

This report provides a review on arguably the most significant threat to the existence of tigers – demand for tiger parts and derivatives that are used in Traditional Chinese Medicine and for home décor. Resolving the issue of demand reduction is a critical priority but is one of the most complex and multifaceted challenges to threaten wild tiger conservation. In order to change attitudes and behaviours towards tiger products, innovative strategies that utilize the principles and techniques of social marketing need to be implemented to inspire people from all sectors of society to help save this magnificent species from extinction.

1.0 Drivers of Demand

The trade in wildlife products remains a largely illicit industry (Rosen and Smith, 2010) and for tigers illegal harvesting has had a catastrophic impact on population numbers (Tensen, 2016). A total population decline of 97% in one century and local extinctions are the result of the demand for skins and a long-standing underlying cultural tradition of using tiger products in Traditional Chinese Medicine (TCM) (Check, 2006). According to TRAFFIC between January 2000 and April 2014, parts from a minimum of 1,590 tigers were seized – an average of two tigers per week (WWF, 2016).

1.1 Traditional Chinese Medicine

Tigers are being driven to the brink of extinction due to the demand for their fur, bones and organs (which are sold as delicacies in restaurants); tiger parts are sold as status symbol, trophies and as an ingredient in TCM (Global Tiger Initiative, 2016). This is despite the fact that in China, tigers are classified as a Category I protected species and as such have the highest level of protection from hunting, sale and use of tiger products (Stop Ivory, 2014). Whilst scientifically unproven, claims in Far Eastern culture and TCM that tiger parts can cure human illnesses is increasing poaching for the illegal tiger trade (Global Tiger Initiative, 2016). The demand for tiger skins and tiger bone wine is booming and is driven primarily by Chinese business, political and military elite who buy these products to prove their wealth and/or use them as bribes within corporations (EIA, 2015a; Tiger Time, 2016). The burgeoning markets for skins that are purchased as luxury home décor, meat that is served as a delicacy and tiger bone wine that is considered a prestigious gift continues despite the trade in domestic and international wild tiger parts being illegal (EIA, 2015a).

1.2 Tiger Bone Wine

In 1993, China introduced a ban on its domestic trade in tiger bones and their derivatives to help implement the international tiger trade ban already in existence under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Kirkpatrick and Emerton, 2010). China recorded the export of 27 million units of tiger products between 1990 and 1992 to 26 countries (Liu *et al.*, 2014; Mills and Jackson, 1994). Before 1993 there were over 200 factories producing TCM products claiming tiger bone as an ingredient (Li and Zhang, 1997; Mills, 1997). China's 1993 ban succeeded in closing down a significant legal trade in tiger bones and medicines made from tiger bones (Gratwicke *et al.*, 2008a) and proved very effective at reducing the supply of tiger bone in China (Nowell and Ling, 2007).

Traditional tiger medicine most commonly takes the form of dried, fried bone that is ground to powder in small amounts and then mixed with other ingredients (Stoner and Pervushina, 2013). The top five reasons cited for using tiger bone wine are: to cure rheumatism, to improve sexual capacity, to treat traumatic injury, to replenish calcium and to treat hyperosteogeny – a TCM term referring to osteoporosis or fragile bones (Gratwicke *et al.* 2008b). Vietnamese consumers prefer their tiger bone in the form of a glue-like substance, known as cao (Stop Ivory, 2014). It is then dried to form a fine powder that is mixed with wine and consumed to supposedly provide general resilience, treat arthritis and bone problems (Stoner and Pervushina, 2013).

In Vietnam, tiger bone wine is an expensive product (which can range from US\$63 to US\$124 for a 500 ml bottle, depending on how long the bones have been steeped in alcohol), marketed as an aspirational purchase and perceived as being bought by those of high status (Kirkpatrick and Emerton, 2010). Surveys and studies by TRAFFIC and EIA have found that between 2005-2011 little packaged and branded tiger medicine was found, however wild raw tiger bone was still available to buy in Western China as late as 2011 (Stop Ivory, 2014). As well as wine, tiger parts are now being used in a larger variety of medicines as the farmed breeding of tigers has increased product availability in China (EIA, 2011).

In 1993 tiger bone was officially removed from the TCM pharmacopeias (Meng and Zhai, 2000). Representatives of TCM industries have acknowledged that prescribing endangered species damages the reputation of TCM and decreases its ability to spread into global markets (Ho, 2007; Gratwicke *et al.*, 2008a). Any efforts to promote the consumption of tiger bone could reignite this dying practice among TCM's 1.4 billion global consumers (Ho, 2007) and would undermine decades of conservation work to reduce demand (Gratwicke *et al.*, 2008b).

1.3 Whole Skins

One of the primary direct threats to tigers is poaching for the illegal trade in skins, promoted as status symbols for decorative purposes (Liu *et al.*, 2014). Two markets for skins have been identified, one is the purchase of skins for luxury ornamentation by wealthy Chinese and European customers, the other market uses skins to decorate traditional-style costumes available in Tibet, Xinjiang and Qinghai (EIA, 2004). The Species Survival Network (2014) cites that tiger skins are used by high status individuals for luxury home ornamental purposes, noting that corruption cases in China confirms the 'gifting' of tiger skins as bribes to officials. The legal Chinese domestic trade in skins of captive tigers has been cited as increasing aggregate demand and perpetuating the desirability of tiger parts and derivatives – potentially driving the illegal trade (Species Survival Network, 2014).

Over the period 2000-2013, tiger skins were the most commonly seized item and accounted for almost half of all commodity types seized (Stoner and Pervushina, 2013). Tiger skins continue to be sold in China smuggled through mountain passes in Tibet/Western China, with reported seizures across Tiger Range Countries (TRC) cited to be destined for markets in China (EIA, 2011). According to EIA research, Whilst the Tibetan community no longer buys or uses tiger products (tiger skins were once used for clothing purposes) they are involved with the trade, with the products primarily being sold to the Han Chinese. Tibetan areas are reputed to be locations where raw medicinal materials and exotic items may be bought (EIA, 2011).

In China, certificates are issued to accompany the skins of captive-bred tigers that are licensed for sale (EIA, 2015a). Skins in the form of rugs and stuffed tigers are sold by licensed

taxidermists to private individuals and hold no scientific or educational value (EIA, 2015a). A proportion of taxidermists benefit from the lack of scrutiny and manage to obtain entire tiger carcasses and illegally sell off bones and meat (EIA, 2015). For a discount, licensed certificates may be returned to the sellers after a purchase has taken place so that the taxidermist may re-use it for an illegally acquired tiger skin (EIA, 2015a).

1.4 Online Trade

Analysis of data on Chinese markets has identified that a shift towards online trade is taking place and is a highly relevant conduit in the illegal wildlife trade (Stop Ivory, 2014). In 2012 surveys on the online trade conducted by TRAFFIC, highlighted 270 advertisements claiming to offer illegal tiger products for sale (Stop Ivory, 2014). Further analysis showed how interested buyers were then directed through advertisements to communicate via online messaging services with illegal wildlife traders (Stoner and Pervushina, 2013). In April 2010 China became the largest country of online users in the world (IFAW, 2011), with Chinese Internet users numbering over 610 million as of January 2014 – almost twice as many users as there are people in the US (Stop Ivory, 2014). The online market place has a global reach, an autonomous nature and an ability to build effective national and international networks (Stoner and Pervushina, 2013); consequently it has become an area of focus for several organisations investigating the illegal wildlife trade.

1.5 China and Vietnam are primary demand markets and zones of consumption

China and Vietnam have been identified as countries of concern for the consumption of illegal tiger products (Stoner & Pervushina, 2013; Stop Ivory, 2014). Key tiger crime hubs have been identified as Hanoi and Ho Minh City in Vietnam, with data also pointing to Guangzhou in China as locations where there have been increased seizures of tiger products (Stoner and Pervushina, 2013). Over the period 2010-2012 the proportion of total seizures accounted for in Vietnam notably rose from 6% to 14%, however as well as trade remaining active this increase could be attributed to improved law enforcement (Stoner and Pervushina, 2013).

An investigation by ENV Vietnam in 2010 into consumer demand for tiger products revealed that tiger bone is the most commonly used tiger part in Vietnam (Stop Ivory, 2014). Tigers are typically smuggled into Vietnam from farms in source states (Lao, Indonesia, Malaysia, India, Bhutan, Bangladesh, Cambodia and Russia) with traders often selling tiger parts to brokers who organise glue-making operations for tiger bone wine production (Stoner and Pervushina, 2013). Over the period 2006-2013 ENV Vietnam's database on illegal trade activities and seizures involving tigers and tiger parts has logged a total of 280 violations and law contraventions (ENV, 2014). This involves 55 possessions cases involving both live and trophy tigers, 107 violations involving the trade and smuggling of tigers and 120 incidents of advertising tiger products (Stop Ivory, 2014).

1.6 Affluence and investment value are driving demand

Consumer demand for tiger bone wine in Vietnam is rising due to rapid economic expansion and is cited as a driving factor in demand for tiger bone wine, owing to its relatively high price that is perceived to confer status (Stoner and Pervushina, 2013). Consumer purchasing power becomes greater as affluence grows; it is wealth rather than poverty that is a strong driver of demand for tiger products in South East Asia (TRAFFIC, 2013; Liu *et al.* 2015). The growth and development of South East Asian economies has resulted in higher disposable incomes and increased affluence are cited as underpinning increasing demand (TRAFFIC,

2008). Traditional purchases of wildlife products – food, medicinal and decorative reasons have now expanded with a dramatic increase in the consumption of wildlife products as luxury consumer goods (Liu *et al.* 2015).

More recent drivers of demand of tiger products include the perceived investment value of some illegal wildlife products (Stop Ivory, 2014). IFAW (2011) reports that Chinese investors are buying tiger bone wine in reaction to shrinking returns on traditional investments such as property and stocks. This new asset class is based on the increasing rarity of certain wildlife species that are seen as desirable, in addition to beliefs surrounding ancient Chinese traditions (Stop Ivory, 2014).

1.7 Size of markets

Since 2000-2014 across 12 tiger range countries there have been 654 seizures of tiger parts and derivatives, which over the period represents an estimated total of a minimum of 1425 tigers seized (Stop Ivory, 2014). The scale of criminal activity represents a serious threat to the survival of remaining wild tiger populations as data on seizures by law enforcement agencies only reflects a fraction of tigers within the illegal wildlife trade (Stoner and Pervushina, 2013). There has been growing international commercial trade in captive tiger specimens, between 2010 and 2015, at least 141 suspected captive sourced tigers were seized with nearly 30% of tigers seized during this period suspected of being from captive tigers (EIA, 2015b).

2.0 Legal supply from captive breeding

2.1 Wildlife farming and legalising the trade in tiger products

In Asia there are more than double the number of tigers in captivity, approximately 7000, than there are in the wild, kept in 240 facilities in South-East Asia and China (EIA, 2015b). As new captive tiger facilities are established and existing facilities expand it will be increasingly difficult to tackle the problem of trade (EIA, 2015b). The management practices of these facilities that keep and breed tigers do not constitute “conservation breeding” and are purely commercial ventures in the regions of Thailand, Lao PDR, Vietnam and China (EIA, 2015b). Scientists and other conservation experts in several peer-reviewed publications have discredited and rejected “farming” tigers as a conservation solution (EIA, 2015b).

Since the enactment of the ban in 1993 proposals have been floated by the Chinese CITES management to reopen the trade in tiger parts from captive-bred tigers (Mills & Jackson 1994; Delegation of the People’s Republic of China to the CITES Standing Committee 2006). The population of farmed tigers in 2007 grew to more than 5000 and investors in tiger farms began lobbying for international support to lift China’s international ban (Gratwicke *et al.* 2008a). However, many tiger-range countries strongly opposed this idea and drafted a decision at the CITES conference of the parties in 2007 stating, “*tigers should not be bred for trade in their parts and derivatives*” (CITES, 2007; Gratwicke *et al.*, 2008a).

Despite the unprecedented threats of habitat loss, depletion of prey species and continued poaching, many tiger specialists agree that the single largest threat facing wild tigers is China’s consideration of legalising the trade in tiger parts and derivatives (Dinerstein, *et al.* 2007). Legalising trade in tiger products threatens increasing poaching pressure and demand, whilst expanding opportunities to sell illegal tiger products (EIA, 2015b). The legal captive tiger trade exacerbates the endangered conservation status of tigers, with surveys in China finding a continuing demand for tiger products, which a legal trade would inevitably

increase demand for (Gratwicke *et al.* 2008b). Although international bans prohibit farm owners from trading in tiger products, there are some academics who believe that a legalised trade in farmed tiger products would reduce the illegal poaching of wild tigers (Jiang *et al.*, 2007; Mitra, 2005).

Some conservationist's have suggested that wildlife farms can combat the black market in TCM, as farmed products enter the market there would be a reduction in the economic motivation to harvest wild animals, as the profits of poachers would decrease (Bulte and Damania, 2005; Mitra, 2005; Lapointe *et al.*, 2007). The hypothesis is that as markets originally dependent on overexploited stocks are flooded with animals from wildlife farms then price would decrease (Kirkpatrick and Emerton, 2010). The increased competition would cause markets to change and the profits of poachers will decrease with new conditions (Kirkpatrick and Emerton, 2010). The pressure on wild tiger populations that have been overexploited would reduce as poachers have less economic incentive to poach (Kirkpatrick and Emerton, 2010). Although there is theoretical merit in wildlife farming, the theory does not work in reality and commercial breeding has the potential to have the opposite effect to what is desired for conservation (Tensen, 2016).

Tiger farming presents significant risks to wild tigers and lifting the current ban on trade in farmed tiger parts could cause a surge in demand for wild tiger products Kirkpatrick and Emerton (2010). A major concern is that a legalised trade would not only increase further demand but would legitimise the consumption of wildlife products (Tensen, 2016). Wildlife farming and a legalised trade could counteract the ethical unacceptance that is associated with buying illegal wildlife products and may make the trade more acceptable and consequently increase demand (Abbott and van Kooten, 2010; Bulte and Damania, 2005; Drury, 2009). If the trade in tiger products were to be legalised it is likely that law-abiding consumers would begin to participate in the market for wildlife products, which can be expected to further stimulate demand (Fischer, 2004). This is referred to as the stigma effect, which implies that if the trade were to become legal, negative attitudes towards the consumption of wildlife products are removed, which can be expected to lead to a higher demand (Fischer, 2004).

2.2 Legal trade with laundering of illegal supplies

China's State Forestry Administration in 2006 invited an international delegation to conduct an independent review of proposals from tiger farmers to reopen the trade in tiger parts and products from captive-bred tigers (Nowell & Ling 2007; Gratwicke *et al.*, 2008a). No recognized international experts in tiger management or conservation were present at the delegation (Gratwicke *et al.*, 2008a). The members claimed that wild tigers would benefit from the market being flooded with captive-bred, legally supplied parts and products as it would undercut the illegal supply from tiger poachers (Mitra 2006; Lapointe *et al.* 2007).

It is challenging for countries importing tiger products to differentiate between wild and captive-bred specimens (Challander *et al.*, 2015; Tensen, 2016). Thus, there is a clear avenue to "launder" illegal parts and products from wild tigers but sell them as legal when there is an open market of tiger parts from any source (Gratwicke *et al.*, 2008a). This raises the question of how effective the ban has been in reducing the demand for tiger bones and restricting supply to consumers (Gratwicke *et al.*, 2008a).

Unfortunately for the majority of species that are targeted by the wildlife trade, laundering is a criminalised business (Tensen, 2016). It is predicted that wildlife poaching will be most prevalent when laundering occurs simultaneously with a legal commercial trade, in such

cases it is suggested that an outright ban is most beneficial for species conservation (Bulte and Damania, 2005; Fischer, 2004).

The laundering of poached products into the commercial wildlife trade often takes place through corruption and the lack of regional enforcement of wildlife harvest regulations (Phelps *et al.*, 2013). Due to corrupt police officers and government officials, the activities of Chinese breeding farms and their involvement within the illegal trade of tiger bones are rarely uncovered (Abbott and van Kooten, 2010; Nowell and Xu, 2007). It is predicted that the laundering of illegal wildlife products will increase over-exploitation and poaching pressure on wild tigers where a legal market for tiger bones exists (Gratwicke *et al.*, 2008a).

A legalised trade and commercial breeding should be avoided where the laundering of illegally retrieved products cannot be prevented (Tensen, 2016). An alternative is to make a clear distinction between wild and captive-bred stock through genetic markers, discriminatory body features or CITES tags (Tensen, 2016). However, the financial costs of forensic studies might make it an unrealistic option (Tensen, 2016) and some feel that distinguishing between farmed and wild tiger parts is impossible (Gratwicke *et al.*, 2008a). Given the multiple threats that currently face wild tigers, the risks associated with reopening trade of any kind is a gamble that cannot afford to be taken (Gratwicke *et al.*, 2008a).

2.3 Farmed tigers are not a substitute for products retrieved from wild animals

Farmed tigers are not a pure substitute for wild tigers as consumers exhibit a preference for wild tiger products and it is likely that a legal trade would increase demand (Kirkpatrick and Emerton, 2010). Consumer preference for wild and rare species creates a parallel, separate market than the one that exists for farmed products (Chen, 2015; Phelps *et al.*, 2013). Currently, there is no logistically feasible mechanism for wildlife authorities to distinguish legal from illegal products (EIA, 2011).

The most significant challenge in eradicating the industry is that the use of animal products is deep rooted in many cultures, but especially for traditional medicines (Zimmerman, 2003; Tensen, 2016). The main problem is that consumers of TCM exhibit a preference for wild over farmed animal products because of the belief that wild tiger products are more potent, generate more medical strength and have a higher spiritual value (Hall *et al.*, 2008; Kirkpatrick and Emerton, 2010). Gratwicke and colleagues (2008b) found that 71% of the consumers of tiger derivatives preferred wild over farmed products. This belief has been fostered and reinforced by TCM professionals who have played an important role in fueling the belief that wild medicinal materials have fewer side effects, are natural and more effective (Liu *et al.*, 2016).

As long as the consumers' preference for wild animal products remains and farmed products cannot offer a substitute for products that are retrieved from the wild, poaching will remain a critical threat to wild tiger populations (Bulte and Damania, 2005). Furthermore, because wildlife products are viewed as a status symbol, wild animals are seen as superior owing to their rarity and high expense (Chen, 2015; Courchamp *et al.*, 2006; Fischer, 2004).

2.4 Rarity increases desirability and is threatening other felid species

Research suggests that increased desirability and demand by consumers for wildlife parts and products is fuelled by rarity (Stop Ivory, 2014). The twin characteristics of high value and scarcity are seen as synonymous with purchasing these items and have become a signifier and enhancer of status (Stop Ivory, 2014).

There is a fear that if farmed animal products become easily accessible then consumer preference for rare species will lead to a change of interest and instead consumers will crave products from rarer animals (Chen, 2015; Tensen; 2016). This demand for rare species has already shifted from tiger parts to clouded leopards (*Neofelis nebulosi*) and snow leopards (*Panthera uncia*) (Henry, 2004; Nowell and Xu, 2007). An attainable substitute for the market in tiger bones are lion bones that are exported from South Africa to Asia; with a sharp rise from 59 skeletons in 2008 to 573 in 2011 (Gratwicke *et al.*, 2008b; Williams *et al.*, 2015). The majority of these illegally traded lion skeletons originate from breeding farms that are intended to support the lion hunting industry (Macleod, 2012; Tensen, 2016).

2.5 Production costs

In order for the captive breeding of animal products to outcompete the illegal trade, breeding farms would need to be more cost-efficient than poaching in order to consistently undercut the price of products that are retrieved from the wild (Tensen, 2016). Unfortunately, the production costs associated with feeding and housing captive animals means that wild-sourced tigers will consistently undercut the price of farmed tigers that could easily be laundered onto the legal market (Gratwicke *et al.*, 2008b; Kirkpatrick and Emerton, 2010). Wildlife farming creates an imperfect competition in the market (Bulte and Damania, 2005), as a kilogram of tiger bones in captivity is 50-300% more expensive to produce than to retrieve from a poached wild tiger (EIA, 2013). Ultimately the high costs for wildlife farmers mean that the poaching of wild tigers will remain an attractive alternative, as it is unlikely that captive farmers can compete with prices offered by poachers (Bulte and Damania, 2005; Mockrin *et al.*, 2005).

Even if fluctuations in market prices were to decrease, it would have little impact on poachers – who commonly lack any other form of income (Gibson, 1999). The income of any average job in the third world can not compete with what a poacher receives for a dead tiger, providing no motivation for poachers to stop their illegal activities (Tensen, 2016). For poachers the economic reward is simply too high and the risks relatively low (Bulte and Damania, 2005; Warchol, 2004). Poaching will always remain an economically attractive option and will not deter poachers from retrieving products from the wild as the commercial breeding industry cannot sufficiently compete due to the high costs of wildlife farming (Tensen, 2016).

Competition between the existing wildlife trade and the wildlife farming industry is likely to result in lowered prices of tiger products and derivatives, in addition to staggering profits for farmers; resulting in a continued and prevailing market for illegally poached products that is detrimental to wild tiger populations (Swanson and Barbier, 1992). A simple cost analysis of wild versus farmed tiger products indicates that to poach a wild tiger would cost as little as US\$15–\$20 (Lapointe *et al.* 2007), whereas to raise a tiger to adulthood in captivity would cost at least \$4000 (Damania *et al.* 2003). Even allowing for the costs of occasional losses to enforcement action and the expense of transporting wild tiger products to end markets, it is clear that the cost of producing farmed tiger parts would be far higher – perhaps even by a factor of 10 (Gratwicke *et al.*, 2008a). Despite the risks of being caught and penalised for poaching and smuggling illegal wildlife parts, this gross discrepancy offers substantial economic incentives to undercut farmers in any legal market (Gratwicke *et al.*, 2008a).

Gratwicke and colleagues (2008a: 223) have noted that “*tiger farmers have no vested economic interest in securing a future for wild tigers*”. In fact it could be argued that captive farm investors would be in an economically advantageous position if wild tigers were to go extinct, as they would have exclusive control on the supply of tiger parts in the global

market (Gratwicke *et al.*, 2008a). Claims that investors in tiger farms are a neutral party with the interests of wild tiger conservation at their heart is false, given that lifting the ban would be financially beneficial (Gratwicke *et al.*, 2008a). Moreover, investors are gambling that the trade ban will one day be dropped, as they have strong economic incentives to divest themselves of their stockpiles of frozen tiger carcasses, which incur significant maintenance costs (IFAW 2007; Lapointe *et al.* 2007). Despite the ban on trade in tiger bones and an acute awareness of the ban, tiger farmers are still acquiring additional economic gains from supplying tiger products onto the illegal market (CITES Secretariat 2007; IFAW 2007; Nowell & Ling 2007).

3.0 Demand Reduction

One of the most complex and daunting issues facing tiger conservation is the problem of demand (Global Tiger Initiative, 2016). As both conservationist scientists and economists recognise poaching will not be halted through law enforcement alone; for successful conservation and recovery of wild tigers it is essential to deal with the core demand for dead tigers (Global Tiger Initiative, 2016). Education programs are critical to change attitudes towards the markets in TCM and wild meat; it is considered likely that many consumers are not aware that the uncontrolled industry from which they obtain wildlife products is overexploiting species to the point of extinction (Still, 2003; Tensen, 2016).

There is a powerful tendency to address the threats to tigers on the ground through funding anti-poaching projects, but it is critical to also address the root causes of poaching (Raffaele, 2015). Whilst there is an obvious importance in anti-poaching efforts, consumer demand in Asia is the fundamental cause of tiger killings (Raffaele, 2015). Studies are key to understand the illegal wildlife trade, why people are buying tiger parts and derivatives, for what purpose and ultimately how the attitudes of tiger purchasers and consumers can be effectively changed (Raffaele, 2015).

Key strategies and behavioural change approaches are essential to change consumer demand for endangered wildlife products in China and Vietnam (Liu *et al.*, 2015). Studies that identify the motivations behind consumer behaviours will help target tools and patterns that can be used to change their preferences and purchasing behaviour to ultimately eliminate the driving factors behind illegally consuming tiger parts and products (Liu *et al.*, 2014). Curtailing international demand for tiger parts and derivatives can be achieved through effective and impactful consumer campaigns that focus on connecting the potential extinction that threatens tigers to the larger issues of ecological devastation and biodiversity loss (Global Tiger Initiative, 2016).

3.1 Understanding consumer behaviours

To strengthen demand reduction efforts on endangered wildlife products in China it is essential to understand public attitudes towards consumption of species products in order to take appropriate behaviour change approaches (TRAFFIC, 2014; Liu *et al.*, 2015). Consumer behaviours and preferences are influenced by many factors, including those in the wider and local environment (Liu *et al.*, 2015). An essential starting point for demand reduction is to understand all the factors that influence the behaviour that you want to change, not only individual consumers but also consumers in their social and cultural settings (Zain, 2012). Firstly, the micro-level influence factors of consumption need and motivations, values, lifestyle, perceptions, attitudes, habits, behavioural learning and personality must all be considered (Liu *et al.* 2015). Secondly, it is essential to understand the macro-level factors that influence individual behaviours, such as: social class and status,

culture reference groups and family (Schiffman and Kanuk, 2004; Kotler and Roberto, 1989). Once all the factors that affect consumer behaviour are fully understood, specific ‘marketing strategies’ must be implemented to change behaviour (Liu *et al.*, 2015; Kotler and Roberto, 1989).

The factors that motivate wildlife consumption are culturally rooted and complex, they include psychogenic motives (i.e. representing social status) and physiological motives (i.e. have a tonic effect) (Wasser and Jiao, 2010; Schiffman and Kanuk, 2004). It is important to understand how people learn and how consumers interpret see the world because consumers make decisions based on what they perceive to be reality (Schiffman and Kanuk, 2004). The public considered the image of a tiger as a famous brand and tiger bone was believed to be more effective in ancient tenets of TCM (Gratwicke *et al.*, 2008b; Nowell and Xu, 2007). As such, TCM manufacturers use the tiger’s image on plasters to take advantage of the ‘brand effect’, which stimulates habitual thinking and even a conditional stimulus that a tiger image is associated with the ‘Tiger Bone Plasters’ (Liu *et al.*, 2015).

Research has shown that consumer attitudes have a pervasive impact on consumer behaviours (Schiffman and Kanuk, 2004). For example, consumers of wildlife products often have a preference for those that originate from the wild rather than from farms. This belief can lead to an increase in the poaching of wild species, causing differential prices and profit margins even after the introduction of farmed supplies (Gratwicke *et al.*, 2008a; Kirkpatrick and Emerton, 2010). In addition, social factors play a very important role in influencing consumer behaviour (Schiffman and Kanuk, 2004). A survey found that the provision of wild meat at a meal is viewed as a special treat and shows respect and closeness to the guests, while the consumption of wildlife products represents social status and prestige (Wasser and Jiao, 2010; Liu *et al.*, 2015).

3.2 Consumer behaviour change models

In 2010 the World Federation of Chinese Medicine worked alongside TRAFFIC and sent out a clear message that there is no place for the illegal wildlife trade within Chinese and traditional medicines through calling their members to cease using tiger parts and products (TRAFFIC, 2016). It is key for demand reduction initiatives to collaborate across all sectors of Chinese society; working with government, business, celebrities and the media. Wider public awareness is key to promote attitudinal and behavioural change in order to reduce demand for the highly endangered tiger (TRAFFIC, 2016).

TRAFFIC (2014) has devised a number of behaviour change models, concepts and theories to address demand reduction by dealing with different audiences, but in particular a business audience (Liu *et al.*, 2015). The ‘Needs-Opportunities-Abilities’ Model illustrates the mechanisms that determine consumer behaviour of wildlife parts and products (Vlek, 2000). Consumers are shown to require a combination of the following factors in order to purchase a wildlife part or product: ‘needs’ – largely emotional motivators, ‘opportunities’ – such as access to the goods they wish to consume and ‘abilities’ – adequate discretionary income (Liu *et al.*, 2015). Typically demand reduction initiatives attempt to disrupt ‘need’, whilst supply reduction initiatives typically attempt to disrupt ‘opportunity’ or ‘ability’ (TRAFFIC, 2014).

3.3 Strengthened Law Enforcement and Reform in Policies

Despite CITES recommendations, in India, Nepal and China there has been a lack of political will to develop new mechanisms to combat the trade in wildlife crime (EIA, 2004). Whilst the

Prime Minister of India is committed to saving wild tigers and despite having initiated various measures to protect the species and committed resources, competing political issues often take priority (Apte, *et al.*, 2015). The threats to tigers are now greater than they have ever been and to secure protection must overcome the backdrop of a burgeoning human population desperate to overcome poverty (Apte *et al.*, 2015). Continued advocacy work is vital to convince policy makers and those in power that tiger habitats across Central India provide important ecological services that benefit both wildlife and people alike (Apte *et al.*, 2015).

Driven by the illegal trade in wildlife skins and body parts, with the majority of demand stemming from China, poaching presents the greatest threat to tigers in India (Apte *et al.* 2015). Despite the magnitude of the problem being acknowledged by authorities, the survival of tigers is continually undermined (Apte *et al.* 2015). Poor enforcement and intelligence, lack of political will and inadequate trans boundary cooperation, in addition to a strong criminal network that controls trade in urban and cross-border areas allow the illegal trade to not only persist but also prosper (Apte *et al.* 2015). Whilst the prosecution of poachers is rare, convictions of poaching is rarer still and intelligence-led preventative policing non-existent (Burke, 2015).

Wildlife Protection Society of India (WPSI) documented the seizure of 853 tigers between 1994 and 2008 (Apte *et al.* 2015). There are records of only 14 convictions having been brought in conjunction with the seizures, despite over 1,400 people having been accused of involvement with these cases (Apte *et al.* 2015). Most concerning, these figures are incomplete and are not an accurate reflection of the true level of poaching activity believed to have occurred during that period in India (Apte *et al.* 2015).

3.4 Conservation Actions

A major challenge that conservationists face in maintaining biodiversity is influencing's people behaviour and modifying human actions (Smith *et al.*, 2010). This work has parallels in the private sector and is why many conservation groups are using marketing techniques pioneered in the commercial world, where profits are increased through influencing the purchasing behaviour of their customers (Kotler *et al.*, 1999; Smith *et al.*, 2010). One such strategy is social marketing, which can be defined as '*the systematic application of marketing along with other concepts and techniques to achieve specific behavioural goals for a social good*' (French and Blair-Stevens, 2006).

Whilst some may feel that glossy brochures or celebrity-endorsed campaigns are not needed and that the conservation ethic is powerful enough, the current extinction crisis suggests otherwise (Smith *et al.* 2010). For this reason, the role of marketing in conservation efforts is vital for generating funds and publicising issues that otherwise may be ignored by the public amongst conflicting messages (Foxall *et al.*, 1998). However, the majority of donors prefer their money to be spent directly on conservation activities rather than contributing to marketing costs (Smith *et al.*, 2010). Due to pressures of bureaucracy, whilst such costs can be covered through project overheads (Smith *et al.*, 2010) most conservation organisations and NGOs keep costs low by spending relatively little on marketing (Pallotta, 2009). Smith and colleagues (2010) suggest more aspirational approaches in campaigns have been generally neglected and argue that more creativity is needed to broaden the appeal and impact of conservation issues. Marketing campaigns play a key role in conservation and the development of new approaches that broaden both involvement and appeal have the potential to play a significant funding role in the future (Smith *et al.*, 2010).

The key driver of all major threats to biodiversity is human behaviour and as such is a fundamental pillar of biodiversity conservation but influencing people to change their behaviour is one of the hardest challenges faced by conservationists today (Verissimo, 2013). The training of conservational professionals is still largely focused on biological sciences, despite biodiversity conservation being overwhelmingly about humans and their behaviour (Verissimo, 2013). Consequently, conservation professionals are often less willing to address human behaviour as a research subject and as such are often ill equipped to understand and influence human behaviour that threatens endangered species (Verissimo, 2013).

Social marketing is an emerging field that promises to deliver insights into how to change human behaviour (Verissimo, 2013) and more recently has been used to tackle environmental issues (Jenks *et al.*, 2010; Verissimo, 2013). Social marketing can be described as the application of marketing concepts and techniques to communicate, create and deliver values to influence behaviour of the targeted audience and benefit society (Kotler and Lee, 2011). An important feature of social marketing is that it appeals to conservational professionals; the majority of whom have a background in biological sciences and as such are attracted to the largely quantitative nature of the field and are more willing to engage with it to address behaviour change (Verissimo, 2013). One other important trait that social marketing inherits from its past links with the commercial business sector is the strong emphasis social marketing places on metrics and evaluation (Smith *et al.* 2010). However, conservation interventions that target behaviour and evaluate behaviour change often lack any form of meaningful evaluation (Verissimo, 2013).

Improved law enforcement can be brought about through effective behaviour change that increases both the social disincentives of rule breaking and detection probability (Verissimo, 2013). A study by Saypanya and colleagues (2013) on the illegal hunting/harvesting of tigers and their prey in Lao PDR implemented a social marketing campaign that aimed to change the behaviour of illegal hunters, village members and government officials. The study established a telephone hotline for reporting illegal wildlife-related activities and found that the social marketing campaign contributed to behaviour change, which led to an increase in reporting and punishment of wildlife crime (Saypanya *et al.*, 2013).

Understanding our own species is required to overcome the challenges that lie ahead for biodiversity conservation, this one species will dramatically affect the entire living system of the world over the next two decades (Saunders *et al.*, 2006). The conservationist's role must not be limited to biological knowledge, rather in order to sufficiently solve conservation problems the role of social sciences must be embraced and recognised as relevant to environmental issues (Mascia *et al.*, 2003; Saunders *et al.*, 2006). An in depth understanding of psychology is necessary to better understand human behaviour that is causing biodiversity loss and how human behavioural change can be attained to achieve a more sustainable relationship between humans and the natural world (Saunders *et al.*, 2006).

Notwithstanding the need for integrated approaches to address the illegal wildlife trade, Challender and colleagues (2014) believe that to directly address the root cause of the problem, social marketing programs are required to change human behaviour and target consumers to modify their preferences and purchasing behaviour. Whilst not without difficulty, the success of interventions should be measured in terms of consumption, not just by the weight of regulation (Challender *et al.*, 2014).

In order to effectively change attitudes and behaviours that are currently threatening the existence of tigers and successfully reduce the demand for tiger parts and derivatives it is essential to be sensitive to the human aspects of conservation and appreciate that

conservation is a human-centered discipline (Raffaele, 2015). Liu and colleagues (2016) feel that it is necessary to reframe our view of endangered wildlife and place focus on consumer behaviour and strategies to tackle the threat to endangered wildlife, with attention on a demand-centric perspective rather than from a supply centric one.

Human behaviour is a key threat to biodiversity and the survival of tiger populations (Liu *et al.*, 2015). Despite the importance of people and their behaviours in bringing about demand reduction for illegal wildlife trade, this issue has only been minimally addressed and there is the potential to adequately develop stronger solutions to the crisis (Raffaele, 2015). Instead of selling products, the principles of social marketing can equally be applied to 'sell' ideas, behaviours and attitudes for the benefit of the public and is a powerful tool for publicity and education (Liu *et al.*, 2015). Social marketing strategies and campaigns can be applied to environmental and conservation problems but the challenge lies in equipping conservation professionals with such principles and techniques (Liu *et al.*, 2015). Success would mean that more evidence-based practices could be achieved through research on the human dimensions of biodiversity management (Liu *et al.*, 2015).

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