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THEORETICAL FRAMEWORK AND PRACTICAL TOOLS FOR CONSERVATION OF BIODIVERSITY AT THE LANDSCAPE SCALE

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For both ethical and utilitarian reasons, (see Callicott et al. 1999, for a review of approaches) preserving our natural heritage should be one of the top priorities in the environmental policy agenda for the decades to come (e.g. UNEP, 1995, UNEP, 1992, WCED, 1987, IUCN, 1980).

Although there are still gaps to be filled in the scientific knowledge, conservation ecologists, planners and policy makers are called upon to deliver a strategy which will enable to preserve bio-diversity across vast areas of the world.

As well as supporting conservation in every country, developed nations clearly have the duty to put order in their own house, at the same time.

The tools to implement a conservation strategy across nations and continents are being developed and, although a large amount of work will be needed, the scientific potential exists to deliver it in the near future. Despite uncertainties, some guiding principles and modelling tools to implement such a strategy in Europe are already available.

Two interlinked aspects of conservation that need societal attention are biodiversity and ecological integrity (e.g. Slocombe, 1998, UNEP, 1995). Ecological integrity is a precondition for species conservation because species depend on, and often contribute to, processes which maintain their niches. This implies that an ecosystem approach to conservation is required. On the other hand, the application of specific knowledge is needed for at least some species, such as large carnivores (e.g.Noss and Cooperider, 1994) and a target species approach has been successful in Southern Europe (Travaini et al. 1997).

I will give an indication of the ecological concepts which can be regarded as a framework for the design of landscape design and regional scale reserve networks, and I will then focus on models as useful tools which can help to achieve this objective.

Ecological theory and conservation practice

It is necessary that applied conservation ecologists and planners take into account progress in theoretical thinking, especially in the areas of heterogeneity, system dynamics and scale , which have practical consequences on the efficacy of conservation policies. This entails abandoning old paradigms to embrace new ones. In particular, it must be recognised that the sun has set on the 'Balance of Nature paradigm' and that no longer do ecologists think that ecosystems and populations are intrinsically stable and able to return to a 'balanced status' after perturbation (e.g.; Pickett, 1992; Pimm, 1991) This paradigm implied self sufficiency of units and suppression of disturbance at the landscape scale, as the goal of conservation was mainly preserving some 'natural' end point, which might not exist in a deterministic sense (e.g. Christensen, 1988). Ecologists have now realised that the 'balance' paradigm is more appropriately replaced by the 'flux' or 'non equilibrium' one, where disturbance is a process to be accounted for, heterogeneity in space and time have important effects on ecological processes, and equilibrium is a particular case (e.g. Meyer, 1997, Fiedler et. Al. 1997). Ecological systems are better viewed as 'open' units existing in a dynamic state, in which different processes happen at different scales. (e.g. Levin, 1992). A new outlook on ecological systems, which has immediate consequences for practical conservation comes from widening of observation scale (e.g. White et al., 1997, Opdam et al., 1995). It is the preservation of ecological integrity, that is of processes on a number of scales, such as nutrient fluxes, ecological succession, exchanges of propagules, and disturbance which permits the existence of these systems. If equilibrium can be aimed at, it is a dynamical and regional one. As an implication ,biodiversity can be seen as a nested hierarchy spanning from individuals to continental biomes. In this respect, local scale management although very important, is not sufficient. Thinking so would only be justified by observation at the human scale of perception. If taken in isolation, however, this can often be inappropriate, because unable to incorporate many of the above processes.

Current understanding, therefore, suggests that conservationists and policy makers have to turn their attention to the landscape structure and function, if they want to protect the processes that influence biodiversity within biomes and ecological regions (e.g. Slocombe, 1998; Angelstam, 1998; Turner, 1989).
To effectively protect several endangered species, policy should therefore be aimed at conserving population processes which permit the viability of populations at the landscapeand regional scale. Ecological networks are one of the strategies ecologists and planners can use to try and restore population processes at these scales, when the landscape has become functionally disconnected.
Finally, in view of the dynamic paradigm, it is important, at the planning stage, not to assume that any network structure can be frozen in a definitive configuration, but to cater for dynamic areas and/or considerable ecological management. In this respect, large scale networks will have to take into account at least two interlinking aspects: conflicting land use and climate change, which are likely to influence and constrain the future location of (present) core areas and corridors.

Habitat and population models

In the absence of extensive knowledge, and given time and financial constraints, modelling can be a valuable approach to providing advice on the design of networks of protected areas. Because population processes are of great importance, Metapopulation Theory, one of the offspring of the new paradigm, can offer important insight (e.g. Levins, 1969, Hanski, 1994). This theory recognises that many populations are not mixing freely, but live in a fragmented mosaic of habitats separated by an 'hostile' matrix which can be crossed at some risk of mortality. Local extinction are frequent, and the population can only persist at the landscape scale, if the dynamic balance between these and recolonisation is positive. For species operating at large scale, needing large amounts of unfragmented habitats, some nature reserves might represent just a few habitat patches in need of connections. The effect of landscape structure on population viability, therefore depends on the interaction between the latter and species life history. Ecological networks become important when there are reasons to presume that the existing natural areas are harbouring small populations, with asynchronous dynamics, and a relatively high risk of local extinction. In order to improve the design of a network of supposedly connected areas, an organism centred approach is needed to provide an indication of the quality of the landscape in terms of habitat suitability and effective connectivity between suitable habitats. An important conceptual step, for this analysis to be carried out at the right scale, is recognising that (members of) species perceive landscape pattern and processes, such as fragmentation, mosaic composition, fragments size, in ways which depend on their life history traits. These include, for example, habitat preferences, dispersal distance, home range size, sensitivity to edge effects. Such knowledge requirements can pose problems in practice, because details of key processes, such as dispersal or colonisation rate are scarce or lacking for many species. For instance, a review of existing scientific databases, shows that empirical studies relating landscape pattern to population distributions are relatively rare in southern Europe, and so are studies concerning dispersal movements, as well as factors influencing habitat selection at the landscape scale. However, these are urgently needed for an experimental underpinning of design criteria for ecological networks, and should represent a priority. Efforts could be concentrated on target species, known to have high conservation value and possibly living in different habitats and operating at different scales. These can be assumed to be representatives of groups (guilds) of species with similar life history traits.
In order to assess the degree of protection that the present core and buffer areas are offering, at least for target species, spatially explicit habitat suitability models can be derived at the landscape scale (e.g. Roseberry and Sudkamp, 1998) These can also be considered a first step towards implementing population viability analysis over a regional landscape. The use of simulation models can be very useful when the conditions for spatial structuring of populations exist (e.g. Harrison and Fahrig, 1995, Wiens, 1995), in particular when inter-patch dispersal is difficult (Lambertson et al., 1994, Wiens, 1996). In these cases metapopulation models at the landscape and regional scale, are one of the best available alternatives to evaluate the adequacy of the spatial structure of ecological networks. Although they have the disadvantage of needing good parametrisation, (i.e. knowledge of the species being modelled) these models account for uncertainty and allow quantitative predictions of probability of population persistence, based on understood causal principles.(e.g. Lande, 1988, 1993). As far as dispersal is concerned, dedicated stochastic models can be developed, which are able to account for landscape quality and existing barriers in a study area (e.g. Tyre et al., 1999, Anderson and Danielson, 1997). These are useful tools to estimate the probability that designed corridors actually absolve their function, and that core areas are functionally, rather than only physically connected. Because of uncertainty in many parameters, the absolute numbers in output are unlikely to be very accurate, however, the models can be regarded as tools to compare the likely effect of different policy and planning scenarios at different scales. A further methodological advantage is that such models can provide focus for research efforts, suggesting a research agenda which encompasses the various stages needed for the final viability analysis. These include, for instance, investigation of spatially explicit habitat suitability, reproductive success, dispersal abilities, effect of barriers. Finally, because these models are linked to geographical data bases, (which can be integrated with remotely sensed data) they can evaluate existing situations, and also planned ones, because simulation results can be analysed with structured decision making methods (Ralls and

Starfield, 1995), and can function as input for models of land use allocation, accounting for biological and socio-economic criteria (Gustafson and Crow, 1998, Parry et al., 1996).

Conclusions

In order to implement a functioning national and international network of protected habitats, ecologist, planners and policy makers will have to focus on conserving ecosystem and population processes at a range of scales, devoting special attention to landscape processes. Change, whether due to climate or to other dynamic factors, ought to be expected, and , at the design stage of a network, the opportunity to be proactive should not be missed.

Spatially explicit models, dealing with habitat suitability, dispersal and population viability represent useful quantitative tools to cope the complexity of this challenge.

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HUNTING AND THE ECOLOGICAL NETWORK ON A PROVINCIAL SCALE: PRELIMINARY DISCUSSION POINTS FOR THE PROVINCE OF ROME

Corrado Battisti

The recently published Regional Game Plan for the Lazio Region opens up the question of ecological networks. The Plan mentions the need to identify and plan for areas that can be used as ecological corridors by fauna, and the possibility of connecting protected areas such as parks and natural reserves to hunting areas.

Reflections on the problems inherent in deciding which land to classify as protected are made below.

The territorial quota problem

At present hunting is regulated by Law 157/92; article 10.3 of this law states that a percentage of the territory must be assigned to the protection of mammals and

birds; this percentage ranges from 20 to 30 % of the agricultural, wood and grazing land. It is also made clear that areas specifically designated for the protection of wildlife according to L.394/91 (parks and natural reserves) as well as areas where hunting is banned are to be included in this percentage. Consequently protection oasi, capture and re-population zones, privately owned land and military zones make up a part of the percentage.
The Regional Law 2 marzo 1995 n.17, in response to a national law specifies that "the above mentioned percentage must be calculated on a provincial basis". This specification is of particular importance in the planning of the protected areas for the following reasons:
The distribution of parks and reserves on a regional level is not uniform. The Province of Rome, for a variety of reasons, has the largest number of protected areas. So whilst on a regional basis the percentage of land destined for protection is well below the values established by the law (19.43%), the value for the Province of Rome, 33.23%, exceeds this percentage; however 23.31% of this comes under the category of Parks and Natural Reserves (the remaining percentage is made up of military zones, privately owned land etc). The significance of calculating these percentages on a provincial level rather than a regional one is clear.
Currently therefore, 33.23% of the agricultural, wood and grazing land in the Province of Rome (the only Province in Lazio to have exceeded 30%) has hunting restrictions placed on it.
This state of affairs has opened up a complex debate on the possibility of creating further protected areas or of reducing the extent of the areas currently protected. Several areas of great environmental value (for example Tolfa and Lepini) have yet to become protected areas and it is unlikely, at least for the forseeable future, that the situation will change given the limits of current legislation. In this respect the problem goes beyond that of hunting. An unprotected territorial environment is not only open to hunting (which if opportunely controlled does not necessarily have a negative effect on fauna and biodiversity values), but is also vulnerable to a variety of disturbances such as building. This problem will become more urgent when the by-laws inserted into D.P.R. 357/97 in response to the Dir. 92/43/CEE "Habitat" come into force The approval of the definitive list of Sites of Community Importance and the designation of Special Conservation Zones (art. 3 comma 2) will mean that new types of area will be protected and suitable conservation methods adopted (art.4). These areas will be in addition to those already protected and will increases the quota of restricted territory.
A recent ruling by the T.A.R. of Lazio (Sezione 2 bis, n. 231/98 of 5/12/98), has opened up discussion again by suggesting that the quota of 20 to 30% of agricultural, forest and grazing land to be destined for protection of fauna in each region "does not define a maximum quote and is only a guideline" The question of how much land to designate protected still remains open.

Species that can be hunted
It would be useful at this point to identify hunted species in order to be able to have an idea of the problem. The species that can be hunted are list ed in article 34 of the regional law and include migratory and non-migratory birds. Some of these species are of little conservational importance being widespread and numerous and in some cases in expansion (e.g. sparrows, skylarks, blackbirds, starlings, crows and magpies), or because they are an introduced species and subject to continuous re-population (partridges and pheasants). Other species may be of greater interest due to their migratory nature (e.g. acquatic birds) or because they populate a limited or fragmented area (e.g. rock partridges, indigenous partridges). Some of these are listed in International Conventions and the Red List of Italian vertebrates.
Worth mentioning amongst the species that nest in the provincial territory for the reasons mentioned above, we have: the Greek Alectoris partridge:
present in fragmented populations in Simbruini, Ernici and Lepini and in dwindling nuclei in Lucretili; the Vulnerable category of the Red List; and the partridge Perdix perdix: present only thanks to the artificial introduction for hunting purposes even though abandoned populations can not be excluded; the Vulnerable category of the Red List; for these two species the Game Plan anticipates the necessity of "recovery programmes through re-qualification of the environment(...) and management and protection measures" Amongst the migratory birds, those species tied to watery environments are of great interest also in merit of their preference for environments subject to change and with a fragmented distribution.
The picture as far as mammals are concerned is different. Most species present are introduced and continually re-populated with allochthonous stock and are of no particular interest as far as conservation of local autochthonous bio-diversity is concerned.

Bearings on ecological networks
Corridor and area systems are subject to planning, and certain hunting restrictions. However the degree to which hunting creates a disturbance needs to be evaluated. At present the degree of liberty to hunt depends on the species and the area under consideration.
With this in mind a differentiation between connecting areas on the basis of the species that populate them and the impact that hunting would have, needs to be made. A preliminary classification follows:
1) Connecting areas for the protection of species that are not hunted (e.g. amphibians, small forest mammals). Hunting within these areas would be allowed but limited so not as to create significant disturbance. Using these areas as 'environmental junctions' would avoid problems arising from the 'percentages' mentioned earlier an measures could be taken to ensure the protection of the target species.
2) The situation differs somewhat for the species which

are hunted; in this case it might prove necessary to impose hunting restrictions in areas considered of key importance within an ecological network for example, unprotected marshlands which are used as stepping-stones for wintering acquatic species. In these areas hunting restrictions might create problems as far as the percentages indicated by the law are concerned (although the recent T.A.R. sentence has re-opened this debate) and with the hunting world.

Hunting areas as possible junctions in ecological networks on a provincial scale.

It would be interesting to evaluate if this type of area could be included in an ecological network on a provincial/regional scale; such an inclusion would be following the line already adopted by other regions and also outlined in the Game Plan for Lazio.

Such areas have all the prerequisites necessary to function as network 'junctions': they are usually marginal areas of a discrete size, with medium 'naturality', often located near protected areas or urban zones where they can play an important role in green connections. Hunting areas can be classified as follows:

1) controlled hunting areas:

Game Groups (Aziende Faunistico-Venatorie A.F.V.):

These groups may prove useful to the network for the following reasons:

- the areas involved are often of a medium to high environmental value and hunting is usually limited to introduced species of little or no value in terms of conservation (pheasants, hares and boars). So they can be considered 'protected areas' in that all other types of hunting are banned;
- the surveillance of the area by gamekeepers keeps poaching of other species down and means that the territory is monitored at all times;
- some of them are located in 'key' areas (Tolfetano-Cerite, sistema dell'Arrone, valle del Tevere, etc.) or are adjacent to protected areas (e.g. the A.F.V. adjoining Lucretili);
- finally, having already been calculated within the quota of territory where hunting is allowed no problems are created in terms of 'percentages'.

These areas were created for hunting but they cannot be considered efficient junctions within the network as other environmental restrictions may not apply. In fact although art. 32 L.R. 17/97 comma 1.a states that "legislation in force concerning the protection of the environment applies" it is not clear how this should be interpreted (the land involved is private property and subject to P.R.G. legislation, often in contrast with protection policies). Problems do not generally arise when there is a single landowner however they can do when a number of owners exist. In this case the land might be put to different uses (building licences may be granted etc.) which harms the environment and influences the hunting as well. There is alot to be said for an agreement between authorised hunting associations for the safeguarding of the environment bearing in mind that the renewal of hunting licences is dependent on the outcome of a study of the environmental condition of the land.

2) areas where hunting is banned:

Fauna Protection Oasi:

These are areas with 'special ecological value within the habitat'(art. 14 L.R. 17/95). An extensive area of monti Lepini in the Province of Rome comes under this category. Their management is in the hands of the A.T.C. (Ambito Territoriale di Caccia).

Re-population and capture zones (Z.R.C.):

These are run by the management committee of the ATC. "They are constituted of land suitable for the species for which they have been designated and are not subject to specialised cultivation". The Game Plan has to provide incentives for the improvement of the environment within these areas.

Closed areas:

Privately owned ground falls under this category; these areas are often small and vary annually; management is difficult given the high number of owners. When the dimensions of the ground owned are considerable an agreement can usually be reached.

Other hunting areas:

Dog training zones (Z.A.C.):

Areas of between twenty and a hundred hectares. Hunting is limited to a few species of little or no conservational value (art. 17 L.R. 17/97) the area being purposely freed for dog training. Examples. The Province of Rome's case.

1. Lepini. In spite of the fact that no protected areas have been established in this mountainous group, three fauna protection oasi exist that can be connected up to two sites of Communitary Importance (Dir. 92/43/CEE)(3041 M.Semprevisa-Pian della Faggeta and 3042 Alta valle del Torrente Rio), a special Protection Zone (Dir. 79/409/CEE)(3043 M. Lepini Centrali) and three sites of National Importance (Prog. BioItaly-Ministero dell'Ambiente) (3079 Punta della Melazza, 3080 Camposano e Montenero, 3081 Faggeta di Canai-S.Martino), making up a constellation of areas that cover a large part of the territory.
2. Tolfa. Although no protected areas have been established in this area either, a complex system of A.F.V. and Z.R.C. exist (from Bracciano to Cerveteri and down to the coast, all of high environmental value). These could, together with the S.I.C.s (7 in total between Bracciano and Civitavecchia) and the Z.P.S. create an environmental continuum, subject to 'network' planning. This would then form a bridge between the "area naturale protetta Bracciano-Martignano" (L.R. 29/97 art. 43) and the coast.
3. Valle del Tevere. The two Z.R.C.s (M. Aceto e Valle del Tevere) and the A.F.V. (Marcigliana) are cushioned between the Parco di Vejo, Valle del Tevere and the Natural Reserve Marcigliana linking the two banks of the river.
4. Cornicolani-Lucretili. This is a complex fragmented system both in terms of environment and type of area. In the interstices between protected areas (Parco Regionale M. Lucretili and the natural reserves of

Macchia di Gattaceca and Nomentum) there is a S.I.C. (3015 Macchia di S.Angelo Romano), converging with a Z.R.C. and three A.F.V. 5. Prenestini-Simbruini. Within the area designated of environmental relevance in the Schema di Piano del 1993 there are two S.I.C. (3034 Valle delle Cannuccete and 3035 M.Guadagnolo), three Z.R.C.s (La Selva, Colli Santi and Sterpara) and a Fauna Protection Oasis (M. Altuino).

In short:

- the realisation of ecological networks can be achieved using not only pre-existing protected areas but also a variety of heterogeneous environments that are subject to differing restrictions.

The following aspects need to be considered:

- the target species;
- the identification of suitable areas by type and their location within the network;
- the restrictions imposed on areas by the EEC Directives 92/43 and 79/409.

The present legislation although underlining the importance of these areas is equivocal (areas have not been properly delimited). The legislation that can be implemented are the following: il D.P.R. 357/97 in response to the Dir. Habitat (art. 8 and 9), the D.G.R. Lazio n. 2146/96 which approves the list of sites, L.R. 29/97 art. 6 comma 4 and L.R. 74/91 art. 10 which can be adopted by the President of the Regional Council in cases of serious environmental danger. According to art. 4 of the D.P.R. 357 conservation measures can be adopted following the approval of the definitive list of sites;

- an agreement between the management committees of the interested organisations concerning the insertion of the areas into the network. The hunting world, in search of a more natural identity, considers this use of the land in a favourable light although there are some voices of dissent.

In essence, the value of land used for hunting in a regional/provincial network needs to be emphasised and an agreement reached by local bodies.

Other areas that could be incorporated into an articulated network are military zones (secondary to areas used for hunting); these areas are of high environmental value and well-positioned with respect to other protected systems.

ECOLOGICAL NETWORKS FROM AN 'ANTHROPOLOGICAL' POINT OF VIEW: IDEAS FOR FURTHER THOUGHT

Luca Santarossa

Numerous conflicts can arise over the use of resources in industrialised countries; the list below gives an idea of some of the areas of dispute:

- agriculture vs fishing: pollutants released into water systems significantly affect fishing in rivers as well as closed and semi-closed basins;
- tourism vs full-time residency: particularly in historical city centres but also in the context of roads and the exploitation of historical attractions and the environment; the conflict between tourists and residents is often apparent but rarely faced;
- residency vs industry: not only in urban areas but also in territories that have been swallowed up by a diffuse urbanisation;
- industry and agriculture vs mobility: not only conflicting traffic flows or their impact but also the location of the infrastructures required;
- agriculture vs industry: even in the presence of functional integration (North- East, there is competition for land resources, water and road/rail access;
- hunting vs tourism: areas of great aesthetic-environmental value are denied to the majority for the benefit of the few .

Will ecological networks create more conflict or will they integrate and prioritize use of the territory on an environmental basis?

Contrasts between the requirements of ecological corridor and anthropological factors

A system of ecological corridors increases bio-permeability whilst the mobility network for example, creates insuperable barriers for species. A territory divided up into farms, small industrial areas, populated areas and other infrastructures, is limited in its extension and restrictions are placed on the movement of species within it. This in its turn limits combinations in the game of bio-diversity and increases the possibility of extinction (Den Boer 1990). Disturbances such as noise, air and water pollution, the temporary or permanent presence of artificial elements, people etc influence protected areas negatively and effectively reduce the area protected. The progressive impoverishment of unprotected natural habitats reduces the overall natural legacy of a given territory and discourages the thoroughfare of species. In conclusion, the strategy followed up to now of simply protecting the largest amount of area possible is being abandoned and a different prospective adopted (for example, the "Ecological Network Project" proposed by the PTP of the province of Milan); one that integrates into environmental protection, the reconstruction of a functional network, able not only to protect natural elements but also to absorb the impact of human activity and prevent future pressure thanks to the introduction of the ecosystem requirements into the everyday use of territory ('territorialization' of environmental politics, Gambino 1997).

People/planners at the centre of conflict

A planner wishing to consider all aspects of the territory finds himself dealing with a large spectrum of

people: local administrators, park administrators, farmers, businessmen, tourists, walkers, hunters, fishermen and the local community, all of whom have different requirements which at first glance may seem irreconcilable. Communication is often difficult; different people have different ideas for the future of the territory however the direction to be taken must emerge clearly (Osti 1992).
The planner can take one of two paths: take into consideration all of the viewpoints and find a compromise which is acceptable to all parties; or working together with representatives from each interested party construct a plan and leave it to them to explain the advantages of the proposal to the groups they represent.

Managing conflict to reach consensus: participation in planning.
Experience up to now of conflict management, in varying parts of the country has used as a base "Agenda 21".
The starting point of this agenda is the establishment of the interdependencies between the natural world and man's activity that cause negative repercussions on the state of the environment and planning. The differing requirements and ideas for development are then compared starting with those considered the most critical. However the extent of the power of this process (and of its participants) must be made clear: agreement to the main points in the plan is the objective however the small details are decided by the group responsible for an in-depth study of the subject.
There is a participation of parties who might not normally necessarily be interested in in environmental planning and numerous benefits - individual, concrete and direct - that can be gained including the opportunity of networking.
The setting up of a permanent committee made up of the same parties who were involved in the planning of the ecological network makes worthwhile the effort put into the bringing together of the interested parties for the planning in the first place. This committee backs the application of the Plan, assures its continuation and looks for ways to make improvements.
After all, plans should create new dynamics rather than fix the limits. The difficulties of this model are obvious but in our opinion well worth the effort.

Socio-economical benefits on a local level
Recovery of biological and landscape diversity:
These two categories have been placed together as the reconstruction of the natural environment means that of rural one, especially in an Italian territorial context.
One of the advantages of establishing a balance between man and the environment in the restoration of the landscape is the increase of the number and varieties of species (Simberloff e Cox 1987); tourists and residents alike, gain from restoration and increased biovariability along the lines of the Anglo-Saxon model 'Greenways'.
The recovery of biological and landscape diversity is clearly, in line with the overall purpose of multiple use, protected areas and contributes to the autodepuration of the ecosystem and to the re-establishment of the hydrogeological-equilibrium.
Technological innovations for agriculture:
Following on from the above, the benefits that the E.U. offers for sustainable farming, which also cover ecological corridors, generates economic activity: from wind-breaking hedges to bio-phytodepuration plants, from rotation of crops to foresting, , the opportunies for modifications of the productive model and reasons for environmental diversification are numerous.
Eco-compatible infrastructurizing:
The creation of pathways is not only of benefit to weekend visitors but also to residents and farmers; a passway under the motorway or a 'green' bridge over the railway opens up new areas to the local community and gives the green light to biodiversity; the creation of natural barriers protects fauna from disturbances (roads, factories, railways etc.) and reduces the disturbance to local residents; the recovery or re-opening of canals, small rivers and other waterways have positive effects on agriculture and small industries (as a result of use as well as the consequently increased autodepurative capacity).
Tourism:
An environmental/cultural product such as one based on an ecological network in a rural context has great potential in the tourist market.
However the 'pressure' factor which vistors represent can be high, especially in smaller environmental contexts. However this is not the occasion to go into detail.
Package holidays (biking, boating, horse-riding, hiking etc) already figure in ecological corridors and encourage the development of a network of tourist facilities: bed&breakfast, restaurants, campsites, hire shops, guides, observation points etc.
The main beneficiaries are the parks and environmental associations but the benefits are widespread and rural centres can take on new roles bringing a diversification of the economy.
Increases in property values:
The areas designated for the creation of ecological corridors are usually land that is no longer cultivated, meadows etc that are little importance from a productive point of view and consequently of little economical value; however the possible acquisition by public bodies raises their value. In addition property values increase and owners can take advantage of the incentives offered for architectonic restoration.
Improvements in the quality of life:
There is no doubt that living in an area where the environment is given space, where the quality of the air, water, land are high and disturbance factors low (noise, pollution) makes a tangible difference to the local community. These factors aid consensus in the construction of an ecological network.
Reinforcing cultural identity:
An improved mobility network at a local level and an alternative to the car-rail network should increase awareness of the surrounding area and encourage 're-exploration'. The involvement of the local community

in the planning process and projecting brings added benefits: from the recovery of traditional 'know-how' (often more appropriate than expensive scientific studies) to the participation of local experts bringing an enhancement of the relationship that people share with the territory where they live and work.
Social life:
Giving local communities back a function, especially those in marginated areas, means giving them a voice; a voice in decisions concerning the future and an ability to make a concrete and appropriate contribution to those decisions. The inclusion of the local community within planning benefits the weaker groups - the elderly, the unemployed, young people offering the possibility of employment or creating greater ties to the area.
Ecological networks can also act as stimuli for new activities (from fishing to organic farming, from simple tourism to in-depth studies of the history and culture of the territory etc.). The social networks that usually accompany ecological ones would aid greatly such initiatives.
In conclusion, ecological networks represent a potentially very interesting means of stopping the demographic haemmorrage of peripheral areas (especially mountains areas) and safeguarding historical and geographical features from the pervasive development of modernization.

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