annex 1.



Figure 1. Locations of surveys conducted

1) Wholesale markets. A total of 12 markets in 10 provinces and 1 municipality were investigated. These 12 are well known to be the most famous TCM wholesale markets in China, according to TCM sources (e.g., China News of Traditional Chinese Medicine: <http://www.cntcm.com.cn>, <http://www.tcm1.com/newtcm1/index.aspx>) and also the literature (Guo *et al*, 1993). The markets were Juhuayuan in Yunnan province, Lianqiao in Hunan province, Changsha in Hunan province, Qingping in Guangdong province, Yulin in Guangxi province, Jiefanglu in Chongqing City, Hehuayuan in Sichuan province, Anguo in Hebei province, Bozhou in Anhui province, Yuzhou in Henan province, Sankeshu in Heilongjiang province, and Huanghelu in Gansu province.

2) Retail markets. A total of seven cities in four provinces were investigated: Lanzhou in Gansu province, Chengdu in Sichuan province; Huizhou, Guangzhou, Jiangmen and Zhongshan in Guangdong province; and Wenzhou in Zhejiang province. The focus on Guangdong was because it was considered to be the most important wildlife consuming province in China (Lau, 1996). Wenzhou city was selected because considerable information obtained in the pre-survey indicated that it was an important consumption area.

3) Boundary surveys. 28 sites in three provinces were investigated. In Xinjiang province: 23 sites including air ports, train ports, road ports and important bazaars along the boundary line, namely Urumchi airport, Kashi airport, Urumchi economic district port, Huangling port, Bianjiangbinguan port, Shangmaocheng port, Erdaoqiao bazaar, Kashi bazaar, Khunjerab port, Turduote port, Laoyemiao port, Wulasitai port, Takeshiken port, Hongshanzui port, Aheitubaike port, Jimunai port, Baketu port, Alataw Pass port, Horguosi port, Durata port, Muzarte port, Yierkeshitan port; in Inner Mongolia: Manchuria, Hailar, Erguna and Erlianhaote (Erlianhaote only for pre-survey); and in Heilongjiang province: Heihe and Mohe.

The location of these sites was determined from previous WCS wildlife trade surveys and long-term field research along the Inner Mongolia and Northeast China boundary areas including two trade surveys along Inner Mongolia borders in cooperation with the WCS Mongolia program (Wingard and Zahler, 2006 ), as well as pre-surveys for this project. All data from these sources showed the hotspots for cross-border trade.

Xinjiang has a complex mixture of nationalities and ethnic groups, and no previous relevant surveys had been conducted here. Hence, our sites in Xinjiang were selected from information in the literature (Abdukadir, 2004), as well as the experience of Professor Ablimiti who is local to the area and has done significant research on wildlife trade in this area.

4) Attitude surveys. These were not formally included in the project proposal. However, the pre-survey and all of the market surveys in retail markets in Wenzhou city showed that saiga was widely and openly sold. Hence, we decided that assessing consumer attitudes would help to illuminate how to address the issue of saiga trade. Yueqing county was selected as a typical Wenzhou community to conduct a small scale attitude survey for local consumers. Survey sites in Yueqing were recommended by the LIs, taking full consideration of the diversity of the interviewees' ages, incomes, educational levels and professions.

#### *Market survey methods*

For each retail and wholesale market investigated, whenever saiga horn was encountered, the following information was collected by interviewing shopkeepers, evaluating presented horns, counting and weighing them: 1) the form in which it was available; 2) its price, 3) its origin, if that could be ascertained; 4) the quantity being offered for sale; 5) the type of customers and where they came from. See Annexe 1 for the datasheet used.

Whole saiga horns vary in size, age, quality, and if bones are still attached. Even one shop can have a mixture of horns. This makes the estimation of weights being sold difficult, and it cannot be done merely using standard measures from the literature. Thus, when surveying wholesale markets, the PIs estimated the weight and number of horns by weighing one or two samples of each type of horn in stock. If horns could not be weighed, PIs estimated weights according to their past experience. In addition, the status of horns were estimated according to the PI's experience, and as much information as could be ascertained from the traders.

The pre-survey showed that in wholesale markets, shops are close to each other and usually only shops selling antlers, ginseng, birds' nests and other high-priced TCM tonic medicines could provide saiga horns, PIs visited every tonic shop in the targeted wholesale market. In all, 262 such shops were surveyed.

Information was also obtained from traders on other aspects of the saiga horn trade, including possible stocks, trade routes and cultural backgrounds of different surveyed locations, to help better evaluate the trade status.

Sales of saiga horn are illegal (see above), and sellers were cautious about being interviewed and tended to show only small amount of their stocks. To minimize possible biases and collect as accurate data as possible, interviews were recorded by a small hidden tape recorder, or memorized and written onto record sheets by the PIs (pretending to be potential buyers) away from the shops or the market stalls. If it was considered to be safe and not to interfere with data collection, photos of the saiga horns were taken. However, the investigators remained flexible in different situations to avoid creating suspicion.

In addition to what PIs actually saw and counted, an assessment was given by PIs calculated from data provided by the traders. (See table 1 below.) Traders sometimes tended to offer more than they had in stock themselves since they could go to other places to get more. Therefore, the study only estimated the amounts that traders claimed to be stored at the site at that time, and which they said that the PIs could immediately see if they paid to buy them. Since the PIs never paid, this could not be finally verified, but was generally deemed to be relatively accurate. Also, PIs discarded any data which they thought was not reliable.

With these methods, the PIs were confident that they were getting a reasonably accurate picture, but given a rather conservative and cautious consideration, it might be an underestimate of the true volume of sales.

#### *Boundary survey methods*

Boundary trade of saiga is usually conducted under cover, and is highly sensitive. Thus, the survey methods used were flexible, according to the situation. PIs interviewed traders using personal connections or pretending to be traders from TCM wholesale markets. On other occasions, when traders were located in tourism shops, the PIs posed as tourists.

Even though no formal introduction letters for this survey had been issued by any government agencies, the PIs interviewed local Customs and Industry and Commerce Administration staff whenever possible, since they are the agencies legally responsible for managing cross boundary trade and boundary markets respectively.

#### *Attitude survey methods*

The questionnaire (see Annex 3) was formulated by the PI who had pre-surveyed the location. It aimed to collect relevant background information on traditions and local cultures. The form was then modified by the LIs, based on their knowledge of the local consumers and the local language.

The LIs were fully trained by the PIs on survey methods and consistency of conducting interviews prior to the surveys. In addition, they conducted a test survey by interviewing their family members.

Interviews were conducted randomly in the streets and department buildings in selected sites. Seventy interviewees were asked by the LIs, in the local language, to complete the questionnaires. Sixty respondents were effective and cooperatively

completed questionnaires. Within that group, 49 were local residents who were born locally or at least lived in this area for over 3 years, therefore with full cultural and traditional background of this area. These 49 resident respondents (RRs) are recognized as valid respondents in this survey for analysis.

#### 4. Results

##### Wholesale markets

In all, 262 shops in the 12 most famous TCM wholesale markets around China were surveyed. All markets had saiga horns or their derivatives for sale.

The main types of saiga horn products seen in wholesale markets were whole horns or horn parts as crude medicine, and slides or powders of horn as prepared TCM slices. The latter were seen frequently and sold openly in wholesale markets. It was difficult to identify whether those slices were from real saiga horns or fakes, while in some cases these prepared slices were packed with the drug certifications series number issued from State Food and Drug Administration (Figure 2). However, in most cases, traders of TCM wholesale markets are aware that the saiga is a protected animal in China and the illegality of selling whole horns of saiga and were sensitive to enquiries.



Figure 2. The package of Lingyang Jiao powder (Antelope horn powder) produced by one medicine company in Wuxi, with the drug certification series number on the left top, photographed in the Bozhou TCM wholesale market, Anhui province. By Yao

Table 1 shows the volume of saiga horns recorded in surveyed wholesale markets by province. These data only show the horns that the PI personally saw and counted. The minimum and maximum assessments were calculated from data provided by the traders. (See above)

However, since the trade is largely underground, the data obtained were influenced by the scale of the market, the sensitivities of individual traders and how willing they were to show and discuss their stocks. Smaller scale markets tend to have less of the high priced TCMs such as saiga horn, and markets in Yunnan, Guangdong and Hebei provinces are more regulated where enforcement has been enhanced in recent years, so traders were very sensitive. Direct investigations did not show high stock volumes, although interviewed traders claimed that those markets are centers for saiga horn supplies. Thus, it is possible that the data in Table 1 are underestimates.

Table 1. Quantities of saiga horns recorded in the wholesale markets sampled.

Location	Number of investigated shops	Quantity		Min. assessment		Max. assessment	
		Number of horns seen	Weight (kg)	Number of horns	Weight (kg)	Number of horns	Weight (kg)
Yunnan	17	79	8.00	136	19.00	280	40.00
Hunan	60**	408	42.45	552	65.45	557	66.45
Guangdong	32	135	9.91	150	20.00	200	30.00
Guangxi	21	100	16.01	148	23.00	164	25.00
Chongqing	13	30	5.50	390	70.00	500	90.00
Sichuan	11	14	2.10	80	12.00	280	42.00
Hebei	9	505	64.47	570	85.47	900	135.47

Anhui	38	358	29.65	1108***	71.65	1308***	89.65
Henan	23	409	20.17	664	65.17	774	80.17
Heilongjiang	20	970	171	970	171	1700	300
Gansu	9	91	14	131	20	191	30
Total	262	3099	383.26	4899	622.74	6854	928.74

\* Volume here only includes horns that PI saw and counted. The minimum and maximum assessments were calculated from the data provided by traders, but we could not see the stock.

\*\* Two TCM wholesale markets were investigated in this province, since both were listed as famous markets in China.

\*\*\* One trader would not show his stocks until money was paid, so the PI could not verify his estimates, which were unusually high. According to this trader, his stock was cut horn tops without bone; this was consistent with the one sample he showed to the PI, which weighed only about 4g.

Table 2 shows the price ranges of saiga horn in each surveyed wholesale market. Since the PIs were not buying horn, it was not possible for them to reach a final deal price with the trader, but they did bargain to get the lowest, and hence most realistic, prices possible.

Prices varied for different types of horn preparation and different market locations. “Horn tops” refer to either horns from sub-adult or young saiga, or the top end cut from the whole horn of an adult. They are usually quite fresh and smooth, and are the most expensive kind of saiga horns in all markets. The markets in Yunnan (Juhuyuan TCM Market) and Guangdong (Qingping TCM Market) were in downtown areas with many tourists as well as local residents going to wholesale markets for personal purchases, which might contribute to the higher average prices than in other wholesale markets.

To better present the price and its distribution in different levels, table 3 shows the prices obtained in wholesale markets in ranks with obtaining ratios. In 3 different types of horns, respective concentrations are clearly in 4,000-4,900 RMB/kg (500-625 USD/kg) for whole horn with bone, 7,001-8,000 RMB/kg (875-1,000USD/kg) for whole horn without bone, and 9,000-10,000 RMB/kg (1,125-1,250USD/ kg) for horn tops. This price for whole horn with bone, compared with that at 63-88USD/kg in 1996 (Guo *et al.*, 1996), has been increased at least by 5 to 10 times in 10 years.

Table 2. Prices of saiga horn in wholesale markets in 262 shops surveyed in five provinces and one municipality in China.

Location	Single whole horn with bone (USD / kg)**	Single whole horn without bone (USD / kg)	Horn tops* (USD / kg)	Horn part (USD / kg)
Yunnan	500-1000	No stock	1125-2250	No stock
Hunan	575-1000	500-1188	900-1750	575
Guangxi	400-813	No stock	1063-1875	No stock
Guangdong	750-1000	850-1250	1000-2000	No stock
Chongqing	450-600	No stock	No stock	No stock
Sichuan	450-575	No stock	No stock	No stock
Hebei	438-625	No stock	-1500	No stock
Anhui	500-813	No stock	No stock	No stock
Henan	450-625	No stock	1375-2500	No stock
Heilongjiang	625-938	No stock	-2250	No stock
Gansu	600-625	No stock	No stock	No stock

\* Horn top refers to either horn from sub-adult / young saiga, or the top end cut from the whole horn of adult saiga.

\*\* Exchange rate= 1 USD : 8 RMB

Table 3. Price ranks and ratios of saiga horn in wholesale markets in 10 provinces and one municipality in China.

Horn types		Single whole horn with bone		Single whole horn without bone		Horn tops*	
USD/ kg***	RMB / kg	Number of prices ascertained	Ratio	Number of prices ascertained	Ratio	Number of prices ascertained	Ratio
1,875.1-2,500.0	15,001-20,000	0	0	0	0	6	23.1%
1,250.1-1,875.0	10,001-15,000	0	0	0	0	4	15.4%
1,125.0-1,250.0	9,000-10,000	0	0	1	3.2%	11	42.3%
1,000.1-1,124.9	8,001-8,999	0	0	5	16.1%	1	19.2%
875.1-1,000.0	7,001-8,000	3	4.7%	16	51.6%	4	15.4%
750.1-875.0	6,001-7,000	5	7.8%	3	9.7%	0	0
625.0-750.0	5,000-6,000	13	20.3%	3	9.7%	0	0
500.0-624.9	4,000-4,999	38	59.4%	3	9.7%	0	0
Lower than 500.0	Lower than 4000	5	7.8%	/	/	0	0
Sample size**		64		31		26	

\* Horn top refers to either horn from sub-adult / young saiga, or the top end cut from the whole horn of adult saiga.

\*\* Only prices for those horns or derivatives that were seen by investigators are counted here. Prices for stocks that were not exhibited to investigators are not included.

\*\*\* Exchange rate= 8 RMB : 1 USD

In addition to the above quantitative data collected, conversations with traders were recorded. Key points were:

- ✓ *Origins* of saiga horns in TCM wholesale markets could not be clearly determined in most cases, but generally stated as Central Asia or Russia, entering China through Xinjiang or from northeastern China. In some individual cases in Yunnan and Hunan markets, Central Asia to Tibet was mentioned as the importing route. In some cases, evidence such as recent newspapers from Kazakhstan used for packing the horns clearly indicated their origin.
- ✓ *Sources* of saiga horn in wholesale markets are three kinds: stockpiles, other wholesale markets, and direct imports through boundary traders. The PIs estimated that 59.5% of 121 shops offering saiga whole horns for sale in the survey had horns of relatively recent origin or stocks only one to two years old, while some were older. Traders usually displayed a mixture of different horn types from fresh to old, cracked ones, from horn tops to long whole horn with bones, indicating that the sources of horns varied.

Traders dealing in high-priced TCM products such as antlers, sea horses and ginseng usually have good relationships with traders in the boundary markets who might be involved in illegal cross border trade, or with other traders in other big wholesale markets. In one case, a PI in Sankeshu TCM market, Heilongjiang province, was told that 100 kg of saiga horn was transported the previous summer to Anguo TCM market, Hebei province. That was later confirmed by a PI talking to several traders in Hebei.

- ✓ *Consumers* of saiga horns in wholesale markets were varied, depending on the market locations. Most of TCM wholesale markets were specifically patronised by wholesale consumers, so pharmacies and TCM factories were the main consumers. Since the price for saiga horn has increased greatly in recent years, traders claimed that TCM factories can no longer afford it as crude TCM materials for producing TCM preparation, therefore pharmacies have become the main consumers in wholesale markets. The exceptions are the downtown markets with many tourists (see above).
- ✓ *The price* of saiga horn is increasing. Most traders stated this, that many of them can no longer afford the high price, and are unable to replenish their stocks. At the same time, traders also claimed that the high price stops many people from purchasing large volumes of saiga horn.

- ✓ *Illegality* of saiga horn sale in TCM wholesale markets is well known by traders, and about 92% of them were cautious when offering PIs whole horns for sale. However, it seems that the perception is that only trade in whole saiga horns is illegal, while other saiga horn parts or derivatives are recognized as legal. Almost every trader was very nervous and cautious when showing PIs whole horns, but exhibited horn powders, horn slices or horn strands very openly. In Anguo TCM wholesale market, Hebei province, the latest price guide book published by the market management agency said, “Lingyang Jiao (saiga horn) strand prices at 3000-6000 RMB/kg, powder prices at 3500-50000 RMB/kg”; posters showing that selling protected animal products such as saiga horn is illegal are also displayed in the same market. Also, many traders claimed that the quality of horn parts or derivatives produced by TCM crude material companies or by TCM factories were unreliable, and were thought to be made from very old horns or horns of other animals.

#### *Retail markets*

A total of 195 pharmacies in seven cities of four provinces were surveyed (Table 4). They included privately owned stores and chain stores held by big companies.

Results show that every province surveyed has pharmacies selling saiga horn or its derivatives (Table 5). More than 50% of pharmacies sampled sold saiga horn and/or its derivatives in three of the provinces surveyed. The only exception was Sichuan province, where 40% sold it (Table 6). In Wenzhou City, Zhejiang province, 97.8% of pharmacies sampled sold saiga horn.

*Table 4. Number of pharmacies investigated for the retail market survey*

Province	Investigated cities	Number of registered pharmacies	Number of pharmacies sampled	Percentage of pharmacies sampled
Guangdong	Guangzhou Zhongshan Jiangmen Huizhou	8760	52	1%
Gansu	Lanzhou	213	28	13.1%
Sichuan	Chengdu	4097	70	1.7%
Zhejiang	Wenzhou	446	45	10.1%

*Table 5. The availability of saiga horn and its derivatives in pharmacies surveyed.*

Location	Target city	Whole horns	Horn parts	Slices/ powder	strands/ TCM preparations
Guangdong	Guangzhou, Jiangmen, Zhongshan, Huizhou	Yes	Yes	Yes	Yes
Gansu	Lanzhou	No	No	Yes	Yes
Sichuan	Chengdu	Yes	Yes	Yes	Yes
Zhejiang	Wenzhou	Yes	No	Yes	Yes

*Table 6. Number and percentage of sampled pharmacies selling saiga horns and/or their derivatives.*

Location	Number of pharmacies visited	Pharmacies with saiga horn and/or its derivatives		Pharmacies without saiga horn and/or its derivatives	
		Number	Percentage	Number	Percentage
Guangdong	52	33	63.5%	19	36.5%
Gansu	36	24	66.7%	12	33.3%
Sichuan	70	28	40%	42	60%
Zhejiang	45	44	97.8%	1	2.2%

The price of saiga horn and its derivatives in the retail markets surveyed varied greatly both within and between provinces, as did the different form in which the horn was sold (Table 7). As would be expected, the average price level in retail markets was much higher than in wholesale markets.

Table 7. Average price of saiga horn and its derivatives in retail pharmacies surveyed

Location	Whole horn or horn parts (USD/kg)	Slices/ strands/ powder (USD/kg)	TCM preparations (USD/kg)
Guangdong	625.0-1,125	238-625	Not recorded
Gansu	No stock	700	313-1,325
Sichuan	1,225	438-1,375	Not recorded
Zhejiang	837.5-2,250	500-1,250	Not recorded

In addition to the above quantitative data collected, conversations with retail traders were recorded. Key points were:

- ✓ *Origins* of horns were mainly: Russia, northeastern China, and Xinjiang. This information came either from the label or from the sellers' description.

- ✓ *Sources* were mainly wholesale markets and local TCM companies. Chain stores said sources are from their headquarters. In general, especially when enquiries were



Figure 3. Different forms of saiga horn being sold in one pharmacy in Wenzhou city, Zhejiang province: cut horn tops, whole horns, packed horn powder in red bags and packed horn slices in plastic bags.

about whole horns, shop keepers were unwilling to divulge their sources, or said that the horns came from private or family stockpiles.

*Consumers* of saiga horn in retail markets generally fall into three categories, those buying for personal/family use, restocking family medicines, and giving presents.

For personal/family use, consumers usually buy saiga horn derivatives such as TCM preparations or prepared slices of TCM crude drugs (slices, strands or powder) in small amounts for use several times, mainly for curing high fevers, colds, or reducing body heat. In most cases, consumers have no prescriptions for buying merely one dose of saiga horn or its derivatives.

For family medicine restocking and for giving presents, whole horns are apparently preferable, sometimes in decorated packages. In Sichuan and Zhejiang provinces, prepared slices of saiga horns in packages are also used for restocking and giving as presents (as in Figure 3).

- ✓ *Special consumers* have recently appeared, buying TCM preparations of saiga horns not for humans, but for pet dogs. Although demand for this is probably not large, more than 2,000 websites for pet owners comment that TCM preparations of saiga horn, especially the Lingyang Jiao injections, are effective in curing canine distemper or other high fevers in dogs. This is not a traditional use of saiga horn.
- ✓ *Prices* are diverse and sporadic in different shops and in different locations, especially for whole horns. For horn derivatives which are prepared or packed by TCM companies or factories, prices are less variable, and open to offers.

Whole horns in retail markets are extremely expensive, since supplies are unstable and any one sale is not large. Shop keepers in different areas reported that the prices are significantly higher in recent years. The high price deters some people from purchasing whole horns, who turn instead to use other forms of horns or other medicines. In spite of that, significant demand remains.

- ✓ *Illegality* of selling saiga horn in retail markets is generally less of an issue to traders than in wholesale markets. In most cases, whole horns and derivatives are exhibited openly, with formal price tags or certificates from companies or factories. In around 91% of shops selling saiga horn and derivatives, horns are thought to come from sources perceived by the sellers to be legal, such as stockpiles; and shops feel safe with no sensitiveness to offer them for sale.

As in wholesale markets, however, in retail markets whole horns are considered to be “more illegal”, and shop keepers tended to be more sensitive when asked about whole horns. This was especially true in Guangdong province, where enforcement in retail markets seems to be relatively strict.

- ✓ *Wenzhou city, Zhejiang province, is a special case because:*
  - The percentage of retail shops selling saiga horns and derivatives was much higher in Wenzhou than any other cities surveyed, with almost all surveyed pharmacies offering them. The main forms of saiga horns in this area were whole horns and prepared slices.
  - The quantity of whole saiga horns available here is higher than any other retail markets surveyed, and is even higher than some wholesale markets. At least 305 horns were seen by LIs in 44 shops surveyed.
  - According to the shop keepers interviewed, demand for saiga horns and derivatives in this area is stable. The habits of local people using saiga horns here, on average, seems to be different from other regions. In Wenzhou, the horns are used primarily to reduce body heat and for detoxification, while other regions regard curing emergent situations of high fevers in young children and high blood pressure in older people as the main functions. In Wenzhou, therefore, the consumer population is not limited to particular age groups, and the frequency of applying saiga horn is not limited to particular serious diseases.

#### *Boundary surveys*

Results of the boundary surveys are summarized in Table 7. The record trade volume and the historical price were derived from PIs interviewing local management agencies and local traders, and also recorded or estimated the information themselves (see Boundary Survey Methods above).

Table 7. Summary of boundary trade survey results. / = no data.

Province	Region	Open trade	Underground trade	Current trade volume seen by PIs (kg)	Recorded trade volume 2004-2006 (kg)	Historical price recorded by traders before 2000 (RMB/kg)	Current Prices offered by traders interviewed in this survey (RMB/kg)
Inner Mongolia	Hailar	No	Yes	1.2-2 (8-12 horns)	/	/	4500
	Manchuria	No	Yes	/	~1.2 (6 horns)	400-800	4800
	Erguna	No	Yes	0.75	/	/	4600
Heilongjiang	Mohe	No	No	/	/	/	/
	Heihe	Yes	Yes	32.7-49.2 (about 218-328 horns)	/	1000-2000	4000-5500
Xinjiang	Urumchi	Yes	Yes	30	1385	/	1200-8000
	Kashgar	Yes	Yes	15	/	/	1500-8000
	Baketu	No	Yes	/	483	/	/
	Alataw Pass	No	Yes	/	/	/	/
	Horguosi	Yes	Yes	0.4	11	/	5000-6000

Because of the illegality of cross border trade in saiga horns, traders were highly sensitive, and most data were obtained by lengthy dialogues between the PIs and local traders, management agencies and local people. Hence, results should be taken to indicate overall trends and patterns rather than definitive numbers.

#### Inner Mongolia

Manchuria, as the biggest land port on China's northern border, with roads and railways to Russia, has historically been an important port for saiga horn trade (Li, 2001). According to the traders we interviewed, in the early 1990s, the trade volume was around 10 tonnes per year. Trade on this scale has disappeared in the past five years. The famous local markets for wild animal products were closed, and open trade was believed to fade away since 2005 because of the decline in supply of saiga, the engagement of CITES, and enhanced enforcement. These reports were consistent with our seeing no open trade in both the pre-survey and formal survey.

However, interviews with local traders indicate that underground trade of saiga horn still remains, but now comprises point-to-point deals whereby boundary traders connect certain consumers inside China with suppliers from outside. Such a pattern is consistent with the apparent significant increases in price in recent years (Table 7).

In Erguna, a small port east of Manchuria mainly supplying commodities across the China-Russia boundary, the situation is similar. Although not as developed as in Manchuria, the saiga horn trade was also quite a large scale in the 1990s but declined in recent years, mainly because of a shortage in supplies. One experienced local trader claimed that many relations in Zhejiang province called him for saiga horns and were willing to pay high prices, but he could not contact the suppliers. According to his personal estimation, the total number of people crossing borders in Erguna is not enough for large amounts of saiga horn to be concealed and smuggled, and he can only order five horns each time if the price is high enough.

Hailar is not a boundary city but a regional big city close to the eastern boundary of China, and also has a thriving cross boundary commodity trade. Most surveyed traders claimed that no saiga horns have appeared in the Hailar market in recent years, although some showed that they often import several horns or other contrabands each time they go to Russia on business.

## Heilongjiang

Mohe and Heihe are both small cities on the northern border between China and Russia, and both are within a short distance of a town or city on the Russian side. The PI found no saiga horn trade in Mohe, but Heihe was noted as a significant new hot spot for the trade (Table 7). Even though enforcement is conducted, more traders were involved in saiga trade here, with about 25 tourism shops/traders. Traders were cautious and only sell the horns to familiar TCM traders or businessmen, or to tourists obviously from Southern China, such as Guangdong or Zhejiang provinces. Wenzhou city, Zhejiang province, was mentioned especially by traders.

Some characteristics of the saiga horn trade across the boundary near Heihe are:

- ✓ Heihe's sister city, Blagovescensk in Amur state, Russia, is also an important business city. Travel between the two cities is easy and convenient by train or car, costing only about 30RMB/person for a one day return trip. Hence, carrying concealed saiga horns in small amounts but frequently is feasible, and difficult for enforcement staff to detect.
- ✓ The increasing development of cross boundary trade in a range of commodities into Heihe brings increasing numbers of businessmen who settle and keep shops there. This includes businessmen from Zhejiang province who are traditionally skillful in commodity trading, and have links to potential consumers of saiga horns in Zhejiang. This pattern was also detected in the retail market survey (above) and the consumer attitude surveys in Wenzhou, Zhejiang province (below).
- ✓ Tourism has also been developing in Heihe recently, which brings more potential consumers. In 2006, more than 1 million people crossings occurred on the Heihe border into or out of China.
- ✓ Heihe has not yet been noted by officials as hot spot for saiga horn trade, so enforcement here was not as strict as other border locations surveyed that were historically known to be important saiga trading points.

## Xinjiang

With a long border, complex system of ports, and well-developed transportation systems including air, roads and railways, the cross boundary trade of all kinds of commodities in this region is always large, reaching 29 million tonnes from 2003 to 2005.

Since 2001, enforcement of illegal wildlife trade in this region has been enhanced, and there have been some big cases with confiscation of smuggled saiga horns almost every year, mainly originating from Kazakhstan through Horgousi, Alataw Pass and Baketu into Xinjiang. Some of these seizures are large, e.g., in November 2005, a single seizure involved 483 kg of saiga horns. The suspects arrested usually have connections in Kazakhstan, and also with certain customers who accept the horns.

In surveyed boundary markets, shops in bazaars and trade centers in Urumchi, Kashgar and Horgousi were investigated. Shop keepers were very cautious and only exhibited a few horns when asked, not giving much information about their origins and stocks.

### *Consumption and attitude surveys*

This survey is a pilot survey which was not planned until we found that the specific area of Wenzhou, Zhejiang province shows an obvious tradition and habits in personal use of saiga horns. Although we formulated a thoughtful questionnaire,

time and funds were limited, and therefore the sample size was small. It still can be a reference for considering consumer attitudes and we attach this survey result in Annex 4.

#### Factory and company users

Drug factories producing TCM preparations containing saiga horn, and TCM companies trading in many kinds of TCM, are the main consumers for large amounts of saiga horns, and possibly also have large stockpiles of the horns.

Since we had no formal introduction letter from the relevant government agencies, our planned formal survey of large drug factories and TCM companies could not be realized. Instead, we interviewed drug factories and TCM companies using personal contacts. Data and information from the literature and other channels were also collected.

According to the database of the State Food and Drug Administration of the People's Republic of China (SFDA), 535 TCM preparations containing saiga horn components are registered in 31 provincial regions. One survey in 41 drug factories conducted by the State Forestry Administration in 1999 estimated that the yearly consumption of saiga horn in drug factories was around 6,000 kg/year from 1990 to 1998 (Meng *et al.*, 1999). In the mid 1990s, the State TCM Management Bureau also gave a similar estimate (Duan, 2004). The latest survey was conducted in 2002 in 308 factories, and estimated the consumption of saiga horn to be 5,000 kg/year from 1998-2001 (Du *et al.*, 2002). Since then, no such data have been recorded. According to one local government work report ( <http://www.hlbe.gov.cn/bmfw/nr.asp?id=5367> ), one factory in Hailar, Inner Mongolia, is one of the biggest producers of lingyang jiao injections; in 2004, they produced an estimated 80 million tubes each containing about 1 mg of saiga horn, giving a total production of 80 kg.

For TCM companies, there are no records of their trade volumes or stockpiles. Through personal interviews with four large companies in Chengdu, Chongqing, Guangzhou and Wenzhou cities, only the one in Chongqing clearly showed that they still had a stockpile. This was estimated to be about 70-90 kg, mainly for supplying its chain of retail shops. The company in Guangzhou mainly supplied TCM crude drugs to drug factories which claimed that they did not deal with saiga trades due to the high price. The Chengdu companies said that it had no stockpiles, but restocks using prepared slices of crude drugs of saiga horn from other companies in northeast China. The Wenzhou companies also claimed to have no stockpiles, and mainly restocks from wholesale markets periodically for its affiliated retail shops.

#### Hospital and clinic users

For the same reason as above, no formal surveys could be conducted here, so we undertook informal interviews of 7 TCM doctors in 4 large TCM special hospitals/clinics instead.

Interviews were conducted mainly in Guangdong and Zhejiang provinces. Guangdong hospitals said that internal documents prohibit using liangyang jiao as a crude drug in TCM descriptions, but that TCM preparations of saiga horns produced by factories were generally in use. Some TCM doctors said that the shortage of saiga horn had been foreseen by many experienced TCM doctors long ago, and many commonly used traditional prescriptions using saiga horn had been changed by using domestic buffalo horns or their concentrated powder as a substitute. Hospitals interviewed in Zhejiang province did tend to use saiga horn in prescriptions, and also to sell horns as prepared slices of crude drugs for retail sales. They mainly obtained their horns from TCM companies and wholesale markets.

Our retail market surveys showed that many pharmacies also act as a clinics, with TCM doctors diagnosing and giving prescriptions.

## 5. Discussion

The surveys showed clearly that trade of saiga horns continues in most markets throughout China, in the forms of whole horn, prepared slices of crude drugs (slices, strands or powders of horn), and TCM preparations containing saiga horn.

### *Sources of horns and possible sustainable use*

No legal exports of saiga horn and its derivatives have been permitted by the range countries after 2004, and China has had no wild saiga since the 1960s. Possible sources of the saiga horns seen in the market surveys are farmed saiga, stockpiles imported before 2004, and illegal imports.

To date, saiga farming has not been successful (see background section above), certainly not on the commercial scale necessary to supply the amounts currently being traded.

In 1994, the stockpiles of saiga horn in China were recorded by the government to be 155.5 tonnes (Duan, 2004). The above estimates of factories and TCM companies consumptions indicate that drug factories producing TCM preparations containing saiga horn are using about 5000-6000 kg per year. If these are primarily from stockpiles, then by 2006, those stockpiles could be estimated to have about 91.5 tonnes remaining. This could support about 15-18 years more use at current rates of consumption if only used for drug preparation production and only if controllable by the TCM management bureau, SFDA and SFA. However, by the time of this survey, no labeling and registration mechanism for saiga horn stockpile management yet have been established and proven to work successfully with no leakage of horn from other sources, and no updated data on current stockpiles have been collected.

However, wholesale and retail markets are apparently selling saiga from various sources, especially whole horns. The 3,099 saiga whole horns weighing 383.26 kg which were counted directly by PIs during the market surveys comprised a mixture of horns stored for different lengths of time, in different forms. Some traders showed very old horns, while many others showed horns in good condition which they said were from last year's saiga hunt. The stocks of about 59.5% of shops in wholesale markets contained at least some relatively new saiga horns which had been harvested in the past 1-2 years. For example, one trader each in Yulin TCM market, Guangxi, and Sankeshu market, Heilongjiang, displayed fresh horns; one had relatively fresh blood and flesh, while the other showed saiga horns wrapped in a Kazakh newspaper dated one month previously.

For prepared slices of saiga horns, traders in wholesale and retail markets were open to tell the PI that they were mainly from some TCM companies in Henan, Jilin or elsewhere. Traders in wholesale markets, however, were sensitive about enforcement for whole horns -- 92.4% of them were cautious which shows that they were aware of the illegality of their stocks.

Results from the retail market and attitude surveys show that demand for personal use of saiga horn is not just through recognized TCM channels and prescriptions, but is more varied, which makes management more difficult, as well as driving up prices. The boundary surveys indicate that, in spite of the illegality of the trade and enhanced enforcement, the higher prices are stimulating smuggled imports and underground markets. By changing to increasing frequency of smuggling trips while reducing the amount carried each time, detection becomes more difficult.

Meanwhile, the situation for the saiga is critical. The saiga wild population estimated by CMS is 64,400-69,400 animals. Given that only about 8-10% of those are adult males that bear the horns (Milner-Gulland *et al.*, 2001), any hunting of wild animals for the trade is on a population of at most only 6,940 adult male saiga. Thus, any significant offtake severely

threatens remaining wild stocks. In November 2006 in Mongolia, 108 Mongolian saiga antelope horns were seized, representing a loss of 54 adult males of the Mongolian subspecies whose total population estimated in 2006 comprised only approximately 2,000 animals (WCS unpublished data, 2006), indicating a loss at least 27% of total adult males of this subspecies, if given an optimistic adult male ratio of 10% (see above)..

### *Management issues*

- *The legal situation of saiga* is apparently seen as ambiguous. Saiga is listed as a Class 1 state special protected species in China, so all sales are illegal unless a permit from national-level authorities is granted. However, TCM preparation containing saiga horn components and prepared slices of saiga horn are prepared by drug companies or TCM companies and presumably sourced from stockpiles under the management of relevant agencies, apparently under the assumption that this is not illegal. This is confusing to both consumers and management officers in the different agencies, and there are clearly different perceptions on the legality of the different types of sales.

Interviews with local Industry and Commerce Administration (ICA) officers in different markets, and local SFA officers, ascertained that their perceptions on the legality of saiga horn trade include:

- stockpiles are recognized as a legal source of saiga horn and its derivatives;
- some saiga horn derivatives, such as prepared slices of strands, slices or powders, are sometimes thought to be fakes made from horns of domestic animals or even plastic, so are not illegal;
- some horns are thought to have been imported under legal permission from the CITES authorities, hence it is assumed that they can be sold legally;
- the status of Class 1 is perceived possibly only to apply to China's own wildlife of that species from the wild in China, not to animals of the same species imported from outside China, or to horns from stockpiles; thus compared with other native Class 1 species, saiga is a lower market enforcement priority.

- *A registration system* for endangered wildlife products has just been set up in the form of an online database (<http://www.cnwm.org.cn/wildlife/bjw/bjzn.asp>). This went live in February 2007 after long term planning, and saiga is included. Currently, the database only lists six companies producing wildlife products whose products should be approved by SFA, and which are registered and labeled under the system. SFA expects, however, that the system will facilitate the registration, management and monitoring of special approved products from endangered wildlife species from captive breeding facilities or stockpiles.

From the information currently in this database, it seems that this registration system can only readily be applied to products made by factories or companies who register, and consumers can check if the product is legally registered online through its digital registration code. It is not yet clear whether the system can also be used for crude drugs such as whole saiga horns or prepared slices, which form a significant part of the retail market. Stockpiles in sectors other than industrial companies and factories remain unknown.

- *Identification of saiga horn in markets* is difficult, both for monitoring such as our surveys, as well as for enforcement. This is especially true for horn derivatives such as prepared slices. Fake horns and derivatives can easily cause confusion in enforcement. Also, identifying the origin and subspecies of horns, as well as the time since harvest, is difficult, yet is important for enforcement and management. So far no efficient method to do this has been developed unless special training has been given and practised.

- *Management agency responsibilities* for saiga horn trade are complex. Generally according to the law, State Forestry Administration (SFA) should manage the wildlife resources throughout the country, Industry and Commerce Administration (ICA) is responsible for inspection and enforcement in markets, the State Food and Drug Administration (SFDA) is in charge of all drug production including crude TCM preparations in cooperation with the State Administration of TCM (SATCM), and Customs is responsible for managing cross border trade.

In practice, complications include:

- in TCM wholesale markets, the local SFDA also does inspections, mainly for drug quality and certification, but also sometimes for illegal TCM trade in endangered species; while ICA does general inspections to maintain market order; thus causing uncertainty about who should lead the main monitoring of the markets.
- when ICA does inspections specifically for illegal wildlife trade in markets, the cooperation of the local SFA is required, and vice versa, which might lead to gaps in market enforcement;
- drug producing factories and TCM companies generally fall under the management of SFDA, while trade is also managed by ICA and, for TCMs, guided by ATCM. Hence, for SFA to record the total stockpiles in TCM and manage the resource effectively, all of these agencies must be involved.
- there is a legal gap since possession of saiga horn and other protected wildlife is not an offence under current wildlife legislation. This allows for uncontrolled, legal stockpiling.

In addition, some of the core relevant agencies legally responsible for managing the saiga horn trade do not have wildlife management as their primary focus, so have little training and experience in wildlife management, laws, and species identification.

## **6. Recommendations**

*Directed to CITES Secretariat*

- a. Research should be initiated on simple mechanisms to identify: (i) real from fake saiga parts and derivatives; (ii) which subspecies of saiga is being traded and, if possible, its population of origin.
- b. The units by which CITES imports and exports are reported should be standardized. It is impossible to monitor volumes of trade, and to track domestic trade volumes in relation to import volumes, when CITES records include kg, undefined units of derivatives, and whole horns.
- c. Research should be encouraged to determine how to reduce the use of saiga horn in TCM, following the lead of some TCM practitioners (see above), and relevant information shared with all Parties.

*Directed to CITES Parties*

- a. Stockpiles of saiga horns in other CITES member countries should also be recorded, registered with the relevant CITES management authority and other relevant management agencies, and an effective system of marking and monitoring the chain of custody should be established.
- b. Capacity building projects should be encouraged and supported for enhancing enforcement on illegal hunting and trade of saiga.

- c. Capacity building projects on saiga conservation and monitoring should be encouraged and supported for staff of relevant protected areas in saiga range countries.
- d. Remaining wild populations of saiga should be monitored regularly across their whole range, to ensure the effectiveness of management programs in reducing poaching.

*Directed to China*

- a. The legal status of domestic sales of saiga parts and derivatives in China should be clarified, and the information widely disseminated to all enforcement agencies and to the general public.
- b. Stockpiles of saiga horns in China should be updated and formally recorded. Possession of unregistered saiga items should be made into a legal offence.
- c. Before any legal trade in stockpiles of saiga horns is allowed, the whole trade chain and chain of custody must be proven to be strictly managed with no possibility of saiga from other sources entering the trade chain and markets, to ensure that remaining wild populations of this extremely endangered species are not threatened further.
- d. To ensure this, the registration system for saiga horns stockpiles should cover not only stockpiles in all TCM factories and companies but also those in private hands; a reliable, foolproof chain of custody system should be developed and, once known to be reliable, implemented, and severe penalties levied on anyone found selling saiga from other sources.
- e. Once such a system is solidly in place, if any trade is then allowed, TCM products should specify clearly if they contain saiga parts and derivatives, not just the more generic term *lingyang jiao*; and they should also state that saiga is an endangered species.
- f. Capacity building programs specifically for enforcement by relevant agencies on saiga horn trade should be supported. These should initially be focused on saiga trade hotspots, including important consumption areas such as Wenzhou city, and along borders such as Heihe county, Heilongjiang province.
- g. Education programs should be conducted in major consumption areas, to raise public awareness and to reduce the private demand for saiga horn.
- h. Ongoing monitoring of the saiga horn trade in China should be conducted, to assess the effectiveness of all management programs in ensuring saiga conservation.

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## References

- Bekenov, A.B., IU.A. Grachev and, E.J. Milner-Gulland. The ecology and management of the saiga in Kazakhstan. *Mammal Review*, 1998 (28): 1-52.
- Ablimiti Abdukdir. 2004. *Endangered Species in Xinjiang*. Xinjiang People Press.
- Chan, S., Maksimuk A.V., and Zhirnov. L.V. (compiled by Nash S.V.) 1995. *From Steppe to Store: The Trade in Saiga Antelope Horn*. TRAFFIC. 47 pp.
- Duan, L. 2004. *The Use and Conservation of Saiga Antelope*. Unpublished report by TCM Task Force of China Science and Technology Information Insitute. Beijing.
- Du, Y., Jia, Q. and Yang, J. 2002. *Report of a Questionnaire Survey on TCM Industry Using Endangered Wildlife*. Unpublished report by TCM Task Force of China Science and Technology Information Insitute. Beijing.
- Guo, Y., Zou, X., Chen, Y., Wang, D. & Wang, S. 1996. Investigation report on sustainable use of medicinal animals. In: *Conserving China's Biodiversity* (eds. J. MacKinnon and S. Wang), pp. 190-221. China Environmental Science Press. Beijing.
- Lau, M. 1996. Investigation report on wildlife trade in South China. In: *Conserving China's Biodiversity* (eds. J. MacKinnon and S. Wang), pp. 235-256. China Environmental Science Press. Beijing.

- Li, Y. 2001. Advances in game hunting, wildlife trade and hunting sustainability. *Biodiversity Science*, 9 (4): 414-421.
- Lushchekina A.A. and Struchkov A. 2001. The saiga antelope in Europe: once again on the brink? *The Open Country*, 3: 10-24.
- Medicine Dictionary Committee of Ministry of Health People's Republic of China. 2000. *Medicine Dictionary of China, version II*, p. 266. Chemistry Industry Press, Beijing.
- Meng, X. and Wang, W. 1999. The use and conservation of saiga antelope in China. *Wild Animal*, 20 (5): 2-4.
- Milner-Gulland, E.J., Kholodova, M.V., Bekenov, A. Bukreeva, O.M., Grachev, A., Amgalan, L. and Lushchekina, A. A. 2001. Damatic declines in saiga antelope population. *Oryx*, 35(4): 340-345.
- Proclamation from the Highest Court of China, passed by The Judgement Committee of the Highest Court, December 2000. China Law Press, Beijing.
- The State Council of the People's Republic of China. 2001. *Drug Administration Law of the People's Republic of China*. China Law Press, Beijing.
- The State Council of the People's Republic of China. 1989. *Wild Animal Protection Law of the People's Republic of China*. China Law Press, Beijing.
- The State Council of People's Republic of China. 1992. *Regulation for the Implementation of the People's Republic of China on the Protection of Terrestrial Wild Animals*. China Law Press, Beijing
- Wingard J.R. and Zahler, P. 2006. *Silent Steppe: The Illegal Wildlife Trade Crisis in Mongolia*. The World Bank, Washington D.C..
- Zang, Z. 1990. A textual research on the history of lingyang. *Nanjing Chinese Medical College Magazine*, 6 (1): 57-59.

### Annex 1. Investigation Timetable

Surveys	Location (Provincial)	Market names	Investigators	Date of investigation
Wholesale market survey	Guangdong	Qingping	Lishu Li	March, June, 2006
	Hunan	Changsha and Lianqiao	Lishu Li	July, 2006
	Yunnan	Juhuyuan	Lishu Li	June, 2006
	Guangxi	Yulin	Lishu Li	June, 2006
	Chongqing	Jiefanglu	Yao Zhao	June, 2006
	Sichuan	Hehuayuan	Yao Zhao	June, 2006
	Heilongjiang	Sankeshu	Yao Zhao	July, 2006
	Gansu	Huanghelu	Zhong Zhao, Yao Zhao	May, September, 2006
	Hebei	Anguo	Yao Zhao	October, 2006
	Anhui	Bozhou	Yao Zhao	October, 2006
	Henan	Yuzhou	Yao Zhao	October, 2006
Boundary survey	Xinjiang	Urumchi airport, Kashi airport, Urumchi economic district port, Huangling port, Bianjiangbinguan port, Shangmaocheng port, Erdaoqiao bazaar, Kashi bazaar, Khunjerab port, Turduote port, Laoyemiao port, Wulasitai port, Takeshiken port, Hongshanzui port, Aheitubaike port, Jimunai port, Baketu port, Alataw Pass port, Horguosi port, Durata port, Muzarte port, Yierkeshitan port.	Ablimiti Abdukadir	August-November, 2006
	Inner Mongolia	Erguna, Hailar, Manchuria	Yao Zhao	July, 2006
	Heilongjiang	Heihe, Mohe	Yao Zhao	
Retail market survey	Guangdong	Zhongshan, Huizhou, Jiangmen, Guangzhou	Lishu Li	March, 2006
	Gansu	Lanzhou	Zhong Zhao, et al	May-June, 2006
	Sichuan	Chengdu	Yao Zhao	June, 2006
	Zhejiang	Wenzhou	Lishu Li, and Jian Yue, Peiling Wang, et al.	December, 2006-Jan, 2007
	Attitude survey	Zhejiang	Wenzhou	Peiling Wang, Zhu Wu, et al.

## Annex 2. Recording Table for Market Surveys

Investigator name:

Investigate Date:

Investigate site:

Shop or stall name:

Sale type: Retail ( ); Wholesale ( ); Both ( )

Shop or stall type: for TCM ( ); for tourism ( ); for both ( ); for other ( )

Are horns placed open counter? Yes ( ); No ( )

Description of saiga horn available in the shop/stall (Colour and Length (*juvenile or adult*)):

Do those horns have fine cracks?

Types of saiga horn for sale: Intact horn with base ( ), horn without horn core ( ), parcel ( ), or powder ( )

How long do the owners keep those horns? Or When do the owners get those horns?

Price per unit weight : (note: for which type)

How many horns are found by investigators?

The period peak for sale estimated by owners:

Estimated trade volume in one quarter by owners:

Estimated trade volume in last month:

Estimated trade volume in the day before investigation:

Why do people buy those horns: Souvenir ( ); For illness ( ); Both ( ).

Buyer types: tourist, TCM practitioners, local residents

Which kind of Buyer visit the shop/stall most frequently, according to owner's estimation: tourist, TCM practitioners, local residents

Where do Buyer come from, estimated by owners?

(Last four questions will also be used if Buyer would like to accept interviews).

### Annex 3. Questionnaire about private use of saiga horns in Wenzhou area

Introduction:

This survey aims to understand the status of the private use and consumption of Lingyang Jiao (the Chinese name referring to saiga horns, means antelope horn) in Wenzhou area. It is anonymous. We promise not to disclose any of your information. Thank you very much for your cooperation.

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Personal information of interviewees: (please put a tick or a dot in the box you choose)

Sex: Male  Female

“

Are you a resident in Wenzhou (not limited to Yueqing city): (resident: indigenous, or has lived in the city for more than 3 years)

Yes  No

Age: 15-20  21-30  31-40  41-50  51-60  61-70  above 71

Education: No formal education  Primary school  High school  College  Master's degree  PhD  Other

Occupation:

Workman  Farmer  Student  Service industry  Unemployed  Military  Professionals (including doctors and other professionals)  Business/finance  Administration  Other

Monthly pay:

800 and under  801-2000  2001-5000  5001-8000  8001 and above  No fixed salary

-----  
(Put a tick in the box you choose)

1. Have you ever heard of Lingyang Jiao in TCM?

Yes  No

(Notes: if no, the survey ends)

2. From who do you know Lingyang Jiao?

Family members or relatives  Friends  Doctors  Drug salesperson  Books or other printed materials

Other  \_\_\_\_\_

3. What are the functions of Lingyang Jiao in your opinion? (May mark more than one box. If you do not think that Lingyang Jiao have any medicinal effect, go to question 6.)

Medicinal effects: Reducing body heat and detoxic  Fever  Lowering blood pressure  Heart disease

Other diseases

Other: Collection  Decoration  Other  \_\_\_\_\_

Do not know:

4. Have you or your family members ever used Lingyang Jiao? If “YES”, do you often use them? If “NO”, please choose the reason.

Yes: rarely  Sometimes (one to three times per year)  More than three times per year

No: Not ill, thus no need  Do not think it is effective  Do not know how to use  Other \_\_\_\_\_

(Notes: If no, go to question 10)

5. The type of Lingyang Jiao you use:

TCM preparation  Whole horn  Strands/Powder/Slices/Other  Other

6. How do you use Lingyang Jiao:

TCM preparation  Boiling with water  Boiling with other TCMs  Cooking as food  other \_\_\_\_\_

7. The source of the Lingyang Jiao you use:

Purchase  Family collection from senior generations  Prescription  Gift from others  Restaurant   
Other

8. Do you have Lingyang Jiao at home? If yes, A) What is the form of Lingyang Jiao? B) What amount do you have

Yes: A) TCM preparation  Whole horn  Strands/Powder/Slices/Other forms  Other

B) \_\_\_\_\_ [Amount: TCM preparation (unit: boxes), whole horn (with/without bones, length, how many), prepared slices (how many grams/number of packages: bags, boxes, etc.)]

No:

9. Have you purchased any Lingyang Jiao in recent five years? A) If yes, where did you buy it? B) For what reason did you buy it? C) Amount?

Yes: A) Pharmacy store  Department store  Tour site  TCM wholesale market  Hospital  Others

B) Medicine  Collection  Decoration  Gift  Others

C) \_\_\_\_\_ (See question 8)

No:

10. Will you buy Lingyang Jiao in the future?

Yes  No

#### Annex 4. A consumer attitude survey of saiga horns in Wenzhou city

This survey aimed to understand the attitudes of consumers of saiga horn in Wenzhou city, and to compare these data with the information derived from retail market surveys and boundary surveys which showed that Wenzhou has notable customs in purchasing and using saiga horns for TCM.

Of the 49 resident respondents (RRs):

- 46.9% were female and 53.1% are male;
- 14.2% were aged 15-20, 42.9% aged 21-30, 18.4% aged 31-40, 16.3% aged 41-50, 4.1% aged 51-60, and 4.1% aged 60 above;
- 6.1 % had no formal education, 8.2% had primary school education, 40.8% high school education, and 42.9% were college educated;
- 8.1% were farmers, 8.2% workers, 12.2% students, 32.7% worked in service industries, 6.1% were professionals, 18.4 were in business or finance, 6.1% in administration, and 8.2% others;
- 4.1% had a monthly income below 800RMB, 38.8% 801-2000RMB, 24.5% 2001-5000RMB, 2.0% above 8000RMB, and 30.6% had no fixed income.

Results were:

1. Have you ever heard of lingyang jiao in TCM? (n = 49)  
Yes 93.9%  
No 7.1%
2. How do you know lingyang jiao? (for those who know of lingyang jiao: n = 46)  
Family members or relatives 48.9%  
Friends 8.9%  
Doctors 22.2%  
Drug salesperson 8.9%  
Books or other printed materials 13.3%  
Other 8.9%
3. What are the functions of lingyang jiao in your opinion? (n = 46) Medicinal effects:  
Reducing body heat and detoxification 86.7%  
Reducing fever 13.3%  
Lowering blood pressure 24.4%  
Other diseases 2.2%  
Do not know: 4.4%
4. Have you or your family members ever used lingyang jiao as medicine?  
(for those who knew functions of lingyang jiao; n = 43)  
If “YES”, do you often use them? If “NO”, please choose the reason.  
Yes: (83.7%)  
No: (16.3%)

Of the 36 respondents or their families who have used saiga horn, the frequency of use was stated to be:  
Rarely 38.9%

Sometimes (one to three times per year) 41.7%

More than three times per year 19.4%.

5. Of the 7 respondents who know the function of lingyang jiao but had never used it, the reasons were:
  - Not ill, thus no need 85.7%
  - Do not think it is effective 0%
  - Do not know how to use 0%
  - Other 14.3% (price too high)
  
6. The type of lingyang jiao you use: (for those who used it; n = 36)
  - TCM preparation 13.9%
  - Whole horn 27.8%
  - Strands/Powder/Slices/Other 61.1%
  - Other 0.0%
  
7. How do you use lingyang jiao: (n = 36)
  - TCM preparation 8.3%
  - Boiling with water 50.0%
  - Boiling with other TCMs 5.6%
  - Cooking as food 27.8%
  - Other 8.3%
  
8. What is the source of the lingyang jiao you use: (n = 36)
  - Purchase 83.3%
  - Family collection from older generations 5.6%
  - Prescription 5.6%
  - Gift from others 13.9%
  - Restaurant 0.0%
  - Other 0.0%
  
9. Do you have lingyang jiao at home? If yes, A) What is the form of lingyang jiao? B) What amount do you have (n = 36)
  - A) Yes: (66.7%)
    - TCM preparation 5.6%
    - Whole horn 16.7%
    - Strands/Powder/Slices/Other forms 44.4%
    - Other 0.0%
  
  - No: 33.3%

B) Amount description

Forms of saiga horn	TCM preparation	Whole horn	Strands/Powder/Slices/Other forms
Number of respondents	2	6	16
Description	Each respondent has one box, not sure weight	Each respondent has one at home, each 100g	Small packages, each with 5-10g horn derivatives, not sure of the total number of packages.

10. Have you purchased any lingyang jiao in the past five years? A) If yes, where did you buy it? B) Why did you buy it? C) How much did you buy?

(n = 36)

A) Yes: (75%)

Pharmacy store 63.9%

Department store 0.0%

Tour site 0.0%

TCM wholesale market 2.8%

Hospital 2.8%

Others 5.6%

No: 25%

B) Of the 27 respondents who purchased saiga horn in the previous five years, the reasons were:

Medicine 88.9%

Collection 0.0%

Decoration 0.0%

Gift 11.1%

Others 0.0%

C) Most respondents could not remember how much they bought, or were unwilling to say so. Of those buying for medical purposes, most said that they bought saiga horn in small amounts each time they needed it. Only one person said that one whole horn was bought as a gift.

11. Will you buy Lingyang Jiao in the future? (For all resident respondents, n = 49)

Yes 49.0%

No 12.2%

Not sure 38.8%

(For respondents who know lingyang jiao; n = 43)

Yes 53.3%

No 11.1%

Not sure 35.6%.

Informal interviews with local residents, hospitals and traders were also conducted and confirmed the results above. According to them, local traditions in using saiga horn are well known by local people, and many residents say that they drink boiling lingyang jiao water in the summer to reduce body heat and detoxification. Especially in recent years, Wenzhou city is developing rapidly with great economic increases, so saiga horn is no longer a precious TCM impossible to afford. Hence, the demand by local people has increased.

In addition to medical use, some interviewees who were young mothers said that the top of a saiga horn has become a popular gift to a new born baby in a baby shower, tied to the wrist of the baby with red thread, to protect it from fever and evil. Previously, when people had less money, such traditions involved cheaper silver made into horn-shaped decorations.