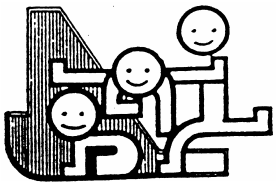

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The Kachimayu River Valley

Pedagogical Trail and Ecological Reserve for the city of Cusco

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Abstract:

Concepts of interactive learning

Pukllasunchis is a non-governmental organisation specialised in bilingual and alternative education as well for kindergarten, elementary school and secondary school as for trainee workshops for State teachers. Since 19983 it is recognised as official pedagogic institution by the Peruvian State, financially supported by Private Swiss funds, public contracts with the Peruvian State and international aid of the European Community. The main aim of Pukllasunchis is to develop teaching methods that motivate each pupil for an active and creative involvement in his/her social, cultural and ecological environment. One very important object in this formation is to give the pupils the possibility to experience and reflect critically their present reality and to give them the knowledge, aptitude, strength and confidence to work on their proper future.

Cusco and the Valley of the River Kachimayu

Cusco, the ancient capital of the Inka Empire (12th century until 1533), lays on the eastern slope of the Central Andes at 3'200m above sea level in a subtropical mountain landscape. The traditional Quechua-speaking societies in the country suffer very strong economical and social neglect, whereas the Spanish-speaking

population of the city strives for a more modern but also more egocentric way of live. This deep cultural and economic conflict leads all parties of the local society to a very extensive use of the primary recourses such as the cultivated land, the wood and the water. The Valley of the River Kachimayu as one of the surrounding ecosystems of Cusco is especially affected by this social imbalance and faces enormous ecological problems as consequence of the pressure of all kinds of contradictory interests. On the one hand the ecological dependence of the urban population on the extraction of primary products motivates the rural population to overuse their ground. On the other hand the desperate economic and social situation of the rural societies drives especially the young generation towards the urban agglomeration which leads to a progressive disturbance of the socio-demographic equilibrium.

The Pedagogical Trail

The main object of the pedagogical Trail is to inform the pupils of Pukllasunchis and the large public of Cusco about the local ecosystems and to make the different social groups aware of the ecological, economical and social interactions and dependencies in this region. The observer should learn about the diversity of flora and fauna in his/her environment, about traditional Andean medicine and ancient mythological and eco-social meanings of many plants and animals in the Inka society. The highly experienced and very harmonic management of all different kinds of ecosystems by his/her ancestors should show the visitor an example of a society who practiced a high level of ecological sustainability. The active exposition with the different ecological and social subjects of the region in the past and in the present should create a common discourse about possible solutions of the different problems and should motivate the large public for a process towards a more sustainable use of their primary resources.

The Ecological Reserve

The ecological overuse of an already labile ecosystem in connection with very complex social interests needs a very adequate way of problem solving, respecting all the different interests and including all the involved groups in the process towards a more sustainable society. One step in this process is the protection of this area by the formation of an Ecological Reserve. This legal frame could define the duties and rights of the different groups of interest in the use of the primary recourses and revalorize the social position of the rural population and their work for the whole economical system of the region. The sustainable use of land in connection with alternative forms of productivity could serve as an example for other Andean regions with similar social conflicts and ecological problems.

The case study

The project-report is divided into three main parts: The first part (appr. 60 p.) exposes the socio-economical context of present ecological inadequacies and shows traditional methods of sustainable land-use. It proposes practical solutions for the local problems and suggests a process towards a sustainable use of primary recourses. The second part (appr. 70 p.) contains a large investigation of the local flora and fauna presented as a foto-register of approximately 300 species drawn up as a co-operation of Pukllasunchis and IEPLAM (Institute for aromatic and medical plants) between January and May 1998. It shows the ecological and social importance of the different plants and animals today and in the past and explains the religious and socio-political signification of some of these species in the time of the Inka and in the original societies of the region nowadays. The third part (appr. 20 p.) contains an evaluation of the present economic, social and ecological situation of the local population based on a profound inquiry conducted by Pukllasunchis in May 1998 in the Valley of the River Kachimayu. The case study serves as a practical guideline and may motivate the effective protection of the different ecosystems and recourses of the region.

The Projects:

Pukllasunchis: Concepts of interactive learning

Pukllasunchis is a non-governmental organisation specialising in bilingual and alternative education for kindergartens, elementary schools and secondary schools, as well as training workshops for state school teachers. Since 1983 it has been legally recognised as an official pedagogical institution by the Peruvian state and financially supported by private Swiss funds, Peruvian government funding and international aid from the European Community. The main aim of Pukllasunchis is to develop teaching methods, which motivate pupils to become actively and creatively involved in their social, cultural and ecological environment. One very important object in this training is to give pupils the resources to reflect critically on their present reality and to develop the knowledge, skills and confidence to shape their own future.

Fig. 1: Children from a rural community, experiencing the magnifying effect of a binocular.

Cusco: A region of contrasts

Cusco, the ancient capital of the Inca Empire from the 12th century until 1533) lies on the eastern slope of the Central Andes at 3,200 m. a. s. l. in a subtropical mountain landscape. The traditional Quechua-speaking population of rural areas suffers from profound economic and social neglect, while the Spanish-speaking population of the tourist-oriented metropolis strives for a more modern and more independent way of live. This deep cultural and economic conflict has led to a continuous rural exodus. These migrant-fluxes have provoked on the one hand the abandonment of large areas of far off agricultural territory, on the other an intensification of the use of primary resources in the surroundings of the densely populated areas. As a result, all sectors of

society in Cusco, one of the classic Peruvian examples of rural to urban migration, are suffering the progressive destruction of their natural resources: forest, water and fertile ground.

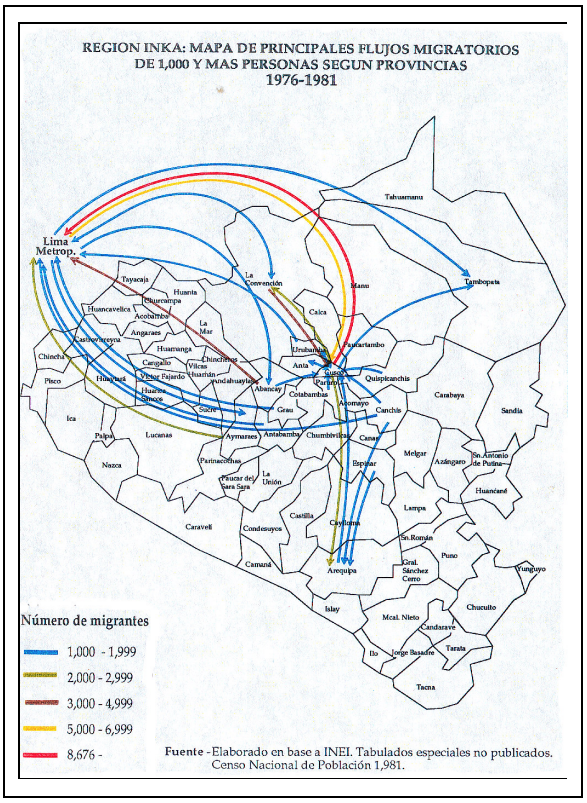

Fig. 2: Mayor migrant-fluxes in the "Región Inka" within 1976 – 1981 (Ramos; 1996).

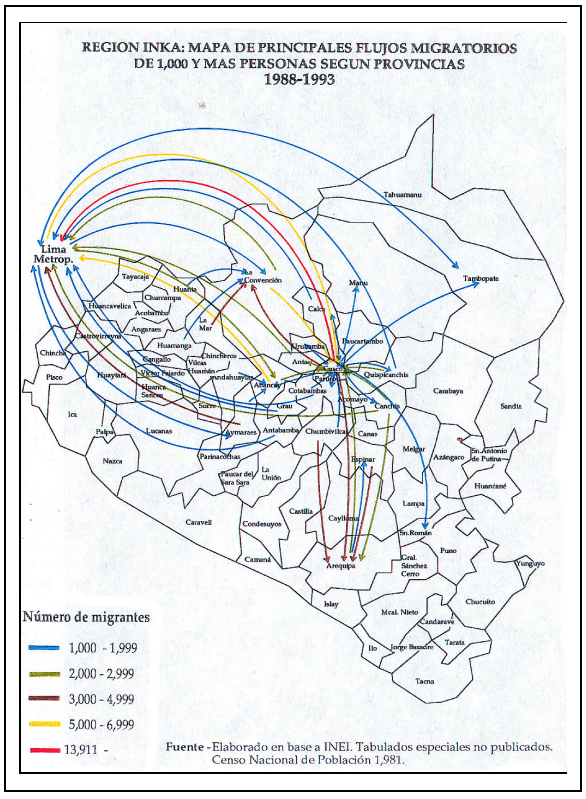

Fig. 3: Mayor migrant-fluxes in the "Región Inka" within 1988 – 1993 (Ramos; 1996).

As Fig. 2 and 3 shows, Cusco's attraction to immigrants has decreased in recent years. In the years 1976 – 1981, the total number of immigrants was approx. 21,000, while the total number of emigrants was approx. 18,000. The netto-fluxe hence was pointed into Cusco. Between 1988 and 1993 however, the direction of migration changed (total immigrants: approx. 31,000, total emigrants: approx. 35'000) in favour of an influx to Lima. At the root of these developments is the fact that the attraction of the area was increasing throughout the period of 1976 – 1993, mainly as a result of tourism. But by the end of the 1980's, the region had reached its ecological, social and economic saturation point.

The Kachimayu River Valley: Conflict of interests

As one of the surrounding ecosystems of Cusco, the Kachimayu River Valley is especially affected by this social imbalance and faces enormous ecological problems as a result of the pressure of contradictory interests. The ecological dependence of the urban population on the primary products motivates the rural population to overuse their ground. At the same time the economic and social deprivation of the rural areas drives the younger generations in particular towards the urban conglomeration which leads to a progressive disturbance of the socio-demographic equilibrium. This haphazard growing of new peri-urban communities produces negative effects on both social and ecological levels. The resulting external costs have to be covered eventually by the society as a whole. Such collective mismanagement results in a

sub-optimal situation not only ecologically but also economically because the society is not functioning according to its collective pareto-optimum (Frey, Staehelin-Witt; 1991).

The rural community: A culturally and socially marginal society

Between May and August of 1998 Pukllasunchis conducted an enquiry in all the rural and peri-urban communities of the Kachimayu River Valley (Pukllasunchis; in elabor.). Using this wide sample it is possible to make certain statements about the socio-cultural background and the ecological and economic circumstances of these societies.

Fig. 4: Native language of the families living in the communities in the rural zone of the Kachimayu River Valley (Pukllasunchis).

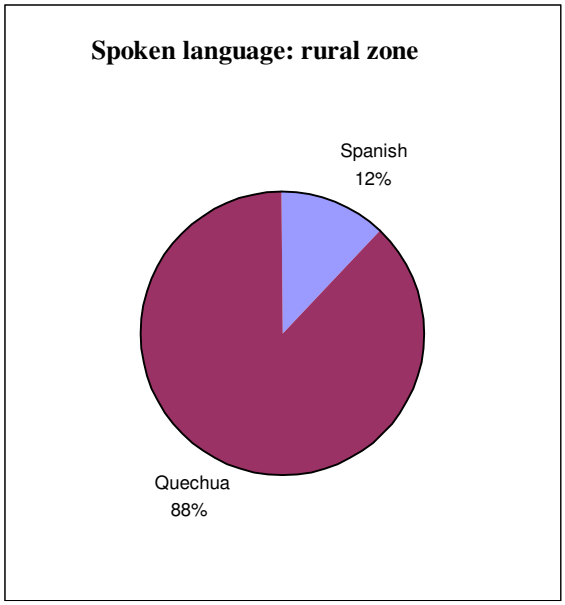

Fig. 5: The language that is used to communicate within the family in the rural zone of the Kachimayu River Valley (Pukllasunchis).

It is apparent from this enquiry that nearly 100% of the families in the communities of the rural zone – Huallarqocha, Tambomachay and Yuncaypata - are originally Quechua-speaking. But it has also been established that 10% of the originally Quechua-speaking families prefer to raise their children in the foreign language of Spanish. It would appear that this stems from a desire to facilitate access for the younger generation to the modern, socially and economically privileged, Spanish-speaking society of Peru. But at the same time, these families are negating their social origin and relinquishing their cultural identity. This ongoing process is prevalent in the rural regions of the Andes, and the resulting loss of traditional knowledge in areas as medicine, mythology, ecology and history is incalculable, continual and irretrievable.

The historical relics: The integrating society of the Incas

Alongside architecture and governmental and military organisation, one of the mayor achievements of the Inca society was the solar calendar that was introduced by the Inca Cusi Yupanqui Pachacútec (1438 – 1471). Pachacútec means in Quechua “the person with whom began a new era”. He was the emperor who initiated the expansive military campaign of the Incas to extend their kingdom towards a pan-Andean empire (Espinoza; 1997).

Since the pre-Hispanic Andean societies knew no monetary system they cultivated an inter-regional, centrally administered system of redistribution within which maize was accorded a particularly high value. Considering the interconnectedness of political and religious power with the agricultural production of these highly valued crops, an inter-regional time system such as the solar chronology is of vital importance. The sun was the only universally observable time indicator within the various eco-levels that make up the complex macro-ecosystem of the Andes. It is supposed that a sequence of grave eco-collapses, followed by the bloody elimination of the Inca ruling elite, led to the implementation of the new chronology. This reorganisation of the state set the violent events in motion that were to lead to the eventual expansion of the Inca Empire from northern Chile to southern Columbia. From this socio-scientific revolution onwards, time was measured throughout the whole Inca Empire by a system of four columns constructed in specific positions according to the area in such a way that the rising sun entered the three interspaces synchronically as the season progressed. Each of the three time intervals corresponded to the sowing period of one of the three main eco-levels of the Cusco region (Earls; 1976).

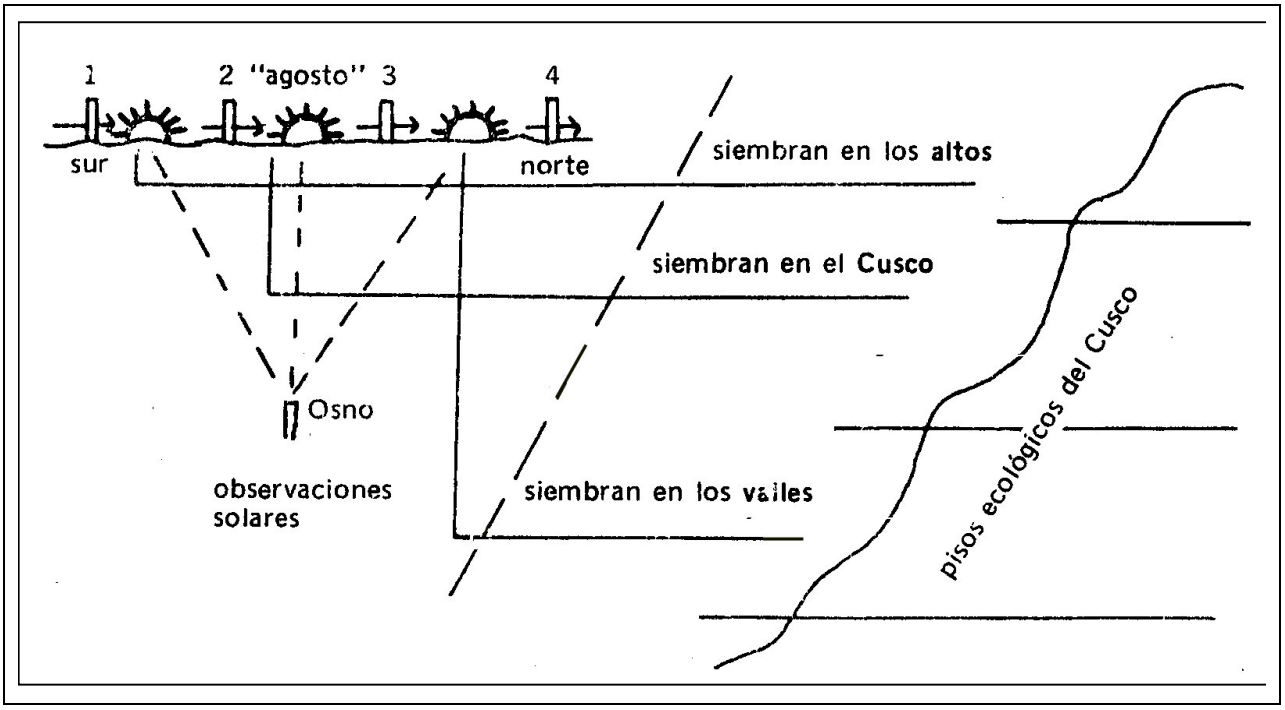

Fig. 6: The solar chronology in relation to the three eco-levels of the region of Cusco (Earls; 1976).

But it is also known that the scientific superiority of the Incas was the result of a long empirical evolution of different systems of calculation that started with the development of a lunar chronology to replace the earlier chronology, which determined the seasons according to biotic indicators such as the growth of specific plants. It is assumed that this change was triggered by a series of collapses of the agricultural system, caused by flawed interpretation of the natural signs by the Inca religious elite. As a direct result of these eco-social catastrophes, the Inca Huiracocha, the father of Pachacútec, was finally able to

introduce the lunar chronology alongside the expulsion of the sacerdotals who were responsible for these catastrophes and at the same time expand his own political power. However the new system was based on the sidereal month, a unit of 27.3 days. Hence, a year of twelve sidereal months was 328 days, 0.4 days less than it is exactly. Projecting this error to the solar year of 365.25 days, the time system of Inca Huiracocha resulted in a loss of 0.445 days in each solar cycle. It is supposed that this error of calculation led to other grave ecological catastrophes within about 40 years and hence to enormous socio-political turbulence. At the end of this second revolution, Huiracocha was killed by Pachacútec who installed the sun as the mayor god, Inti (Earls; 1976).

Besides their knowledge of astronomy and its application to the local agriculture, the Incas also had an advanced understanding of complex physical and ecological processes. It is supposed that they knew about the physical effects of terracing in a steep landscape. It has also been proven that this system not only retains humidity and prevents the erosion of fertile soil, but also that it improves significantly the local microclimate. As a result the difference in altitude between natural eco-levels is reduced by a factor of 71. In other words, certain agricultural species that may naturally be separated by 70 metres of altitude can be cultivated within one single metre. This facilitated an optimal distribution of agricultural activities and the breeding of a maximum number of genetic species (Earls; 1976).

Fig. 7: System of terraces near Inkiltambo to breed and cultivate different kind of maize.

Another very efficient Inca system to improve the quality of the soil and the microclimate of an eco-system is the construction of small artificial lakes, called Cocha's. They were built particularly in high altitudes for the cultivation of potatoes because they protected the soil from erosion and loss of humidity. It has been proven that they altered the local climate positively by saving the solar heat during the day and reflecting it during the night. In this way, the Incas were capable of stabilising locally a climate which, in high altitudes in particular, is prone to extreme variations of temperature (Espinoza; 1997).

Fig. 8: Cocha of Llulluchayoc Pellorcocha to facilate the cultivation of potatoes in high altitudes.

In summary, although the Incas didn't know the precise scientific bases of their techniques, they knew very well how to influence natural systems for maximum integration and sustainability.

Natural resources: Possibilities and dangers

The Kachimayu River Valley shows a wide diversity in its flora which adapted to the three ecological levels: the very humid sub-alpine, sub-tropical wasteland higher than 3900 m.a.s.l., the humid, mountainous, sub-tropical forest between 3900 and 3500 m.a.s.l. and the dry mountainous low sub-tropical forest between 3500 and 3350 m.a.s.l. (IIUR; 1995). Pukllasunchis conducted an inicial investigation in collaboration with the Institute of Ecology and Medical and Aromatical Plants (Instituto de Ecología y de Plantas Medicinales y Aromaticas IEPLAM) between January and June of 1998. About 190 different species have been identified by their Latin, Quechua and Spanish names and registered electronically with photos. About 45 of these plants are known traditionally as medical remedies for all kinds of diseases and another 5 flowers are handed down as ornamental or mythical plants of the Inca era. Nowadays the local population is slowly losing its traditional knowledge of these plants as a result of the increasing influence of modern medicine in all the regions of Peru.

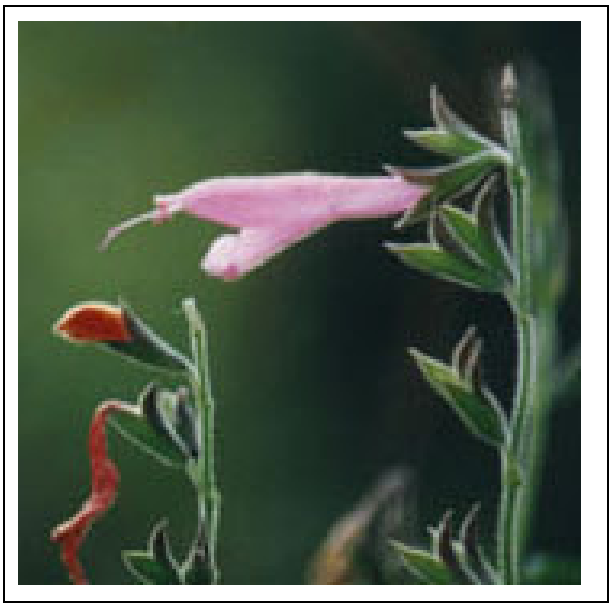

Fig. 9: Salvia opositiflora (Quech.: Ñuqchu): A very rare pink mutation of the originally red species. In the Inca society it was used as ornament for the mummies.

Fig. 10: Xantium spinosum (Quech.: Allqo kisqa): Tea made from the leaves cures renal infections, the roots have contraceptive effects when consumed at the 21st day of the menstrual cycle.

Many of these species specially adapted to specific ecological conditions are easily overpowered by stronger, more quickly expanding species (pioneer vegetation). The main reason for this is overuse of the soil through extensive cattle, sheep and goat breeding. Based on the inquiry conducted by Pukllasunchis (1998), there are an estimated 290 lamas and 10 alpacas as native species, and 530 cows, 1800 sheep, 130 goat and 300 pigs as introduced species that in the relatively small area of the rural zone. In comparison with the two native species of domestic animals, the four hoofed foreign animals have a much larger ecological impact on the vegetation. One reason for this is that they are incapable of biting off the grass because they have only one row of teeth. The other reason for their negative impact is the destructive influence on the soil of their hooves. Besides these physical effects the enormous number of animals that are grazed in a very limited area impacts negatively on the chemical composition of the soil through their defecation.

Extensive farming of mainly nutrition-extractive species like maize and potatoes makes another grave negative impact on the fertility of the soil. Most of this farming takes place in extremely steep terrain that is exposed to the erosion impact of the heavy summer rains. Many fields are harvested two times per year – first potatoes, later in the season maize – and some are even used for a third time to graze the herds during the dry winter season. The mixed cultivation of these crops together with native leguminous plants (Leguminosae sp.) is known of but very rarely applied, probably as a consequence of lack of demand. This extreme over-use of the ground leads to a progressive erosion of the fertile soil which in turn results in an expansion of the terrain used for agricultural purposes.

An additional problem for the nutrition equilibrium is the enormous loss of water caused by the loss of native woodland. Studies in the classification of eco-zones in this region have showed that according to the existing microclimates at least 45% of the whole area there should be covered by wood. However, the appropriate percentage of terrain used for pure agriculture is estimated at about 5% and about 35% for pastureland (IIUR; 1995). In reality not more than 5% of the Kachimayu River Valley are covered by wood, mainly due to recent reforestation through introduced species such as Eucalyptus (Eucaliptus globulus). The loss of protection against the strong sun radiation and the raised water consumption of the

Eucalyptus both contribute to the increasing decomposition and as a consequence to the progressive erosion of the fertile soil.

Fig. 11: Polylepis incana (Quech.: Q'euña): The only native tree that still exists in small woods on the banks of the River Kachimayu.

Fig. 12: Escallonia resinosa (Quech.: Chacha-como): Another native tree whose incidence across the whole region is very rare not to be found in woods anymore.

The destruction of a number of different micro-ecosystems, belonging mainly to woodland or meagre grassland eco-systems, is resulting increasingly in a loss of bio-diversity in the local flora. The disappearance of these habitats results in indirect negative effects on the bio-diversity of the fauna, of insects and birds in particular, but also of reptiles and small mammals. The whole equilibrium of the system has shifted and the wide variety of specially-adapted species have been replaced by more generally-adaptable species. A new ecological equilibrium such as this is often less buffered against exterior physical impacts and therefore much less stable and less auto-controlling. The eventual consequence of the disturbance of such a delicate equilibrium may be a mayor ecological collapse.

Another challenging ecological problem is the organic overload of the water (eutrofication) by human and animal excrement and detergents. Both the river and the open water pipes are often so highly polluted that already in the first community of the current the drinking water can not be consumed uncooked. This situation results in high external costs for all the communities in the valley and also has a strong negative impact on the aquatic ecosystems and, in consequence, on the survival of certain aquatic insects and amphibians. These animals depend directly on the purity and quality of the water. The organic overload can provoke an explosive reproduction of certain organotrophic aquatic species, while the toxic detergents reduce the survival possibilities of the more sensitive aquatic animals. On an indirect level, the state of aquatic systems also affects the numbers of many birds and reptiles that hunt these aquatic insects and amphibians.

Fig. 13: Anchotatus peruvianus (Quech.: K'aspi kuru): The stick insect depends on uncultivated grassland.

Fig. 14: Nycticorax nycticorax (Quech.: Huachua): The heron suffers from the disappearance of healthy humid biotopes and of safe breeding-places.

Fig. 15: Aeshna sp. (Quech.: Karta karta): The dragon-fly, as an aquatic insect, depends directly on the purity of aquatic systems.

Fig. 16: Vanellus resplendens (Quech.: Lique lique): This water bird depends indirectly on the abundance of its aquatic nourishment.

The Pedagogical Trail: The connection between Ecology and History

The main target of the Pedagogical Trail is to inform both pupils and the public of Cusco about local ecosystems and their history and to explain the ecological, economical and social interactions and dependencies in this region.

On a scientific level, visitors to the Pedagogical Trail will learn about the diversity of native and introduced flora and fauna in the different ecological levels of this macro-ecosystem. They will hear about the numerous circumstances and requirements for life of the different organisms, about the specializations and symbioses that facilitate their survival, and about the various survival strategies that thus have evolved over thousands of years.

On a historical level, they will have access to detailed information about the numerous constructions of the Inca epoch and their social and economic significance. They will understand the connection between the hierarchical political structures of the Inca state and its integral organization and administration of cultivation on all eco-levels. Visitors will learn about the empirical knowledge of the Incas in the areas of astronomy, physics, medicine and biology, about their understanding and managing of complex systems and about their mythical life and modes of religious belief. The adept and harmonious organization of a wide variety ecosystem exhibited by their ancestors will provide for the visitors an example of a society, which achieved a high level of ecological sustainability.

By comparing ancient and recent forms of land-use, the visitors will examine on an eco-sociological level the benefits that can be extracted by the human from these natural resources, but also the possible noxious effects on fertility of the antropic use of nature. Through the study of the interactions between the biotic and abiotic elements of a particular ecosystem visitors to the Pedagogical Trail will be able to understand the influences and interdependencies between the antropic world and its natural environment. Through the direct experience of the mythical world of their ancestors and the nature of the area itself, they will also recognize the significance of nature not only as a vital physical but also as a unique spiritual source of live.

This active exposition of the different ecological and social debates of the region, past and present, will facilitate an open discourse about possible solutions to the various problems. Collective discourse amongst large areas of the local society will facilitate the move towards more sustainable use of primary resources.

The principal peculiarity of the Kachimayu River Valley is that despite its steepness, the majority of it is populated and cultivated. The Valley is easily accessible by footpaths but only at a few points is it accessible by car. Connections to the tracks are possible from four areas easily accessible by public transport. The one east-west axis leads the visitors from Yuncaypata downhill to the river and from there by an ancient Inca Trail up to the “Huaca de la Luna” (Temple of the Moon at Roca Cancha). The other one leaves from the archaeological site of Tambomachay following the river in a southerly direction down to the peri-urban village of K’ari Grande. On this route important archaeological constructions such as Callachaca, Inkiltambo, Ccorquengcapata, Llulluchayoc Pellorcocha, Roca Cancha, Puka Pucara, and Tambomachay constitue the historical part of the Trail. In respect of the ecological subjects, the two bisecting paths give an important insight into the different eco-levels and eco-systems of that region. The north-south track leads the visitors through the three eco-levels of the Kachimayu River Valley, while the east-west track shows the strong influence of the topographic and geographic situation of the different microclimates within one only eco-level (see Fig. 16).

The large volume of information will be transmitted to the visitors primarily by means of big boards on the route that explain these subjects through coloured pictures and verbal descriptions, written in Spanish, Quechua and Latin. They will have to be constructed from a stainless metal such as aluminium, embedded in a concrete cap, designed with engraved letters and using water- and light-proof colours. An additional possibility to guide the visitors are professional tours conducted by the local pupils of the Pukllasunchis school of Huallarqocha or K’ari Grande. This provides a small income to the pupils and allows them to put their scientific and historical knowledge into practice. Another source of income for the local population will be the sale of entrance tickets at Tambomachay and Yuncaypata.

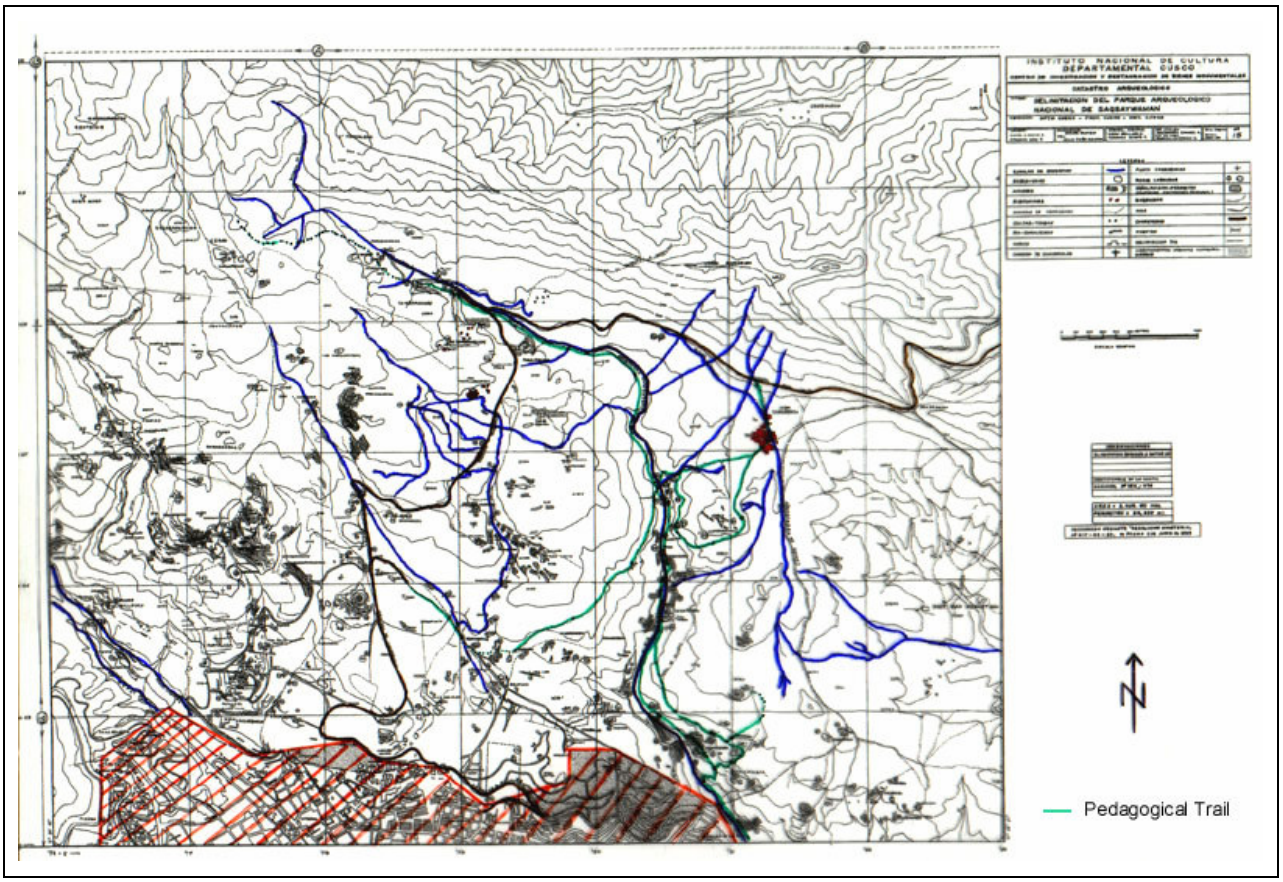

Fig. 17: The geographic situation of the Pedagogical Trail in the Kachimayu River Valley, near Cusco, **Perú**.

The Ecological Reserve: The integral protection of the Kachimayu River Valley

The ecological overuse of an already fragile ecosystem and the complex and inter-related social issues demand a problem solving strategy which considers the various conflicting interests and includes all the involved groups in the process of working towards a more sustainable society. One step in this process is the protection of this area by the formation of an Ecological Reserve.

The majority of the Kachimayu River Valley forms part of the Archaeological Park of Saqsaywaman (Parque Arqueológico de Saqsaywaman PAS). The PAS has been recognised in Decree Law Nº 6634, Art. 22 and was declared and ratified in Decree Law Nº 24047 as a National Monument on the 21st of December 1984. This legal frame implies throughout law 26505 the intangibility of this area (IIUR;1995). Further more, Art. 60 of the Codex of Environment defines the regional governments in co-operation with the National Institute of Culture (Instituto Nacional de Cultura INC) as the responsible institutions for the protection, restoration and use of the material –archaeological as well as natural– in the PAS (Frisancho; 1997). This legal background would obligate local institutions to protect the archaeological and natural resources of the entire Park.

Fig. 18: **Saqsaywaman**, the biggest of the approximately 70 archeaological sites within the Archaeological Park of Saqsaywaman.

Because of contradictory human interests and activities, the responsible authorities are not able to apply these laws in actuality. For this reason, Pukllasunchis proposes exclusively for the Kachimayu River Valley a new legal frame of protection that gives adequate respect to the present eco-sociological situation. So the target is not only to protect the unique ecosystem of this region, but also to find new forms of integral and sustainable use of the territory by its rural population.

The responsible organ for the establishment of politics, plans and norms for the adequate management of the units which compose the National System of Protected Natural Areas is, declared in the Mayor Decree Nº 055-92-AG, the General Direction of Protected Natural Areas and Sylvester Fauna. Following the Decree Law Nº 25902, this organ forms part of the National Institute of Natural Resources (Instituto Nacional de Recursos Naturales INRENA). This highest authority enshrines in Art. 51 of the Codex of Environment and Natural Resources, Legislative Decree Nº 613, the right of the communities to participate in the identification, delimitation and protection of these areas. This implies hence an active contribution by the rural communities Huallarqocha, Tambomachay and Yuncaypata to the establishment and maintenance of the Ecological Reserve.

The Law of Protected Areas defines various forms of ecological reserve. Because of the inevitable human presence in the Kachimayu River Valley such as the rural communities, their fields and pastures, the explorer tourism and the motor-road to Pisach, the legal limits are clearly defined. Following Law Nº 26834 Art. 22º two adequate forms of protection in particular present themselves for implementation in the Kachimayu River Valley (the original law text is translated by the author):

d. Scenic Reserves: Areas where the geographical integrity of the environmental landscapes show a harmonious relationship between human beings and nature containing important natural, aesthetic and cultural values.

h. Protected Woodland: Areas with the target of guaranteeing the protection of the high river basins or affluents, of the river-banks and other watercourses in general to protect adequately fragile soils against erosion. In these areas the use of resources and the development of such activities that do not put the vegetal covering at risk will be allowed.

Both forms of protection allow for the presence of human activities but also require a respectful use of the natural resources. One of the two legal regulations could therefore define the duties and rights of the different interest groups in relation to the primary resources and at the same time revalue the social position of the rural population and their work for the entire economic system of the region. The sustainable use of land in connection with alternative forms of productivity could serve as an example for other Andean regions with similar social conflicts and ecological problems.

The case study: Socio-ecological reflections

The case study report is divided into three main parts: The first part (approx. 60 pages) outlines the socio-economic context of present ecological inadequacies and shows traditional methods of sustainable land use. It proposes practical solutions for local problems and suggests a process for working towards a sustainable use of primary resources. The second part (approx. 70 pages) contains extensive investigation of the local flora, fauna and historical relicts of the Inca epoch presented as a photo register of approximately 300 local species and 70 archealogical sites. It was drawn up as co-operative project by Pukllasunchis, IEPLAM and the University of Cusco (Universidad Nacional de San Antonio Abad, Cusco UNSAAC) between January and June 1998. It shows the ecological and social importance of the different plants and animals both today and in the past and explains the religious and socio-political significance of some of these species in the times of the Inca and in the societies of the region today. The two first two parts are documented in the project report "La Cuenca del Río Kachimayu; Recorrido Pedagógico y Reserva Ecológica para la Ciudad del Cusco". The third part (approx. 20 pages) is a separate document entitled "Encuesta socio-ecológica en la población de la Cuenca del Río Kachimayu". It contains an evaluation of the present economic, social and ecological situation of the local population based on an in-depth enquiry conducted by Pukllasunchis in May 1998 in the Valley of the River Kachimayu. The entire case study serves as a practical guideline and may promote the effective protection of the different ecosystems and resources of the region.

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