NDF WORKSHOP CASE STUDIES
WG 2 - Perennials
Case STUDY 3
Nardostachys grandiflora
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TOWARDS VALID NON-DETRIMENTAL FINDINGS FOR *NARDOSTACHYS GRANDIFLORA*

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I. Background information on the taxa

Nardostachys grandiflora DC belongs to the Valerianaceae. It is the only species within its genus, and it only occurs in the Himalayan region. *N. grandiflora* is a perennial herb growing in forests and alpine meadows from 3300m up to about 5000m, with known slow recovery after harvest of the traded product, the rhizomes. The non-processed rhizomes are exported in large quantities from Nepal, and to a smaller extent Bhutan, to India. The status of the plant population is not known but it is suspected to be declining due to commercial trade. *N. grandiflora* was listed on CITES appendix II in 1997. At present no purposeful management of the species is taking place.

1. BIOLOGICAL DATA

1.1 Scientific and common names

Scientific name: *Nardostachys grandiflora* DC.

Synonyms: *Nardostachys jatamansi*, *Nardostachys chinensis* (Mulliken and Crofton, 2008).
Common names: jatamansi (India, Nepal, Pakistan), balchhad (India, Nepal), bulthe (India, Nepal), mushkbala (Pakistan) (Mulliken and Crofton, 2008).

1.2 Distribution

N. grandiflora is confirmed to occur between 3,300 and 5,200 m in the Himalayas: Kashmir (India), Uttar Pradesh (India), Nepal, Sikkim (India), Bhutan, South-West China including Tibet, Yunnan and southwest Sichuan. There is conflicting information regarding its occurrence in Myanmar, Afghanistan and Pakistan. Records from the two latter countries may have confused *N. grandiflora* with *Valeriana jatamansi* Jones (Mulliken and Crofton, 2008).

1.3 Biological characteristics

N. grandiflora is an erect perennial herb of 10–60 cm. It has a stout rhizome, by some described as relatively short, but it can reach lengths of up to 60 cm. The rhizome is covered in a mantle of fibrous dead petioles. Leaves develop from both rootstock and stem. Basal leaves in rosettes are 15-18 cm long and 2.5 cm wide, longitudinally veined; leaves on stem in opposite pairs are about 7.5 cm long and 2.5 cm wide, sessile. The inflorescence may have one or in rare cases 2-3 terminal capitate clusters. Flowers are pale pink or blue. The growing season extends from May to early October, flowering June – July and fruiting from August (Weberling, 1975; Amatya and Sthapit, 1994; Ghimire *et al.*, 2005; Mulliken and Crofton, 2008). The essential oil content of rhizomes is reported to vary from 0.57 up to 2.9% of the rhizome dry weight (Mulliken and Crofton, 2008).

1.3.1 *General biological and life history characteristics*

Reproduction is through vegetative means (clonal growth) and seeds, where pollinators are likely small insects, e.g. flies (Eriksen, 1989). Seed germination rates between 10-20% (Nautiyal *et al.*, 2003), 60% (Regmi, 2000, cited in Mulliken and Crofton, 2008) and 80% (Nautiya and Nautiyal, 2004, cited in Mulliken and Crofton, 2008) have been reported. A study from Dolpo, Nepal found survival rates of adults to be high (88-100%), while lower for juveniles and seedlings (68-90% and 46-78%, respectively) (Ghimire *et al.*, 2008). The growth of seedlings to reproductive size may take 3-4 years (Nautiyal *et al*, 2003). Population growth rates are reported significantly higher in meadow habitat compared to rocky-outcrop habitat; this due to differences in flowering frequency, seed mass, and seedling recruitment (Ghimire *et al.*, 2008).

1.3.2 *Habitat types*

The typical habitat type is rocky outcrops, but also alpine meadows, Juniper scrub, dwarf Rhododendron forest, and open pine forests (Weberling, 1975; Amatya and Sthapit, 1994; Ghimire *et al.*, 2005). Alpine meadows in Central Nepal have been phytosociologically exam-

ined and the occurrence of *N. grandiflora* determined at the plant community level (Olsen, 1996). Positive correlations of density with altitude and density with shady conditions have been found (Airi *et al.*, 2000).

1.3.3 *Role of the species in its ecosystem*

N. grandiflora is s small plant growing in clusters/patches that may cover the ground where it appears very dense. It is generally not very frequent in any of the habitats where it is found, but no studies have been conducted to document this.

1.4 Population:

1.4.1 *Global population size*

There have been no inventories estimating the global population size, and only fragmented data is available. In a study estimating the total national Nepalese commercial collection of medicinal plants *N. grandiflora* was reported collected in all of 5 randomly selected districts for study (Olsen and Larsen, 2003), and is as such probably not an intrinsically rare plant in the alpine habitat. The Pokhara CAMP workshop in 2001 estimated *N. grandiflora* to occupy more than 2,000 km^2 within an extent of occurrence larger than 20000 km^2 (Anon., 2001).

1.4.2 *Current global population trends*

___ increasing _X___ decreasing ____ stable ____ unknown

The global population size is assumed to be declining primarily due to human induced habitat loss and degradation (India) and overharvest (Nepal), but actual data are missing. Recent (from 1997 onwards) Conservation Assessment and Management Plan (CAMP) workshops in India reported observed population declines of 75-80% and classified *N. grandiflora* as Endangered (Arunachal Pradesh, Sikkim and Himachal Pradesh) and Critically Endangered (Uttaranchal) according to the IUCN Red list criteria (Mulliken and Crofton, 2008). In Nepal *N. grandiflora* populations were assessed to have been reduced by more than 30% within the previous 10 years, and although spatially and temporally systematic monitoring data is lacking the large trade of rhizomes to India is assumed to be causing overharvest. This is supported by the observed slow recovery of populations after harvest (Ghimire *et al.*, 2008; Larsen, 2005) that is often indiscriminately removing juvenile and mature plants (Larsen, 2005; Pandit and Thapa, 2004).

1.5 Conservation status

1.5.1 *Global conservation status (according to IUCN Red List)*

___Critically endangered ___Near Threatened
___Endangered ___Least concern
___Vulnerable ___ Data deficient

There has not been any IUCN assessment at the global scale. There have been some regional assessments (see 1.4.2).

1.5.2 *National conservation status for the case study country*

N. grandiflora was assessed to be vulnerable at a CAMP workshop in Nepal in 2001 (Anon, 2001).

1.5.3 *Main threats within the case study country*

___No Threats
_X_Habitat Loss/Degradation (human induced)
___Invasive alien species (directly affecting the species)
_X_Harvesting [hunting/gathering]
___Accidental mortality (e.g. Bycatch)
___Persecution (e.g. Pest control)
___Pollution (affecting habitat and/or species)
___Other_____
___Unknown

The largest threat to the *N. grandiflora* population in Nepal is without doubt the commercial trade, i.e. harvesting. Another influence, grazing in the alpine meadows, is considered a minor stress factor and is in some places reported minimised through rotational grazing practices (Ghimire *et al*., 2004).

Olsen (2005) estimate that some 19,000 households obtain 18-30% of their annual cash income from harvest and sale of *N. grandiflora* and *Neopicrorhiza scrophulariiflora*. Olsen (1998) report that a high proportion of households living at high altitudes in Nepal rely on medicinal plant collection for cash income and given the relatively poor growth performance of the Nepalese economy, combined with distributional aspects, the reliance on medicinal plants is not expected to decline much in the short to medium term. The threat is therefore likely to persist.

2. SPECIES MANAGEMENT WITHIN THE COUNTR

FOR WHICH CASE STUDY IS BEING PRESENTED

2.1 Management measures

While no comprehensive management plan exists, some regulatory mechanisms are in place. Commercial collection of medicinal plants requires a licence (collection permit) specifying collection area, period of harvest, species, quantities, and methods of harvest (Mulliken and Crofton, 2008). District Forest Officers have the authority to issue the license, verify the harvest, collect a fee and issue a transport permit for passing the harvest out of the district of origin (HMG, 1995). Furthermore, export of unprocessed rhizomes of *N. grandiflora* is banned (HMG, 1995).

2.1.1 *Management history*

International trade in medicinal plants is very old and records indicate that *N. grandiflora* has been traded to the Middle East and to Europe for millennia (Dalby, 2000), and from Nepal for centuries (Kirkpatrick, 1811; Regmi, 1988). The magnitude of this historical trade is not known. Given that global medicinal plant trade is rising rapidly (Kate and Laird, 1999), it is assumed that this influences also the Himalayan plant populations. It is hypothesised that while earlier harvest rates may have been sustainable the current high levels are not (Shrestha and Joshi, 1996; Chaudhary, 1998; Mulliken and Crofton, 2008).

2.1.2 *Purpose of the management plan in place*

There is at the moment no national plan for the management of the *N. grandiflora* resource. The purpose of current regulations (collection license, transport permit, banned export of unprocessed rhizomes) appears to be collection of fees (Larsen *et al.*, 2005).

2.1.3 *General elements of the management plan*

Not applicable.

2.1.4 *Restoration or alleviation measures*

Cultivation of *N. grandiflora* has been attempted on a small scale by non-governmental organisations such as the Canadian Centre for International Studies and Co-operation (CECI).

2.2 Monitoring system:

2.2.1 *Methods used to monitor harvest*

The required collection licences and transport permits are argued by forest authorities to fulfil the purpose of providing district level monitoring data (Larsen *et al.*, 2005). Also custom data would theoretically allow for monitoring of harvest levels.

2.2.2 *Confidence in the use of monitoring*

In practice, traders bulk the medicinal plant material and get collection and transport permits at the same time, meaning that location of collection can at best be established at district level. Moreover, national monitoring data is persistently lower than independently collected data (Mulliken and Crofton, 2008) likely partly due to the practice of circumventing the official license system through rent-paying (documented in Jumla by CECI, 1999). Currently, among the actors involved in medicinal plant harvest and trade in Nepal only District Forest Office personnel have faith in the monitoring information provided by the license data (Larsen *et al.*, 2005).

2.3 Legal framework and law enforcement

N. grandiflora was included in CITES Appendix II in 1997, after having been proposed for inclusion by India in 1989, 1994 and 1997 (India, 1989, 1994, 1997). The original listing annotated 'whole and sliced roots and parts of roots, excluding manufactured parts or derivatives such as powders, pills, extracts, tonics, teas and confectionary (ref Annotation 3). This was changed in 2007 to 'all parts and derivatives except: a) seeds and pollen; and b) finished products packaged and ready for retail trade (CITES, 2007). The change meant that the mentioning of 'roots' rather than 'rhizomes' was removed.

The CITES Management authority in Nepal is the Department of Forest (Ministry of Forests and Soil Conservation). Until recently the Scientific Authority was the Department of Plant Resources (Ministry of Forests and Soil Conservation) but currently it is the Department of Forest, as it is believed that the District Forest Officers are best positioned to assess the status of plant populations through their direct contact with harvesters and traders.

Medicinal plant harvest and trade from forests in Nepal is regulated by the Forest Act of 1993 and the Forest Regulations of 1995. Alpine meadows where *N. grandiflora* occurs are legally categorised with forest land. Export of *N. grandiflora* was banned in 1995 as specified in the Forest Regulations. An amendment in 2001 allowed export of processed plant material, provided the processing had taken place in Nepal and was authorised by the Department of Forest (advised by

the Department of Plant Resources and Herbs Production & Processing Co. Ltd. – a company started by the Nepalese government in 1981 to pioneer commercial cultivation of medicinal plants). Collection of medicinal plants is not allowed in National parks, conservation areas and protected areas according to the National Parks and Wildlife Conservation Act (1973).

The de facto implementation of the forest law regarding export of medicinal plants in Nepal is weak: customs officers are unable to distinguish rhizomes from various species (Aryal, 2004; Mulliken and Crofton, 2008), deputed forest rangers are not actually working at customs offices (Aryal, 2004) and forest and police officers reportedly extract rents for letting medicinal plant consignments pass the control posts (CECI, 1999). Additionally, the rhizomes are easily confused with those of *Valeriana jatamansi* Jones.

In conflict with CITES, a bilateral treaty of trade between Nepal and India grants preferential treatment for the import into India of certain goods from Nepal, including forest products that have not undergone processing. The treaty is valid until March 2012. This directly undermines the requirement of export permits from the country of origin for species listed on CITES Appendix II (Mulliken and Crofton, 2008).

3. UTILIZATION AND TRADE FOR RANGE STATE FOR WHICH CASE STUDY IS BEING PRESENTED

3.1 Type of use (origin) and destinations (purposes)

N. grandiflora is reported used in Nepal to treat several illnesses, for example, in brain and uterine tonics, stimulants, external pain killers, antiseptic, for epilepsy, hysteria, convulsions, heart palpitations, high blood pressure, and insomnia. It is used in Ayurvedic and Amchi medicines as well as in modern herbal preparations. Rhizomes from *N. grandiflora* are also used to produce essential oil and incense (Mulliken and Crofton, 2008). While there is thus some ideas of end uses, there are no systematic or comprehensive studies of demand factors; it is therefore not possible to estimate future demand trends using existing demand-side studies.

More than half of the national collection of *N. grandiflora* is estimated to be exported to India (Olsen and Larsen, 2003). All collection is from the wild with only negligible cultivation taking place. In India, 80% of the imported *N. grandiflora* rhizomes are consumed locally (in processed form), while the rest is exported as manufactured medicines (Mulliken, 2000). The Indian market is supplied primarily from Nepal, with some products from Bhutan and India (Olsen, 2005).

3.2 Harvest:

3.2.1 *Harvest regime*

Historically, it seems that rights to harvest medicinal plants have been linked with rights to alpine grazing areas. While access rights to grazing areas continue to be well defined, medicinal plants are at present often assumed to occur in areas subject to open-access conditions. There is little evidence available on actual access restrictions to the alpine medicinal plant collection areas. Cases of local management systems have been reported (Hertog, 1995; Larsen, 2002), but whether such rules are common practice, and whether they can continue to withstand current market pressures, is not known.

Harvest of *N. grandiflora* is extractive as the traded product is the rhizome. Available information indicates that commercial collection includes mature and juvenile individuals (Ghimire *et al*., 2008; Larsen, 2005). Harvest is undertaken by digging with a hand tool, typically harvesters make trips exclusively for harvest or harvest while herding in the alpine meadows. The harvest season is from August to October, but may start earlier depending on the number of harvesters and the economic needs of harvesters. What former rules (e.g. agreed starting dates after seed fall, allowed tools, exclusion of outsiders) may have been in practice are now assumed to have disappeared due to increasing potentials for commercialisation (Bhattarai, 1997; Pandit and Thapa, 2004).

3.2.2 *Harvest management/control* (quotas, seasons, permits, etc.)

Harvest is not managed by the national authorities, no quotas or maximum amounts are specified. In practice, traders bulk the harvested rhizomes and apply for collection license and transport permit at the same time, meaning that officially recorded data is valid at the district level at best.

Local harvest management is typically reported to be based on a fixed starting date rather than maximum amounts. Concern for the plant population as well as distributional aspects seem to be the basis for the rules, and whether these are generally observed in practice is not clear.

3.3 Legal and illegal trade levels

Olsen (2005) estimated annual trade level of air-dry *N. grandiflora* rhizomes from Nepal at 100 – 500 tonnes, with trade in 1997/98 of 350 – 400 tonnes. Official records for the same year put national harvest at only 97 tonnes *N. grandiflora* rhizomes (DoF, 1999). Illegal medicinal plant trade has also previously been reported to be significant (Malla *et al*. 1995), and legal trade can in some areas be as little as 12% of the

total trade (Hertog, 1995; Olsen, 2005).

An increasing export from Nepal to India and overseas destinations of essential oil produced from *N. grandiflora* rhizomes is reported by Mulliken and Crofton (2008) on the basis of data from the Nepalese Customs Department. Export of 21 tonnes essential oil from the years 2000/01 and 2001/2 is reported, and it is mentioned that Nepal imported between 50 and 100 tonnes *N. grandiflora* rhizomes per year between 2001/2 and 2003/4 from Tibet for this production.

II. Non-detriment finding procedure (NDFs)

1. IS THE METHODOLOGY USED BASED ON THE IUCN CHECKLIST FOR NDFS?

__yes _X__no

2. CRITERIA, PARAMETERS AND/OR INDICATORS USED

Not applicable (but see section 6.1)

3. MAIN SOURCES OF DATA, INCLUDING FIELD EVALUATION OR SAMPLING METHODOLOGIES AND ANALYSIS USED

Not applicable (but see section 6.1)

4. EVALUATION OF DATA QUANTITY AND QUALITY FOR THE ASSESSMENT

Not applicable (but see section 6.1)

5. MAIN PROBLEMS, CHALLENGES OR DIFFICULTIES FOUND IN THE ELABORATION OF NDF

There are two major problems in relation to the elaboration of NDF:

1. The lack of knowledge on the size of the present population and trends in population changes of *N. grandiflora*. Without such data speculations abound, and there is no way of knowing the rate of resource decline (or if decline is taking place).

2. The Management Authority at present has no control over harvest and management. The licence system in place captures only a relatively small part of the commercial harvest, and it effectively discourages official registration of harvested amounts both through antagonizing harvesters and allowing circumvention of the rules due to rent-seeking.

6. RECOMMENDATIONS

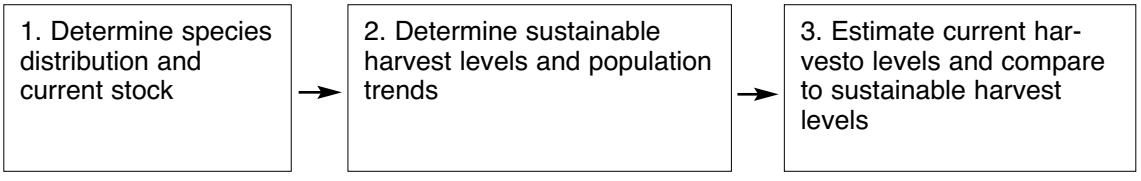
It should be of high priority to collect data on the population size at national and local levels. If actual inventories are not possible proper implementation of the permit system would be a good start. (For this to happen, however, fundamental shifts in the regulating policy and its implementation need to occur). However, trade monitoring does not on its own provide sufficient information to determine whether harvest levels are sustainable, e.g. if trade levels decline this could be due to either overexploitation or decreasing demand.

For example, potentials for sustained production of rhizomes through rotational harvest could be facilitated through supporting legislation, whereas currently export of cultivated rhizomes is subject to the same licences as wild collected plant material. Ghimire *et al*. (2008), on the basis of studies from Dolpa District, suggest that with harvest of mature plants at the end of the growing season harvest levels of 10% with rotations of 5 years in rocky outcrop habitats and harvest levels of up to 25% in meadows with rotations of 5 years may be appropriate. Harvest intensities of 25% in outcrop habitats are predicted to result in population extinction within 15 years.

6.1 Towards an approach to generate data to allow valid NDF statement

This section outlines an approach to generate data that will allow valid NDF statements for commercially collected perennial plant resources (the issue of priorisation of species for investigation is not addressed) at meso and macro levels. That is, the purpose of the approach is to generate non-local data. An overview of the approach is presented in figure 1.

Figure 1. A three-step approach to generating meso and macro level data that allow valid NDF statements for perennial plant resources



In the first step, species distribution is determined at the relevant spatial scale (e.g. regional or national) and the stock level is estimated. This would typically involve collection of both qualitative and quantitative data, e.g. eliciting knowledge of species occurrence from botanists with field experience and conducting inventories. Secondly, sustainable harvest levels are estimated as are population trends. This would, probably for all species, involve a significant amount of field

work in representative sites. Thirdly, current harvest levels should be estimated and compared to the already estimated limits for sustainable harvest.

In Table 1 below, we break down each step into a number of distinct data requirements and the associated activities. For some plant species part of the information will be already available, while for other species (probably most) substantial data collection will be necessary. Determining what activities must be conducted, i.e. where no available information exists or can be used for developing suitable indicators, requires in-depth knowledge of the relevant literature and the species specific context.

Table 1. A general step-wise procedure to generate meso and macro level data that allow valid NDF statements for perennial plant resources

Data need	**Method**	**Comments**
Step 1. Determine species distribution and current stock		
Step 2. Determine sustainable harvest levels and population trends		
1.1 Geographical occurrence	1.1.1 Workshop with experts	Workshop purpose: extract all existing-knowledge on species distribution. By invitation only; invite 10 most knowledgeable persons with extensive
1.2 Distributional parameters (altitude, exposition, habitat of species, soil types, etc.)	1.2.1 Workshop with experts	
1.3 Triangulation	1.3.1 Review of available herbarium vouchers	Workshop distribution estimates should be confirmed by existing voucher specimens. Collect this information prior to workshop; discuss and explain deviations at workshop
1.4 Distribution map and area estimates	1.4.1 Data from 1.1 – 1.3 used to create map 1.4.2 Map used to calculate area estimates	Use GIS databases, that allow inclusion of key parameters from workshop (such as vegetation types and their distribution), to generate map and calculate area data (e.g. distribution area broken down according to relevant parameters such as administrative units or vegetation types)
1.5 Current stock estimate	1.5.1 Select area for pilot survey 1.5.2 Conduct pilot survey	Calibrate pilot study area map using aerial photos and harvester focus group interviews. Choice of inventory technique species' dependent. Calibration of chosen technique in pilot survey. Key

	1.5.3 Conduct meso or macro level survey	parameters for inventory registration of perennials include presence-absence and no. of individuals; as part of inventory necessary to establish average amount of (fresh and dry weight of) traded product per individual, possibly per main type of vegetation

As an example, the required information to reach valid NDF state-

2.1 Sustainable harvest levels	2.1.1 Demographic studies and modelling of harvesting effects	Stage-based population projection matrix modelling (Lefkovitch, 1965) to estimate demographic parameters in main vegetation types. Determine harvesting treatment in collaboration with local harvesters. Estimate sustainable harvest level based on above.
2.2 Population trends	2.2.1 Continuous studies of population viability	Long term monitoring of plots (set up as above) across vegetation types and treatments.
Step 3. Estimate current harvest levels and compare to sustainable harvest levels		
3.1 Current harvest levels	3.1.1 Local trade studies	Conduct marketing chain analysis for pilot study area. Scale up and conduct at national/regional level.
	3.1.2 National/regional trade studies	
3.2 Sustainable harvesting guidelines	3.2.1 Synthesise data collected and write guidelines	Document and synthesise above process. Compare amount extracted per unit area (from maps and trade study) with estimated sustainable harvest levels.

ments for Nardostachys grandiflora in Nepal is presented in Table 2.

Table 2. The specific step-wise procedure to generate national-level data for making valid NDF statements for Nardostachys grandiflora in Nepal

Data need	Method	Comments
Step 1. Determine species distribution and current stock		
Step 2. Determine sustainable harvest levels and population trends		
1.1 Geographical occurrence	1.1.1 Workshop with experts	Shortlist 10 experts (INGOs, NGOs, university, ministries). Convene one-day workshop in Kathmandu. Generate hard copy district-level distribution map. Reach agreement on distributional parameters, including vegetation types.
1.2 Distributional parameters (altitude, exposition, habitat of species, soil types, etc.)	1.2.1 Workshop with experts	
1.3 Triangulation	1.3.1 Review of available herbarium vouchers	Collect voucher specimen distribution information from herbaria in Kathmandu and the wider region. Compare list to expert distributional parameters at workshop and discuss.
1.4 Distribution map and area estimates	1.4.1 Data from 1.1 – 1.3 used to create map 1.4.2 Map used to calculate area estimates	Obtain copy of the databases used to construct the map of potential vegetation types in Nepal (Lillesø et al. 2005). Enter workshop distributional parameters and generate country-level distribution map. Use data base to calculate maximum distribution area at district level.
1.5 Current stock estimate	1.5.1 Select area for pilot survey 1.5.2 Conduct pilot survey 1.5.3 Conduct meso or macro level survey	*N. grandiflora* appears to be collected in all high altitude districts. Pilot surveys to be conducted in Nuwakot and Mustang Districts as these represent the extremes of harvesting pressure: unpublished background data for Olsen and Larsen (2003) show that harvest per potential distribution area unit, a figure that can be interpreted as harvest pressure, is highest in Nuwakot District (large amounts collected in small area) and lowest in Mustang District (also a conservation area). Stock estimates (and harvesting rates) per unit area should be lower in Nuwakot than in Mustang. Pilot study: district level distribution

		area maps (from above databases) calibrated using aerial photos and local knowledge elicited from harvesters during focus group interviews. Revised map used to group occurrences based on logistics (to minimise costs); a small number of groups randomly selected. Random sampling within each group using transect walks; registration along lines of area of occurrence, number of individual plants/area, collection of rhizomes to estimate average fresh and dry weight of rhizome/main vegetation type. National level study: if pilot study findings indicate the need (significant differences between stock and harvesting pressure per unit area in Nuwakot and Mustang), use pilot study experiences (frequency of observations per transect unit, time per transect unit) as basis for designing scope of national study. Use potential distribution area units to group districts; randomly select district in each group; calibrate district distribution map as per pilot study; randomly lay out transect lines (km dependent upon resources available and experiences from pilot study).

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2.2 Population trends	2.2.1 Continuous studies of population viability	Set up system of permanent sample plots; selected and treated based on mapping above, Larsen (2005) and Ghimire et al. (2008).
Step 3. Estimate current harvest levels and compare to sustainable harvest levels		
3.1 Current harvest levels	3.1.1 Local trade studies 3.1.2 National/regional trade studies	Can be extracted from existing case studies and unpublished databases; new data is, however, desirable and the study by Olsen and Larsen (2003) should be repeated.
3.2 Sustainable harvesting guidelines	3.2.1 Synthesise data collected and write guidelines	Present at national workshop

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