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Perceptions of conservation by children and women in the Palas Valley, Pakistan & implications for environmental education

By

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ABSTRACT

The success of community-based wildlife conservation projects depends on attitudes held by the local community, which will in turn influence their level of participation and behaviour. Environmental education aims to provide knowledge and skills to improve the capacity of people in addressing environmental problems, and thus can be integrated into these projects. True participation should be inclusive, to improve success and equity, but often the perspectives of marginal groups are not considered. Using semi-structured interviews with local children, women and key informants, this study begins to redress this imbalance for a conservation and development project in northern Pakistan. Information is gained on resource use, knowledge, and attitudes towards wildlife and conservation, in order establish recommendations for future education initiatives.

Children and women were found to play central roles in the collection of non-timber forest products which are heavily relied upon for food, medicines and income. They have a great deal of indigenous knowledge about these species which should be utilised. Both direct experience and formal education have a role to play in knowledge of wildlife and conservation, and different kinds of valuation were placed on the natural world, informing attitudes. These attitudes toward conservation were found to be generally positive, but are influenced by education, age, gender and knowledge. The context in which knowledge is acquired may also be important in attitude formation. The connection between conservation and development is not fully understood, highlighting a need to make this link more explicit in future work and awareness materials.

Basic education provision is poor in the area and suggestions are made to improve access and relevance to the community. The approach to environmental education should be less didactic, and more participatory and action based, involving the whole community. Efforts should especially be made to improve participation by women.

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ACRONYMS

CBO	Community Based Organisation
CRC	Convention on the Rights of the Child
Df	Degrees of Freedom
DfID	Department for International Development
ESD	Education for Sustainable Development
EU	European Union
NFE	Non-Formal Education
CBC	Community-based Conservation
GLM	General Linear Model
HJP	Himalayan Jungle Project
ICDP	Integrated Conservation and Development Project
MoE	Ministry of Education
NGO	Non-Government Organisation
NTFP	Non-timber Forest Product
NWFP	North West Frontier Province
PCDP	Palas Conservation and Development Federation
PCDP	Palas Conservation and Development Project
PKR	Pakistani rupees
PRA	Participatory Rural Appraisal
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Childrens Fund
UNGEI	United Nations Girls Education Initiative
WPA	World Pheasant Association
WWF	World Wildlife Fund for nature

1 INTRODUCTION

There exists a potential conflict between the aims of wildlife conservation initiatives, which are often instigated by the rich nations in the West, and the livelihoods of those communities who rely on natural resources in poorer countries, where much biodiversity is held (Adams, 2001). Community based conservation (CBC) aims to reconcile these priorities, by creating incentives for participation in conservation in order to benefit the local community (Little, 1994), thus connecting the environment to development.

Studies on knowledge and perceptions are conducted in communities, on the basis that positive attitudes increase participation in conservation efforts and lead to behaviour change. It is also becoming increasingly recognised that environmental education can be a driving force in influencing attitudes and behaviour by providing knowledge and skills to resolve environmental problems (UNEP, 1992a) and this is being applied in conservation projects.

However, communities are not homogeneous entities and often marginal groups such as women, children and the poor are excluded from participation. These groups may have different perspectives, priorities and needs which can inform conservation and development projects, improving success and equity (Sarin, 1998).

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The Palas Valley provides an example of an incentive based conservation project where these issues are highly relevant. Both women and children are thought to be important users of natural resources, specifically non-timber forest products (NTFPs), which are being promoted to reduce deforestation and improve livelihoods. Both groups and especially women are marginalised in Palasi society and have rarely been consulted on issues relating to conservation and development in the region. There is a lack of education in the valley, but some environmental education programmes are starting to be initiated and there are plans to build a new school in the near future.

Objectives:

- To gain information on natural resource use by women and children, specifically the use of NTFPs, their value in the valley, and the environmental effect of their collection, specifically related to conservation of the Western Tragopan, the flagship species in the valley. This will aim to inform future work of the conservation project.

- To gain an understanding of perceptions of the natural world and conservation, specifically assessing how these may have been changed by the conservation programmes, environmental education and the earthquake which hit the region in 2005. To assess how children and women would like to see their local area change in terms of conservation and development in the future.

- To explore how their knowledge and attitudes may be connected.

- To assess the current environmental education programme, awareness and levels of participation in order to identify possible improvements in education based on the information gathered. This is particularly focused on school education and women's role in conservation and development in the valley.

2 COMMUNITY-BASED CONSERVATION

2.1 Linking conservation and development

It was not until the 1970s that the two previously separate concerns of environment and development were seen as interdependent. The challenge of reconciling these issues has inevitably become political, and centres on the much used but contested concept of sustainable development. Although debates are far more nuanced, they can largely be seen as falling into two visions for sustainability: weak, in which human and natural capital (resources) are more or less substitutable, and strong, in which a constant stock of natural capital is necessary, allowing for no trade-off (Connelly and Smith, 2003). These ideas largely equate to a choice between more reformist and radical ideas respectively. The latter more explicitly addresses social and political issues and focuses on increasing well-being rather than the more economic elements of development (Adams, 2001).

Biodiversity conservation projects are now at the forefront of initiatives for achieving sustainability in practice, and the different theories behind them reflect these opposing views of sustainable development. It is becoming widely accepted that the traditional approaches – the 'fences and fines' of protected areas - are ineffective, due to the detrimental economic and social effects they have often caused (Rao and Geisler, 1990), including the erosion of indigenous institutions and livelihoods, and conflicting relations between communities and reserve staff (Jones and Carswell, 2004). This not only jeopardised the conservation aims but raised ethical questions regarding the exclusion of communities from land that once provided their livelihood (Little, 1994). This is especially true in developing countries where much of the world's biodiversity is represented but where people are most reliant on the natural resources for their livelihoods (Prescott-Allen and Prescott-Allen, 1982). This includes not only harvesting of wild species for food, fuel and medicines but ecological services such as nutrient cycling, local climate regulation and cultural benefits, which are not included in economies (Balmford *et al*, 2002). In these countries, the loss of wildlife and poverty are intricately linked problems and therefore need to be solved concurrently (Adams *et al*, 2004).

These issues have led to the idea of incentive based programmes or 'new conservation'. Its two central objectives are to enhance conservation and to provide incentives, often economic or social, for local people (Campbell and Vainio-Mattila, 2003), thus aligning to the stronger vision of sustainable development. Incentive based conservation is an umbrella title used to emphasise the coexistence of people and nature rather than the earlier protectionism, but covers a range of approaches. These include using different types of incentives, which can broadly be split into two types. Firstly, by the provision of services such as healthcare and education, or secondly, by making a connection between the wildlife survival and livelihoods. Initiatives may also be distinguished by the level of community participation. Integrated conservation and development projects (ICDPs), are often centred on consultation rather than direct partnerships with local people (Newmark and Hough, 2000). Community based conservation (CBC), on the other hand, aims to create a deeper level of participation, in the hope of creating ownership of conservation objectives (Little, 1994). It uses this participation, not simply as a means to enhance conservation but as a part of its ultimate aim (Spiteri and Nepal, 2005)

Regarding incentives, difficulties can arise when there is no connection between the wildlife survival and the livelihoods of the local community so that programs such as sustainable harvesting, and ecotourism, for which stable populations are vital for the local economy have been best able to achieve conservation objectives. The system can best conceptualised as a self-perpetuating, closed loop where there is a direct dependency between biodiversity and people (Salafsky and Wollenberg, 2000) (Figure 1). Indirect linkages, such as earlier attempts at buffer zones where communities lived outside of protected areas, in exchange for substitute economic activities, have been less successful (Wells and Brandon, 1992; Oates, 1995).

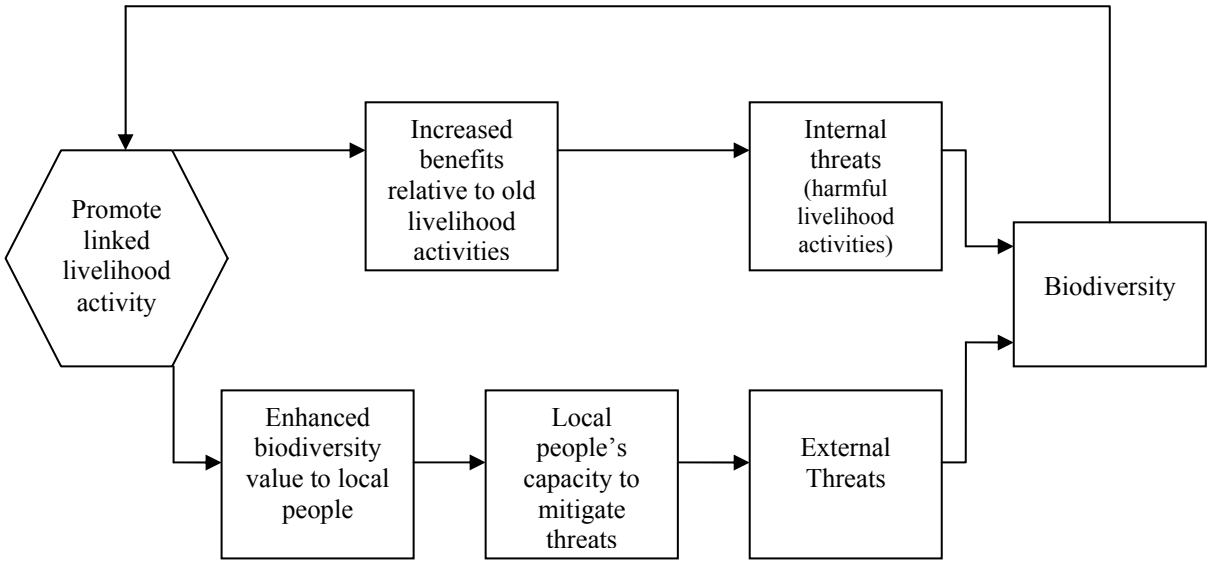

Figure 1: Linked incentive strategy for conservation. (adapted from Salafsky and Wollenberg, 2000)

Given the human costs of conservation, incentives are often provided to promote sustainable use of resources where ideally the rate and means of extraction do not lead to a decline in biodiversity (UNEP, 1992b). Given the risk of failure, there is often reluctance amongst conservationists to promote sustainable use over complete protection, given the risk of failure. Pragmatism, however, necessitates recognition that human-nature interactions often provide the only answer. The aim is to achieve a sustainable mosaic of land uses achieving both conservation objectives and livelihoods for people. However, there is not only incomplete knowledge of how to reach the right management strategy to achieve sustainable use, but confusion over the meaning of the term itself which has a fluid, rather than fixed aim. These two factors can ultimately lead to mismanagement and conservation failure (Hutton and Leader-Williams, 2003).

Indeed, although the theory of CBC seems rational, there is much debate over the level of success in implementation on the ground, and questions over whether nature conservation and the interests of communities can ever be truly compatible (Adams, 2001). On an examination of a number of CBC projects, Kellert *et al* (2000) concluded that there were 'serious deficiencies' with regards to a number of criteria including biodiversity protection, sustainable management and equity, with an emphasis often being placed on human development rather than conservation.

2.1.1 Non-Timber Forest Products

Development of a Non-timber forest product (NTFP) harvesting scheme is one means of linking conservation with poverty alleviation by creating an incentive to manage forests sustainably (Peters *et al,* 1989). The term NTFP is not clearly defined, and can include all biological products derived from the forest, except timber, most often wild meat, vegetables and medicinal plants (Robinson and Pfund, 2005). The idea of using these products as the basis of a conservation scheme is founded on three assumptions. Firstly, that NTFPs are accessible to rural people; that their extraction is more benign than timber harvesting and lastly, that increasing the value of NTFPs provides incentives for conserving the forest (Belcher *et al,* 2005). The aim of projects is often to create markets, improve harvesting and marketing, and cultivate the most valuable species to improve income – the 'conservation by commercialisation' hypothesis (Ndoye, 2005). Open access to NTFPs leads to inefficient and damaging harvesting practices, which conservation programmes aim to curb by promoting sustainable extraction and commercialisation (Arnold and Ruiz-Perez, 2001)

The initial promise of NTFP management is giving way to more scepticism, as all the assumptions above may not be met. There are examples of people remaining poor due to lack of skills, land tenure and capital to take advantage of market access (Arnold and Ruiz-Perez, 2001). Many communities may only rely on a few species, weakening the incentives for conservation of entire habitats (Salafsky and Wollenberg, 2000). Doubts have also been raised regarding biodiversity conservation provided by such systems, as harvesting will always create an impact, and it may be difficult to create a balance (Arnold and Ruiz Perez, 2001). Given the diversity of NTFPs, and the communities that use them, it may be that the importance of NTFPs to rural livelihoods varies widely so that conservation potential and the appropriate means are product and location specific (Ros Tonen and Wiersum, 2003).

2.2 Community Participation

Critics argue that 'new conservation' is simply a re-labelling of traditional methods and that participation is often at a superficial level, remaining passive. There exists a continuum in the degree of participation from informing to consultation to partnership to complete self-determination and decision-making (Arnstein, 1969). 'Deliberative,

inclusionary processes' with true debate, negotiation, and co-management are advocated as the best means of including different stakeholders' values and knowledge into decision making, improving not only equity but effectiveness and legitimacy. True participation will build upon indigenous knowledge (Nyhus *et al*, 2003) and include cultural traditions (Kleymeyer, 1994). However, reaching this level of participation often remain a challenge for many projects (Brown, 2003) as the process is political, with tensions over who is involved, how and on whose terms (Jones and Carswell, 2004). The question remains of whether imposed CBC is a contradiction in terms altogether.

Community participation should not only involve depth, in terms of enhancing active decision making but also breadth, by being truly inclusive. Support by local communities is necessary for the success of CBC projects (Nepal, 2002) but this buy-in by the community has been patchy and research suggests that this is due to the variety of different characteristics possessed by a community. These must be accounted for in the design of the CBC program so as not to neglect needs and interests (Spiteri & Nepal, 2005). Supposed benefits of a program may hold different values to different people. In addition, perceived equity will encourage positive attitudes further improving chances of success.

Agrawal and Gibson (1999) conceptualise the traditional idea of a 'community' as having three qualities - being set in small area of geographical space, having a homogenous social structure and holding shared norms. In reality, even if a community shares these characteristics, it does not necessarily equate to successful resource management. For example, a deep-seated social norm such as hunting may promote the exploitation rather than conservation of resources (Gibson and Marks, 1995). These authors suggest not only including all multiple interest groups but considering more closely the institutional arrangements - that is, the local level processes leading to certain individual actions.

2.2.1 Children

The first step towards recognition of the importance of children's participation and rights came with the UN's Convention on the Rights of the Child (CRC) in 1989. Article 12 states that children have the right to express views in matters that affect them (UN, 1989). Children are, however often viewed as an extension of their parents, thus

automatically covered by supporting those adults' interests. Considering that they have different needs, rights and ideas, this is inadequate (Chawla and Johnson, 2004). Children represent a unique marginalised group in that they have little or no political power, and are especially vulnerable if poor and female. Added to this they also constitute a large majority of the population and represent the future decision makers, so that improving their confidence, knowledge and skills will have a tangible benefit to future society (Chawla and Johnson, 2004).

Young people are thought to be passive beneficiaries of projects but can, in fact, act, just like adults to make social and economic contributions to society (Theis, 1996). Children's ability to bring fresh ideas and perspectives into development projects such as those tackling child labour has been recognised (Sapkota and Sharma, 1996) but with regards to natural resources and conservation, their insights are rarely sought. Instead decisions are normally based on untested adult assumptions. Children may also be more willing to disclose truthful information, as they are less likely to be aware of social norms and expectations (Hart, 1997).

2.2.2 Women

The Rio Declaration states that 'Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.' (UNEP, 1992c) However, social barriers and male dominated culture remain barriers to inclusion and equity, even in supposedly genuine participatory programmes (Kellert *et al*, 2000). Exclusion can also be with regards to the benefits from development projects, so that for instance only males may receive education, further marginalizing women. (Wainwright and Wehrmeyer, 1998). Women are often the primary users of natural resources in rural communities (Mumtaz, 1993) and according to ecofeminist thought, the interests of both women and the environment are complementary (Mies and Shiva, 1993), thus their perspectives and participation in conservation projects may prove vital.

2.3 Community Perceptions

Since community participation is a fundamental precondition to CBC success, studies of knowledge, perceptions and attitudes have been conducted in communities on the basis

that these factors affect behaviour and participation levels. They have been used to measure the success of initiatives and gain information on the concerns and priorities of stakeholders, in order to implement more effective projects (Arjunan *et al,* 2006).

2.3.1 What affects perceptions ?

Behaviour is largely determined by beliefs according to the theory of reasoned action (Azjen & Fishbein, 1980) but for environmental actions the link appears not so straightforward (Lai and Nepal, 2005, Holmes, 2003). Initiatives that alter people's views in a positive way toward conservation may have a corresponding effect on environmental behaviour but this is dependent on a number of factors which can affect both attitudes and behaviour making the relationship between the two more ambiguous. As previously discussed, communities are not homogeneous entities and the way in which the community varies may affect perceptions.

Firstly, people need to recognise linkages between their livelihoods and biodiversity for a conservation strategy to succeed (Salafsky and Wollenberg, 2000), and access to benefits from conservation has been shown to have a positive effect on the attitudes of local people (Newmark and Leonard, 1993). However, costs and benefits are often not equitably distributed across the community (Wainwright and Wehrmeyer, 1998) and there can be dissatisfaction due to this inequity (Alexander, 2000). People living in closer proximity to protected areas may rely on the resources to a greater extent and therefore hold more negative views toward conservation, as they expect losses from restrictions on their resource use (Jim and Xu, 2002). Similarly, crop losses from animals – a common concern in rural communities – can affect attitudes toward wildlife conservation (Arjunan *et al*, 2006).

Expected losses from conservation may not equate to real losses and it has been found that in a nature reserve in Southern China a higher level of knowledge and updated information resulted in expectations of more benefits than losses (Jim and Xu, 2002). There is a lack of understanding in many projects and poor general knowledge about wildlife, values and conservation can result in dissatisfaction (Wainwright and Wehrmeyer, 1998). These negative perceptions are due to poor conveyance of information and a lack of participation by the local community. Holmes (2003) found that even informal visits by project staff improved understanding and created more

positive perceptions of conservation. Similarly, education levels may be also be influential and this will be discussed in the following section.

Ultimately, there are flaws to CBC initiatives, which are often specific to the context of the project, but in theory, they remain, in theory the best means of achieving conservation and development goals. Perceptions have been shown to affect behaviour, but initiatives must take account of the specific local conditions, including community values and interests (Heinen, 1996). This concept of community needs to be holistic, including both women and children, in order to create sufficient incentives for conservation and meet the equity dimension of sustainability.

3 ENVIRONMENTAL EDUCATION

3.1 Definition & Theory

The beginnings of environmental education can be found in the study of nature, emerging from the Romantic Movement, in the early 20th Century, but it was not until the 1970s that attempts to formally define the term were made, most notably at the intergovernmental UNESCO conference in Tbilisi where the following definition was formulated:

> 'Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action' (UNESCO, 1977)

With the emergence of the concept of sustainable development (discussed in section 2.1), encompassing not only ecological ideas but economics and social justice, environmental education, at least in theory, has moved from a traditional focus on nature and aesthetics, with a rather apolitical stance to a more participatory, value-driven and interdisciplinary approach, fully reflecting the complex interrelationships between humans and natural systems (Fien and Tilbury, 2002; Palmer, 1998; UNESCO, 1977).

With this shift, environmental education has been propelled from relative obscurity to being viewed as instrumental in achieving a sustainable world. Agenda 21, the central outcome of the Rio summit, states that 'Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues' (UNEP, 1992a). It appears intuitive that people will only participate in environmental action if they have the knowledge, motivation and skills provided by education (Fien *et al,* 2001). Theoretically, education is thought to feed into the linear model of behaviour described in Section 2.3.1 by influencing beliefs and attitudes and in turn behaviour related to these (Azjen & Fishbein, 1980).

General education is thought to enhance people's ability to deal with change (Schultz, 1975), which suggests it could affect conservation efforts. Godoy *et al* (1998) showed that each additional year of schooling lowered the probability of people cutting old growth rain forest. Sharpening the focus of education onto environmental issues would surely strengthen this effect. Indeed, participation in environmental education programmes has been shown to increase pro-environmental attitudes (Leeming *et al,* 1997), but may be slow to have a significant or tangible impact on the desired environmental outcome, by changing behaviour (Trewhella *et al,* 2005). Kaiser *et al* (1999) found environmental attitude to be a strong predictor of ecological behaviour, although others have not found such a straightforward link. It has already been suggested that education and awareness materials are a way to dispel misunderstandings regarding conservation projects and allow greater participation (Jim and Xu, 2002). Certainly, mere knowledge and awareness does not necessarily lead to responsible environmental behaviour (Hungerford and Volk, 1990) and it is thought that affective as well as cognitive variables are important in the model. This requires that education focuses on changing feelings and attitudes, especially fostering empowerment to give learners a sense that they can resolve problems (Hsu, 2004).

Three interlinked threads are thought to form a complete environmental education (Lucas, 1991): 'about' the environment, focusing on factual knowledge and investigatory approaches; 'in', using the environment as a resource; and 'for', to develop an environmental ethic and action. Palmer (1998) views these elements in a complete model, hinged on providing appropriate knowledge, skills and attitudes (Figure 2). Approaches to environmental education can also be viewed as a continuum from passive information provision, to communication, to education and ultimately active capacity building (Fien *et al*, 2001) which aligns to broadly the same ideas.

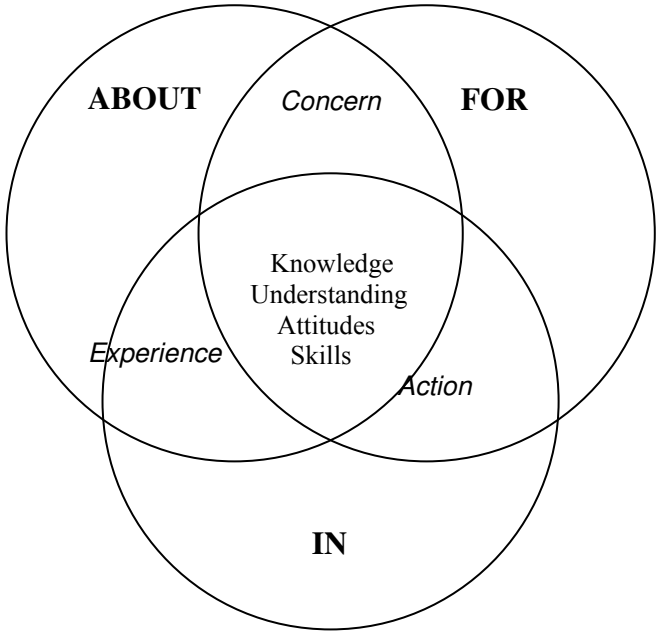

Figure 2: A Model for teaching and learning in Environmental Education (adapted from Palmer, 1998)

3.1.1 Education for Sustainable Development

There is now a preference for using the term Education for Sustainable Development (ESD) rather than environmental education with the focus being on the 'for' strand of the model above. However, the development of a comprehensive framework for ESD is intrinsically challenging given the many interpretations of sustainability, which encompass a spectrum of green ideologies. Sterling (1996) rejects models such as ecological modernisation, based on weak sustainability and instead, advocates a more eco-centric, socially focused and integrative view of sustainability. With this approach, he envisions ESD holding the key to an entirely new educational paradigm with radical shifts in teaching and learning.

Characteristics of Education for Sustainability (adapted from Palmer 1998; Sterling, 1996; UNESCO 1977)

- **Contextual** – grounded in the local economic, social and ecological context
- **Holistic** – interdisciplinary and trans-disciplinary, taking inspiration from a range of fields
- **Process orientated** - participation and empowerment through action learning
- **Constructive** – offering practical ways forward
- **Systemic** - emphasis on relation and pattern

- **Socially orientated** - extending personal responsibility to the environment, other people and the future
- **Inclusive** and **Lifelong –** reaching all people of all ages

The central focus is on creating 'Global Citizens' for the future (Sterling and EDET, 1992) by providing people with the knowledge, intention and skill to bring about change. It is often suggested that EFS be multidisciplinary, integrating a whole range of non-traditional issues in the curriculum such as politics, ethics, natural history, ecology and cultural studies, but there is an argument, given that the environment does have a discrete content, of increasing educational impact by it being a separate subject (Pande, 2002). Nonetheless, the focus of EFS is largely on the means rather than the content, so that attention to the pedagogic change has been key in the debate (Sterling, 1996). Rather than the conventional product view of education with predetermined ends, where the learner is seen as a blank canvas, participatory processes, like those now accepted in conservation and development theory are used to create ownership and empowerment for a socially sustainable education system (Palmer, 1998).

According to critical social theory, traditional education simply perpetuates the prevailing culture and economy (Burbules and Torres, 2000). The alternative is an action research approach described as a 'methodology and a way of thinking' hinged on critical reflection, creative thinking, problem solving, thus empowering both students and teachers to take action (Wals and de Jong, 1997). These ideas link to the 'service learning' education philosophy of John Dewey where learning takes place in real world contexts, which has been shown to promote positive attitudes (Bradley *et al*, 1999). Student led initiatives centred on action learning have been found not only to cultivate pro-environmental attitudes but social competencies such as leadership skills useful for the future (Johnson-Pynn and Johnson, 2005). They also have the additional benefit of being attractive and motivating to students, enhancing the effect (Hsu, 2004).

3.1.2 Institutional context

To complement a shift towards education for sustainability, it is necessary to examine the institutions best suited for this change. Where previously, education was viewed as synonymous with formal teaching of young people in schools, a broader, more far reaching view of the institutional setting is emerging. Theories of environmental education have brought attention to the potential of non-formal education (NFE),

especially for community based environmental initiatives. NFE is based on participatory mechanisms, using community structures, flexibility and a relevant content in order to meet community needs (Fagan, 1996; Wals and de Jong, 1997). Given that sustainable development depends on inclusive participation from all sectors of society (UNEP, 1992c), it is argued that EFS should also follow this model (Fagan, 1996) and become fundamentally connected to community development (Hart, 1997).

Broadening the perspective also involves lengthening it and EFS advocates 'lifelong learning' (UNESCO, 1977), including all ages. This on the basis that by confining education to a school context, there is the danger that changed attitudes and behaviour begin to erode. Intergenerational programmes have been successful in fostering a relationship between the knowledge and skills of older and younger people in the community, and maintain cultural continuity (Hart, 1997). Despite this promise for environmental education based on NFE, problems may arise if a purely local focus results in insularity (Bekalo & Bangay, 2002) and it has been viewed by some as creating a dual system, whereby formal education remains elitist and inaccessible for poor communities (Vulliamy, 1988).

3.2 The Reality

There is much theoretical and semantic debate regarding environmental education due to its broad perspective, encompassing controversial issues and potentially forming the foundation for wider educational reform. As a result, ground level progress has been mostly in the form of isolated programmes, with small steps rather than radical shifts (Palmer, 1998). The language of participation and action learning, much like that in participatory research methods, does not always match the reality and been used tokenistically in failed initiatives (Webster, 1996). There is the problem that environment studies are still viewed as a science rather than a more discipline spanning subject (Palmer, 1998) and the potential for lifelong learning is not widely recognised (Leal Filho, 1997). Sterling (1996), predicts a more techno-centric reading of EFS will be likely in the short-term, which can be built upon in the future.

3.3 Environmental Education in Developing Countries

In countries with developing economies, there are clearly greater practical constraints to be faced in order to implement effective environmental education programmes. The first priority is provision of basic education. One of the Millenium Development Goals is to achieve universal primary education, including a target for 2015 of eliminating all gender disparity at all levels of education (UNDP, 2005a). In terms of sustainable development, basic education has the potential to improve agricultural productivity empower women to take control of reproduction and health, as well as enhance environmental protection (Hopkins and McKeown, 2002). However, the target is far from being met in many countries due to economic and social barriers. Demand for education from communities may be low because both opportunity costs in terms of lost labour and actual schooling costs are deemed to high. There is a lack of funding for teachers, learning materials and training, resulting in inadequate methodologies and skills. These problems are exacerbated by high population growth and inequity within countries especially between rural and urban areas, where formal schooling is designed to benefit the latter population (Bekalo and Bangay, 2002).

Due to these inadequacies, environmental education is simply not a priority and may be limited to patchy initiatives by Non Government Organisations (NGOs). There can be tokenistic inclusion of environmental issues in broad education policy which becomes meaningless without an implementing framework; this was found to be the case in 9 out of 10 African countries studied (Taylor, 1998). This framework needs to be developed, taking account of diverse and challenging ecological, economic and cultural contexts. Despite these problems, some environmental education initiatives have managed to achieve some success. For example, positive outcomes in terms of awareness levels and measurable improvement in conservation in East Africa, have resulted in part from environmental projects such as the Wildlife Clubs of Uganda which are based on practical activities and reciprocity between students, staff and community members (Johnson-Pynn and Johnson, 2005).

3.3.1 Pakistan

Pakistan suffers some of the major educational problems that affect many countries with developing economies. Enrolment in primary schools in 1996-2004 was only 56% according a national household survey. From a gender perspective, the primary school

enrolment ratio (the number of children enrolling divided by the population of that age group) is 80% for males but only 57% for females. At secondary level this decreases to 26% for males and just 19% for females (UNICEF, 2005). There is an equally glaring disparity between rural and urban schooling, with 57% completing primary education in the latter but only 30% in rural areas. Here just 17% are female. (UNDP, 2005b). This reflects not only the wealth inequality in the country but cultural differences and child marriages in more remote regions. In fact, there are often broadly three hindering factors to female education: cultural, due to early marriage into other families; economic, as families on low incomes value household duties carried out by women; and educational factors, such as the vicious cycle of few female teachers (Mehran, 1997).

At a political level, education is neglected, amounting to only 7.8% of total government spending compared to 12.8% in India (UNDP, 2005b), and exacerbated by large military spending, a fragile democracy and high birth rates (Heward, 1999). Spending on social services including a focus on primary education was pledged in 1992 with the Social Action Plan, but ineffective implementation at the local level has necessitated more NGO involvement and community participation. Community schools have been established to overcome the often poorly funded government schools, for example the establishment of girls schools in remote regions through the United Nations Girls' education initiative (UNGEI, 2005).

Education is largely a provincial responsibility, taking on the general policy, guidelines and curricula provided by the federal government. Text book content and adaptations to the curriculum and teacher training are defined by the provincial government (MoE, no date), and the approach is seen as focusing on the cognitive aspects of education (Tahir, 1997). Environmental education was introduced formally in 1985 through the Co-ordinated Environmental Education Programme (CEEP), incorporating concepts through the 'infusion approach' into existing subjects such as science, Pakistani studies and languages (Tahir, 1997). Like other developing countries, Pakistan has a number of environmental education programmes run by NGOs. For example, the World Wildlife Fund for Nature (WWF) has taken a participatory educational approach to supporting conservation objectives in mountainous areas, through demonstrations and skill enhancement in activities such as social forestry and solid waste disposal (WWF, 2004).

Environmental education has a crucial part to play in addressing environmental issues including conservation, but there is debate over the framework to use. There is a general consensus that it should be broadened in line with the idea of sustainability, integrating disciplines with a more action-based, less didactic style and more participatory institutions but this has not always been translated into reality. Curriculums must be formulated in the context of distinct community needs, perceptions and culture to produce 'an ongoing, learning process for change' (Sterling, 1996). For developing countries, including Pakistan, this is a particular challenge, but environmental education may provide the breadth and relevance to tackle environmental issues and development needs together.

4 BACKGROUND TO THE STUDY SITE: THE PALAS VALLEY

4.1 Biogeography

The Palas valley lies in the Kohistan district, North West Frontier Province (NWFP) of Pakistan (Figures 3 and 4) which is thought to be one of the least developed districts of the country. It is the area where the Hindukush, Karakorum, and Himalayan mountain ranges meet, forming a unique environment.

Figure 3: Map of Pakistan showing NWFP

Figure 4: Map of NWFP showing the Kohistan district and the Palas Valley

The valley itself covers an area of 1300km^2 of mountainous terrain, including forested and alpine areas. It ranges from 600 to 5151m above sea level, and experiences both a sub-tropical and temperate climate. It is a sub-watershed of the Indus river and lies on its east side.

4.2 Society and Community

The population of the Palas Valley is sparsely distributed with approximately 95 people/sq km and in total 64,000 according to the last census. The societal structure of Palas is considered tribal and the peoples indigenous. The majority of the population belongs to the same caste – Shin. Sub-castes or 'khels' are based on paternal lineage and form joint family systems that provide a support network, financially and socially. Literacy levels are low and the local language, Shina is not written. Urdu, the national language is used mainly in schools.

Much of the population makes season migration from winter settlements to the alpine pastures in order to graze livestock. Migration has also taken place on a larger scale with some people seeking education and facilities outside of the valley.

The 'jirga', a traditional institutional means of making collective decisions on economic, social, and cultural issues, holds a strong role in Palasi society, taking precedence over the formal Union Council decisions. The system aims to be egalitarian, but often, in reality only to major castes (Jami, 2005) and is restricted to adult males.

Islam has a strong influence over many in Palas and much of the superstitition and relics of former belief systems have been lost over the last 25 years. The patriarchal controls in the region are based on culture – composed of traditions, social norms as well as religion (Mumtaz, 1993). 'Purdah' is fiercely adhered to, so that women are largely secluded from public spheres of life. Health is a significant problem especially for women in Palas, where there is a lack of resources and awareness. Due to this, medicinal wild plants are heavily depended upon (Shinwara, 2002). Child mortality is high and both women and children have been found to be underweight and malnourished, partly due to unequal access to food, compared to adult males, and there are a variety of nutritional problems, such as iron deficiency (Farooq, 2004). Women carry a large burden of work, and are primarily responsible for domestic work including fetching fuelwood and water, as well as carrying out agriculture tasks.

There are 125 school buildings in the valley, but only 36 are thought to be functional (Nawaz and Khan, 2006), although there appears to be uncertainty over these numbers, and during the period of research, six were considered to be opened (Ayaz Khan, pers comms).

4.3 Economy

The community is largely dependent on natural resources for livelihoods, and poverty levels are high relative to other parts of Pakistan. Within the valley, some groups are landless and marginalized, resulting in differences in wealth (Jami, 2005). The Karakorum Highway has opened up some trade and opportunities but given that some villages lie 2 to 3 days walk from the road, this has not been exploited economically. Livelihoods are primarily based on subsistence agriculture but remain precarious due to a variety of limiting factors. Only 1.5% of the land in Palas is cultivated, and only a

single crop – maize - is grown (Rabin, 2002). Traditional tools and methods are used, which added to the harsh terrain and high altitude, results in poor yields (PCDP, no date). For livestock, there is a lack of appropriate marketing facilities for the animals and products, and veterinary care is limited (Khan, 2002). Non-timber forest products (NTFPs) have a subsistence and cash value and are thought to account for 13.2 million PKR of income per year in the valley (Shinwara, 2002).

4.4 Biodiversity and Threats

The forests of the Western Himalayas have been identified as a global priority for biodiversity conservation. There is particular concern for the temperate forests, and Palas holds a pristine tract of this habitat, containing a wealth of biodiversity. Birdlife International has labelled the area within which Palas lies the West Himalayan Endemic Bird Area which as a whole supports 11 endemic bird species (BirdLife International, no date),. In Palas, a total of 160 bird species have been identified, 600 species of plant, 6 of which are endangered and a number of rare mammal species such as the musk deer (*Moschus moschiferus*), hunted for its highly valuable musk (Arshad, 2003).

The most significant threat to biodiversity in Palas is unsustainable forestry practices. Deodar (*Cedarus deodara*) is cut, both commercially and for use by the community for building, firewood and fodder. In 1992, there was a moratorium on logging, but the government of Kohistan makes some allowances such as permitting extraction of already cut timber. Restrictions such as these are not followed or enforced, in such a remote region. The sale of timber rights by local people is an attractive and certain means of improving income levels, but the Palasi realise only a small proportion of the actual value of the timber, and in some areas, especially in Lower Palas, there is substantial degradation (PCDP, no date). Hunting is banned in Pakistan but is still carried out in the Palas valley.

4.4.1 The Western Tragopan

The world's largest known population of the Western Tragopan (*Tragopan melanocephalus*) is found in Palas and surveys suggest that there are approximately 300 pairs (Bean *et al*, 1994) out of a total population of 5000 (McGowan and Garson, 1995) spreading from Northern Pakistan, east through Kashmir and possibly to Uttaranchal, northwest India (BirdLife International, 2001). The species is categorized as 'vulnerable' due to its sparse distribution, and small and declining population which is

becoming increasingly fragmented due to forest loss and degradation (IUCN, 2006). The distribution boundaries are not confirmed for Palas, but it is mainly limited to the intact forests of Upper Palas. Breeding takes place between April and June, when the bird is found at higher altitudes, and favours south facing slopes (Whale, 1997). During the winter, it moves to lower altitudes, at the lower limit of snow.

The Western Tragopan is threatened not only by deforestation but collection of wild species leading to disturbance of its habitat (BirdLife International, 2001). Studies in the 1980s suggested that hunting and trapping were widespread in the valley but there is uncertainty as to the effect on the species population (Rab Nawaz, pers comms). Increasing development, such as road building is facilitating access and further threatening the species (BirdLife International, 2001), and may be a future problem in the currently remote valley.

4.5 Conservation and Development

4.5.1 The Palas Conservation and Development Project

The discovery of the population of Western Tragopan instigated a conservation initiative in the early 1990s. This took the form of the Himalayan Jungle Project (HJP), but was replaced by the Palas Conservation and Development Project (PCDP) in 2001, a 4 year project funded by the European Union (EU) and the government of the NWFP. The project's overarching aim is 'To safeguard the biodiversity of the Palas valley by enabling local communities to tackle the linked causes of poverty and incipient natural resource degradation' (PCDP, no date).

This is split into 4 further aims (PCDP, 2001):

- *to catalyse and facilitate the establishment and/or strengthening of viable community organisations that sustain participation in conservation and development*
- *to safeguard biodiversity and optimise the flow of local, national and global benefits from the management and sustainable use of natural resources through conservation and environmental awareness, participatory forest management, sustainable agricultural development and improved animal husbandry and rangeland management*
- *to foster the local economy and facilitate natural resource management through the rehabilitation and development of basic infrastructure*
- *to develop and sustain improvements in health, nutrition and sanitation,*

particularly among women and children

There is little in the way of modern infrastructure in Palas, and no roads penetrate the interior into the Upper regions. The project has been involved in activities such as road and bridge building to improve this. Community participation is mostly through the establishment of 42 democratic community based organizations (CBOs), village committees which provide a means of communication with the project and complements the jirga system. This has resulted in a valley level forum called the Palas Conservation and Development Federation (PCDF), representing the CBOs and other interest groups. Apart from this, the main means of participation is through decisions on development projects, in exchange for adherence to certain conservation guidelines. This can be described as 'trading development for environmental protection (Hellquist, 2004). As a whole, the project uses both these indirect incentives and those linked directly to livelihoods, and combines different levels of participation as described in section 2.1.

Operation of the PCDP officially ended due to withdrawal of EU funding in January 2005, but continues with its activities through the force of various NGOs, and will be referred to as the PCDP in this study for simplicity.

4.5.2 Non-timber forest product project

One of the conservation initiatives focuses on promoting the sustainable management of non-timber forest products, as described in Section 2.1.1. The project has the following objectives (PCDP, no date):

(i) To increase awareness of community regarding the importance of effective NTFPs collection, processing and marketing

(ii) To develop capacity of Palasi people to manage NTFPs through effective collection, processing and marketing;

(iii) To demonstrate the benefits of effective management of NTFPs in the Valley

(iv) To decrease disturbance to the local biodiversity from NTFPs collection

(v) To establish a community -based monitoring and evaluation mechanism in the Valley

(vi) To establish a long-term support and monitoring system at the Valley level

Awareness campaigns have been carried out in some villages in Palas, in both schools and the community in general and some nurseries and demonstration plots have been established to train local people in techniques and marketing methods.

4.6 The Earthquake

On 8th October 2005, an earthquake registering 7.6 on the Richter scale hit the northern areas of Pakistan. The effects were felt over an area of 30,000 square kilometers, damaging 15,000 villages (Dfid, 2005). In the Palas valley, the earthquake resulted in the loss of 77 lives, hundreds of injuries and damage to infrastructure. It is estimated that 869 houses in total were destroyed completely, leaving many homeless at the start of winter, and the two roads entering the valley were badly damaged. The PCDF began coordinating relief work immediately, in collaboration with NGOs, such as the establishment of medical camps, and basic provision of clothes and food. It is thought that in response to this work, the attitude of the local Palasi community may have become more positive toward NGO activities (Nawaz and Khan, 2006) which could be beneficial to future work in the valley.

4.7 The Study Villages

4.7.1 Sherakot

Sherakot is one of the more accessible villages in Palas, lying in the Lower region approximately two hours drive from Pattan. Due to this, PCDP activities have been more extensive in the village and local people are thought to be open to initiatives and awareness relatively high. A nature club has been established in the primary school, in collaboration with the PCDP, and lectures and awareness-raising carried out regarding the value of NTFPs. A debate competition on 'the importance of medicinal plants' was carried out in the high school during June 2005 (PCDP, no date). However, the accessibility has also resulted in heavy commercial deforestation surrounding the village, with daily logging activities taking place during the time of research.

4.7.2 Gidar

Gidar lies a days walk from any vehicle accessible track, in a more forested area in Upper Palas, closer to the habitat of the Western Tragopan. There have been fewer PCDP activities in the village, but a significant amount of relief work was carried out there after the earthquake. Due to the isolation of the village, commercial logging is not carried out, and deforestation is small scale, for local use.

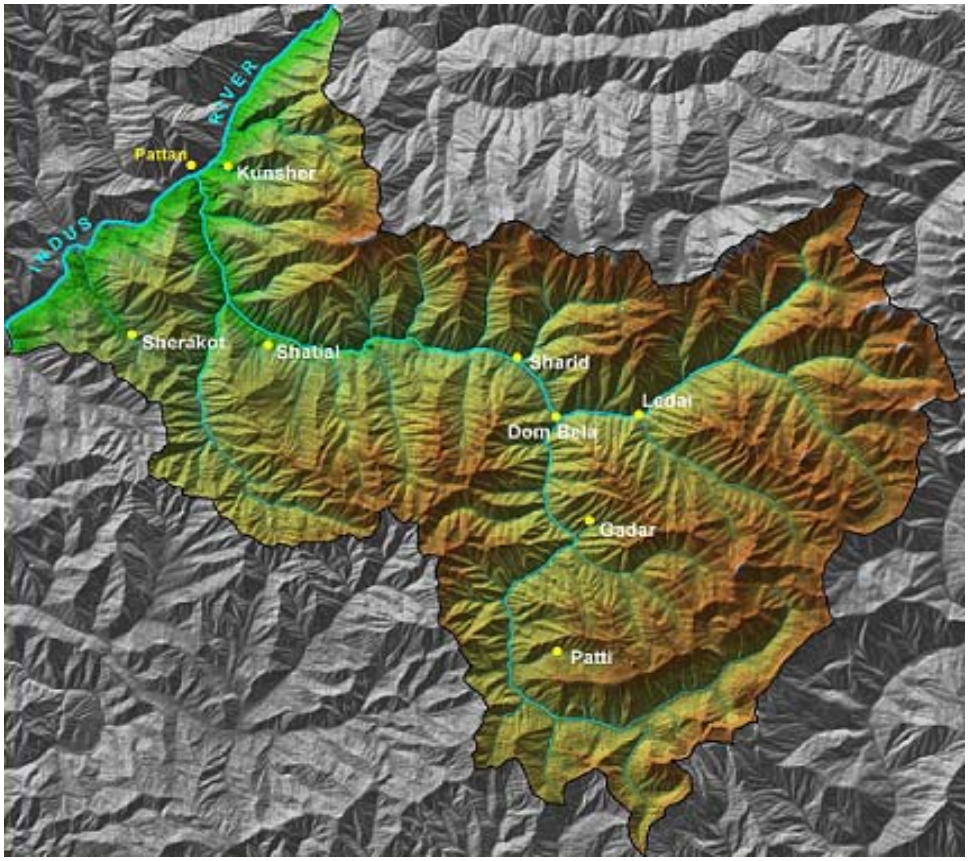

Figure 5: Map of the Palas Valley, showing the study villages of Sherakot and Gidar

5 RESEARCH METHODS

5.1 Rationale for methodology

Semi-structured questionnaires were the predominant method used to obtain both quantitative and qualitative data on socio-economics, knowledge and attitudes from students and women in the two study villages. Key informant interviews with school teachers and PCDP staff provided further information on education, potential improvements and project activities in the valley. Participatory rural appraisal in the form of a mapping exercise and group discussion was carried out in the schools, forming a means of verification of qualitative data as well as being a useful ice-breaker.

5.1.1 Questionnaires

Questionnaires are an efficient, traditional means of collecting both quantitative and qualitative data about a population. They focus on finding trends and patterns and allow hypothesis testing on a large scale and formulation of predictive models (ICRA, no date). They can be administered face-to-face, via the telephone or posted to respondents. The former was used in this study as most people are illiterate and it allows for more open ended questioning and probing. Given the location of the study, other means of communication were impossible. Pre-prepared, identical sets of questions provide comparable data for analysis but the interviews were semi-structured so that many of the questions were open-ended. Complex ideas, and perspectives are difficult to capture through predetermined terms and measurements based on the interviewer's perceptions. A more semi-structured approach allows for flexibility in responses, explanations and probing to gain clarification, and more accurate information (Saunders *et al*, 2003).

The primary disadvantage of face-to-face, orally administered questionnaires is the fact that they are 'reactive' and there may be response effects so that data are potentially biased due to characteristics of the respondents, interviewers and environments (Bernard, 2002). It must be considered that data are constructed, and are not independent of the research context (ICRA, no date). Alongside this, people may find them intrusive and they can be time consuming to carry out.

5.1.2 Participatory rural appraisal (PRA)

Disillusionment with conventional 'top down' approaches to rural development led to the development of PRA and the idea that indigenous knowledge and local participation in analysis and problem solving is a key to success (as discussed in Section 2.2). PRA can be described as principles, means of communication and methods to enable local people to share knowledge and analyse issues thus empowering them to participate in planning and action (Chambers, 1994; Mukherjee, 1993) although Chambers (2002) emphasises that it is an evolving process that necessitates a changing definition. The central principles are as follows:

- diversity and not seeking representativeness
- triangulation by cross-checking data through different means
- learning from and with local people in a flexible, progressive, interactive way
- shifting from measuring to comparing, ranking, scoring
- empowering people to take control
- commitment to equity including marginalised groups such as women, children and the poor
- shifting from verbal to visual techniques

Despite the promise of participatory, empowering, and equitable research which allows people to make decisions and take responsibility, PRA has often been used as a label, masking traditional techniques that justify predetermined actions. Activities can be subject to domination by a few vocal individuals, resulting in an unrepresentative picture, and a lack of experienced facilitators can result in biased results (Chambers, 2002). There are a range of methodologies typical of PRA including time lines, seasonal calendars, linkage diagrams, mapping, matrix scoring and ranking (Chambers, 1994). In this study mapping was used with children as a basis for group discussion.

5.1.2.1 Mapping

Maps are a means of communicating information instantly, reflecting how people view their area and which types of information and issues are important to them (Alcorn, 2000). Drawing allows the freedom to express ideas in their own way, can provide an effective ice-breaker, and a stimulus for discussion (Sapkota and Sharma, 1996). When carried out in a group, it allows for comparisons to be made and a synthesis of ideas

(Hart, 1997). At a practical level, visual exercises are especially useful for illiterate members of the community.

5.1.3 Carrying out research with children

When working with children, it is especially important to use language, tools and approaches that they are comfortable with and can engage with (Chawla and Johnson, 2004). Visual tools are especially effective, and were incorporated into the study with the mapping exercise and species card naming exercise within the interview. When interviewing, it is important to avoid difficult wording and link questions to familiar concepts and things (Sapkota and Sharma, 1996). Rapport is more important when working with children as they can be more inhibited with strangers and especially in a school context, may respond tentatively, as though a learner, rather than a participant. Therefore icebreaker exercises and encouraging initial communication are paramount (Theis, 1996).

5.1.4 Key Informant Interviews

Individuals can be targeted, and interviewed to gain specific information regarding their area of expertise. It is important the people selected are observant, reflective and articulate in order to gain an understanding of specific details related to the research being carried out (Bernard, 2002). In this case, information and perspectives on education, culture and conservation activities specific to Palas were needed, and required input from local educators and those involved in conservation in the area.

5.2 Application of methodology

Research was carried out during June 2006 in the villages of Sherakot and Gidar in the Palas Valley.

5.2.1 Selection of study villages

Sherakot and Gidar were selected on the basis of advice given by PCDP employees on accessibility and receptivity to foreigners. As discussed earlier, Sherakot is situated in Lower Palas, making it one of the more physically accessible villages of the valley. Gidar lies a days walk from the road, in a more forested area in Upper Palas, thus providing a contrast for comparative analysis. Villages further into the valley could not be accessed due to security risks.

5.2.2 Sampling

As the aim of the study is focused on environmental education and therefore includes school children, it was convenient and efficient to use cluster sampling by visiting functional schools, and taking samples from those. In both schools a stratified random sample of 25 students was selected ensuring each year group was represented. This does not necessarily correlate with age, but educational level is more relevant to the study. Since there were no female schools open in the valley, only males were interviewed.

Due to the cultural sensitivity of approaching and interacting with women in the community, it was impossible to take a random sample of households in the villages. Instead, non-probability, snowball sampling was used, which is often useful in studies of 'difficult to find' populations (Bernard, 2002). Firstly, some individual women were identified largely through connections to the PCDP and members of the Federation, and interviewed. These women and members of their family were then asked if they could suggest other likely candidates in the village who could also be interviewed. This may result in a biased sample in terms of tribe, knowledge of the PCDP, wealth and educational level, not representative of the village population of women. However, the sample was geographically spread and taken from different tribal groups as far as possible.

5.2.3 Participatory Rural Appraisal – Mapping

A mapping exercise was carried out with the school children in groups of between 6 and 10 students of varying ages. The teacher and translator were briefed on the purpose of the exercise and the instructions given to the students to draw a map of their village, and the surrounding area in which they travel. The students' lack of experience and confidence in carrying out group, participatory work was overcome by initially asking questions about the village to encourage them to start drawing, and they were then left to complete the maps. Subsequently, a group discussion centred around the maps they had drawn was initiated. Time limitations prevented other PRA techniques from being used so the exercise was primarily used as an exploratory study suggesting issues to be highlighted when interviewing and also provided a means of triangulation. It was not possible for the mapping to be carried out with women due to difficulties of women interacting outside of their family units.

The objective of the mapping exercise and following discussion was to gain information on:

- The layout of the village
- Land usage
- Knowledge of habitats and wildlife
- Socioeconomic trends
- Earthquake damage
- Opinions and attitudes regarding resource use and habitat destruction

5.2.4 Questionnaire design

Draft questionnaires were adapted in consultation with PCDP staff on arrival in Pakistan. Advice was sought on wealth indicators, possible sensitive issues and difficult concepts and language which required specific knowledge of the region and culture. Further refinement was made on the basis of pilot studies which were carried out with 8 school children and 5 women in the village of Shalkanabad in Palas. The changes were largely made by cutting unnecessary questions which made the interview overly long, resulting in people losing interest. The final questionnaire was designed to last approximately 40 minutes. Unclear and ambiguous language was also refined. The school children especially found some subtleties difficult to understand, so for instance the distinction between future ideal career and future probable career was removed. The pilot also allowed the translator's initial use of leading wording and biased explanations to be recognised, discussed and subsequently avoided in the study.

Questions were worded to be as simple as possible, without losing nuances, in order to avoid bias and enhance the validity of responses. The order of questions aimed to maintain the respondent's interest and avoid biasing subsequent responses so that for instance, questions regarding perceptions of conservation were placed before questions regarding the Western Tragopan. The questionnaire was based largely on open ended questions, providing flexibility and an unlimited range of responses, discussion and participation. Following up on unexpected responses and probing was consequently made easier. One ranking exercise regarding benefits received from the forest was included, to provide unambiguous data for analysis. Picture cards are an effective means to assess knowledge of wildlife (e.g. Balmford *et al*, 2002), and were chosen in consultation with Rab Nawaz to include little known, common and endangered species

in order to calculate corresponding knowledge scores, based on the difficulty of identifying the species correctly (Appendix 1).

5.2.4.1 Student questionnaire (Appendix 2)

Questions were designed with the aim of obtaining data on the following:

- Socio-economic information
- Educational level and ambition
- Environmental education received and desired
- Types, uses and value of NTFPs collected
- Knowledge of local wildlife and endangered species
- Feelings and attitudes towards the local environment, wildlife and conservation
- Threats to pheasants especially the Western Tragopan
- Knowledge of and attitudes toward the PCDP
- Hopes for the future of the community

5.2.4.2 Women's questionnaire (Appendix 3)

In order to carry out comparative analysis, the questions were mostly identical to those asked of the students. Further information regarding monetary value of NTFPs and future hopes specifically for women were added. Other questions were removed if irrelevant or adapted accordingly.

5.2.5 Interview approach

The interviews with students were carried out in the school building away from other children, and for women, interviews took place in the family home and were as informal as possible. The questionnaires were translated into Urdu, but when the respondent was not confident in Urdu, explanations were given in the local language of Shina by a PCDP community facilitator who had been briefed on the questions. Inevitably, this use of double translation led to loss of information and inaccuracies which were difficult to overcome. Fewer women were able to speak Urdu due to lack of education and in some of these cases, ad hoc translation through other females had to be used, creating further inaccuracy.

Bias may have emerged due to response effects, as the respondents were aware that the study was associated with the PCDP and were therefore more likely to inflate pro-environmental attitudes and report desirable behaviour. This 'deference effect' is more

likely a problem for students, given the interviews were carried out in a school context. Despite the use of the mapping exercises as an ice-breaker in the schools, some students were reticent and shy to answer questions. Gentle probing was used to stimulate more detailed answers and time given to allow the respondent to reflect, especially on questions regarding feelings and attitudes. Since no PRA exercises were carried out with women, introductions were made and time given for any questions they may have had, to make them more comfortable, and dispel any suspicion, especially as women are not used to interacting with people outside of their families. Again, probing and patience were used for non-verbal respondents and many women were not confident answering questions. There was some uncertainty regarding the family income so this was confirmed with another member of the household.

5.2.6 Key informant interview approach

People were targeted on the basis of their area of expertise. To gain specific information and ideas on education and environmental education, teachers in both schools, where students were sampled were interviewed. A female teacher in Shalkanabad, who teaches in a girl's school, was also interviewed. Although this school was not open it was important to gain a female perspective given the gender bias in education in Palas. As the teachers had both practical experience of teaching in Palas and were all locals, they could provide valuable information specific to the socio-economic and cultural context. Again, a semi-structured interview approach was taken, and a general list of question areas drawn up in preparation (Appendix 4). Discussion around these areas was as in depth as possible, and flexible so that areas of interest were followed up and discussed. The interviews were carried out in Urdu through a translator.

To gain information on government education policy and the curriculum in the NWFP, a local educator in Abbottabad – Muhammad Arshad was also interviewed. This took the form of an informal, semi-structured discussion and was carried out in English. Informal discussions were also carried out with key members of staff working in Palas, who provided information on the culture, educational activities, and the non-timber forest product project.

5.3 Data Analysis

Data were managed and coded with Microsoft Excel and analysed using SPSS 12.0. Non-parametric tests - Chi square, Mann Whitney and Kruskal Wallis - were used, as appropriate, to test when a single variable was of interest. General Linear Model (GLM) was used for multivariate analysis and binary logistic regression used when the dependent variable was dichotomous. Significance was determined at p=0.05

Two instances of duplication were found, in which a woman and child from the same household were interviewed. One set of this non-independent data has been removed when analysis is carried out on both sets of data combined.

6 RESULTS

6.1 PRA mapping exercise

The maps drawn by school children in both villages can be seen in Appendix 5. In most of the maps, the school building forms the focus, and many of the children stated that this was the most important place for them in their village. There was a general feeling that education was a privilege to them especially since many children do not attend. The natural environment also forms a dominant part of the maps – the mountains, forest and water sources – and the children could identify areas where wildlife is found. In Sherakot, many groups pointed out where there is environmental degradation in the form of logging and there was expression of loss and sadness at this. The children were able to identify where they collect non-timber forest products, mostly at the boundaries of the forest, near their villages.

6.2 Socio-economics

6.2.1 Household employment

For more than half of the households surveyed, agriculture is the primary employment (Figure 6). Overall, there is likely to be a sampling bias, especially for women, who often come from 'professional income' households. A far greater number of households sampled in Gidar are in labour employment (93%) compared to Sherakot (45%) which most likely reflects a real difference between village employment given the greater accessibility of Sherakot, but also a sampling bias. Some households have a secondary means of income.

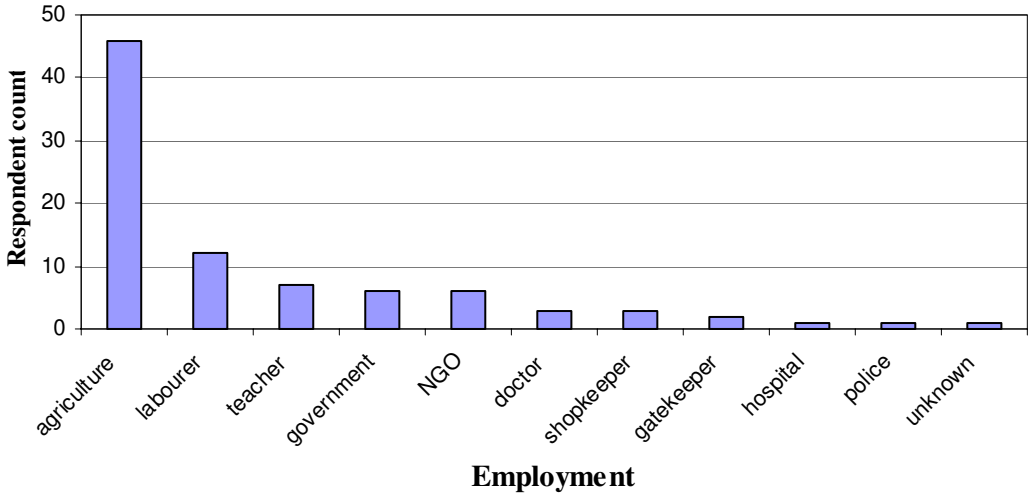

Figure 6: Primary employment of respondents' households

6.2.2 Income

The mean annual income for households in which women were interviewed is 73,560 Pakistani Rupees (PKR) (approximately £640), with a large range of 3600PKR to 252,000PKR. Households surveyed in Sherakot earn significantly more than those in Gidar. Those in 'professional' employment earn significantly more than those working in agriculture and manual labour. Thus, income and employment are confounded factors that divide the population according to wealth (Table 1).

Table 1. Associations between socioeconomic factors. Mann-Whitney and Chi-Square used as appropriate. N=40 except for village vs employment, N=88.

	Village	**Income**	**Employment**
Village			
Income	Z=-3.115 p=0.002		
Employment	$\chi^2 = 21.836$ p=0.000 df=1	Z=-3.554 p=0.000	

The income distribution is slightly right skewed (Figure 7) with only 5 households earning above 150,000PKR, whereas 18 (45%) of households earn between 30,000-60,000PKR.

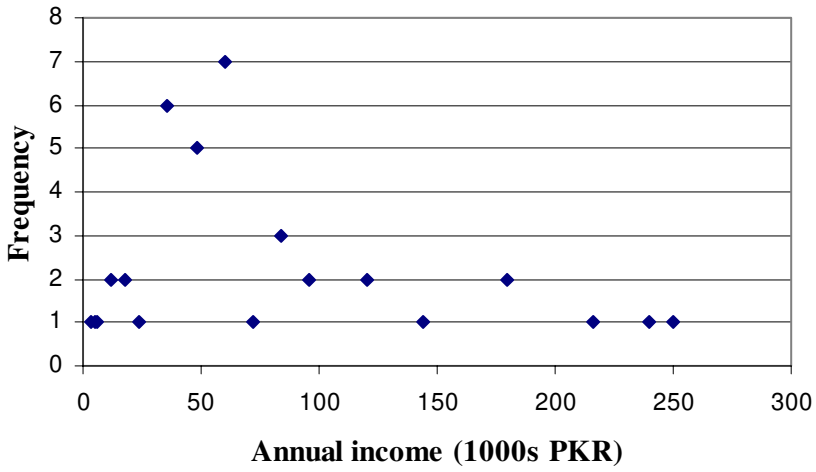

Figure 7: Distribution of respondents' household annual income

The mean number of people in a household is 8.9 (mode and median = 8) ranging from 2 to 22 people, showing high fertility rate with large families often reliant on one source of income.

6.2.3 Education

5 of the 40 women interviewed had attended school, 2 of which for 6 months or less and only one woman had reached secondary school, reflecting the low proportion of females receiving an education in the valley. All of these women live in Sherakot, which has greater access to education, and 4 of the 5 were from 'professional income' households, indicating a connection between education and socio-economic status. Of the women that had children (37), 31 sent at least one of their children to school but none sent their daughters.

6.3 Non-timber forest products

6.3.1 Collection of NTFPs

47 of the 50 children (94%) interviewed collect NTFPs themselves compared to 29 of the 40 women (73%). In 9 (23%) of these households, someone else in the family

collects, making children the primary collectors of NTFPs. There is no significant connection between whether a women collects herself and household income (Z=-0.549, p=0.583) or employment type (χ^2=0.714, df=1, p=0.398).

Both children and women were a great source of knowledge on the species collected, their uses and other information such as time of year collected and parts used (Table 2). A total of 69 species were named as being most often collected (see Appendix 6 for complete list).

Table 2: The ten most collected NTFPs. Latin names taken from and information corroborated with Shinwara (2002).

Local name	**Latin name**	**Part used**	**Use**	**Respondent count**	**season**
Lilyo	*Viola caespitosa*	flower	medicine	63	march-sep
Jomi	*Urtica dioica*	leaf	medicine	62	April-Oct
Guchi	*Morcela esculanta*	fruit	food	60	April-June
Rain	*Bistorta amlexicaulis*	leaf/root	food	58	
Mushkbala	*Valeriana jatamansi*	root	medicine	53	March-Oct
Kuzi	unknown		food	38	
Chotyal	*Rheum webbianum*	root	medicine	35	March-Sep
Korat	*Berginea ciliata*	root	medicine	32	All year
Zarozal	*Rabdosia rugosa*	root	medicine	29	march-april
Mamekh	*Peonia emodi*	root	medicine	28	all year

The majority of respondents (63%) stated that collection of NTFPs had decreased in the period after the earthquake, largely due to damage to the forest and physical inability to access areas where the species are found. However, 33 people (38%) thought their collection had remained the same, showing that NTFPs remained important to

livelihoods during this time. Only two respondents stated that they had collected more after the earthquake.

6.3.2 Importance of NTFPs

Morcela esculanta (Guchi), a wild mushroom was by far the most valued species (Figure 8) collected by both women and children, and in each village, all stating that it had a high monetary value when sold.

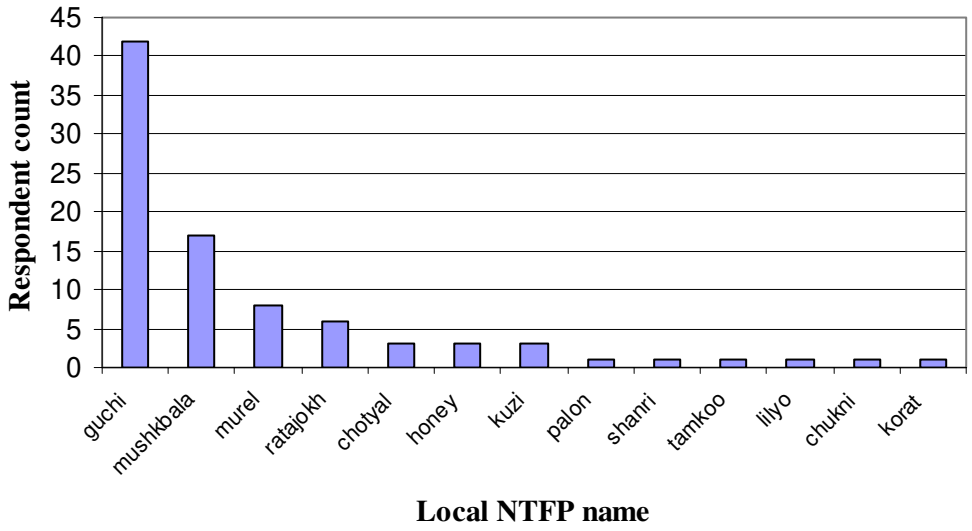

Figure 8: NTFPs considered most important to respondents. See Appendix 6 for latin names.

Valeriana jatamansi (Mushkbala) and honey were valued mostly for monetary value and 6 of the species were most valued due to their medicinal uses, for both livestock and humans (Table 3), showing that wild species are relied upon for income and use domestically. The majority of women, although finding it difficult to quantify, stated that wild species form a significant part of the food their family eat, and most of their vegetables are either found in the forest themselves or bought, not cultivated. Vegetables are dried in the summer to be used over the winter months.

Table 3. NTFPs considered most important due to their medicinal value

Local name	Latin name	Respondent count	Medicinal use
Murel	unknown	8	For jaundice
Ratajokh	*Geranium wallichianum*	6	To improve milk production in livestock
Chotyal	*Rheum webbianum*	3	For digestive problems
Lilyo	*Viola caespitosa*	1	Painkiller and reduce fever
Chukni	*Jurinea doloamiaea*	1	To reduce fever
Korat	*Berginea ciliata*	1	To treat wounds

Medicinal uses corroborated against Shinwara (2002)

6.3.3 Contribution of NTFPs to household income

Across the 40 households in which women were interviewed, the average income from NTFPs sold per year is 3550PKR, ranging between zero and 30,000PKR. As a proportion of total annual income, the average is 12.9%, ranging from 0.0% to 83.3%, showing that there is a large variation in the importance of wild species to livelihoods in the two villages, with the majority of people earning between 5% and 10% of their income from these products (Figure 9).

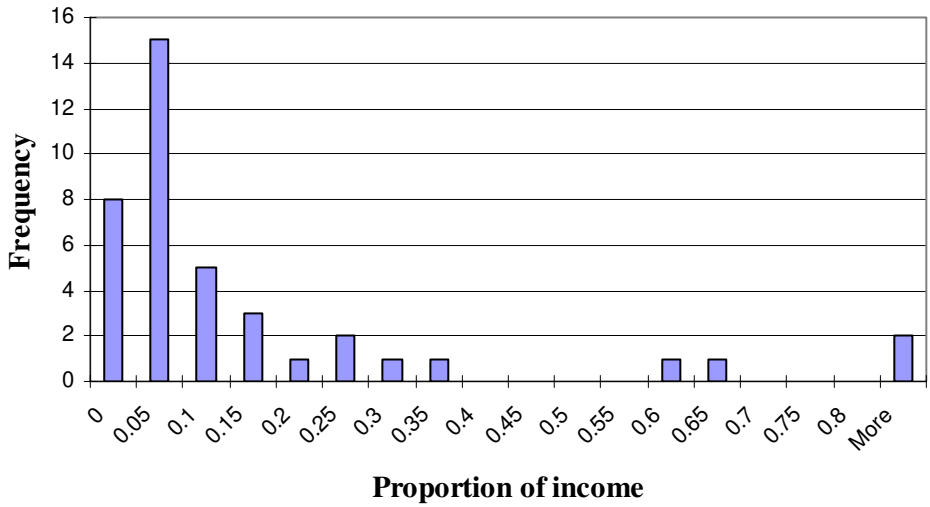

Figure 9: Histogram showing proportion of income earned from NTFPs

A GLM was run to examine the effects of a range of explanatory variables (village, employment, income and village*employment) on the proportion of income received from NTFPs. Model simplification was carried out manually, by removing non-significant variables in turn and checking for consistency in coefficients of the remaining variables. The simplified model contains only the main effect of income (Table 4). Income is shown to have a significant impact on the proportion of income gained from NTFPs, with those on a lower income, gaining more from wild species (Figure 10).

Table 4. GLM of proportion of income from NTFPs as a function of income, village and employment.

Values for overall model: F=2.726, df=4, p=0.045, R2=0.238, adjusted R2=0.150

Parameter	B	Standard Error	Significance
Intercept	0.240	0.049	0.000
Income	-1.81E-0.05	0.000	0.005

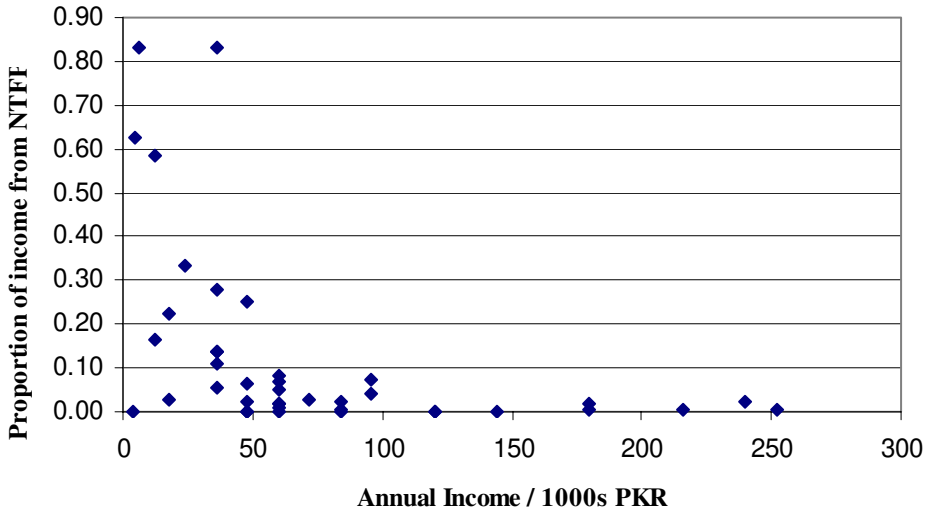

Figure 10: Relationship between household income and the proportion of this income received from NTFPs

6.4 Knowledge and perceptions of the local environment

6.4.1 Knowledge of local wildlife

There are wide range of knowledge scores (Figure 11) reflecting respondents differing abilities in recognising and naming correctly common and rare local wildlife.

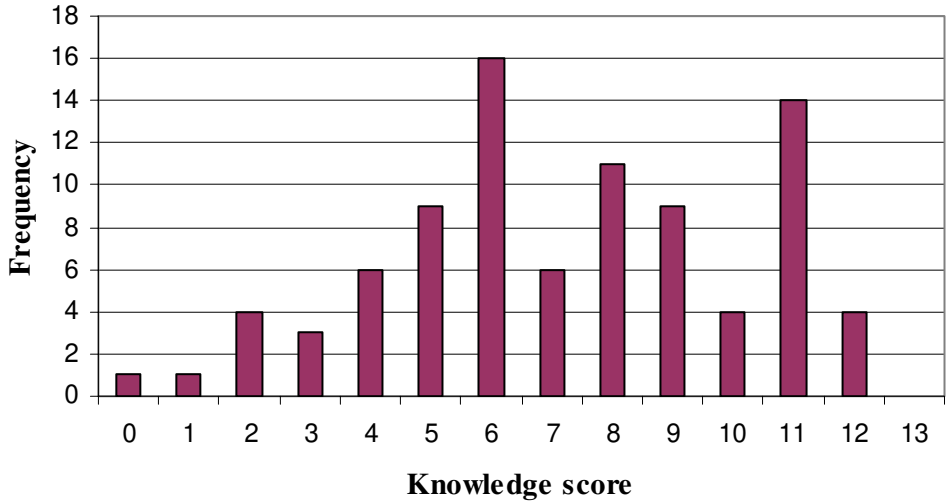

Figure 11: Knowledge scores for all respondents (highest possible score = 13)

A GLM was carried out to examine the variables (child/adult, village, employment and all interactions) and again, simplified manually, as explained above. The simplified model contains only the main effects of child/adult and village. School children had significantly greater knowledge scores than the women interviewed and respondents in Gidar had significantly greater scores than those in Sherakot (Table 5).

Table 5: GLM of knowledge score as a function of child/adult, village and employment.

Values for overall model: F=3.973, df=7, p=0.001, R^2=0.258, adjusted R^2=0.193.

Parameter	B	Standard Error	Significance
Intercept	8.960	0.475	0.000
Sherakot village	-1.682	0.564	0.004
Gidar village	0		
Women	-2.013	0.568	0.001
Child	0		

21 (42%) of children go into the forest on a weekly basis, 7 (14%) on a daily basis (but two of these said that they live in the forest) and the rest less often, but all at least once a month. There is no significant connection between frequency of visits and knowledge score (χ2=6.877, df=2, p=0.32) and no significant difference between the villages in frequency (χ^2=1.742, df=2, p=0.410), showing that even in the more accessible Sherakot, there is a strong tendency to visit and use the forest.

6.4.2 Perceived benefits from the forest

There is a significant difference between women and children's views on the greatest benefit they receive from the forest (χ^2=11.260, df=3, p=0.01). Although food and firewood was ranked first most often for both groups (Table 6), children were almost as likely to rank happiness as the greatest benefit whereas many women ranked the provision of money first, showing differences in priorities. No significant difference occurred between villages (χ^2=4.671, df=3, p=0.198). The majority of respondents who ranked happiness highly, based this on the aesthetic beauty of the forest. Others spoke of the 'clean air' and sense of well-being it provides them.

Table 6. Benefits from the forest considered most important by respondents

Benefit	Women %	Children %	Total %
Food/firewood	51	37	43
Happiness	13	35	25
Protection from natural disasters	15	25	21
money	21	4	11

6.4.3 Effect of the earthquake

52 of the 87 respondents who answered the question (60%), said that their feelings toward the forest had changed since the earthquake. The majority suggested that the value of the forest had increased for them, as it provides them with protection (although it must be considered that this had been alluded to the previous question), and some expanded by suggesting that the trees are especially important for reconstruction since the earthquake.

6.5 Knowledge and attitudes towards conservation

6.5.1 Threats and endangered species

6.5.1.1 Knowledge of threats

There were a variety of suggestions as to why local species may be threatened, with hunting being identified most often (Table 7). Women respondents identified population increase almost twice as often as the children. 8 of the women considered that any

decline in species numbers would be 'natural' and 7 of the women could not or did not think there are any threats to wildlife in the valley.

Table 7. Respondent's suggestions as to why species may be endangered or declining in the valley

Threat	Children Frequency	Women Frequency	Sherakot Frequency	Gidar Frequency	Total% N=88
Hunting	35	17	25	27	59
Deforestation	25	15	31	9	46
Population increase	12	15	18	9	31
Earthquakes	13	8	5	16	24
Natural	0	8	1	7	9
Weather	2	1	2	1	3
Don't know	1	7	4	4	9
Fire	2	0	2	0	2
Lack of water	2	0	1	1	2
Religious	1	0	1	0	1

A binary logistic regression was carried out to examine the effect of a number of variables (employment, child/adult, knowledge, village and interactions) on whether deforestation was identified as a threat (Table 8). The interaction between knowledge and village has a significant effect on whether deforestation is identified as a threat, meaning that knowledge score has a different effect between villages. In Sherakot, those with less knowledge of wildlife were less likely to identify deforestation as a threat whereas in Gidar, the opposite is true. In fact, only 23% of respondents in Gidar identified deforestation as a threat at all, compared to 70% in Sherakot.

Table 8. Binary logistic regression of identification of deforestation as a threat as a function of employment, child/adult, knowledge, village and interactions. Forwards conditional simplification used.

$R^2=0.310$ $N=88$

Parameter	B	SE	Df	Significance
Knowledge*village	0.397	0.083	1	0.000
Constant	-1.359	0.350	1	0.000

Children were more likely to identify hunting as a threat (Table 9) with 35 (69%) responses compared with 17 (46%) women. Other factors included in the model did not have a significant effect.

Table 9. Binary logistic regression of identification of hunting as a threat as a function of employment, child/adult, knowledge, village and interactions. Forwards conditional simplification used.

$R^2 = 0.054$ $N=88$

Parameter	B	S.E	Df	Significance
Child/Adult	0.972	0.446	1	0.029
Constant	0.818	0.310	1	0.008

6.5.1.2 Knowledge of endangered species

Respondents were often able to name some local species which they thought were endangered or of conservation concern, such as the musk deer (*Moschus moschiferus*) and snow leopard (*Uncia uncia*). Overall 53 respondents (60%) identified the Western Tragopan as a threatened species, with almost equal proportions of women and children. There was nosignificant difference between women and children, and villages. As would be expected those with higher wildlife knowledge scores were more likely to identify the Western Tragopan (Z=-4.231, p=0.000)

Fewer respondents identified collection of NTFPs as a conservation concern with only 20 (23%) suggesting one or more of these species. A greater, (but not significant) proportion of women suggested NTFPs (28%) compared to the children (18%). There is not a significant connection between this and knowledge scores (Z= -0.176, p=0.861).

6.5.1.3 Threats to pheasants and the Western Tragopan

32 respondents reported having seen pheasants alive in the forest (36%). This number was slightly lower for the Western Tragopan, specifically 26 (29%). The majority who have seen a Western Tragopan have done so alive, with others having only seen it dead or captured (Table 10). However, only 4 people reported seeing nests and/or eggs of pheasants and only 2 respondents have seen and identified Western Tragopan eggs. All respondents said that they had left the bird or nest and eggs, which may simply reflect their reluctance to disclose information about potentially damaging actions.

Table 10: Details of respondents' most recent sighting of the Western Tragopan

Western Tragopan seen	Respondent count
Alive in forest	26
Dead, hunted	7
Skin only	5
eggs	2
captured	1

15 of the sightings of the Western Tragopan took place in the last year (Table 11) and 21 of the 26 sightings were by respondents living in Gidar reflecting its closer proximity to the habitat of the species.

Table 11. Approximate period of time of most recent sighting of Western Tragopan

Time	Respondent count
Within last month	1
Within last 6 months	5
1 year	9
2 years	5
3 years	2
> 3 years	4

When asked what other people in their community do when they come across pheasant nests and eggs in the forest, there were a variety of responses (Table 12). Approximately half of the respondents stated that people leave the nests or protect them, but there are a significant number of reports of harmful activities. Responses with regards to the Western Tragopan specifically, were almost identical.

Table 12: Responses to the question 'What do people in your community mostly do when they come across pheasant nests / eggs in the forest?

Activity on finding nests / eggs	Respondent count
Leave / protect	50
Hatched and kept /sold as pet	22
Eaten	8
Sold	5
Don't know	3
Leave but wait until hatch then capture	2
Children break eggs	1
Nest destroyed	1

With regards to the birds themselves, people reported that hunting is still taking place (Table 13), although many, especially in Gidar spoke of a reduction in hunting in the area and a large number of people said that people now protect pheasants.

Table 13. Responses to question 'What do other people in your community do to pheasants / Western Tragopan?

	Respondent count	
	Western Tragopan	Other pheasants
Hunting for meat	34	22
Hunting for skin	32	34
Leave / Protect	26	25
Captured, pet or sold	21	24
Don't know	4	2

The breeding season of the Western Tragopan is between April and June, which coincides with the collection periods of many of the most collected NTFPs found in this study (see Table 2). This is of concern, as a high level of collection during this time is likely to disturb mating and nests

6.5.1.4 Feelings towards species extinction

The majority (60) of respondents had negative feelings about local species extinction. However, women were more likely to express at least some positive feelings (χ^2=6.557, df=2, p=0.038) and two women stated that they would have no feelings whatsoever if a species became extinct. The reason behind positive feelings in all cases was agricultural loss (either crops or livestock) due to attacks by wild animals (Table 14). By far the greatest reason given for negative feelings was due to the aesthetic value placed on local

species with many expressing, for example, that the animals "form an important part of the beauty of our valley". One women remembered "watching birds in my childhood. They always looked so beautiful". Others gave reasons based on the use value of species, such as for meat and money. Two children reasoned that an extinction of bird species would result in more insects attacking crops and one respondent suggested that wildlife is needed for ecotourism in the future.

Table 14. Reasons given for feelings toward local species extinction

Positive feelings	**Respondent count**
Harm to agriculture	24
Can't explain	2
Negative feelings	
Aesthetic	45
Use value	11
'do no harm'	2
Empathy toward wildlife	2

6.5.2 Community Action

All respondents thought that the same or more effort should be put into conservation in their community. However, there was a significant difference in responses between both children and women and a significant interaction between knowledge score and village (Table 15). Women were more likely to state that the current effort is enough. In Sherakot, those people with high knowledge scores are more likely to consider that more conservation effort is needed whereas the opposite is the case for Gidar.

Table 15. Parameter estimates for binary logistic regression of perceived conservation effort required as a function of employment, child/adult, knowledge, village and interactions. Forward conditional simplification used.

R^2*=0.153* *N=88*

	B	**S.E**	**Df**	**Significance**
Child/adult	-1.092	0.500	1	0.029
Knowledge*village	0.215	0.083	1	0.010

6.5.3 The Palas Conservation & Development Project (PCDP)

73 respondents (83%) had heard of the Palas project but significantly fewer people had heard of the project in Gidar as compared to Sherakot (χ^2=9.724, df=1, p=0.002). When

asked to describe their work, only 36% of respondents mentioned both the conservation and development elements of the PCDP's work (Figure 12), showing a lack of understanding of their objectives. There were also some misconceptions, for example one women stated that the PCDP "sold timber". Of all the respondents that had heard of the PCDP, almost all considered that that the project was helping people in the community but two women stated that they thought they were neither helping nor harming people.

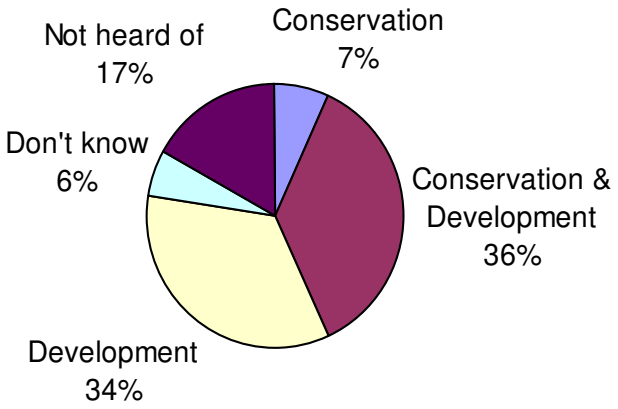

Figure 12: Answers to the question 'Can you describe what the PCDP does?' for all respondents

Respondent's views on the PCDP since the earthquake are split, with 35 people becoming more positive towards their work due to the relief work they carried out and 35 remaining the same. One respondent, not untypically commented "now I know that they are working for our community". 3 respondents described more negative feelings towards their work as they thought they were carrying out fewer activities with regards to conservation. There is a significant difference in responses between villages (χ^2=7.045, df=2 p=0.03) with the majority (57%) in Gidar becoming more positive whereas in Sherakot, most respondents (69%) had not changed their views on the PCDP.

Due to the method of sampling, 18 of the women interviewed had connections to the PCDP through male members of their family, who either worked for NGOs, were members of committees, or had attended meetings or workshops. This is not representative of the village population and may affect knowledge and attitudes.

6.6 Environmental education

67 (76%) of all respondents had received education regarding nature, conservation or the environment (Table 16), however often, and especially women were not able to expand on a limited description of what they had learnt. The most popular answer was forest protection (39% of respondents), but this may reflect the respondents knowledge of the research topic. For women, the most common answer was that they had learnt nothing regarding the environment, reflecting the lack of formal education for females. Although the majority of children remembered something they had learnt about forest and bird protection, there was a far greater range of answers and often more detail given. However, most answers were connected to local wildlife and only 2 respondents gave answers relating to wider environmental concern, specifically pollution.

Table 16. Environmental education that respondents had received

Description	No. of children	No. of women	Total % (N=88)
Forest protection	22	13	67
Bird protection	13	9	40
None	4	18	25
Plants and flowers	2		2
Western tragopan protection	2		2
Pheasant ecology	1		1
Development of area	1		1
Pollution control	1		1
Local wildlife (general)	1		1
Musk deer protection	1		1
Solid waste disposal	1		1
Wolf protection	1		1

The interviews with teachers provided information on the current state of education in the valley, and environmental education. They also gave suggestions for improvements.

Generally, attendance, even in these villages is low, estimated at 50% for males, higher in Sherakot where awareness and education provision higher, and 25% for the girl's primary school. Attendance falls dramatically in the summer months due to migration to the pastures. All the teachers received the standard Primary Teaching Certificate (PTC), a one year teaching course, and teach from the curriculum set up by the provincial government. This includes some environmental education elements, in core subjects.

The teachers aim to adapt the curriculum to make it relevant to the locality, and provide some practical activities, but most of the teaching is centred on rote learning and theory. In Sherakot, a nature club has been set up in conjunction with the PCDP, focusing on local environmental issues, and providing weekly activities such as nature walks, and teaching on conservation and pollution.

The teachers identified general constraints on effective education and environmental education as well possible ways to overcome these (Table 17). The earthquake has affected education through physical damage to buildings and materials, migration out of the valley and psychologically, so for example students are fearful of entering the school buildings.

Table 17. Summary of problems related to education and environmental education and improvements suggested by teachers

Problem	**Suggested Improvement**
• Non attendance of government teachers	• Community based schools, to encourage accountability and higher standards. Create incentives.
• Low student attendance	• Awareness raising of importance of education, free schooling
• Limited teaching techniques used based on rote learning	• Provision of materials for practical work, teacher training and workshops
• Curriculum based around urban life and not understood by students	• Appropriate adaptation and exposure visits
• Lack of education for females	• Provision of acceptable education facilities – local, with vocational and academic studies
• Environmental issues only addressed at a basic level in curriculum	• Establishment of a network of 'nature clubs' with a focus on practical work
• Environmental education restricted to school children and not reinforced by other community members	• Extension of environmental education to elders of students
• School building design inadequate	• Separate classrooms for each year group, library facilities, play area and hostel for those who migrate to the pastures

6.7 The future

6.7.1 Children's hopes for future work

The large majority of the children expressed a desire to enter professional careers, the most popular answer being teaching. When asked about future involvement with the forest, 5 students considered working in the timber industry, although many spoke of cutting trees for their own use, but also being involved in plantation. This idea of sustainable use was especially prevalent in Sherakot.

6.7.2 Hopes for the community

There were a variety of responses in answer to the question "What are you hopes for your community in the future" (Table 18). Most striking is the consensus on a need for basic infrastructure (94%), mostly transport and electricity. One respondent, not untypically hoped for "facilities, just like in the cities". 42 respondents (48%) saw the need for more education, with an emphasis for higher education opportunities in Sherakot, where primary and secondary education is relatively good and in Gidar, more basic facilities are needed. Several of the students in Gidar mentioned the need for female education. Environmental issues were considered more important in Sherakot where deforestation is widespread and 25 respondents (28%) hoped for more future protection. Health was mentioned considerably more by women, especially the need for female doctors, reflecting their priorities and there was a small but significant, number of respondents hoping for improvements in agriculture.

Few people could put forward ideas of how this kind of development would take place but it is interesting that ecotourism was suggested by a few students to "encourage foreigners to come to the area and bring money in". Another student saw the potential for a pheasantry, to attract tourists. Only two women saw the need for greater employment opportunities to generally improve the local economy and reduce poverty.

Table 18. Categorised responses to question "What are your hopes for your community in the future?'

Category	Detail	Children (N=49)	Women (N=39)	Sherakot (N=44)	Gidar (N=44)	All (N=88)
Infrastructure		45	38	43	40	83
	transport	31	27	24	34	58
	electricity	31	24	36	19	55
	water system	14	16	19	11	30
	market/shops	5	3	5	3	8
	housing	3	4	5	2	7
	communication	5	0	5	0	5
Education		24	18	12	30	42
	more basic	18	2	3	29	20
	female	6	2	1	7	8
	higher	6	0	7	0	6
	religious	1	2	1	2	3
Environment		24	9	27	6	33
	conservation	23	8	25	6	31
	waste	3	2	5	0	5
	awareness	1	0	1	0	1
Health		6	20	5	20	26
Agriculture		9	3	3	6	12
	gardens	1	3	0	3	4
	fertilizer	3	0	2	2	3
	irrigation	1	0	0	1	1
	vetinary doctors	1	0	1	0	1
Other						
	ecotourism	3	0	2	1	3
	religious	1	1	0	2	2
	job opportunities	0	2	0	2	2

6.7.3 Hopes for women

When asked what they would like to see for women in their community, the female respondents were most likely to suggest education (Table 19), many mentioning the need for separate schools for girls and female teachers. Two women thought that there was a need for adult education. Again, health was a significant issue for the women as was work. In relation to the latter, many women wanted less burden of work placed upon them and suggested facilities such as a water supply and a different source of fuel which would reduce the need to fetch water and firewood. Additionally, 8 of the women hoped for employment opportunities, including professional employment such as teachers and doctors and also the opportunity to earn an income from learning more vocational skills. 3 respondents suggested that some kind of teaching centre could provide this. One women said "I know that I could work, that I could make jewellery and sell it but there is no-one here to teach me".

Table 19. Categorised responses to the question 'What are your hopes for women in your community in the future?'

	Respondent count		
	Sherakot	**Gidar**	**Total**
Education	12	13	25
Healthcare	3	8	11
Reduced workload	3	7	10
Employment opportunities	5	3	8
Don't know	5	0	5
Practical facilities	0	3	3

7. DISCUSSION & RECOMMENDATIONS

7.1 Socio-economics

Poverty is widespread in the Palas valley and the majority of households sampled were dependent on subsistence level agriculture. Some households relied on income from professional employment although this is probably overrepresented in the study due to sampling bias. There is a positive connection between those who were in professional jobs and income, creating a range of wealth in the study sites with a slightly skewed distribution. Poverty is exacerbated by the high fertility rate, resulting in large families often reliant on one source of income. With few schools functional in the valley, there is a low level of formal education – both a product and cause of poverty - and few of the women interviewed had attended school.

7.2 Non-timber forest product collection

Children were found to be the primary collectors of NTFPs, with almost all those interviewed collecting. It must be considered that all of the students interviewed were male, but based on the fact that a considerable number of adult females also collect, it can be assumed that a high proportion of girls do also. Both children and women have good knowledge of the species and a total of 63 were named although these may include some synonyms. Information was also offered on the uses and values, indicating that women and children hold valuable indigenous knowledge. People with a long history of interaction with local natural resources may have a strong knowledge base of species (Huntingdon, 2000), and this could play a role in conservation projects. In Palas, the knowledge that women and children clearly have is not being utilized to its full potential, due to the marginalised status of these groups in the community. This is especially the case for women, who are not consulted on conservation project work, and for children communication is largely through school based activities, excluding the large proportion of uneducated children.

Wild species were highly valued in the study site, both for their subsistence value, as food and medicinal resources, and as an important source of income. 7 of the 10 most collected species, and half of those considered most important are medicinal plants.

This shows their high value in the area, especially given that there is little conventional healthcare in Palas (PCDP, no date). Women often stated that their households were dependent on wild vegetables they had either collected or bought for food throughout the year. Plants are dried for use through the winter months. The three most highly valued products are all sold, with *Morcela esculanta,* a mushroom, being by far the most highly valued species, due to its monetary value. These species should be focused upon for sustainable harvesting and marketing strategies. The level of income dependence is affected by total income, with those on a lower income, leading a more subsistence lifestyle and being reliant on NTFPs. This corroborates other studies where natural resources are used more heavily by poorer sections of society (Belcher *et al*, 2005; de Merode *et al*, 2004) NTFPs are often thought to be especially important in times of hardship (Neumann and Hirsch, 2000), and this study found that many people had not reduced their collection of wild species after the earthquake. This bears out reports of people returning to their normal collection routines soon after the event (WPA, 2005).

There is some concern over the potential damaging effects of NTFP collection, not only on the wild species themselves, but effects on other biodiversity. None of the respondents disclosed information regarding their own actions toward pheasant and Western Tragopan nests and eggs, which may merely reflect the deference effect of the interview, as respondents were aware of the research topic and association with the PCDP. However, people did report that other members of the community take eggs to be hatched for pets or eaten. In addition, there is considerable overlap between the timing of collection and the Western Tragopan breeding season, emphasising the need for awareness, especially in villages lying near the bird's habitat.

Overall, the level of dependence on NTFPs was found to be high in the study site, and this may even be understated due to the skewed sampling. This is likely to result in similarly high ecological costs, and efforts need to be made to minimize these costs (Shaanker *et al*, 2004). This is the aim of the PCDP's NTFP project (described in Section 4.5.2), which is targeting villages throughout the valley and promoting sustainable harvesting of wild species and more effective marketing to improve income from these species. Not only is the knowledge amongst women and children under-utilised but given they both play a crucial role in collection, their increased involvement in the project's activities would improve conservation and development outcomes. Few

respondents identified NTFPs as a conservation concern, further highlighting a need for awareness raising and education programmes. The concern was raised more often by women. Given their providing role in the household, they are often the first to be affected by dwindling resources (Mumtaz, 1993). Although, there are awareness raising activities, some of which are in schools, such as the debate held in Sherakot school in 2005, women and especially uneducated children are not exposed to these awareness programmes and engagement activities.

7.3 Knowledge and Perceptions of the Environment and Conservation

The school children showed significantly greater knowledge of local species than the women interviewed, which may be a combination of a higher level of formal education and gender, both of which have been found to correlate with wildlife knowledge (Nyhus *et al*, 2003). Women are slightly less likely to collect NTFPs and may not explore the depths of the forest, reducing their exposure to wildlife. There was also a significant difference between villages, with those in Gidar displaying greater knowledge. This shows that direct experience is an important factor in gaining knowledge, as Gidar is situated in a more forested area in the valley, with higher biodiversity, perhaps outweighing the greater exposure to environmental education experienced in Sherakot.

Overall, there appears to be a strong experiential connection with nature, with many people collecting wild species, and children reported visiting the forest at least once a week. These experiences are reflected in the different ways that people value the environment. The provision of food and firewood is the most important value received from the forest, with most women and children ranking this first, again reflecting the subsistence use of wild species in Palas. However, children were almost as likely to rank the happiness they gain from the forest as highly, mostly in the form of aesthetic appreciation. Children also displayed knowledge and a great sense of pride towards the natural environment during the mapping exercise, where these resources featured prominently in the drawings and discussions. Studies suggest that life experiences outdoors, particularly in childhood, may be the single most important influence affecting attitudes (Palmer, 1998; Bogeholz, 2006) and there is plenty of scope in Palas to encourage these experiences in education programmes. Women, instead, see the use

value of income from the forest as more important, showing that their priorities are more practical. Nonetheless, both intrinsic and use values of the environment may be important in forming positive attitudes toward conservation (Bauer, 2003), so that different kinds of valuation may be equally relevant in attitudinal and therefore behavioural change. An alteration in environmental circumstances may change people's perceptions and more than half of respondents reported that they had become more aware of the importance of the forest since the earthquake, due to protection from landsliding and flooding and as a resource for building.

The knowledge gap between children and women was also shown in the identification of different threats to wildlife. More than a third of the women did not know of any threats or thought that any decline in species would be 'natural'. Children were much more aware of the anthropogenic threats, and significantly more children identified hunting as a problem. This may reflect a greater acceptance of hunting by the older generation, and the use value of wildlife by women. Location was also a significant factor in respondents' perceptions of threats to biodiversity. In Sherakot, the emphasis was placed on deforestation, largely due to it lying in close vicinity to heavily deforested areas with daily logging activities. Gidar, in contrast, is situated deeper in the valley, where there is no commercial deforestation, and fewer people saw this as a threat, instead focusing on hunting, showing that direct experience shapes knowledge and there is little awareness of, or perhaps concern about activities taking place outside the village itself.

With regards to endangered species, 60% of respondents identified the Western Tragopan as endangered and of conservation concern, with both women and children showing high levels of awareness. As the 'flagship' species of the conservation project in Palas, this would be expected but is promising nonetheless. Local knowledge can be utilized in biodiversity studies and to aid conservation projects (Nyhus *et al*, 2003). In this study it was used to gauge potential effects of wild species collection, and general awareness and damaging behaviour towards pheasants, specifically the Western Tragopan. Sightings of live Western Tragopan were claimed by more than a third of respondents, mostly within the last year, but few had seen nests or eggs. No one admitted to having taken any action towards pheasants or their nests, although many spoke of family members or knew of others in their community who had. Although more than half of respondents stated that people now protect eggs and nests, the

majority of people reported that hunting and capturing still takes place. However, there was a general feeling that this activity is declining and that the Western Tragopan should be protected. But throughout this line of questioning, it is difficult to discern whether people were disclosing accurate information and if this growing awareness necessarily equates to behaviour change.

Attitudes towards wildlife differed according to the particular species in question, and between women and children. All those respondents who expressed positive feelings toward species extinction gave the reason that wild animals attack livestock and crops. This has shown to be a common concern amongst communities, and affects the outcome of conservation projects (Parry and Campbell, 1992; Heinen, 1993). Women were more likely to express these positive feelings towards extinction, again showing the different values placed on wildlife and more practical considerations. More women also gave use value reasons such as provision of meat for negative feelings they may have about extinction. However some of these respondents make a distinction between these animals and others, mostly birds, towards which they have different feelings. Most people who express 'bad' feelings related to extinction based it on aesthetic reasons, often mentioning the beauty of birds and their song, and a few children showed empathy towards animals themselves - both types of emotional connection with nature. Support was expressed for the conservation of birds and especially the Western Tragopan, as it is viewed as unique, and not seen to conflict with livelihood needs directly. Alexander (2000) found that support for a particular species – the black howler monkey in this case - may be a good basis for a successful broader-scale conservation project.

There is generally a positive attitude towards conservation and the Palas Conservation and Development Project. All respondents stated that the same or more effort should be put into conservation, rather than less. However, children appeared to have a more proactive attitude, matching their more negative feelings towards extinction, which could be the result of a variety of factors. Education has often been found to improve support and attitudes towards conservation (Ingfield, 1988; Heinen, 1993), although this has not always found to be the case (Struhsaker *et al*, 2005). The children are more exposed to information about wildlife and its value, and generally have access to printed media, unlike the women who are on the whole uneducated and illiterate. However, in this study, education is confounded with age and gender. Younger people have been shown to have more positive attitudes towards conservation (Fiallo and Jacobsen, 1995)

and the same may be the case for males (Sah and Heinen, 2001) partly due to greater participation in conservation activities. In Palas, children have been more involved in PCDP activites, especially in Sherakot where a nature club has been established, whereas women are excluded from taking part. This conclusion is tempered a little by the fact that a few children disclosed that they would still consider working for the timber industry, so that their apparent attitudes may not reflect their future behaviour, and the short-term gains from logging remain attractive to those who are educated and aware of longer-term conservation benefits. Additionally, it must be considered that there was an overstating of support for conservation from all respondents given that they were aware of the research topic.

Knowledge about wildlife can also be an important factor in determining attitudes (Harcourt *et al*, 1986; Kellert, 1996) and in this study had an effect, albeit not straightforward, as it appears to differ between villages. In Sherakot, those respondents with high knowledge scores are more likely to consider that more conservation effort is needed, suggesting a link between education and attitudes. In Gidar, where environmental education efforts are lower, but knowledge scores were high, the opposite is true. It appears that that the fact that knowledge is gained in different ways, between villages has an effect on the attitudinal outcomes. In Sherakot, where people are less exposed to the forest and wildlife, knowledge about wildlife may be primarily gained through formal education, and factual knowledge about wildlife is made to have an explicit connected to conservation, as there is a greater effort to include environmental education, notably through the nature club. In Gidar, where experience appears to play a greater part in wildlife knowledge, the connection between this and conservation is perhaps weaker. Thus the context in which knowledge is gained may have an influence on how it is linked to attitudes. The way in which knowledge has been tested in this study, must also be considered, as some respondents, for example women, would be unfamiliar with printed materials and illustrations, which may skew the results.

Wealth, measured here by household employment type, did not play a significant role in knowledge and attitudes towards wildlife and conservation, but since the respondent sample is probably skewed with regards to wealth and education, it is worth mentioning as a potential factor in creating the generally positive views found here. Some studies have shown a positive connection between wealth and attitudes (Ingfield and Namara,

2001), but this is not always the case (Sah and Heinen, 2001). Further studies, taking a more representative sample would need to be carried out to gain conclusive results.

Although the large majority of respondents thought that the PCDP was 'helping people', there was lack of understanding of its objectives. 83% of people had at least heard of the project, but fewer in Gidar, indicating that awareness has not reached the upper part of the Valley. Only just over a third of respondents described both the conservation and development aspects of their work, and many focused on the development activities. Benefits received from conservation are important in forming perceptions (Alexander, 2000; Fiallo and Jacobsen, 1995) and in this study, those receiving aid after the earthquake often formed more positive views of the project, but this may not equate with more positive views towards conservation in general. One ingredient for successful CBC is thought to be an explicit link between conservation and development (Stocking and Perkin, 1992), as shown in Figure 1, and positive perceptions have been found to be stronger where development activities have a natural resource focus (Abbott and Thomas, 1999). This is not the case in Palas, and has probably led in part to the lack of understanding of the link between conservation and development.

It may be that awareness amongst women as a whole is less than represented in this study due to the skewed sample. Due to practical difficulties, a significant proportion of the women have some connections to the PCDP, though it is reflective of the social situation in Palas that even some of those with direct family members working for the PCDP were uncertain of the project's aims.

7.4 The Future

Identifying the needs and wants of the community, especially of those who are not normally consulted, can improve perceptions of conservation projects and help to align objectives between the community and project (Little, 1994). The desire for basic infrastructure is overwhelming, with almost all respondents hoping for more facilities such as transport, electricity and water in the future. The PCDP has begun to address this need by building roads and bridges, and many people identified the project with these activities. Education is the second most hoped for service, with the emphasis on basic provision due to the lack of functional schools in the valley. There is a sense that

education is a much needed privilege, and many of the children expressed a desire to become teachers, although this may simply reflect the social acceptability of that profession.

The greater concern for conservation issues in Sherakot, where there is greater environmental degradation, is matched by a hope for improvements in conservation efforts. Although most children did not see their future involving the forest, some wanted to be involved in raising awareness of conservation or reforestation projects, whilst a few considered entering the timber industry. It is promising that the younger generation expressed some quite progressive ideas. Some male students hoped for improved education for females and three students hoped for ecotourism in the area, showing the potential for social shifts in the future. Ecotourism was one of the few suggestions relating to the means to reach the desired improvements in Palas. This may reflect a lack of understanding or even complacent attitude to development, especially since development is seen to be the key role of the PCDP. Care must be taken to ensure this attitude is not perpetuated by further PCDP activities, and the connection between community livelihoods, conservation and development activities is clearly made. Many children, however, expressed aspirations to go into professional careers such as medicine, and there was some sense that they, themselves wanted to improve the situation of the area.

Given that women are excluded from the public sphere in Palas, there has been little consideration of their hopes or potential for involvement in conservation and development. Respondents recognised the problems that exist for women, and there is demand for improvements. Education provision was the priority, showing an understanding of its potential as a shaping force, affecting other social issues. Healthcare was another important issue raised. Frequent and early pregnancy, malnutrition and anaemia are all common medical problems affecting rural women in Pakistan (Mumtaz, 1993) and have found to be the case in Palas (Farooq, 2004). Many wanted less burden of work to be placed on women, who do much of the domestic as well as agricultural work. It has been shown that women feel positive about work when they receive payment, but if not may have negative attitudes towards women's work generally (Shaheed and Mumtaz, 1981). There is almost no opportunity for paid work in Palas, given the social restrictions, but a significant number of women showed a desire

for greater employment opportunities, both professional and vocational through provision of suitable education for females.

7.5 Environmental Education

In order to assess the current level of environmental education in the valley, it is first necessary to discuss basic schooling provisions. The teachers interviewed identified major constraints to basic education in Palas, reflecting common problems in rural areas of developing countries (see Table 17). The problems can be divided into two main issues. Firstly, access to schooling is lacking at a basic level. There is poor attendance at work by teachers employed in government schools, despite the fact that the school buildings are in place. This problem is reinforced by low demand from the community. Teachers estimated that only half of the children in their villages attended school and in one of the few functional schools for females, only a quarter of the school aged girls in the village attended. This is viewed to be due to lack of awareness, poverty and few employment opportunities for women. Secondly, the curriculum is not considered relevant to the daily lives or livelihoods for many people. The curriculum is also limited in its scope, designed for urban schools and encourages didactic teaching methods. Many teachers complained that they lacked the resources and training to adapt the curriculum and provide more practical and interactive activities.

The physical school environment in both schools visited was inadequate and in desperate need of resources, in part due to damage from the earthquake which has almost totally destroyed the primary school in Gidar, and teachers made various suggestions as to how the design of schools could be improved.

It is encouraging that three quarters of all respondents had learnt something related to environmental issues. Many of the children were able to explain what they had learnt and were clearly interested in the subject. However, many answers were very similar, and most were restricted to forest and bird conservation. Although these are the most pressing local issues, this shows a lack of breadth in the syllabus. Limited understanding of wider environmental issues has been found in other projects in remote areas (Johnson-Pyne and Johnson, 2005) and a balance must be found between local relevance and breadth of coverage. Environmental issues are included in core subjects

in the government curriculum, alongside the recently added subjects of gender and population (Muhammed Arshad, pers. comms), but it is unclear how these are translated in the classroom. Teachers felt the environmental elements of the syllabus were inadequate, in addition to a lack of resources to teach them effectively. However, it must be noted that many children in Palas showed some understanding of sustainability related to logging, balancing the needs of humans and conservation aims. Sustainability is often thought too complex for young children, but cognitive ability to appreciate a variety of viewpoints necessary to understand the concepts may be developed in children as young as seven (Symons, 1996). Sherakot is making improvements in environmental education with the establishment of a nature club, which has had a noticeable effect on the children's enthusiasm for conservation. In Gidar, four children said that they had learnt nothing about the environment, and there appears to be less emphasis on this in school, partly because the earthquake has caused large-scale damage and provision of basic facilities is the main priority.

Almost half of the women had not learnt anything regarding the environment, showing the lack of formal education. The majority who had learnt something had learnt it from a male member of their family, suggesting that social transmission is the primary means of education for women, and could be harnessed for awareness raising. Some claimed that they had realised the problems of deforestation themselves, indicating that women are using their own experiences to understand issues. This has been found to be the case in rural areas elsewhere (Yencken, 2000).

7.6 Limitations of the study

As discussed in Section 5.2.2, there is sampling bias in terms of education, wealth and connections to the PCDP and marginal groups in terms of the poor and landless were not interviewed. This reflects the difficulties in reaching groups such as women and children, and studies should make further efforts to overcome these problems, and also to reach poorer sections of society. Translation was problematic, and may have resulted in inaccuracies and restricted the depth of analysis and discussion of issues, potentially simplifying some issues raised by respondents.

Adult males were not included in the study, to make some attempt to correct the

imbalance in participation in the valley, and due to time restrictions. However, for a more complete analysis and for comparative purposes, this would be required and limits the study somewhat. Coverage was also restricted to only two villages being sampled, but at least shows a contrast between lower and upper parts of the valley. This study is the first to take account of women and children's knowledge and attitudes in Palas, and as a result has taken rather a broad sample of a number of issues. It therefore forms an exploratory study, which should be the foundation for further research including these marginal groups.

7.7 Recommendations

The research carried out has been used to inform the following suggestions for improvement is environmental education in Palas. This is particularly focused on the new school which is to be built by the WPA in the Upper Palas valley region, in the habitat of the Western Tragopan. General recommendations which may apply to environmental education in most contexts, including Palas and particularly developing countries are made, and suggestions specific to the situation in Palas subsequently highlighted.

7.7.1 Environmental education in schools

Formal education has been shown to influence attitudes in this study, and as children have been found to play an important role in natural resource use and are the future decision makers in the valley, a focus on schooling is paramount. Despite some attempts to provide environmental education by teachers and the PCDP, this requires improvement and expansion to harness the potential role that education could play in sustainable development of the region.

7.7.1.1 Basic education

- *Establishment of a community based school* – funded by NGOs, with little or no costs to those attending, and flexibility in the time table allowing access to all children. The venue may be also flexible using community institutions such as mosques to reduce costs. Teachers are local and the curriculum should meet the standards set by the government but adapted in consultation with community

members, making it locally relevant and transparent, encouraging acceptance and improving enrolment rates (Fagan, 1996).

7.1.1.2 Curriculum

- *EFS* - An 'Education for Sustainability' (EFS) approach should be taken (described in Section 3.1.1), centred around the three interlinked realms of society, economics and environment, and spanning school subject areas, rather than the current 'tag on' approach which superficially addresses environmental issues, and has led to knowledge gaps.

- *Linking development and the environment* - An interdisciplinary approach is needed, where explicit connections are made between development, livelihoods and the environment. The root causes of environmental degradation need to be addressed, which may require complex issues and the socio-economic situation to be discussed. Oversimplification is not productive and can lead to deterministic explanations (Bekalo and Bangay, 2002).

- *Flexibility* – The curriculum should not be too heavily prescriptive, to allow people to explore forces defining human activity in relation to environment, and come to an understanding on their own terms, encouraging empowerment and creativity in problem solving. There is a danger that NGO initiatives can dictate education outcomes in line with their own agenda (Martin, 1996) and this should be avoided.

- *Locally relevant* - The curriculum should focus on locally relevant issues that students can relate to, especially in isolated regions such as Palas, where the area is of high conservation value. However, this should be balanced with breadth, to address to some extent all aspects of sustainability, both local and global in a holistic manner.

- *Locally developed* - Local educators should play a key role in developing the curriculum, in consultation with PCDP staff, and community members, as local people have knowledge of the people, culture and biophysical surroundings to formulate an appropriate, relevant curriculum (Palmer, 1998). The teachers have been shown to have practical and useful ideas, based on their own experience. Some

kind of imposed core and outward looking approach is required to balance this and prevent insularity (Bekalo and Bangay, 2002).

7.1.1.3 Teaching Methods

Content forms the foundation of EFS, but it is primarily focused upon learning processes and the creation of active, inquiring 'global citizens'.

- *Teacher training* - Pre-service and in-service workshops are required, and attempts made to harness existing skills to reduce costs. Practical and accessible advice linking teachers in a supportive network and allowing them to be actively involved in the development and implementation of new programmes is needed, along with critical evaluation of outcomes and suggestions for improvements.

- *Action based learning* – Instead of passive information provision, methods should focus on immersing students in the problems, so they come to understand issues on their own terms, with the teacher acting as a facilitator. For example, in a school in India, students learnt to quantify village resources, calculate carrying capacities and explored solutions to overexploitation (Pande, 2002).

- *Experiential learning* – Experience has been shown to be a formative influence and in Palas there is opportunity to exploit the rich biodiversity and environment of the area, which the students were shown to value highly. This can provide a powerful foundation upon which to build a strong environmental ethic, knowledge and problem solving ideas (Palmer, 1998).

- *Critical enquiry* – Basic knowledge from the curriculum should be built upon by critically examining alternative solutions to environmental issues and asking key questions, for example role play has been used to represent different opinions and perspectives (Palmer, 1998).

- *Participation* – participation is fundamental to sustainability, and in an educational context, aims to empower students and create a belief that they can make a difference (Johnson-Pyne and Johnson, 2005). The desire for change shown by students in this study should be built upon. Children will be critical of tokenistic involvement in projects so that participation must be genuine (Hart, 1997)

7.1.1.4 School environment

Children have questioned the integrity of environmental education if those environmental ideas not mirrored in the school environment (Titman, 1994). Although basic facilities are the priority in Palas, sustainability can be reflected and play a part in the learning process through the school environment itself. For example, children have been actively involved in making their school grounds areas for conservation though tree planting and pond building (Hart, 1997). Green school construction, in terms of building materials and energy efficiency is also something to consider for the future in Palas.

7.1.1.5 Specific recommendations for schooling in the Palas Valley

- *Incentives for teachers* – A Community based school will go some way in addressing the absence of teachers from work, by creating accountability, but special attention should be given to creating further financial and social incentives for teachers to attend.

- *Establishment of a girls' school* - to make an immediate attempt to address the gender imbalance in schooling in the valley. This should cover all educational levels, as there is currently only primary level education for females. Issues of distance to travel, safety and relevance of the curriculum need to be addressed to encourage enrolment.

- *Gender sensitive materials*- Girls may be portrayed stereotypically, in content and images in lessons in rural schools (UNICEF, no date), and this may perpetuate the current situation for women in Palas. Replacing these ideas in schools with more equitable portrayal, will make way for more progressive ideas in the future, and form an initial foundation for change.

- *School design improvements* **-** The school buildings in Palas are inadequate and not conducive to effective teaching. This problem has been exacerbated by damage during the earthquake, which has left the school in Gidar unusable. Suggestions provided by the teachers should be used in the building and renovation of schools in the valley. These are:
    - Separate classrooms for each year group

- Library and laboratory facilities
- Playground area for physical education
- Accommodation for those children whose families migrate during the summer to prevent interruption in learning

- *Conservation and development linkage* – A particular problem is the lack of understanding of the interlinked aims of conservation and development, which need to be made explicit in the curriculum and awareness raising in general, particularly in relation to the objectives of the PCDP.

- *Exposure Visits* – Given the valley's isolation both physically and culturally, there is a lack of understanding of issues outside of the context of Palas. This is reflected in the narrow knowledge base of environmental issues and many students could not relate to the topics in the government curriculum. Visits to less rural, conservative areas would highlight the specific socio-economic problems in Palas and broaden understanding of outside environmental issues.

- *Key topics* – Although the curriculum should be flexible, some core topics (below) which are most relevant to Palas should be included. These are based on issues raised in Agenda 21 (UNEP, 1992a). Their interdependent causes and consequences should be highlighted for a holistic approach, to encourage integrated solutions. Knowledge and skills relating to these areas should aim to promote positive attitudes and personal responsibility.
    - Biodiversity
    - Poverty, population growth and development
    - Deforestation
    - Food and agriculture
    - Fresh water
    - Energy
    - Atmosphere and climate
    - Solid waste and sewage
    - Ethics and exploration of ideologies

- *NTFPs project involvement* – Awareness of sustainable harvesting and potential damage to biodiversity, particularly Western Tragopan. As children are the primary

collectors of NTFPs, educational activities related to sustainable use of wild species should be included in the curriculum and the high level of indigenous knowledge built upon.

- *Establishment of a support network of schools* – Due to the isolation of villages in Palas and the valley as a whole, it is of particular importance to create a network of schools that are working towards the same goals, sharing knowledge and experiences through regular meetings and workshops of teachers and students. This could be centred on the new school. The nature club in Sherakot has proved successful, and the idea needs to be extended across the valley especially in Upper Palas where awareness is lower and attitudes are less positive.

7.7.2 Community environmental education

As mentioned above, a community based school, could address the problem of demand by listening and responding to the community's needs. School based learning has a proven 'spillover effect' on the rest of the community, influencing parents (Leeming *et al*, 1997; Ballantyne *et al*, 2001), which should be explored further, and may overcome the generational wedge that sometimes comes with education (Bekalo and Bangay, 2002).

These ideas could be expanded to include the community in the education provision itself. EFS aims to be inclusive and lifelong, and given the need for awareness and large scale community action shown here, there is a strong case for developments in environmental education for the whole community. This type of initiative would be based on non-formal education (NFE), described in section 3.1.2, where participation is encouraged with flexible timetables and relevant content. For example, pre-primary education centres have proved a successful means of social change, where families meet in a flexible environment (Pande, 2002).

7.7.2.1 Specific recommendations for community education in the Palas Valley

- *Involve key community members* – Due to the patriarchal and religious society of Palas, involvement and acceptance by key figures and religious leaders may be important for progress in community engagement with conservation. This has been used in other WWF funded projects (Ibrahim Khan, pers comms) and should be a focus in Palas.

- *Build on improved attitudes* – the involvement of the PCDF in distributing aid has improved attitudes towards the PCDP, and this should be built upon, but especially focusing on connecting these development activities to conservation initiatives, and preventing complacency with regards to development

7.7.3 Women

Overcoming the entrenched social norms with regards to women and allowing them to play a role in sustainable development in the region will no doubt be a long process, requiring sensitivity and large scale attitude change.

- *Education for all ages* - Education for girls will be an important step towards equity and inclusion of women, and this should aim to include women of all ages, and sections of society. Women have shown to be carriers of experiential knowledge, which should be nurtured and built upon.

- *Vocational skills development* - Mumtaz (1993) suggests that education needs to be made relevant to women's lives, and they could play a fundamental role in the management of NTFPs. Many of the women showed an interest in enterprises for employment opportunities, but lack the skills or access to markets to develop this. Vocational skills development could aim to provide this and improve income levels.

- *Holistic approach* - Environment, education, employment and health need to be viewed as holistic problem, each affecting the other. Environmental education has the potential to form an umbrella improving other social issues due to its interdisciplinary, far reaching nature (Leal Filho, 1997). This could be carried out through NFE which has been used successfully to improved self-confidence and the ability to bring about change (Jones, 1997; Ellis, 1995) as well as improved literacy, and income from environmental management (Gurung, 2002).

7.7.3.1 Specific Recommendations for involving women in the Palas Valley

- *Encouraging social transmission of information* – As women were found to have some knowledge of environmental issues from family members, males involved in conservation activities such as NTFP cultivation, should be encouraged to share

knowledge to females who are excluded from programmes, as this may be a more acceptable means of initially involving women in Palas.

- *Transparency of activities* – There is suspicion and resistance to any activities or education for women, so any future attempts to involve women should aim to be as transparent and participatory as possible.

7.7.4 Further research

Further studies in Palas should firstly compare knowledge and attitudes of adult males, and also aim to target poorer, less accessible groups to form a more complete picture. This study has shown that people place both non-use and use value on the natural environment and further analysis on how this relates to attitudes and behaviour should be carried out.

Attitudes regarding women are entrenched in Palasi society, and if any change is to take place, an objective assessment of the views that males hold towards women, and a thorough feasibility study on the means of increasing female participation is needed.

The research shows that education and knowledge may not have a simple relationship to attitudes, and the context is important. This could form the basis of further research into how situations can best promote positive attitudes. The study also failed to address how behaviour is connected to attitudes, a link that has often proved elusive in previous studies. Further research into this area, generally is required, and in Palas, the level of poverty may have a powerful effect on decision making.

8. SUMMARY AND CONCLUSIONS

The research carried out into resource use, knowledge and attitudes amongst children and women, alongside the analysis of the educational situation in Palas has led to the following main conclusions:

- Non-timber forest products were found to be highly important to livelihoods and children and women play central roles in their collection, and showed a high level of knowledge. They should therefore participate more fully in further efforts in the sustainable management of wild species.

- The collection of NTFPs is likely to be having a detrimental effect on biodiversity, with special concern for the Western Tragopan. Harmful activities such as hunting are still occurring but there appears to be growing awareness of the threats to the species.

- Differences in knowledge of wildlife and conservation between women and children, and between villages show that experience and formal education have a role to play in awareness.

- People place different values on the natural environment and in Palas, children focused more on non-use, especially aesthetic valuation, whereas women were more likely to value the environment for its usefulness. This may be connected to the way in which attitudes are formed.

- Attitudes toward conservation were found to be dependent on the type of species in question, and there was particular concern over the damage that wildlife may cause to agriculture.

- Attitudes were generally positive towards conservation and the PCDP, but children were more likely to take a proactive stance which is likely to be connected to education, age and gender, as children have been more greatly involved in and exposed to conservation activities. Knowledge was found to affect attitudes, but the context in which this knowledge is gained changed the outcome.

- There is a general lack of understanding of the aim of the PCDP, and in particular the connection between conservation and development is not clear.

- The focus of future hopes for the community was on basic infrastructure, education, health and conservation - ideas that should feed into development efforts in the future. For women, education and healthcare provision for females was the priority and there is demand for employment opportunities

- Education is poorly provided in Palas, and efforts need to be made in basic provision, especially for girls. An 'Education for Sustainability' approach should be taken, that encourages action based learning and participatory activities, to encourage positive environmental attitudes and action. Education should be expanded to the whole community, and work should be carried out on the inclusion of women.

Overall the research supports studies on the importance of experience and formal education in forming attitudes, and highlights the role that indigenous knowledge should play in conservation initiatives. Women have often been found to be involved in natural resource management, but it is perhaps unusual that here, children take a primary role. Their inputs are often only considered in projects specifically related to young people, but this view clearly needs to be expanded. Inclusion of children in this study has also highlighted the different world views they may hold, especially related to valuation of the environment. In general consulting marginal groups may be important in gaining different perspectives, to feed into conservation and development initiatives.

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Appendix 1: Species knowledge cards

Appendix 2: Questionnaire for school children

Hello, my name is Emily and I am a student from England, working on behalf of the Palas project. I am carrying out my research in Palas on local people's views and perceptions. This will help the future work of the project, both in nature conservation and helping the community. I would be very happy if you would participate in the research by doing some group work and answering some questions. Please feel free to ask me any questions you may have too.

Socio-economic information

Name: *M / F* *School:*

1. How old are you? (or which class are you in?) _____
2. Which tribe do you belong to? _____
3. Family income:

    i. How many people are in your family?
    ii. What does each of them do to earn money?

Family member	Employment

4. Does your family own any of the following? (give numbers)
    - Land _____
    - Livestock _____
    - Guns _____
    - Guest room _____

Education

1. Environmental education:

    a) Can you remember something interesting that you have learnt about the nature, conservation or the environment?

    b) Did you learn this within the last year ____ month ____ week ____
    c) Who taught you? Your teacher _____ project people ____someone else _____
    d) Is there anything that you would really like to learn about, concerning the natural world, conservation or the environment? Why?

2. Future:

    a) When do you think you will leave school?

    b) What would you like to do afterwards?

    c) Do you think that your future work will involve the forest in any way?

Natural World

1. The forest:

   a) How often do you go into the forest? every day ____week ____ less ____
   b) What is your favourite

   & least favourite thing about doing this?

2. NTFPs (put answers in chart):

   a) Do you collect wild plants and animals from the forest? (If you do not, does anyone else in your family?)
   b) If yes, which types (species) do you collect most of? (Limit to 10)
   c) Which types are you most pleased to find and why?
   d) Are they most often eaten (there or at home with your family) or sold?

Species	Most important & why	Eaten / used or sold?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

3. How did the earthquake affect your collection of these plants and animals. Did it:
   Decrease _____ Increase _____ Remain the same _____

4. What do you feel is the most important benefit you receive from the forest?
   - It provides you with food /firewood ____
   - It makes you feel happy – how? _____
   - It provides you and your family with money – how? ____
   - It protects you from natural disasters such as flooding and landslides ____
   - Any other _____

5. Did your feelings about the forest change after the earthquake? In which way?

Conservation

1. Do you know of any plants or animals in your valley that are endangered, declining or of conservation concern?

2. Do you know why they might be endangered?

3. How would you feel if these plants or animals no longer existed? Why?

4. Do you know of anything that you and your community is doing to help these species? Do you think that more, the same or less effort is needed?

5. Do you think your parents and older brothers/sisters hold the same views as you about the forest?
   - do they collect NTFPs
   - do they cut down trees?
   - do they go hunting?

6. Animals

   a) Species cards exercise

   1. 2.
   3. 4.
   5. 6.
   7.

   b) Do you ever look for or come across pheasants or their nests in the forest?

   c) When was the last time you saw a pheasant or a nest?

   d) What did you do?

   e) Has anyone else you know come across them?

   d) What do you think people do when they find pheasants or their nests?

   g) Have you ever seen a Western Tragopan (Jijeel) or its nest? What did you do?

   h) What do others do?

7. Palas Conservation & Development Project (PCDP):

   a) Have you heard of the project?
   b) Can you describe what they do?

   c) Do you think that their work is:
   - Helping people
   - Harming people
   - Not harming or helping

How?

d) Have you seen any project awareness material (posters, brochures etc)? Where?

e) Have your views about the PCDP changed since the earthquake? Why and how?

8. What are your hopes for your community in the future?

Appendix 3: Questionnaire for women

Hello, my name is Emily and I am a student from England, working on behalf of the Palas project. I am carrying out my research in Palas on local people's views and perceptions. This will help the future work of the project, both in nature conservation and helping the community. I would be very happy if you would participate in the research by answering some questions. Please feel free to ask me any questions you may have too.

Socio-economic information

Name: *Location:*

4. Which tribe do you belong to? _____
5. Family income:

    ii. How many people are in your family?
    iii. What does each of them do to earn money?

Family member	Employment

5. Does your family own any of the following? (give numbers)
    - Land _____
    - Livestock _____
    - Guns _____
    - Guest room _____

Education

3. Did you go to school?

4. Children:

    a) Do / Did your children go to school?
    b) Why / why not?

    c) What kind of job / business would you like for your children?

5. Environmental education / awareness:

    a) Have you received any education / awareness materials about nature and conservation? Describe it.

    b) Did you learn this within the last year ____ month ____ week ____
    c) Did you receive it at school _____ from the project ____someone else

Natural World

6. NTFPs (put answers in chart):

e) Do you collect wild plants and animals from the forest? (If they do not, does anyone else in their family?)
f) If yes, which types (species) do you collect most of? (Limit to 10)
g) Which type is most valuable to you?
h) Are they most often eaten (there or at home with your family) or sold?
i) Estimate how much wild species contribute to your household income, per year.

j) Estimate how much the wild products you have collected or bought contribute to the total food your family eats (split into summer and winter)

Species	Ranking & why	Eaten or sold?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

7. How did the earthquake affect your collection of these plants and animals. Did it:
Decrease _____ Increase _____ Remain the same _____

8. What do you feel is the most important benefit you receive from the forest?
- It provides you with food/firewood ____
- It makes you feel happy – how? _____
- It provides you and your family with money ____
- It protects you from natural disasters such as flooding and landslides ____
- Any other _____

9. Did your feelings about the forest change after the earthquake? In which way?

Conservation

9. Do you know of any plants or animals in your valley that are endangered, declining or of conservation concern?

10. Do you know why they might be endangered?

11. How would you feel if that plant or animal no longer existed? Why?

12. Do you know of anything that you and your community is doing to help these species?

13. Do you think that more, the same or less effort is needed?

14. Do you think your children and husband hold the same views as you about the forest?
    - Do they collect NTFPs?
    - Do they cut down trees?
    - Do they go hunting?

15. Animals

    a) Species cards exercise

1. 2.
3. 4.
5. 6.
7.

    b) Do you ever look for or come across pheasants or their nests in the forest?

    c) Has anyone else you know come across them?

    d) What do you think people do when they find pheasants or their nests?

    e) When was the last time you saw a pheasant or a nest?

    f) What did you do?

    g) Have you ever seen a Western Tragopan (Jijeel) or its nest? What did you do?

16. Palas Conservation & Development Project (PCDP):

    a) Have you heard of the project?
    b) Can you describe what they do?

    c) Do you think that their work is:
        i. Helping people
        ii. Harming people
        iii. Not harming or helping

    How?

    d) Have you and your family been involved in any of their activities? If yes, describe.

    e) Have you and your family received any benefits from them? Describe this.

    f) Have your views about the PCDP changed since the earthquake? Why and how?

17. The future:

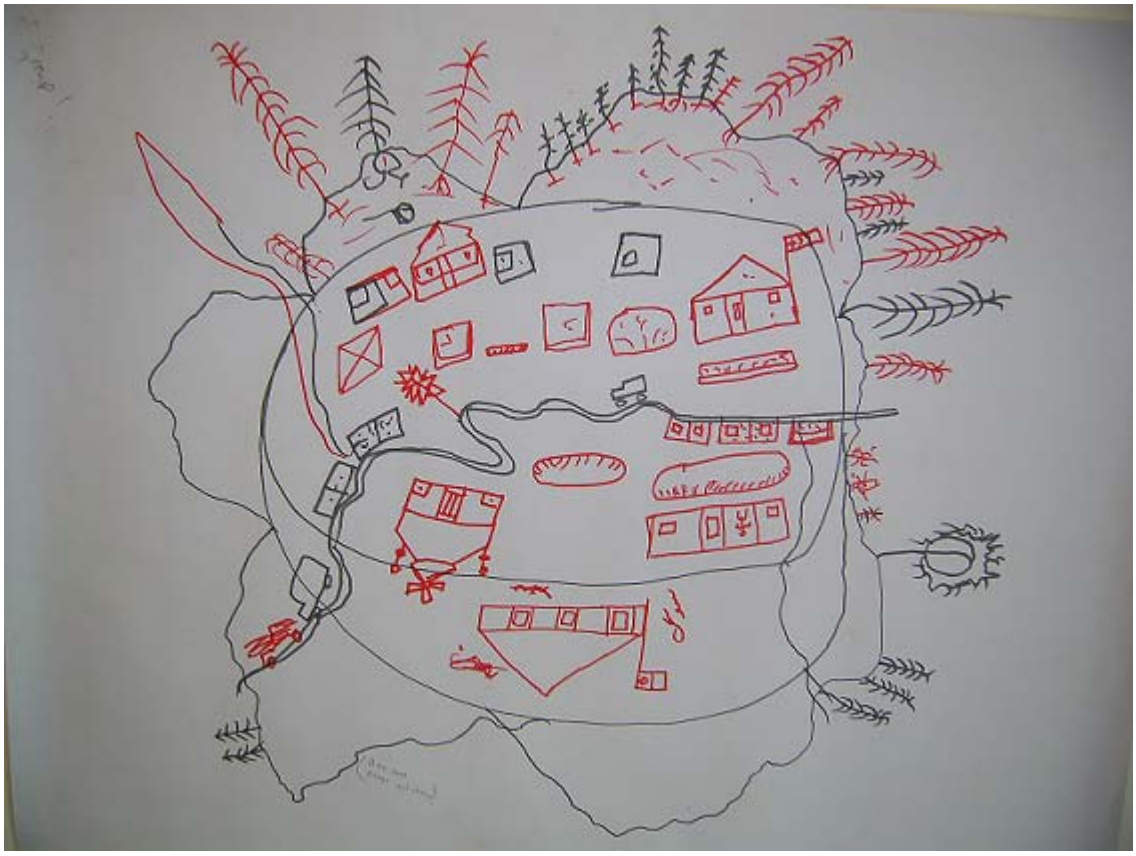
    a) What are your hopes for women in your community in the future?
b) What are your hopes for your whole community in the future?

Appendix 4: Interview outline for teachers

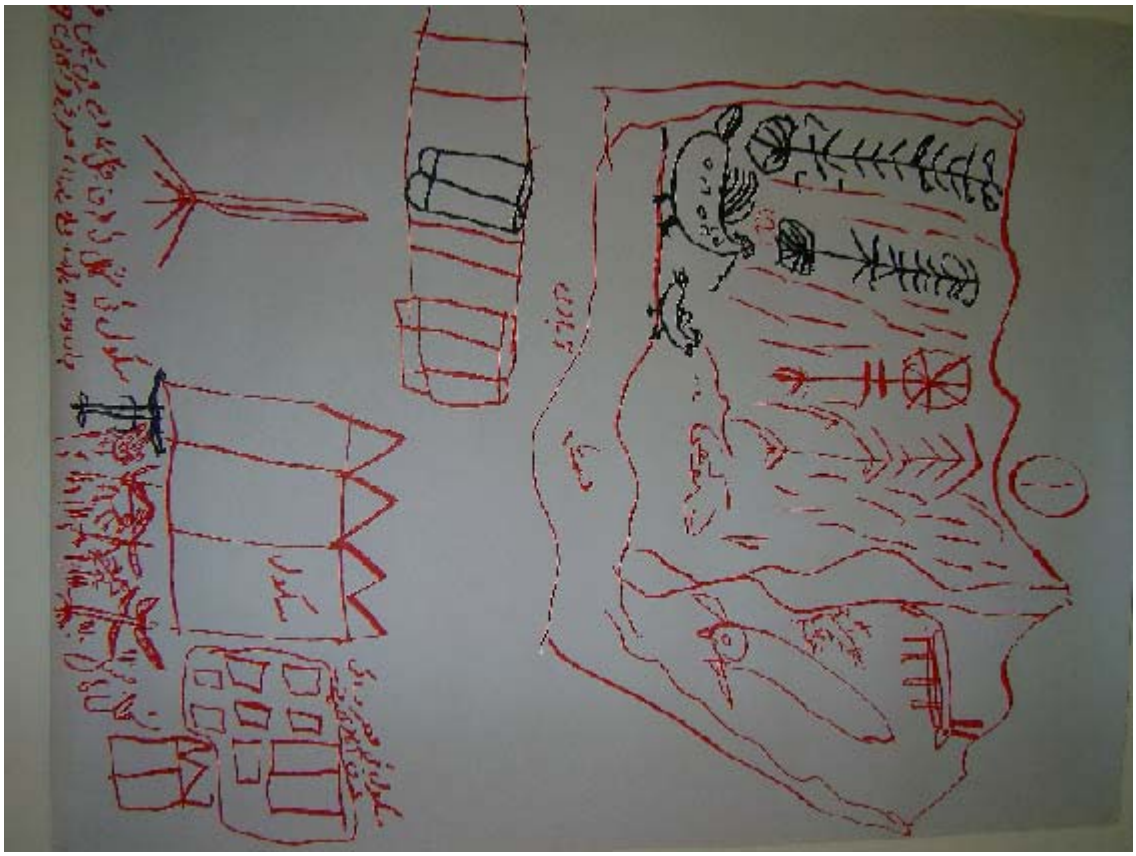
1. How many students attend the school?
2. What proportion of families send their children to school? Why / why not?
3. What proportion are male and female?
4. Are you a local Palasi?
5. What kind of teacher training did you receive? Where did you receive it?
6. Is there a school curriculum? Who developed it?
7. Do you stick to the curriculum or adapt it? How and why?
8. What kind of methods do you use to teach? Is it more rote, practical, interactive?
9. What are the main constraints on your ability to teach the students sufficiently?
10. How did the earthquake affect your school and teaching?
11. Do you have an environmental / sustainability element to your curriculum? Can you describe it?
12. Have there been any PCDP initiatives in this school? How effective do you think they have been?
13. What would you like to see improved in terms of schooling in the valley?
14. What would you like to see improved in environmental / sustainability education?
15. Do you have any recommendations for improving the design of schools in the valley?

Appendix 5: Maps drawn during PRA exercise

Maps drawn by school children in Sherakot



Maps drawn by school children in Gidar



Appendix 6: List of Non-timber forest products named

Local name	Latin name	Use	Respondent count
Lilyo	*Viola caespitosa*	medicine	63
Jomi	*Urtica dioica*	medicine	62
Guchi	*Morcela esculanta*	food	60
Rain	*Bistorta amlexicaulis*	food	58
Mushkbala	*Valeriana jatamansi*	medicine	53
Kuzi		food	38
Chotyal	*Rheum webbianum*	medicine	35
Korat	*Berginea ciliata*	medicine	32
Zarozal	*Rabdosia rugosa*	medicine	29
Mamekh	*Peonia emodi*	medicine	28
Murel		medicine	27
Ratajokh	*Geranium wallichianum*	medicine	26
Tamkoo		food	15
Geegeo		check	12
Zakali		food	12
Chur	*Angelica glanuca*	medicine	10
Sheelo		food	10
Hobobal	*Rumjex dentatus*	medicine	9
Tuk		food	9
Bahoo/Baon		food	7
Minrial	*Saussuria lappa*	medicine	7
Sperki		medicine	7
Namero	*Rhododendron arboreum*	medicine	6
Shanri		medicine	6
Dindasa	*Juglans regia*	medicine/food	5
Paloojh	*Cedrus deodara*	firewood	5
Shugloo	*Berberis brandisiana*	medicine	5
Chukni	*Jurinea doloamiaea*	medicine	4
shangoy?	*Podophyllum hexandrum*	medicine	4
throthoo		medicine	4
Trepth	*Saussurea candolleana*	food	4
Buti	*Geum elatum*	medicine	3
Condroye			3
Honey		food	3
Mashwani		food	3
Pishmaali		check	3
Ratrati	*Arnebia benthamii*	medicine	3

Tuktuko	*Caltha palustris*	medicine	3
Bhang	*Cannibis sativa*	medicine	2
Ghanaar			2
Golgoch			2
Kundair		food	2
Loh		medicine	2
Phebel	*Mentha longifolia*	medicine	2
sezan	*Ziziphus sp.*	medicine	2
Chodan	*Taxus wallichiana*	medicine/food	1
Choko	*Aconogonum alpinum*	medicine	1
dat Paloon		perfume	1
Deodar cones			1
fats of dead bear			1
Hayoon			1
Kakoo		food / med	1
Kandoli			1
Koar		check	1
Kunroo		medicine	1
Kunrun		medicine	1
maashmauri			1
Palon	*Allium humile*	food	1
Peechii	Sedum ewersii	food	1
pheasants			1
Sheetel - check			1
Shush			1
Sumbul	Adiantum venustum	medicine	1
Tarmera		medicine	1
yomi			1
yoshaaye			1
zeshay			1
Zumpi/Yumpi	*Nepeta sp.*		1
Kukuaanchin (eye of hen)			1
Washwine			1