2. Background information on research subjects

"I have to feed the animals, for our livelihood depends on them. We have to take more care of our animals than our children".

(Punjabi rural women, quoted in Carpenter, 1991: 70)

2.1. Ethnoveterinary research

While Western medicine strayed away from herbalism, 75%-90% of the rural population in the rest of the world still relies on herbal medicine as their only health care. The long tradition of herbal medicine continues to the present day in China, India, and many countries in Africa and South America. In many village marketplaces, medicinal herbs are sold alongside vegetables and other wares. Practitioners of herbal medicine often undergo a rigorous and extended training to learn the names, uses, and preparation of native plants. (Mc Mahon *et al*, 1994). The people's Republic of China is the leading country for incorporating traditional herbal medicine into a modern health care system. The resulting blend of herbal medicine, acupuncture, and Western medicine is China's unique answer to the health care needs of over a billion people and animals. While China melded traditional practices with Western medicine, in India traditional systems have remained quite separate from Western medicine. At Indian universities, medical students are trained in Western medicine; however much of the population puts its belief in the traditional systems. In addition to Ayurvedic medicine, which has a Hindu origin, Unani medicine with its Muslim and Greek roots is another widely practiced herbal tradition. Economics is also a factor in the reliance on indigenous cures, since the cost of manufactured pharmaceuticals is beyond reach for most of the population (Levetin *et al*, 1994).

Since the domestication of animals some 10.000 years ago, rural communities have been experimenting with and developing their own veterinary theories and techniques. The oldest known veterinary texts originate from Egypt, India and China documented as early as 269 BC. Until the early 1900's most veterinary practices could be considered traditional in the sense that they derived from long experience and underwent little fundamental change in many of their tools and techniques. With the discovery of modern chemo-therapeutics in the twentieth century, however, the First World began to abandon much of its own medical and veterinary tradition in favor of what is now viewed as conventional or modern medicine (Mc Corkle *et al,* 1996).

In all parts of the world, indigenous peoples discovered and developed medicinal uses of native plants. About 75% of the biochemical components in drugs have the same or similar forms of application in Western medicine as in traditional healing systems.

For example The National Cancer Institute in USA currently has used 50-100 per cent of its budget for research on ethno-botanical information in traditional healing methods which could be of importance for cancer and AIDS medicine.

Well-known drugs developed from tropical diversity are Vinblastine and Vincristine from *Catharanthus roseus*, Tubocurarine muscle relaxant from *Talabash curare* and Strophantin for congestive heart failure from *Strophantus gratus* (Lans, 2001). Other drugs which are commercially used in veterinary medicine and are similar to traditional plant extracts are Atropine from *Atropa belladonna*, Digoxin working as cardiotonic from *Digitalis lanata* and Adrenaline from *Ephedra sinci* (Anzuino, 1999). Not only medicinal plants form the bases of modern medicine, also ethnoveterinary practices have formed the foundation of several modern uses. For example the use of intrauterine device (I.U.D.) In human medicine originated from traditional veterinary medicine. Desert nomads placed small stones into the uteri of camels to prevent pregnancy during long caravan journeys. This was the foundation for the modern use of I.U.D. as contraceptive (Adejuwon *et al*, 1985).

Ethnopharmacological surveys provide the rationale for selection and scientific investigation of medicinal plants, since some of these indigenous remedies are already used by significant numbers of people over extended periods of time (Lans, 2001) Most pharmaceutical companies have some form of research programs investigating plants with the aim of creating allelochemicals (bioactive secondary compounds) and new marketable drugs. Their findings are often based on well funded research, it is estimated that it cost $320 million to develop a new drug over 10-15 years (Anzuino, 1999).

Historically both human and animal medicine have relied heavily on traditional treatments and plant materials. Even now in human healthcare 80 to 90 per cent of the planet's inhabitants still rely mainly on traditional treatments and practitioners. Similar figures appear to hold for animal healthcare (Mathias *et al*, 1996). The traditional theories or indigenous knowledge which is local knowledge unique to a given culture or society still forms the basis for agriculture, health care, food preparation, education, environmental conservation and a host of other activities. It is build upon and passed down from generation to generation, usually by word of mouth. Farmers and livestock raisers throughout the developing world rely on traditional practices to keep their animals healthy. Such ethnoveterinary medicine includes the use of medicinal plants, surgical techniques and management practices to prevent and treat livestock diseases. Interest in ethnoveterinary medicine has risen over the last decade. Some scientists and development professionals recognize its potential as an alternative or complement to Western-style veterinary medicine (McCorkle *et al*, 1996).

Ethnoveterinary also known as veterinary anthropology or local knowledge systems is a relatively young discipline in the sense that it got recognition only during the last 10 to 15

years. The term ethnoveterinary was invented by McCorkle in 1986. It was first used by her in her article “An introduction to ethnoveterinary research and development”.

From analysis of literature on ethnoveterinary medicine some conclusions can be drawn. Ethnoveterinary research and development is still very young, field research has mainly been done in Africa, less in Asia and very little in Latin America and elsewhere. These researches are mainly descriptive (practices, prescriptions, linguistic analyses). Few analytical studies (e.g. Bauman et al., 1989 compared the knowledge of pastoralists with epidemiological data on contagious *caprine pleuropneumonia*) have been carried out (Mathias, 1996). Major work in this field has been done by women (Evelyn Matthias and Constance McCorkle especially), a veterinarian and a sociologist, a combination which has led to a broader understanding (Van’t Hooft, 1995).

Ethno- and western veterinary medicine have much to learn from each other when it comes to their practical application. As Last (quoted in McCorkle *et al.*,1996) observes for medical systems cross-culturally, “In theory.....all systems may work; in practice, all have successes and failures, with some systems scoring much higher in particular areas of medicine depending on the social, cultural and economic context in which they are applied”. Indeed, it would be naive to think that either ethno- or Western science alone is likely to provide a sufficient solution for all development problems present today. “The aim is not to impose one medical paradigm on another but rather to create contact points between them” (Salih quoted in McCorkle *et al.,*1996).

2.2. Gender bias in livestock research

Predetermined thinking patterns and the fact that livestock research has long been dominated by male researchers has caused gender bias in social and natural sciences.

“This means that scientists take men’s behavior and predominance to be ‘ standard’ (e.g., men are the ‘farmers’, ‘foresters’, ‘leaders’, ‘shamans’ etc.) whereas women are given little importance or their behavior is seen to be ‘deviant’ in comparison with the male standards” (Howard Borjas, 2001 forthcoming).

As gender is the primary social differentiation among adult economically active members of a society, it is logical that specific spheres of activity will become the specialized domains of different genders, as they increase their knowledge and skill over time. As a result of this gender specialization, the indigenous knowledge and skills held by women often differ from those held by men (Fernandez, 2000). Thus gender-based division of labor has an effect on the ethnoveterinary knowledge of men and women. It also implicates that interventions focus on problems identified by men and thus projects neglect important human resources, for example, those receiving para-veterinary training are usually men (Davis, 1995). Research

and development efforts have often treated the household as the unit of planning, this does not necessarily deliver benefits to all members of the family. Assessments of poverty based only on household income may conceal much hidden poverty. Members of a household have different positions and different needs and can therefore not be assumed to have the same benefits from research and development efforts.

Most authors indicate that herding and the care of livestock are almost exclusively the domain of men. The unwritten implication is that women have only limited knowledge of animal health care issues. It is clear from recent publications that such perceptions have consciously or unconsciously excluded women from the design and implementation of development projects (Awa *et al.,* 1992). This implicates that women knowledge is not recorded and an important body of knowledge is being missed.

Due to male cash labor and migration, more and more women have the sole responsibility for the care of animals, which implies a shift in the use of ethnoveterinary remedies in relation to western drugs. There is then a need for ethnoveterinary info for these women. Also because of women handling small stock, dead animals, processing of milk and meat and the care of young and weak stock at home, they need to be included in any ethnoveterinary research.

Young (1993), Perezgrovas (1996), Davis (1995), and McCorkle (1996) all agree that research has neglected to examine women's knowledge on animal health. Only a handful of projects have addressed, or are addressing, women's knowledge in animal health systems specifically. These include the university of Chiapas work with the Tzotzil shepherdesses and their sheep (Perezgrovas, 1996).

2.3. Governmental animal healthcare services

Animal husbandry is the most important activity in rural Rajasthan in which sheep husbandry takes up an important part. Income from livestock accounts for 30% to 50% of the rural households income, for pastoralists this figure is much higher, ranging up to about 90%. Livestock sector tops in rural employment with 4.50% growth rate against 1.75% for all sectors and 1.10% for agriculture (Kurup, n.d.).

However India still has many animal epidemics, across all species and recurring incidence of the epidemics (most importantly Foot & Mouth Disease) which severely affect the livestock economy of the country. Livestock enterprise in India is predominantly the endeavor of the small holder. Over 70% of all households own livestock and earn supplementary incomes out of them. Though losses due to livestock diseases had not been precisely quantified, estimates are that the total annual loss is around Rs. 50 billion some 10% of the total output value of the entire livestock sector in India in 1991 (Kurup, n.d.). Figures on losses due to specific sheep diseases could not be obtained, but since sheep husbandry takes up a large

part of the livestock sector- especially in Rajasthan- these losses are substantial. Foot and Mouth disease, peste des petits ruminants sheep pox and haemorraghic septicaemia are some of the sheep diseases which cause substantial losses in Rajasthan in terms of smaller average returns to -in this case- the Raika sheep breeders and to the livestock sector in India as a whole.

Furthermore, India's inability to eradicate (or even control) animal epidemics, has compromised the country's competitive advantage in the global market place, as non-compliance to the "sanitary and phyto-sanitary regulations" of the WTO deprive Indian livestock products even the benefits under the "minimum access clause" of the world trade order, open to all countries (Kurup, n.d.)

Kurup further stated that " the institutional network of the departments have grown at the expense of the quality of the services they provide, as state governments face growing resource problems to support the system (meaning public sector livestock service network). Financial constraints have reduced State Funding for these services to barely the establishment costs. There is growing realization within Governments that they will have to pass on at least a part of the cost burden for the services to the livestock owner and of the need to evolve alternate mechanisms for service delivery, in the near future".

The current system of health care suffers from a curious dichotomy. On the one hand an impressive infrastructure has been created for the delivery of health services which includes district hospitals, block level hospitals, animal health centers etc. However the percentage of the animal population actually covered by these health services is very low, this especially counts for nomadic pastoralists. Apart from poor coverage in rural areas, many other problems exist, such as, economic sustainability of such a model which requires the pumping in of more and more financial resources to sustain it. In the light of such ground realities it has become necessary to critically review the strategy that India should adopt in order to achieve self-reliance in animal health care (Balasubramanian, 2001).

In contrast to the above scenario, there exists an indigenous model of animal healthcare, which relies on local resources, has traditions of self-help, is autonomous and is entirely community supported. It has been due to the western ethnocentric outlook of health policy makers and planners that the government has so far been ignoring the existence of these indigenous traditions of healthcare (Balasubramanian, 2001).

In this regard NGO's, community based organizations, could play an important role.

The Raikas posses a large amount of ethnoveterinary knowledge but so far little efforts were made to record information on ethnoveterinary knowledge and perception regarding sheep diseases. An evaluation report on the Camel Husbandry Improvement Project ("CHIP") made clear that the camel breeding Raikas of Pali-district in south-central Rajasthan voiced their strong discontent with the difficulties of obtaining veterinary services (Köhler-Rollefson *et*

al.,1997). The same appears to hold for sheep breeding Raikas. According to a survey conducted in Pali district, livestock keepers will much rather resort to their own resources and experience, consult a traditional healer or, if all else fails, visit a spirit medium. In the survey area, the traditional healthcare system was still functioning, with people regarded by the community as especially knowledgeable in animal diseases available in most villages (Rathore *et al*., 1997).

2.4. Domestic animal biodiversity

Every week the world loses two breeds of its valuable domestic animal diversity, the UN Food and Agriculture Organization (FAO) said in its 3rd edition of the "World Watch List for Domestic Animal Diversity". The study was co-published with the UN Environment Program (UNEP). Over the past decade, FAO has helped collect data from some 170 countries on almost 6,500 breeds of domesticated mammals and birds: cattle, goats, sheep, buffalo, yaks, pigs, horses, rabbits, chickens, turkeys, ducks, geese, pigeons, even ostriches, see Appendix 2A. One third are currently at risk of being extinct, according to Keith Hammond, Senior Officer of FAO's Animal Genetic Resources Group.

The FAO Global Databank for Farm Animal Genetic Resources contains information on 6,379 breeds of 30 mammalian and bird species. Population size data is available for 4,183 breeds of which 740 breeds are already extinct and 1,335, or 32 percent, are classified at high risk of loss and are threatened by extinction. Domestic animal diversity is unique and cannot be replaced, As much as novel biotechnology may attempt to improve breeds, it is not possible to replace lost diversity. Loss of diversity is forever. Biotechnology will not be able to regenerate diversity if it is lost (FAO, DAD_IS, 2001).

There is an additional important aspect to the indigenous knowledge system of pastoralists that has been overlooked. Pastoralists must be regarded as crucial guardians of biodiversity, because they have developed and maintain a large variety of indigenous livestock breeds. Many of these breeds are adapted to specific and often very difficult environmental conditions (Köhler-Rollefson, 2000).

Virtually every pastoral group has created a specific and pheno-typically distinct animal breed. This is a consequence of the fact that in traditional pastoral societies breeding stock is rarely if ever sold, and changes in ownership occur only within circumscribed social networks, at occasions such as births, circumcisions, marriages or other crucial stages in the life cycle. Hence, the exchange of genetic material is limited to the social network within a tribe or other endogamous unit. Redistribution of genetic material between different social groups occurred only during raids of tribal warfare which were not uncommon among such groups as the Bedouins of the Somalis. But, by and large, the genetic composition of a social

group's animals remained virtually unchanged over generations. In this respect the livestock holdings of a pastoral group resemble very closely the recognized herdbook of registered breeds of western cultures: both derive from a small original population and represent essentially closed gene pools (Köhler-Rollefson, 2000)

Local livestock breeds and minor species often represent the lifeline of rural populations. While they may not be able to compete with 'improved breeds' in terms of productivity, they fulfil a much wider range of functions and provide a larger range of products. They thrive even under low levels of inputs, thus in marginal environments, their maintenance is ecologically more sustainable. Requiring lower levels of health care and management, they entail a lower work load for women in comparison with improved breeds (IK Development Monitor, 2000).

Many of these indigenous livestock genetic resources are threatened: according to the FAO, one third of the world's estimated 5000 livestock and poultry breeds are endangered. Maintenance of livestock genetic diversity is mandated by the Convention of Biological Diversity (CBD). This legal instrument specifically calls for the conservation of agro-biodiversity in the environment that have nurtured and shaped it. It also emphasizes the need for the active involvement of indigenous communities and the role of local knowledge and institutions in conservation. But so far the groundwork for such an approach has not been laid. Indigenous knowledge and institutions that maintain domestic animal diversity are only now beginning to be explored (*ibid*).