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Environmental protection in the Apuseni Mountains: The role of Environmental Non-Governmental Organisations (ENGOs)

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Abstract

The Apuseni Mountains constitute one of the most interesting parts of the Carpathians in terms of landscape, biodiversity and culture. Yet dislocations are now severe and there are development threats which also require a significant response. On the one hand there are some severe pollution problems associated with mining areas developed in the communist period which require remedial action and the cases of Roşia Montană and Zlatna are discussed. On the other hand, there are forest and pasture zones – especially the Padiş Plateau – which are coming under heavy pressure from farmers seeking to enhance their incomes following the decline of mining and manufacturing which has left many households without salaries. At the same time, tourist pressure is growing. Actions are already being taken to limit pollution damage and develop sustainable landuse practices. There is a national park project linked with nature reserves comprising picturesque landscapes, a rare flora and fauna and distinct geological and palaeotological formations (including fossil ice). There are major tourist attractions and with proper management they could become part of a development programme of the countryside. However it is essential that all stakeholders adopt sustainable practices and this means that official programmes – including the future national park authority administration's work in environment protection and tourism management – are backed up by Environmental Non-Governmental Organisations (ENGOs). The paper reviews their diverse activities and concludes that they are making a very substantial contribution in ensuring that the potentials of isolated regions can be utilised in a manner consistent with nature conservation.

Introduction

The Apuseni (Western) mountains of Romania are outstanding in terms of landscape, biodiversity and culture (Figure 1). Despite the expansion of settlement at high levels, with consequent deforestation, human activities have been broadly sustainable. Yet dislocations are now severe and there are also development threats which require a significant response. While mining is a traditional activity – carried on in the Roman period in Alburnus Maior (Roşia Montană) and Ampellum (Zlatna) – the large scale of development under communism led to severe pollution problems in the Ampoiu and Arieş valleys (Mac and Ripeanu, 1996) (Plate 1). Action is now being taken, especially at Zlatna; yet expansion of activity at Roşia Montană using cyanide to process mine waste creates new threats for the future. Meanwhile, the decline of mining and manufacturing (e.g. closure of textile industries in Abrud and Câmpeni) has left many households without salaries and some forest and pasture zones are coming under heavy pressure from farmers seeking alternative sources of income. These problems are being addressed but in a situation where all stakeholders need to support sustainable practices there are great opportunities for Environmental Non-Governmental Organisations (ENGOs) to contribute to the formulation of policies, the implementation of conservation projects and the dissemination of information. The paper examines these activities in two damaged areas linked with mining and woodcutting problems highlighted by Badea (2001): the mining town of Zlatna and the Apuseni National Park. It is also recognised that communities must be sustainable and the rejuvenation of population in remote areas is also a priority (ADRNV, 2000).

Salient physical and cultural characteristics

The Apuseni contain great geological variety – including eruptive and metamorphic rocks – offering a range of ores (non-ferrous, gold-silver and bauxite) as well as building materials (Ianovici, 1976). Given the topoclimatic conditions there is a copious water supply (Sorocovschi 1997) and xerophilous and/or thermophilous flora, with some alpine-arctic characteristics. Scenery is most varied and spectacular in limestone areas with dry valleys, scree slopes and precipices, gorges like Cheile Turzii – dug by the

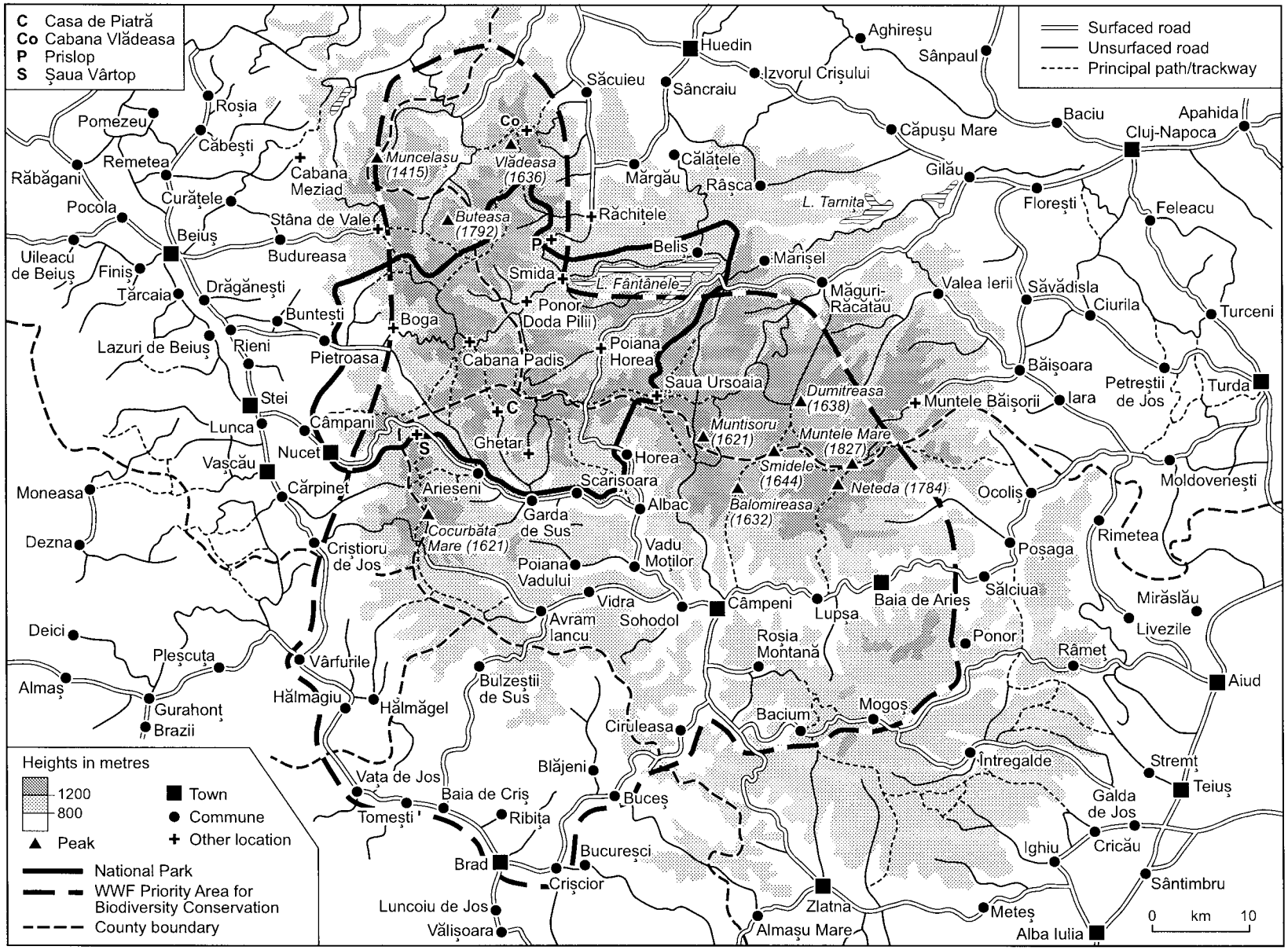

Figure 1. The Arieş Valley and the core of the Apuseni Mountains showing the national park and the proposed biodiversity conservation area.

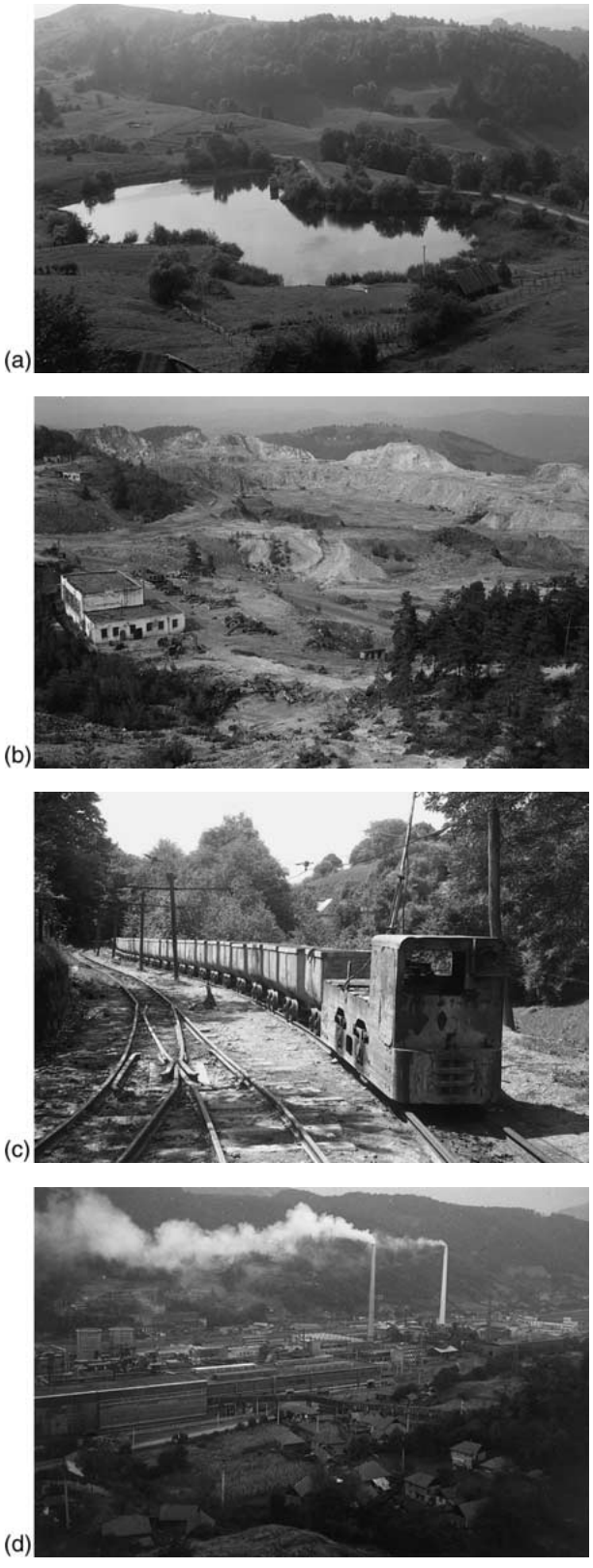

Plate 1. Mining landscapes: (a) small reservoir for processing ore in the pre-communist period (Cărpiniş); (b) quarry in the gold-mining area (Roşia Montană); (c) narrow-gauge railway for transporting ore (Roşia Montană); (d) copper smelter (Zlatna) (D. Turnock).

Hăşdate stream – and Întregalde, Ordâncuş and Râmeţ; numerous caves including several with fossil ice (Gheţarul de la Scărişoara and others including Bârsa, Focul Viu and Zgurăşti) (Cocean, 1988). The karst of Padiş (Cetăţile Ponorului) is outstanding with its portals, galleries, lakes, waterfalls and rocks. The gorges are notable for their birds; with Cheile Întregalde and Cheile Râmeţilor frequented by eagles as well as woodpeckers and woodlarks (Munteanu, 1980, 2000). The relief is fragmented; yet there are extensive surfaces. A number of mountain summits – ranging from Măgura Vânata (1,641 m), Bătrâna (1,579 m), Piatra Arsă (1,488 m), Vărăşoaia (1,441 m), Biserica Moţului (1,466 m), Glăvoiu (1,426 m) and Ţapu (1,476 m) to Cristeasa (1,426 m) – relate to the highly fragmented Farcaşa-Cârligaţi surface at 1,400–1,600 m (Niculescu, 2000). By contrast the Măguri-Mărişel surface (1,000–1,300 m) is more continuous and supports a large number of dispersed settlements (Abrudan and Turnock, 1999). Finally the Feneş-Deva surface occupies a niche at 600–900 m, exemplified by Măgura Guranilor (948 m), Ciungitura (926 m), Vârful Grohoţilor (807 m), Preluca Corbeştilor (746 m) and Dâmbu Citerii (640 m).

The fragmented relief provides the basis for the geography of mountain communities with Ţară Moţilor in the upper Arieş valley giving way to the Măgureni district in the north; Mocaimea and Trascău to the east; with Ţara Abrudului and Zlatna to the south (Popescu-Argeşel, 1977). Colonisation of the high ground took place in modern times with the terracing of steep slopes (Pacurar, 1997), but Ţară Moţilor is distinctive for the extent of the settlement dispersal across the mountain surfaces (up to 900 m and occasionally beyond) and the relatively small size of the commune centres. The human resources are distributed in relation to the farm potential, but are not easily recruited for non-agricultural work. Yet the dispersed settlement pattern is an essential part of the Apuseni landscape which merits conservation: both the permanent settlements (linked with stock rearing, forestry work and wood crafts) and the temporary habitations used for grazing livestock in summer: the individual 'sălaş' and groups of 20–30 houses in 'mutatora' (Surd and Turnock, 2000). The Moţi who inhabit this area are widely seen as direct descendants of a Dacian population present in the Roman period, although the settlement history presents problems on account of the emphasis on high ground where placenemes indicate relatively recent clearance ('curăţitură') with the name ('arsură') indicating the use of fire, at least in the burning of branches ('snide'), preparatory to the development of pasture ('pleşu') (Stefanuţ et al., 1996, p. 10). However the immediate concern is the survival of these people rather than their history.

When not in the high mountains animals are kept on small enclosed grazings close to the farmhouses, where cropping involves potatoes and vegetables with some rye and fodder roots. Farmers have little equipment but they borrow from others and supplement the meagre farm income by running small shops and bars, by sawmilling and producing barrels and other goods and providing transport services. There is little food processing and cheesemaking

is usually for family use only. Despite the potential for tourism (Ciangă, 1997), the infrastructure is too poor to open up the remotest areas that now have relatively unbalanced age structures (Prida and Gyemant, 2001). Meanwhile, the growth potential lies in the depressions and also in the 'gulfs' on the edge of the mountains (and very pronounced on the western side), especially where there are extractive industries concerned with bauxite and other non-ferrous ores, refractory sand, building materials and mineral waters (Şerban, 1993). Despite significant pollution risks, this could bring further growth to mining areas like Dobreşti and Şuncuiuş where villages might even attain urban status; though more likely in the case of resorts based on mineral waters like Geoagiu and Moneasa (Cocean and Bojor, 1997). It is one the edge of the mountains, particularly on the northern side that ethnic minorities are encountered (Figure 2).

Plate 2. A sustainable economy for the 'Moţi' peasantry of the Apuseni? (a) Marcel Pasca from Faţa Cristesei removing the bark from a tree he has just felled with a chain saw, prior to sliding it down the hillside for transport to a sawmill; (b) Viorica and Teodor Pantea saw wood in their own mill at Cobleş; (c) carts loaded with 'scândure' descend to the Bihor plains from the Vârtop Pass: heavy rocks in bags act as part of the braking system (B. Gubbins).

Threats and opportunities: mining areas – Abrud and Zlatna

Acid rain containing chlorine and sulphur pollutes soil and water. The concentration at Câmpeni is 4 mg/l for chlorine and 7 mg/l for sulphur, but the latter reaches 30 at Zlatna due to pollution by the 'Ampellum' enterprise in Zlatna (referred to below) which has taken the Roman name for the town (Ileana and Popa, 2001, p. 113). Heavy metal pollution involves mainly cadmium, chromium, copper, iron, lead and zinc. Mining pollution affects the Ampoiu and Abrud/Arieş rivers and is a major facet of water pollution in the wider area of Alba County. The Abrud river is permanently polluted with water from mining galleries at Bucium Izbiţa – containing metallic ions – and the preparation plant at Gura Roşiei: material in suspension averaged 162.6 mg/l during 1993–1997 at the confluence of the Abrud and Arieş rivers (compared with only 38.6 at Scărişoara, where the river is of Category 1 quality). There is also 1.84 mg/l of dissolved iron; 0.07 dissolved copper; and 0.33 dissolved zinc (Batinas, 2000, p. 127). Then there is pollution from the Abrud mining enterprise and prospecting galleries in the Muşca valley, followed by the Baia de Arieş installations lower down, concerned with the production of gold and silver ores. Material in suspension at Buru averaged 103.4 mg/l during 1993–1997, including 0.05 dissolved iron; 0.04 dissolved copper; and 0.06 dissolved zinc. There is also a particular hazard of cyanide released from the tip at Baia de Arieş (a centre of gold and silver production). And pollution comes from old mines in the Abrud area, with the maximum admissible level of 0.01 mg/l: virtually identical to the average observed at Buru during 1993–1997. As a result many fish die and drinking water at Turda is affected, while emergencies in January and December 1999 were serious enough to disrupt production.

Abrud area: the Roşia Montană gold mining project

Although mining has been declining through closures, there are continuing risks because gold production in the Apuseni

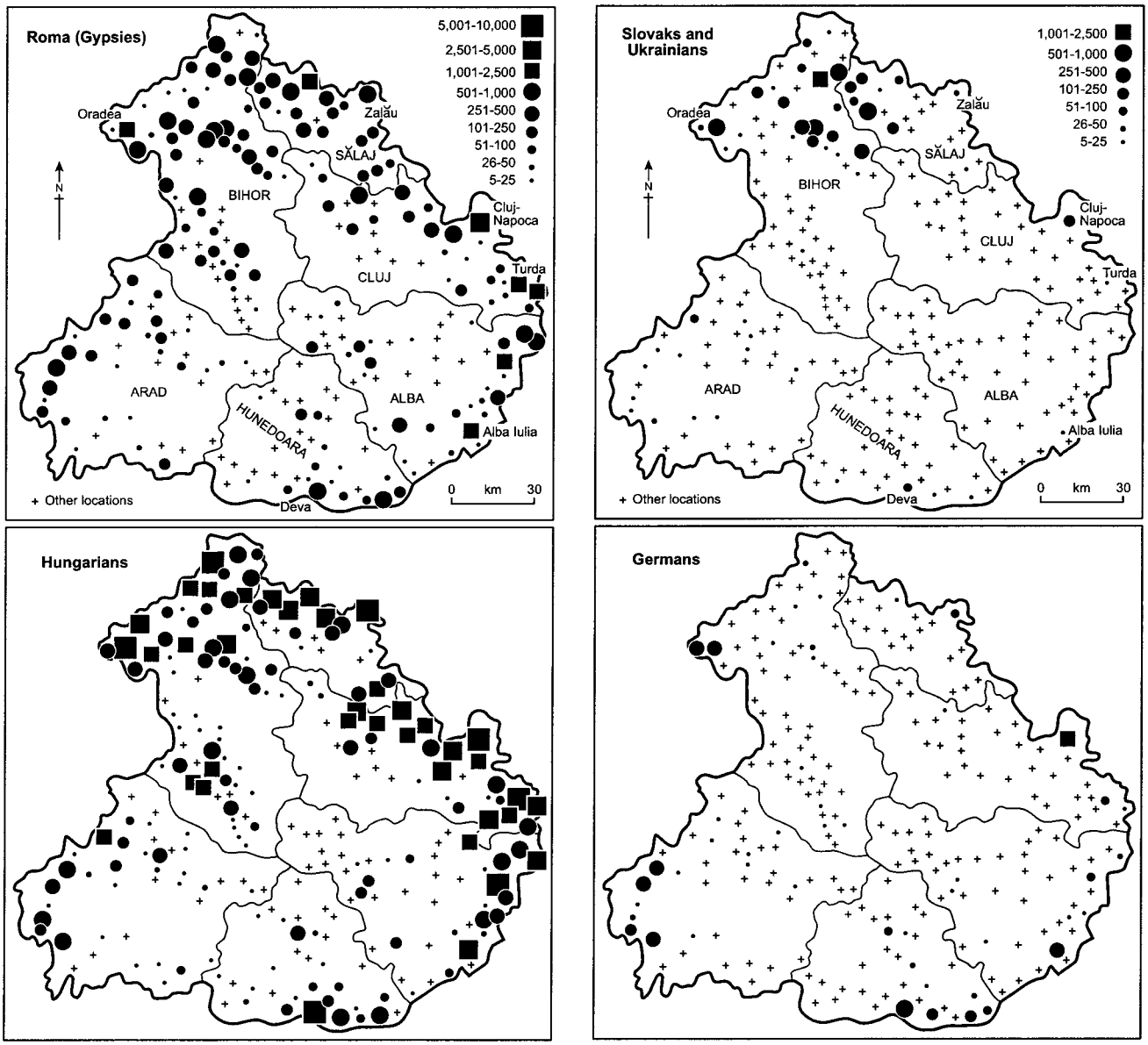

Figure 2. Ethnic distributions in the Apuseni region.

may be enhanced by the process of cyanide leaching. Pouring potassium cyanide over low grade ore means that virtually the entire gold content can be obtained: a very great advance over traditional methods which secure only 0.7–1.7 g of gold from each tonne of ore mined at Roşia Montană today. The system was pioneered by the Australian company 'Esmeralda' and used in Romania at Baia Mare (with disastrous results when cyanide spilled into the Tisza drainage system in 2000) but it is still considered feasible provided that adequate environmental safeguards are taken. Gabriel Resources of Canada have secured exploration rights at various sites in Romania and saw good opportunities under the 1998 Mining Law which encouraged foreign participation in the mining industry. One of Gabriel's interests is located at Roşia Montană and involves a joint venture – Eurogold Resources/Roşia Montană Gold Corporation, dating back to 1997 – with the the state copper company (now Minvest) based in the town of Deva. Prospecting revealed that in the context of new cyanide technology gold extraction costs would be well below the present world price (albeit depressed by central banks' selling of gold reserves) and that steady demand from the jewellery industry would remain stimulative: a margin of $275 per ounce has been mooted after production costs of $107. In 1999, the company announced the discovery of 'the largest gold deposit in Europe': a new ore body capable of yielding 300 t of gold and 1,600 t of silver. While the joint company appears to be somewhat undercapitalised, finance for an investment estimated at some $400 million has been obtained during this year (2002) from the International Finance Corporation. Despite fiscal concessions for a 'less-favoured area' (discussed below) including the waiving of customs duties and also profits tax (the latter until 2009) the government stands to benefit through personal taxation and a two percent production royalty in addition to its stake in the company. Moreover the new project will supersede the existing gold mining op-

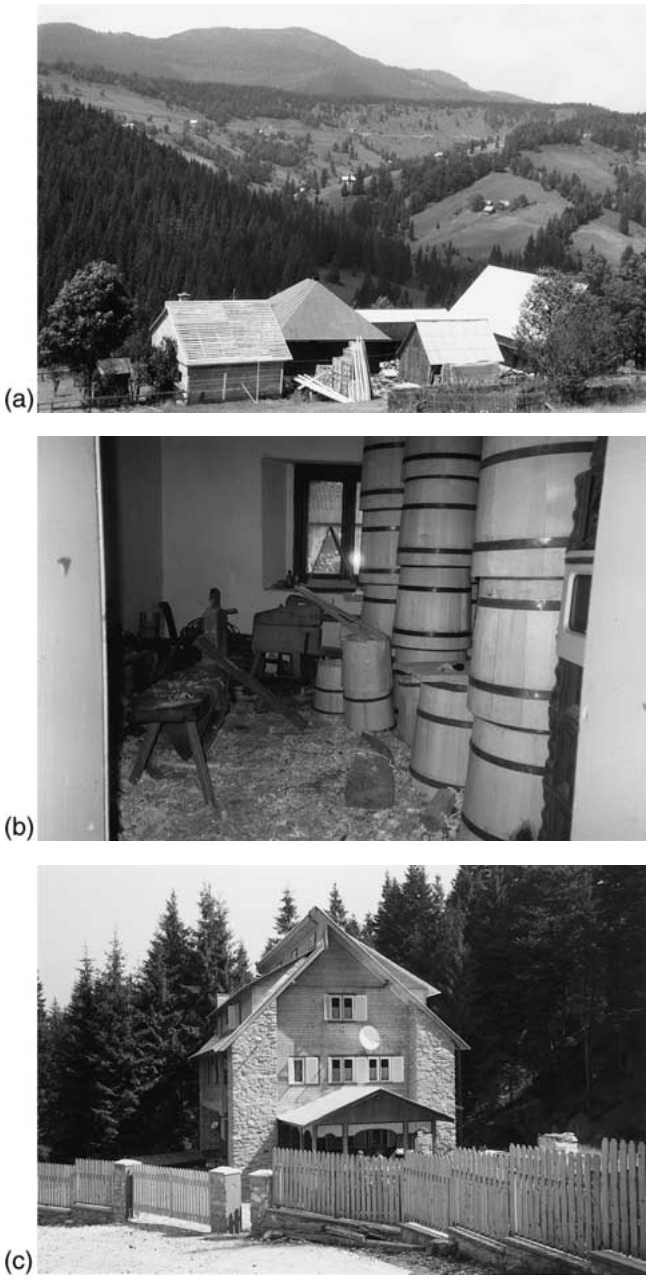

Plate 3. Landscapes at Arieşeni: (a) 'scândure' on a farm in the Cobleş Valley; (b) craft workshop at Pătrăhăiţeşti; (c) new tourist accommodation at Galbena; (d) the existing piste at Vârtop, now a mixed settlement for pastoralism and tourism (D. Turnock).

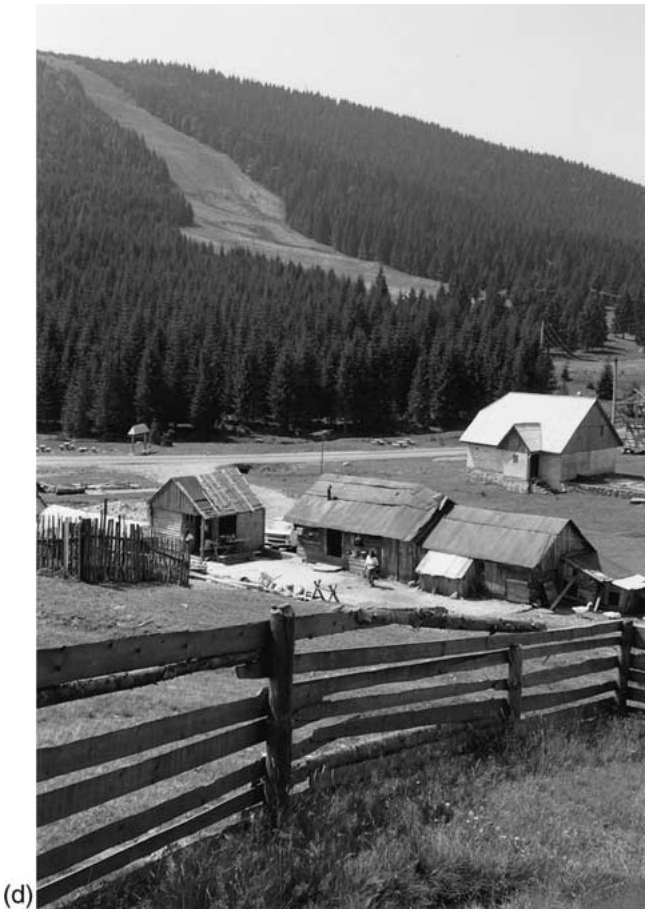

Plate 3. Continued

eration, using traditional methods, that is heavily subsidised. A Senate Commission approved the project in 2001 and the present government therefore approves the project as an exercise in regional development that includes promotion of small and medium-sized enterprises in the Apuseni with which the World Bank is being associated. However, while a licence was granted to Minvest in 1999 and transferred to the joint company later in the year there is uncertainty over both the feasibility study and the environmental impact assessment while the status of the local urbanisation plan is also being questioned.

This is a massive undertaking – expected to yield 22.5 t of gold and 102 t of silver each year and due to come on stream in 2002 – which will require considerable areas of land for four open pits and the processing unit. Farms and churches will be lost and many families will need to move down-valley to new homes at Gura Roşiei on the road between the towns of Abrud and Câmpeni. The environmental implications are substantial and under the project 'Apă Curată de la Izvoare' (Clear Water from the Spring), the Alba Iulia-based ENGO 'Albamont' has heightened public awareness of dangers of cyanide pollution and the community has sought public participation in the project to protect their interests and secure sustainable development for area in accordance with EU norms. There is concern about the record of Gabriel Resources in other countries with regard to environmental management and replacement housing and hence the aim of the ENGO to inform and seek guarantees. Many families, especially those with young men who stand to benefit from employment, initially favoured negotiation with the company over the transfer to a new house, in the context of a comprehensive relocation involving the bulk of the village including the churches and cemeteries, although the highly supportive public opinion polls cited by the company are a matter of dispute. A model house has been built to show the accommodation that would eventually become available at Gura Roşiei: those who will not accept a house built by the company will evidently have a house bought for them by the company in another village. Meanwhile the cyanide issue was defused when the company gave the im-

pression that cyanide would not be used in the early stages of the project, although there is concern over the risks made apparent through the Baia Mare disaster and the International Commission for the Protection of the Danube River (referred to elsewhere in this volume) sees Roşia Montană as a 'hotspot' identified by the Baia Mare Task Force in its study of the Tisza basin. Local concern has increased due to widely fluctuating estimates of the levels of job creation (currently 200 but pitched at a maximum of 3,500) and resettlement (ranging from 200 to 800 housholds) – as well as salaries and community benefits – emerging from the comments of company representatives and local officials. This uncertainty led to the formation of a local opposition group 'Alburnus Maior' (the Roman name for the village) which represents families in the affected area who feel they have not been properly consulted and who question whether the government has the financial and technical resources needed to monitor the scheme properly.

Given the approvals that have been given both nationally and locally – by the 'politics of small steps' – and the scale of transformation involving the removal of five mountains, and the creation of both a 1,600 ha waste tip around Roşia Montană and a 60ha decantation lake in the Corna valley – it is difficult to see how there can be any viable option of staying and expropriation may be inevitable for those who refuse to sell. There are grave concerns over health which emanate not only from the village but also the surrounding area where property values could ber adversely affected, aggravated by tensions caused by the dilemma between employment and environment interests. Support is coming from neighbouring communes and towns and also from cities in western Romania, while NGOs worldwide, including the World-Wide Fund for Nature in Vienna, are becoming involved in what is perceived a potential disaster. There has been widespread action and extensive media coverage duing 2001–2002. People look for a reasonable scale of mining activity that will avoid the use of potassium cyanide and harmonise with agriculture and rural tourism to achieve sustainable development. However there is also a split between those who stand to benefit through employment and those who will lose their farms and homes (albeit with compensation). In the highly charged atmosphere where the tension between employment and environment may be exploited by ecomilitants, the work of Albamont in supporting the community and seeking access to the environmental impact assessment, could be devalued since the organisation is (unfortunately) listed as a collaborator in company literature. There is certainly concern over the risk of damage to the archaeology (of great cultural and touristical importance, dating to the Roman period), although rumours of illness affecting the community seem premature since the project has not started at the time of writing (June 2002). It is astonishing that the project should have made so much progress since it represents an extension of 'Ceauşescu thinking' going beyond the indelible impression on he locality left by the huge copper mine of Roşia Poieni which lowered the mountains by 400 m. Whatever the outcome it is very clear that major projects of the kind promoted under communism will now come under close scrutiny, given the capacity of local organisations and their overseas connections which include specialist groups such as Mining Watch in Canada <http://www.mining.watch.ca> although in this case the critical decisions have already been made.

Zlatna area: reclamation and diversification in a smelting town

Pollution problems are most severe in the Zlatna basin where they are accentuated considerably by the climatic conditions. The depression has a tectonic origin but is also modelled by actions associated with marine retreat, evidenced through miocene formations. It lies between three sub-units of the Apuseni Mountains with the Trascău Massif to the north, the Munţii Vinţului to the south and the Muntii Auriferi to the west. The basin has a population of 9,800 of whom some 4,450 live in the town. The main employers are the mining company 'Sucursala Minieră Zlatna: SMZ' (with 1,130 employees including the ore preparation plant) and the Ampellum enterprise – producing electrolytic copper, sulphuric acid and alumina (atomised aluminium particles used for paint preparation) from complex ores – accounts for another 2,500. All this activity derives from vulcanism in the southern part of the Apuseni Mountains and the resulting mineral endowment of copper, gold and silver ores exploited since Roman times (although processing did not start until 1747). The wind comes predominantly from the west and northwest so that pollution – quite moderate at first – is directed down the valley. However, it is clear from historic paintings of the area that pollution was aggravated by the lack of a normal wind flow due to the containment of the air in the basin under a 300 m high inversion belt. Inversions are most frequent at night and during cold periods, especially in spring. Hence the greatest air pollution is found below this level at a distance of up to four kilometers to the southwest (Smejkal, 1982, p. 75). Meanwhile there is severe water pollution for the pure water at the source of the Ampoi is badly degraded below the town and much damage to fish is caused (Ileana and Popa, 2001).

Under communism however Zlatna expanded as a mono industrial urban area, depopulating the surrounding rural areas as young people were drawn to the town's industrial zone. The level of pollution increased because 'clean' technology imported from Finland (Outokumpu) for the older part of Ampellum plant ('Uzina Veche') was maintained using obsolete and low-performance components manufactured in Romania under the slogan 'să realizăm totul prin eforturi proprii, fără importuri occidentale' (we do everything ourselves, without imports from the West) – a variant on the more concise phrase 'prin noi înşine' used during the inter-war years. Emissions were not properly filtered and problems were increased by the tall chimney built on the hill of Mãgura Dudaşului during the 1980s. Whereas the chimney in the factory precinct was 100 m high, the new chimney was 200 m high, with the base at a level 250 m above the factory. Its capacity was 25 cu m/s compared with only seven for the old one. The chimney solved the inversion problem for the moment but since there was no filter system, a large

Table 1. Heavy metal dust in soils at Zlatna

Pollution	Soil	Cadmium		Copper		Lead		Zinc	
Level	Depth	A	B	A	B	A	B	A	B
None	1–5 cm	1.48	na	14.01	na	31.35	na	150.0	na
	6–35 cm	1.48	na	15.21	na	16.98	na	150.0	na
Low	1–5 cms	2.23	51	54.46	288	64.86	107	272.0	81
	6–35 cm	1.76	19	33.41	120	14.85	na	101.5	na
Medium	1–5 cms	2.28	54	98.25	501	147.10	369	284.3	90
	6–35 cm	1.80	22	31.90	110	43.66	163	173.3	3
High	1–5 cm	1.90	29	163.90	1070	168.20	436	317.6	118
	6-35 cm	1.64	11	24.70	62	39.43	132	109.2	na
Very High	1–5cm	1.83	24	142.70	920	228.10	628	288.0	92
	6–35 cm	1.83	24	6.20	na	7.27	na	150.0	na

A, Metal content: particles per million.
B, Percentage in excess of the maximum legally permitted ('limitele maxime admisibile': LMA).
Source: Smejkal (1982, p. 74).

area of 30 km by 10 km – with an elliptical form reflecting the local topography – was damaged through the horizontal dispersion of gases; adversely affecting human health and the ecosystems in general, especially the lower slopes of the depression below the town which have suffered heavy erosion. Pollution is greatest during periods of calm when the stagnant air is highly contaminated and causes great damage to the vegetation (Turnock and Dimen, 2001).

High pollution correlates with cloudiness and high humidity: nebulosity reduces the penetration of solar energy. Heavy metals, gases and dust damage the soil and prevent natural regeneration. Rain is important in washing pollutants into the soil and thereby reducing the concentration in the atmosphere. Soils have been excessively degraded over some 30,000 ha through SO_2 and acidification is high: pH values range from 4.15 to 5.70 compared with a range of 5.30–6.70 under normal conditions. Heavy metal dust in the soil usually exceeds the permitted level by a large margin: 1070% for copper at 1–5 cm (Table 1). This causes a serious regression of enzymatic activity in the soil through gradual destruction of the organic material and the prevention of humus formation reduces nutrition for micro-organisms. Values increase with the degree of pollution in respect of 1–5 cm but not always for 6–35 cm. The values exceed the guideline ('martor') – a reference value based on unpolluted areas – mostly at 1–5 cm depth, because of the process of sedimentation of the metal dust and the lack of organic material needed to introduce the elements into the deeper layers of the soil. The greatest accumulations (predominantly lead) tend to occur in meadows where the surface layers are undisturbed, whereas pollution is dispersed over a range of 0–25 cm where land is ploughed (Rusu et al., 2001). Transfer of heavy metals to plants is greatest for cadmium, lead and zinc; least for copper. Meanwhile, soil humidity is increased because the dead organic material impedes drainage, favouring surface run-off; while erosion by torrents removes any remaining vegetation, stripping away of soil down to the bare rock (Figure 3).

The value of crops and industrial raw materials is reduced by pollution. Some 43,000 ha of woodlands have been damaged by SO_2 and metal dust (2,000 ha heavily, 3,000= ha moderately and the rest slightly) (Stirban et al., 1980). The greatest impact has been felt in the Ampoiu Valley downstream to Meteş (some 75 km^2); with a second zone at the foot of the mountains between Izvoru Ampoiului and Tăuţi (150 km^2); while a third includes the mountain slopes as far as the Mureş (300 km^2) (Mihăilescu and Ciobanu, 1990; Şerban, 1993). The density of woodland is only 35-40% what it would be under normal conditions. The vegetative period is shortened by two to three weeks in the average year; evident because yellow leaves appear much earlier than in unpolluted areas. Improved production is being sought by the application of lime (8–10 t/ha), with best results through sustained dressings of complex and organic fertiliser applied in various combinations (Rusu et al. 2001). The work is done by the Alba branch of Oficiul de Studii Pedologice working on a 1-h plot polluted by sulphur and heavy metals and cultivated for maize and pasture. Bentonite and zeolites absorb the heavy metals.

The smelters in Zlatna

Meanwhile there is still a significant pollution problem in Zlatna. A new factory (Uzina Nouă) was opened in 1988 and used Western environmental equipment under licence. However, the parts were manufactured in Romania and the performance was unsatisfactory. Moreover, the factory was unviable in the 1990s with a capacity for 30 t/day of copper production whereas the output was only 4–5. Nevertheless the factory was privatised in 1996 in favour of an Indian company under name 'Deals Elcont' of Zalău, but despite promises to install new technology the factory was closed as unviable the following year. Meanwhile, the old factory ('Uzina Veche') which had used the emissions generated by the copper smelting process to make sulphuric acid went out of use during 1988–1996 when the new factory was operating with its own factory for sulphuric acid and a high chimney on Măgura Dudaului to evacuate the remaining emissions. It was intended that the allocation of 3.0 bln lei

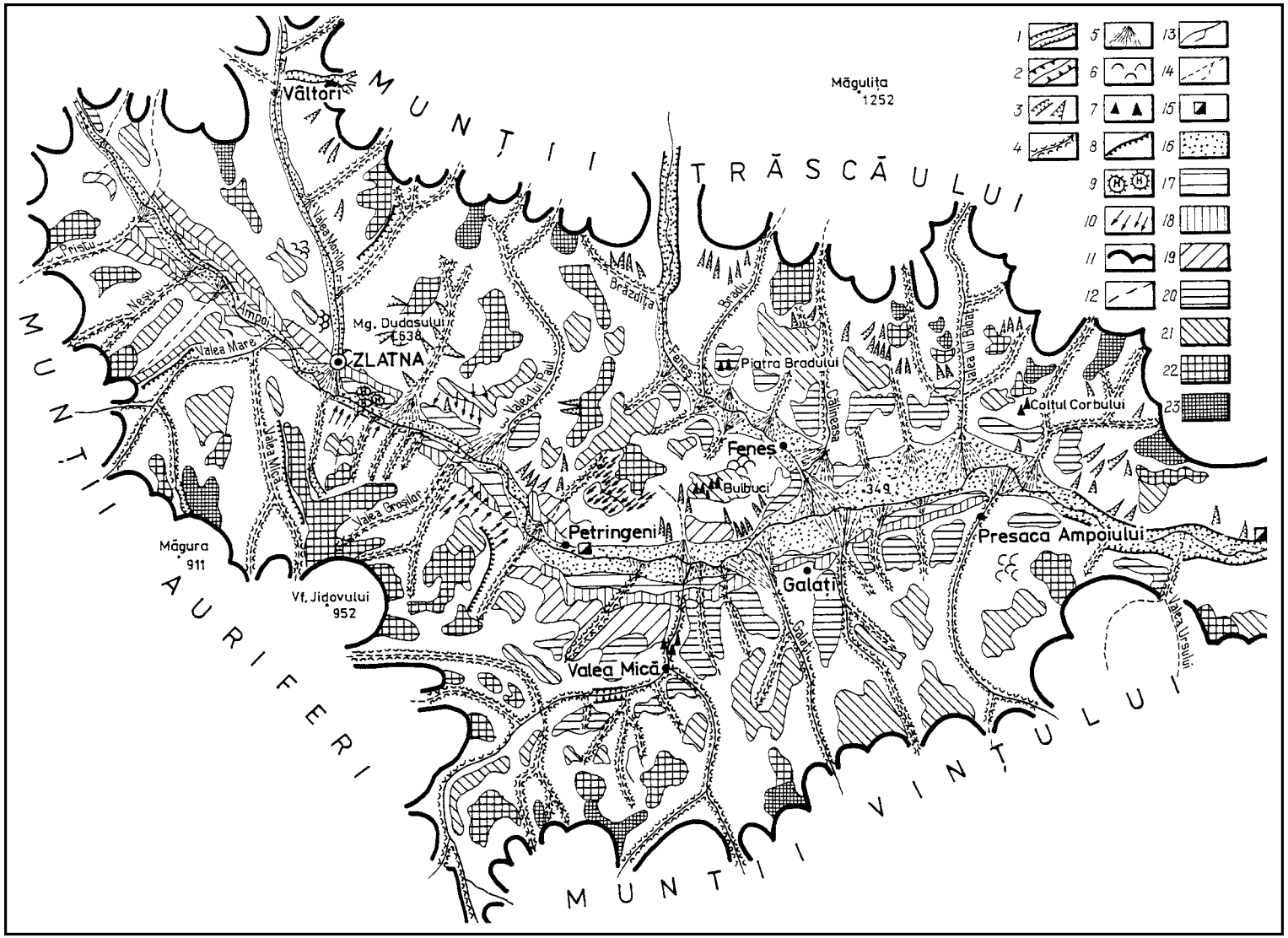

Figure 3. The Zlatna basin. 1, Defile; 2, Gorge; 3, Gap; 4, Minor tributary; 5, Dejection cone; 6, Landslides; 7, 'Olistolites'; 8, Cuesta; 9, Waste Tip; 10, Badlands; 11, Basin boundary; 12, Floodplain limit; 13, Permanent streams; 14, Impermanent streams; 15, Quarry; 16, Floodplain; 17, 6–10 m terrace; 18, 15–20 m terrace; 19, 30–40 m terrace; 20, 60–80 m terrace; 21, 500–575 m surface; 22, 600–700 m surface; 23, 700–800 m surface. Note the damage on slopes perpendicular to the air current; also on the lower slopes – Prisaca – parallel to the current of polluted air.

for Ampellum in 1993 would allow for rebuilding of the sulphuric acid plant during 1994-1996 and pave the way for privatisation (Floca and Mihăiescu, 1999). Modernisation of the copper factory melting furnace (by installation of a fireplace of 80 m^2) would intensify the melting process and enrich the SO_2 gases (with electrofilters were to be installed and the furnace connected with the 200 m chimney). There was also to be modernisation of the sulphuric acid plant, installation of an automatic control system and an electrical device ('hotă electrică') to absorb dust and particulates but the work has never been implemented.

However, with the closure of the new factory the old factory is back in use but the level of production is too low for the sulphuric acid plant to operate: a higher rhythm of activity is needed for the manufacturing process to function. In any case there is no market and it is doubtful if the plant could operate without substantial refurbishment after years of closure. However, the lack of sulphuric acid production means that the level of emissions remains high since the main goal of this activity was the reduction of pollution. The present activity in the old state-owned factory is concerned with blister copper ('cupru negru') which is sent to the privatised 'Pheonix' smelter in Baia Mare for conversion to electrolytic copper. The ore comes by lorry from Roşia Poieni and the Haneş mine at Geoagiu-Băi; also by funicular from the Larga mina at Trampoiele-Almaşu Mare south of Zlatna (with 310 people working at this local 'Exploatare Minieră'). The zinc ore from these sources is processed at Copşa Mică, but the Zlatna factory also produces copper sulphate and magnesium sulphate. Despite pollution two to three times the legal limit emitted from two chimneys in the valley, people are desperate to retain jobs; yet the pollution makes it virtually impossible for new investment to come in. The chimney on the hill cannot be used because it is connected to the new factory and in any case people outside Zlatna do not wish to be burdened with the town's pollution. The new factory currently employs 1,040 compared with 1,500 at the new factory prior to its closure.

There are also some concerns over mineral preparation by the mining company. Each year this produces some 42,000 t of slime ('zguri metalice') which Ampellum can process by flotation to separate out useful minerals. There is then a process of decantation after which the residue remains in place without treatment, while the clear water is discharged into the Ampoi, although there is no correction for the fact that the waters are strongly acid (pH_3), as are the waters from the Haneş and Larga mines. There is a plan to provide an installation to correct this problem but no funding has been made available. On the other hand slime known as 'namoluri auroargintifere' that results from the production of copper sulphate is processed in Baia Mare because it contains gold and silver. Meanwhile, sewage facilities are being overhauled for domestic used water and also industrial water with the need to neutralise the Cu, Zn, As and Pb and increase the Ph level to 9. But the water treatment station is not yet operating while the industrial complex puts used water into the river (roughly 1:1 used and fresh). There is an open waste tip ('halda') covering 33 ha with 3.2 mln t and

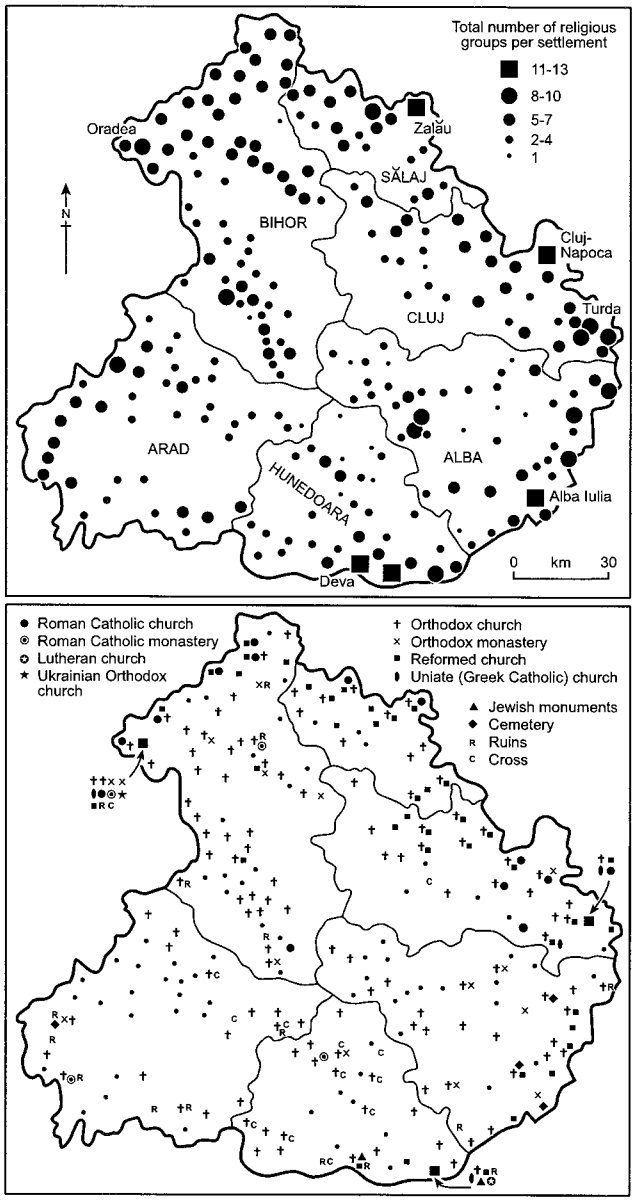

Figure 4. Distribution of religions.

increasing by 80,000 t annually for all types of waste. A separate area of one hectare used for domestic waste has a total accumulation of 66,350 t which is increasing all the time. It is also inadequately managed, but there is some ENGO involvement in the collection and recycling of waste.

Diversification

The human population has declined from the level of some 11,000 in 1978, due in part to reduced life expectancy linked with workplace accidents and the high infant mortality arising from respiratory diseases caused by heavy metal particles in the air (70–100 t generated each year). However, the local population's concern over pollution – indicated by an awareness of political influence expressed through support for parties with a credible ecological programme – is tempered by the importance of retaining salaries. In the 1992 local elections the ecological movement (MER) topped the poll but no change occurred given the overriding concern

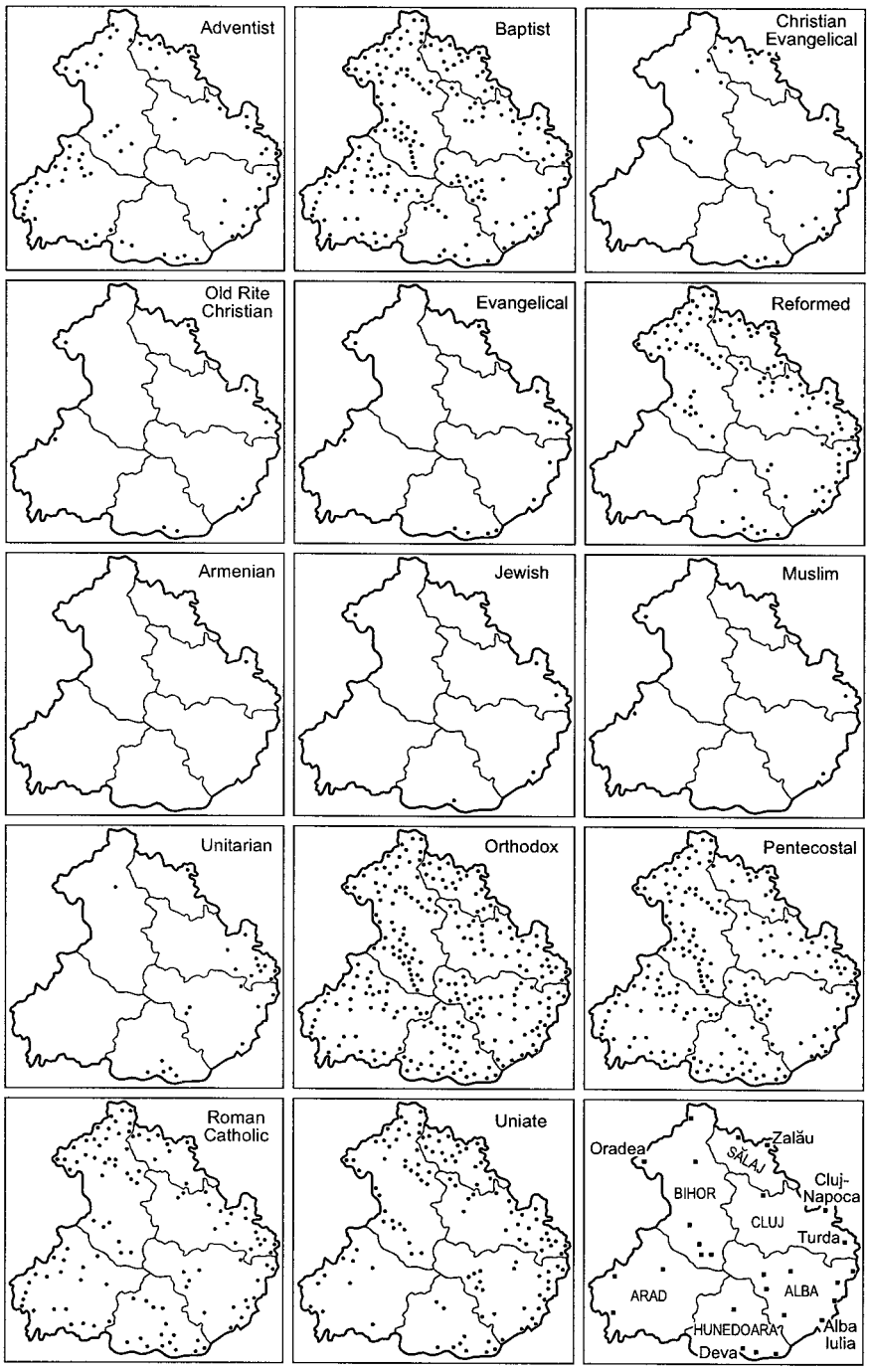

Figure 4. Continued

to keep the local factories open and social democrats are now in control along with the nationalist România Mare party. Environmental reconstruction must be consistent with alternative employment opportunities. More sustained monitoring of emissions is needed for an environmental impact assessment programme leading to projects for ecological reconstruction and sustainable development that will hopefully safeguard the environment in the future. The Alba Environment Agency monitors emissions; using modern equipment obtained through collaboration with their US counterpart, while the national water company ('Apele Române') monitors running water quality. In this process there should be full public participation with encouragement from the local authority and also help from ENGOs which can provide environmental education and contribute to the supply of information. The state has contributed to diversification through declaring Zlatna a less-favoured area (LFA), along with Abrud, Baia de Arieş and the communes in between, but despite a standard gauge rail link with Alba Iulia and natural gas distribution the continuing pollution problem discourages new development even when fiscal incentives are available (Ianoş, 2000). The only significant enterprise apart from the mining company SMZ and Ampellum is the local

utility Servcom which provides essential services formerly controlled by the local authority.

Information provided by the Ministry of Development & Forecasting acknowledges the pollution problem by references on the internet <http://www.mdp.ro> to 50,000 ha of polluted land, SO_2 emissions up to 10 times the legal limit (dust 2.4 times, lead 1.7 times and cadmium 1.3) and contaminated water threatening flora and fauna. There is one locally-based ENGO in Zlatna ('EcoZlatna') but it maintains only a modest activity and most work in environmental education and in lobbying local government is being done by organisations based in Alba Iulia, although their actions are mainly concerned with welfare rather than environmental action explicitly. 'Sprijiniti Copii', based in Alba Iulia, provides educational support for 10–15 year olds, and operates in Abrud and Câmpeni as well as Zlatna. There are also initiatives – based on a $50,000 allocation by the World Bank – to combat unemployment ('Programe Active pentru Combatarea Şomajului': PAEM) involving people from local government, trade unions and youth groups who assess unemployment levels as a basis for job creation through training courses to provide skills needed for small businesses concerned with auto services, building, carpentry, computing and tailoring. In Zlatna there is further World Bank help for people made redundant by Ampellum and SMZ as part of a wider programme concerned with diversification in four Romanian counties affected by the restructuring programme – including Alba (35 settlements) and Hunedoara (28 settlements – which is being implemented during 2002 with the support of an centre for assistance and consultancy in Deva.

The international dimension is relevant through environmental assistance and possible investment in a privatised mining and processing industry. However, the social aspect will be very important given the inevitability of reduced employment in the key industries, following technological upgrading to eliminate pollution and increase both productivity and profitability. What other options could arise from the local resource base? Agriculture is compromised by polluted soils and the heavy metal content found in the crops. An expanded wood processing industry is also ruled out by forest depletion and impossibility of regeneration. Rebuilding the economy of Zlatna should secure a role for transit tourism on one of the major routes through the Apuseni Mountains: Oradea-Beiuş-Câmpeni-Abrud-Zlatna-Alba Iulia; shorter and more interesting than the route round the edge of the mountains through Huedin, Cluj and Turda (Ion-Tudor, 1998). The director of the Rural Foundation of Romania, Bernard Houliat, has announced some 30 tourist intineraries in the Apuseni worked out in connection with the EU PHARE Tourist Programme. 'Albamont' contributes with signposting which could help Zlatna become a centre for excursions – including travel to the main areas of potential for winter sports in the upper Arieş valley – and justify some development of hotels and entertainment. It is also significant that Pătrângeni, near Zlatna, is one of a constellation of monasteries situated on the edge of the Apuseni (with others quite close at Crişan (Vaca) near Brad and Izvoru Poşaga, Lupşa, Râmeţ and Sub Piatra in the Arieş Valley. This aspect of the Orthodox religion has potential for tourism not to mention the diverse cults that are also represented in the area and could be included in tourist programmes (Iacob 1996) (Figure 4). Beyond this, the area will have to rely on light industry stimulated by the local labour market and fiscal incentives linked with less-favoured areas. Stei-Nucet (one of two other LFAs in the Apuseni: the other is the rural area of Vadu Crişului) has been quite successful in attracting foreign investment (e.g. a large biscuit factory) – on top of the massive 'European Drinks' complex nearby on the outskirts of Beiuş – and it is important that Zlatna should promote itself more effectively, given its rail link and its proximity to the major Transylvanian routes.

Threats and opportunities: the peasant economy of Padiş and the upper Aries

The environment here is quite unstable due to heavy pressure through agriculture, woodcutting and tourism. This is not unprecedented for there were heavy Moţi deforestations in the 18–19th centuries as large clearings ('poieni') were formed, leading to more torrential activity and degradation in the Ampoiu, Arieş and Criş Negru valleys. In the Arieş local historians indicate that some minor waterfalls ('gârde') removed to facilitate the floating of timber while the name 'tau' near Gârda de Sus refers to an artificial lake (now abandoned and silted) to store a small reserve of water for use in pushing logs downsteam (Stefanuţ et al., 1996, p. 79). Replanting was undertaken during the period 1890–1910 with further land improvement in response to the law of 1930 (Muică et al., 1999). There was heavy cutting again in the early communist period, making use of funiculars and 'mocanite' (narrow gauge) railways until more roads were built to expedite mineral prospecting as well as wood extraction, while the forest road system between Beiuş and Huedin gave a boost to tourism on the Padiş Plateau. However some roads provoked erosion, as in the Gârdişoara and Ribicioara valleys (Cocean and Onac, 1996; Josan et al., 1997) while the unsurfaced road between Arieşeni and Pietroasa through the Cobleş and Galbena valleys damaged scenery in the Cheile Galbanei reserve. Cocean (1984) noted post-war plantings of Douglas fir, pine and spruce in karst areas, as well as afforestation of mine waste tips, as at Roşia Montană. But now there is another cycle of cutting underway, following partial privatisation, judging by the scale of sawmilling which electrification is facilitating in outlying hamlets which can transport planks to the main road by cart and substantially augment farm incomes. There is also evidence of some pasture deterioration with more Nardus stricta (reducing water infiltration into the soil) and reduced biodiversity most evident in the narcissus glades. It seems that everyone wants to cut more trees: local farmers, local authorities and even Romsilva (the state forestry commission) which is unwilling to stop its operations in Cluj County in the interest of conservation. Particular problems have arisen because of illegal actions when woodland restitution procedures required Romsilva to relinquish responsibility for the protection of the relevant areas before new owners could take over.

Table 2. River discharge in the Arieş Basin

Station	River	A	B	C	Di	Dii
Scărişoara	Arieşul Mare	20	203	1126	6.2	238.0
Albac	Arieşul Mare	29	330	1029	8.5	270.0
Mihoeşti	Arieş	42	574	1035	10.9	460.0
Câmpeni	Arieş	47	639	1020	11.8	519.0

A, length to source km; B, drainage basin area above station km^2; C, Mean altitude m; Di, Mean discharge cu m/s; Dii, Mean discharge 27 December 1995 (maximum).
Source: C. Resiga, Scola Naţională 'Avram Iancu', Câmpeni.

However there are serious flood risks at times of high rainfall, as in March 1981 (Bălteanu, 2000). But very great damage to infrastructure and production was caused in December 1995 by a sudden rise in temperature (to +10 °C by day and +5 at night) accompanied by rain and snowmelt. This was a very rare phenomenon for high water normally occurs during March-May. Discharge at the Mihoieşti dam above Câmpeni reached 519 cu m/s on December 27 when the lake was full and the entire discharge was going over the spillway (Table 2). Run-off was rapid because the basin is only 56% forested above Câmpeni (though 68% above Scărişoara). The Arieş valley is not the only one affected for there are also flood hazards at Răcătău and Râşca (ADRNV, 2000). The Romanian government has drawn up a recovery plan (referred to below) while USAID has allocated USD3mln for environmental protection with emphasis on cross-border pollution in the Criş basin. Moreover the PHARE Cross-Border Cooperation (CBC) programme for Hungary-Romania includes flood prevention in the Cris basin financed by € 1.18 mln non-reimbursable credit plus E0.80mln from the Ministry of Waters Forests and Environment Protection (MWFEP). The emphasis is on constant monitoring of rain- and snow-fall and river levels. There will be meteorological radar, with a computer for processing in order to forecast rainfall; then there will be 50 automated stations to measure actual rainfall and river levels. However, part of the solution lies in more sustainable landuse practices. Foresters are concerned about grazing pressure and the threat to woodlands through the latest round of restitution (approved in 2000) which may affect up to half the state forests in the Apuseni, including the main massifs.

Protection is inadequate because although a national park for the Apuseni was suggested by Racoviţa in the 1920s progress was difficult because the agricultural and silvicultural interests could not be sacrificed to a regime of nature protection (Puscariu and Boscaiu, 1981-1982). 'Gheţarul Scărişoara' was protected in 1938 and other reserves were established under the scrutiny of the Academy in the early 1950s included Cetăţile Ponorului. A national park of 20,000 ha was proposed by Bleahu and Şerban in 1959 without effect, but UNESCO's 'Man and Biosphere' programme provided a new outlook accepting that some exploitation of protected areas is consistent with conservation. In this way communities are able to develop and their survival contributes to the richness of the cultural landscapes especially where traditional occupations are maintained and historical events are commemorated (like Horea's association with Albac). On this basis a park was declared by the Council of Ministers in 1974 and the forests were subsequently examined in this context (Iacob, 1988), but a management system is still lacking, even though the Apuseni was designated a biosphere reserve in 1991 at UNESCO's request. The proposed reserve extends over 75.6 th ha in Alba, Bihor and Cluj counties – providing a buffer for individual reserves – with a boundary of almost 173 km (Figure 5). The northern limit extends from Măgura Fericii (1,106 m), just south of Stăna de Vale, to Beliş via Vf. Briţei (1,759 m) and Măgura Călăţele (1,404 m) with a salient to take in the Pietrele Albe Rocks. The eastern boundary follows the Someş Cald upstream to Fântânele Lake and thence to Fântânele Hill (1,322 m) and Colţul Vârfului (1,653 m) and the Albac valley. From Albac the southern boundary follows the Arieş and Băiţa valleys; crossing the watershed at Vf. Gălesoaia just south of Vârtop. The western boundary, passing close to the villages of Sighiştel, Chişcău and Pietroasa, takes in the higher parts of the Criş basin southeast of Beiuş, including the reservations of the Aleu and Sighiştel valleys.

The central-western part of the area contains great geological diversity: eruptive rocks, limestones, conglomerates, sandstones and argillaceous schists, with each rock type generating a specific relief. There are some places in which the dominant karst formations produce highly picturesque landscapes with steep slopes, narrow gorges, caves and sinkholes (in particular the glacier caves of Scărişoara, and also Bârsa, Bortig, Focul Viu, Vârtop and Zgurăşti. There are also numerous isolated rocks, peat-bogs, trees and secular forests and trees protected within reserves (botanical, geological, hydrological and palaeotological) or as individual monuments of nature. Alba County Council (ACC) has been particularly keen to protect as many areas as possible: there are 77 nature reserves in the Apuseni section of this county, compared with 36 in Bihor, 10 in Hunedoara and six in Cluj (Măhăra and Măhăra, 1982). ACC has commissioned research from the Geography Institute on 'A Systems Study of Nature Reserves' (1997-1998) with detailed description of each reserve and a review of the park/biosphere reserve as a whole. However scientific study reveals that the most important sites lie in Alba and Bihor) counties. Both these counties are particularly keen on linking conservation with sustainable mountain tourism (while Cluj County Council is more concerned with industry and training). However, although a Territorial Planning Law passed in April, 2000 formally places the Apuseni in the category of 'biosphere reserves, national and natural parks' it does not stipulate the precise designation (such are the tensions over the level of priority for conservation) and legal measures to set up an administration, a scientific body and a monitoring system are still awaited.

This dilemma reflects the problems faced by the peasants since 1989. With the loss of salaries, young people have left the area while the older inhabitants who own the land are trying to find alternative sources of income. Money made from wood processing can be used to buy cereals.

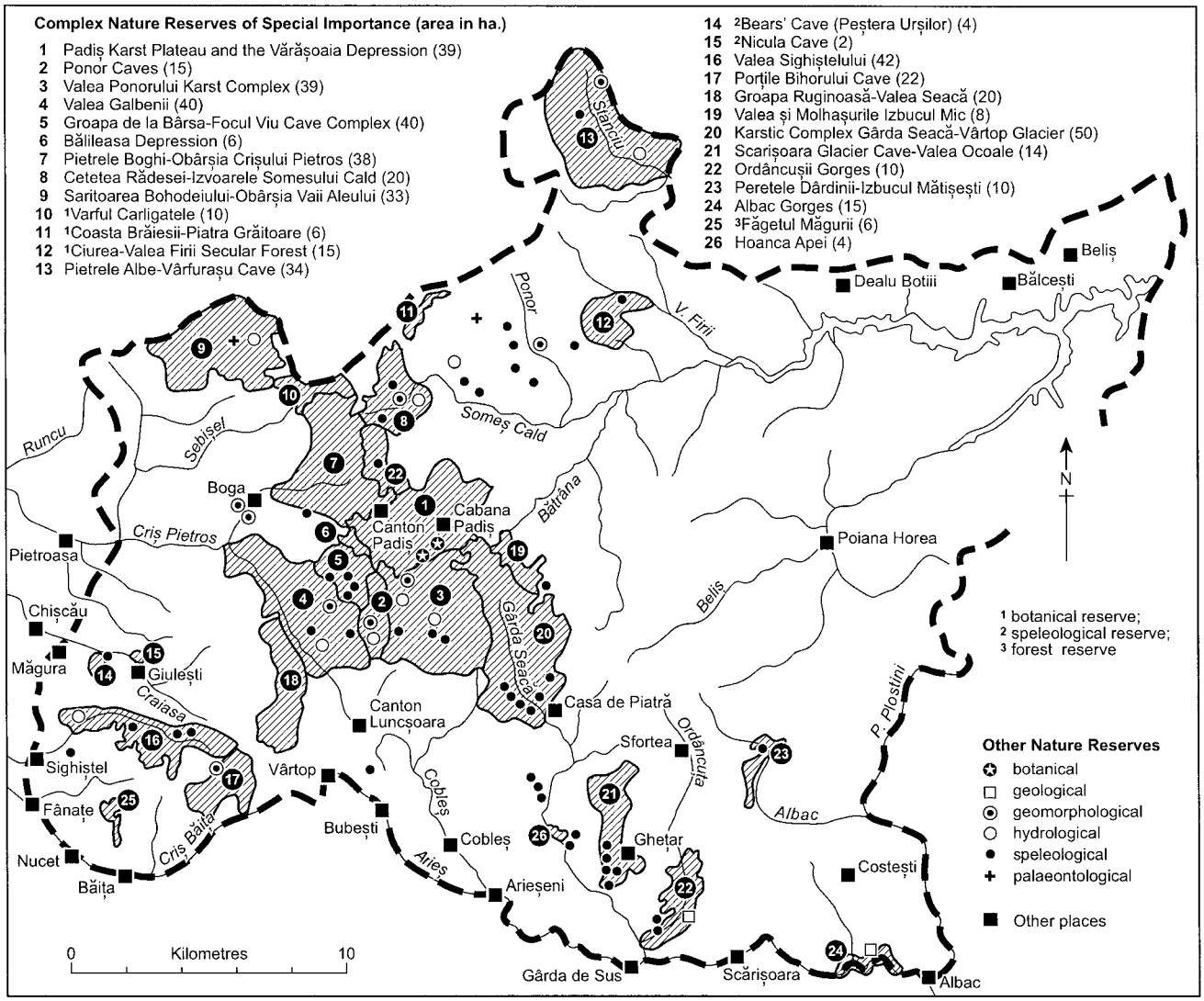

Figure 5. Apuseni National Park and its constituent reserves.

However privately owned woodlands are very limited, pending the implementation of measures approved in 2000, and this places pressure on the national forest (Mihăiescu and Floca, 1999). Arrangements to make limited cuts are grossly abused at night with the best trees removed and – with the police powerless to intervene – the 'mafia pădurilor' sees to the sawmilling locally and exports the product to Hungary or overseas through Constanţa with the money shared out around the ring which includes corrupt foresters. At the same time, Romsilva's income is tied to timber sales and so there is a desire to retain as much production forest as possible. (Pop, 1997a, p. 15) sees the nub of the problem in the removal of 57.9 th ha from Romilva's control in 1992 but without any alternative management regime in place. Hence it has been impossible to combat the illegalities and the destruction of woodland – plus the overgrazing of the meadows – has been followed by erosion by wind and rain and more severe flooding (as occurred at Padiş in 1995). The situation will be complicated by further privatisation of woodlands approved in 2000 if there are no management systems in place (Uncu, 2001).

The scale of the problem may be exaggerated because there is a wood processing industry that operates with the approval of Romsilva and relates to small restituted woodlands which are cut on a sustainable basis for processing into 'scândure': planks of standard size which are sold locally to timber merchants or marketed directly in villages in the adjacent lowlands of Bihor county using lorries or carts. During the summer months convoys of carts are a common sight on the road over Vârtop with each cart loaded with two cubic meters of timber (a lorry would take 10 cu m) at the start of an itinerary ('trăseu') taking some two weeks and covering both local markets and villages en route. The peasants often buy cereals with the proceeds and get the milling done on the way back home (Gubbins, 2001). Such a routine is possible because privileges granted after the First World War have been restored since 1989 and the 'Carnet Moţilor' not only guarantees a free allocation of timber by the state (where no woodland is owned) and exemption from taxes that might normally be levied on the sale of manufactured goods but allows the use of public transport at reduced rates and the right to camp on common grazing land. It perpetuates the

'comerţ ambulant' that was very common before communism and which can be seen in its most extreme form in the marketing of large fermenting vats ('vozuri') made of fir staves in distant parts of the country (Plate 2).

Grazing is however a less severe problem because of falling profits on meat, milk and wool: cattle numbers are well below capacity. Nevertheless communities surrounding the national park are grazing large numbers of sheep and training dogs to look out for wolves from cages placed in the trees so they can give the alarm without being endangered themselves. Poaching is encouraged by inflated perceived threats to livestock from wolves and bears, plus the going rates for legalised hunting which can reach DM10,000 for authorisation to shoot a bear. Berries and mushrooms are collected by Romsilva for export but the business can also be exploited by teams of gypsies employed by exporters which may damage the forests. Even the traditional practice of plum brandy ('ţuică') distillation has become too intensive in some areas with the disposal of fruit residue ('boască') flavouring the drinking water supply (abstracted downstream) to the extent that some householders in the town of Brad complained that they were getting 'ţuică' through the tap! Business is constrained by poor infrastructure and milk is often fed to pigs because there are no local catering or processing outlet (Popov et al., 2001).

Although a modest tourist industry is long-established (Vlad and Truţi, 1984), there is no significant growth in the remoter villages in view of the poor infrastructure regarding road and telephone access, and the supply of gas and piped water (by contrast electricity is now more widely available), though Surd (1992) considers that small hamlets like Cărmăzăn, Casa de Piatră, Ocoale and Oncăseşti have a future as holiday villages ('sate de vacanţâ') attractive to foreign visitors. There are some facilities in the villages, like the Cabana Arieşeni and Popaş Turistic Gherda in Gârda and the 'han' in Albac; and there are agrotourism networks with 'tabere' run by evangelical churches. While most tourism is run from the towns there are cases of over-concentration and 'wild tourism' in evident in rural areas through large numbers of second homes giving rise to traffic congestion, litter accumulation and erosion in places like Muntele Băisorii and the Someş Cald and Someş Rece valleys close to Cluj-Napoca (Şerban 2000); and the Vălişoara area near Aiud and Alba Iulia. Substantial deforestation has occurred to create the piste at Vârtop in the upper Arieş. Some dispirited peasants seek solace in alcohol – easily obtained through private bars – but there is also tendency for adherents to new faiths – 'pocăiţii' (mainly baptists and pentecostals) – to form their own self-help groups separate from the wider community (Pop, 1997a, p. 27). Peasant farmers following traditional practices are generally reluctant to sell land (apart from small fragments that are of little agricultural value) so it is difficult for speculators to gain a foothold: the problem is essentially one of moderating pressure on the publicly-owned land through more sustainable practices.

In the absence of a national park/biosphere reserve administration, the county councils have set up a 'convenţia interjudeţeană' (1995) for ecological monitoring while plans have been drawn up by Park Silva (1992) and by Urbanproiect in Bucharest whose unitary 'plan de amenajare ale teritoriului' (PAT) which does not yet make sufficient provision for local interests. The problem is to operationalise the 'natural park' concept in a way that will attract local support by retaining traditional landuse practices and allowing for the development of small industries on a sustainable basis (Chauvin, 1997, p. 35). This in turn calls for public investment and in recognition of the inadequate infrastructure. The Ministry of Public Works and Physical Planning (MLPAT) developed 'Planul de Amenajare a Teritoriului Zonal Munţii Apuseni' during 1993-1994 with the help of Urbanproiect. But in view of the serious flood damage of 1995 a 'Program Special pentru Sprijinirea Dezvoltării Economico-Sociale a unor Localităţi din Munţii Apuseni' was launched in 1996, covering the core of the region (Moise 2001). Infrastructure has started to benefit from 8,000 bln lei was allocated for an eight year period (to 2004) to deal with roads and bridges; the consolidation of river banks; electricity and gas supply; education and health; and small business (especially in the food sector) backed by PHARE and other donors. With the creation of 'Consiliul Naţional pentru Dezvoltare Regională' in 2000, the region also benefits from the eight regional development agencies. But the Apuseni is unfortunately split between three separate regions for the Centre, North West and West which calls for careful coordination (Nica, 2001).

There has also been a $16.5 mln loan accord between Romania and International Fund for Agricultural Development (a UN specialised agency fighting rural poverty) for rural development in the Apuseni – plus $2.5 mln in technical support from Germany. Initially aimed at Alba County, farmers and entrepreneurs in all underprivileged villages in the Apuseni are now eligible. This initiative should now be maintained by EU SAPARD pre-accession funding. Furthermore, until the government reorganisation of 1996 an 'Agenţia Naţională pentru Dezvoltarea Zonei Montane' was working on farm diversification strategies and proposed not only a comprehensive 'lege a muntelui' – with administration for individual massifs ('Comisariate de Masiv') – but the restoration of a package of fiscal concessions (mainly wood supply, transport and personal taxation) available to the people of the Apuseni before the communist era (Tont, 2001)

Some progress has been reported which extends diversification beyond the traditional artisan activity with wool and wood. Ianoş (1999) refers to 10 PHARE projects during 1996–1997: six in milk production and processing (Baia de Arieş, Comanu, Geoagiu de Sus, Necrileşti, Ponor and Sălciua) handling 1,000–2,000 l/day (despite continuing marketing problems); two for wood processing (Câmpeni and Sălciua); also a bakery in Ampoiţa and an agrotourism venture at Gârda (supplementing ACC's initiative of encouraging agrotourism in about 100 selected households in Bucium, Ponor and the Upper Arieş). Also, an association was formed at Întregalde in 1997 to mechanise mowing, with the proceeds used for a milk processing plant. And a small slaughter house was opened by three people in Baia de Arieş with profits ploughed into meat processing. It is suggested

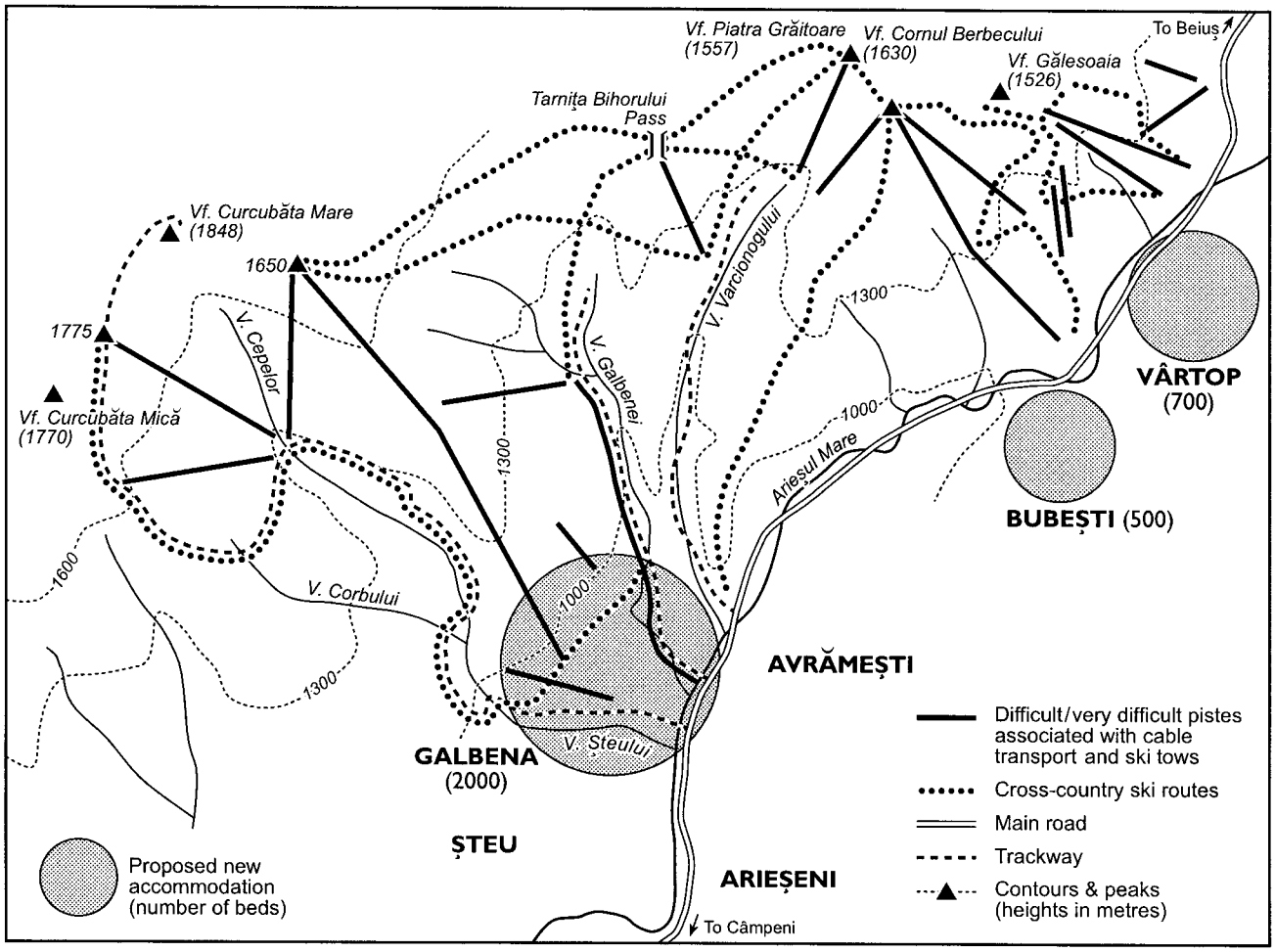

Figure 6. The proposed tourism development at Arieşeni.

(Ianos, 1999, p. 62) that a branch of the Institute of Mountain Research (Cristian, Sibiu) should set up model farms in the Apuseni to provide education in rural management and technical support for diversification, though more finance and accelerated farm amalgamation are also necessary.

ENGO activities linked with the National Park and adjacent areas

According to the register there are some 35 ENGOs active in the Apuseni although they are concentrated overwhelmingly in the towns on the edge of the mountains with 21 in Cluj and Oradea and another nine in Alba Iulia, Arad, Deva, Turda and Zalău. Only Aştileu (Bihor) and Gârda (Alba) have ENGOs based in rural areas. A questionnaire survey was attempted and despite a disappointing response rate sufficient material was obtained to indicate a diverse range of activities. There are some large and active groups – like 'Fundaţia pentru Cultură şi Educaţie Ecologistă "Ecotop" Oradea' formed in 1991 and 'Club Ecologic Transilvania' (CET) which started in Cluj-Napoca in 1992 – which provide ecological education for sustainable development, engaging the public through meetings and publications (e.g. CET's monthly 'Ecoforum') and reconstruction based on green technologies, with project implementation. Ecotop and CET have combined with others to form 'Centrul Regional de Supraveghere Ecologică a Munţii Apuseni' (CRSE) which provides ecological guards ('garzi ecologice'), marks tourist routes and runs camps and education programmes. There are links with County Councils and EU PHARE support for input on planning – in collaboration with Urbanproiect - especially Bihor (CRSE 1997; Fundaţia Ecotop 1996). In this county European money has gone into tourism management and CRSE is working the council and 'Federaţia Române de Speologie' to control abuses. 'Salvaţi Munţii Apuseni', based in Abrud with branches in Baia de Arieş and Câmpeni, brings together archaeologists, geographers, geologists and historians with an academic interest in the region and a capacity to produce scholarly work with an applied function.

The ENGOs have been working on park management (Lascu, 1997; Pop, 1997a). They want to see a strict regime of protection for plants and a sanitary approach to forests, with only moderate human pressure and action to combat soil erosion, carry out impact studies and provide civic and ecological education for young people. Management of grazings should conserve pastures, with clear limits for the grazings, controlled movement of each 'stana' periodically and long-term lets to stimulate conservation. There should be a good supply of information for local people to facilitate community involvement in decisions regarding the

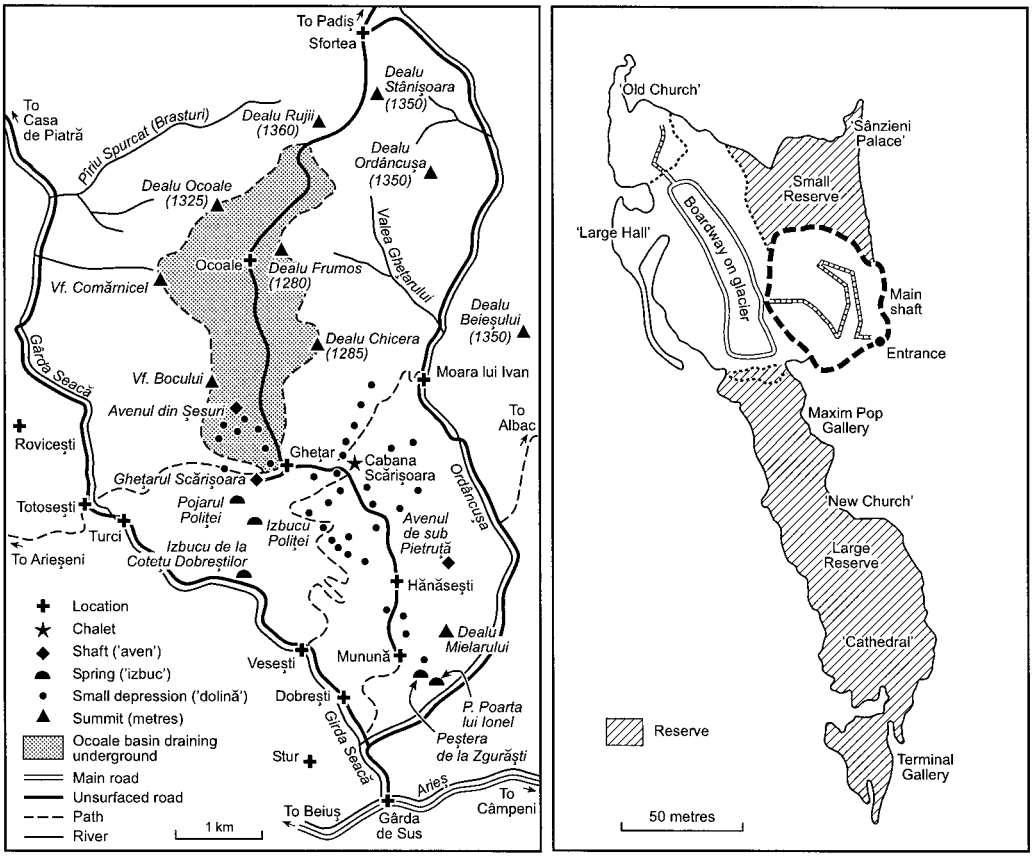

Figure 7. Gheţarul Scărişoara (left: location and context; right: the cave).

maintenance and development of the park. Although wood-cutting and grazing pressure should be transferred to areas outside the park borders as far as possible, it is conceded that wood processing interests must be considered and it is therefore suggested that there should be a special regime for forests within the park belonging to local authorities to allow production to satisfy local needs with the use of modern harvesting technology encouraged (Pop, 1997a, pp. 68–69). Forest fruit collection by people living on the edge of the park is also acceptable provided it is only for personal interest (Ibid). Investment is needed for diversification and a fund is proposed to guarantee bank credits for private local initiatives linked with the park (Pop, 1977a, p. 83).

ENGOs also want to see a retreat by industry from the most sensitive areas: intensive mining/quarrying activity for bauxite and refractory sand in the Pădurea Craiului as well as stone quarrying which is now damaging of fine limestone gorges. Cocean and Silvestru (1993) have noted how the removal of large volumes of limestone crates quarry steps in the landscape which are significantly modifying gorges like Cheile Ardeului and Cheile Ampoiţei in Munţii Metaliferi; also Cheile Gălzii and Cheile Turului in the Trascău Mountains. The region also needs to be relieved of all the equipment abandoned with the ending of intensive mineral prospecting, while further problems arise through small-scale wood processing because of the dumping of sawdust which provokes the eutrophication of lakes and is also very unsightly: often dumped beside roads and rivers since there is no means of utilising this waste material and no centralised storage facility. There is Ecotop-Albamont collaboration over 'Operation Clean Apuseni' ('Campania Apuseni Curaţi') which involves environmental education in schools but also field projects to solve the sawdust problem. After discussions during 1998-9, local activists launched a successful 'Community Action Plan for Abating Wood Waste in Gârda' which is being extended – through Ecotop – to Băiţa-Bihor, Nucet and Pietroasa. Meanwhile 'Asociaţia Sportiv Turistică Montan Club "Cheile Turzii" Turda' combines ecological education in schools with conservation and the enhancement of infrastructure in Cheile Turzii. 'Polaris Blaj' have ecological education programmes in Abrud and Câmpeni while 'Grupul Ecologic de Colaborare "Lotus" Oradea' and 'Tinerii Prieteni a Naturii Oradea' are two of a range of groups active in nature protection projects.

Indeed, since protected natural areas are tending to facilitate sustainable regional development (Buza, 2001a, b), the question arises whether the proposed national park is sufficiently extensive to safeguard the region's natural resources. The World Wide Fund for Nature (WWF) has launched a Carpathian Ecoregion Programme which identifies the Apuseni as a priority area in view of its high biodiversity value. The whole of the core area is considered to merit protection, although WWF leaves out the westernmost part of the park – which has experienced so much pressure on the woodlands and grazings – while extending eastwards across Muntele Mare as far as the zone of heavy recreation pres-

Table 3. A profile of tourist activities and routes in the Arieş valley (distances measured from the Mureş confluence)

Km 124: Arieşeni with tourist accommodation and Vârtop piste ('Teleschii Vârtop' 753 m); with access to Curcurbăta Mare (1849 m) – via Valea Steule and Pătrăhăiţeşti – and Cascada Vârciorog; also long distance routes to Băiţa and Padiş. The surfaced road network gives access to the Beiuş Depression, but there are no links to the northwestern sector of the mountains without travelling via Cluj-Napoca.
Km 116: Gârda, for Peştera Poarta lui Ionel and Peştera cu Gheţar de la Scărişoara (the latter by footpath or the road via Cheile Ordâncuşei). The unsurfaced road to Casa de Piatră along the Gârda Seacă valley gives options for caving at Izbucurilor (Coteţul Dobreştilor and Fileşti), Cheilor (Gârdişoarei, Jilip and Tauz) and Peşterilor (Coiba Mare, Coiba Mică, Gheţarul de la Vârtop, Huda Orbului and Oilor). There are long distance paths to Băişoara resort (10–12 h), Cabana Padiş (6–7 h) and Cabana Arieşeni (3 h).
Km 89: Mihoieşti with access to the Avram Iancu museum and annual 'Târgul de Feţe'; also old and typical Moţi church at Goieşti (1712); and the palaeontological reserve Dealul cu Melci and Pisoaia waterfall at Vidra.
Km 84: Câmpeni, with places relating to the 1784 rising and 1848 revolution (Avram Iancu statue and museum). There is surfaced road access through Avram Iancu to Baia de Criş and Brad but not to Vaşcău.
Km 82: road to Roşia Montană with mining museum (Roman gallery and open air section), small artificial lakes and the Taul Brazilor campsite; Abrud with places relating to the 1784 rising (also the memorial house at Cărpiniş) and 1848 revolution; Vulcan geological reserve; Bucium-Mogoş area with the Detunata geological reserve and the Poiana Narciselor botanic reserve. There is surfaced road access to Zlatna and Alba Iulia.
Km 81: Forest road via the Someş Mic basin to Măguri-Răcătău
Km 72: Muşca, for Muşca monastery.
Km 69: Lupşa, with an ethnographic museum.
Km 46: Sălciua, for access to Peştera Huda lui Papara, the Vana Tare and Taul Morii potholes and the route over Masivul Bedeleu to Râmeţi monastery.
Km 39: Posaga with forest road to Cheile Poşagii, Schitul Poşaga and Belioara village for a climb of Scăriţa Belioara botanic reserve.
Km 32: Ocoliş/Ocolişel for Cheile Pociovaliştei, Cheile Runcului and the Scariţa-Belioara botanic reserve; also the long-distance route to the Băişoara resort.
Km 20: Buru, with a modernised road southwards to the Trascău Depression (including Aiud via Colţii Trascăului) and the Galda and Stremţ valleys: Cheile Vălişorii, the ruins of Cetatea Colţeştilor and Remetea ethnographic museum. Another modernised road leads to the Băişoara tourist complex and Cluj-Napoca.
Km 17: Cabana Buru with hotel and restaurant; Cheile Turzii is 5kms by modernised road; also paths marked from Turda, Turteni (via Cheile Turenilor), Cabana Muntele Băişorii and Cabana Buru.
Km 9: Turda with Roman 'castrul' at Dealul Cetăţii; Calvinist and Catholic churches of the 15th century; history museum (Palatul Voievodal); memorial house and Ion Raţiu monument. Băile Turda (4 km) has a zoological garden and monument to Mihai Viteazul.

Source: Popescu-Argeşel (1984) and tourist literature.

sure close to Cluj-Napoca (Figure 1). The area also extends southwards beyond the Arieş towards the Brad and Zlatna basins. The Romanian government is now committed to expedite measures to protect this extended area while WWF will work through partner ENGOs to find sustainable solutions for local development needs (Bălteanu and Popescu, 1994; Bran et al., 1998). In this connection there is already significant activity, for CET are involved with a Carpathian Foundation PHARE project for the Huedin Depression (the town of Huedin with the communes of Beliş, Călăţele, Ciucea, Margău, Poieni, Săcuieu and Sâncraiu) aiming at a local development agency to attract investment, expand the agrotourism network for the northern Apuseni and bring together the Hungarian and Romanian communities in the area (Pop, 1997b). This is also making contact with economists of Babeş-Bolyai University in Cluj-Napoca and the Open Society Foundation. Important work is also being done by 'Asociaţia de Speologie-Montanologie "Emilian Cristea" Alba Iulia' through an education project on family planning in the Brădeşti area (1997), in partnership with other local ENGOs (Ecotur and the Salvamont mountain rescue organisation), and is improving access in the Ponor-Râmeţ-Sălciua area. It has also started a pilot project to provide computers and instructors to help young people in rural areas gain computer skills which will help them use web cafe facilities when they join others from an urban background at the secondary school ('liceu').

'Albamont' – which runs a resource centre for other ENGOs – is helping local communities find solutions to their problems through training facilitators to operate in the Abrud-Câmpeni area on an ethnic or confessional basis. Albamont also aims to set up a local association ('Asociatia comunitară') or a group in a poor village ('Grup comunitar sărac') for help secure all-weather roads. One or more such organisations now operate in the communes of Ceru-Băcăinţi, Întregalde, Livezile, Mirăslău, Mogoş, Poşaga, Poiana Vadului, Ponor, Râmeţ and Sălciua, as well as the town of Zlatna which includes several outlying communities. Help is sought from the Romanian Social Development Fund which can either finance a project in a poor village – identified on the basis of specific criteria – or contribute to such a project with significant community participation. Production groups ('Grupe productuvi') have been set up in connection with apiculture in Ponor and Râmeţ; milk collection in Galda de Jos, Posaga, Râmeţ and Sălciua; trout farming in Ocoliş and Poşaga; and woodworking in Sălciua.

It is desirable that local groups should form their own NGOs, as has already happenened in the case of 'Izvoarele Arieşului' which was established in 1997 by the five communes of the upper Arieş Valley centred on Albac. Concerned basically with rural tourism (the OVR network referred to below), it concerns itself with local services, including water supplies in deficit areas, and the retention of small schools in remote places like Gheţar where closure would require small children to use hostel accommodation

in Gârda de Sus. There is also consideration of economic models, including systems of cooperation that could apply to marketing and production (handicrafts and other small industries). The group is also a source of ideas on small local projects such as a hostel or guest house at Gheţar (close to the famous ice cave); a small fish hatchery ('micropăstrăvarie') to maintain stocks in the Arieş and its tributaries; and exploitation of local products like the 'ciupercile' fruit (a traditional food) which could be collected along with medicinal plants; and the development of handicrafts already established in Biharia and Pătrăhăiţeşti. Vrabete and Popse (1999) underline the local authority obligations to support rural services and strengthen development axes, but commend local organisations and encourage communities to review their attitude to cooperatives which could safeguard local services and traditional skills.

The case of tourism

As already noted, much of the tourism in the Apuseni is relatively large in scale; linked with winter sports at Muntele Baişorii and Stâna de Vale. Further development is anticipated through a Swiss consortium interested in investments at Arieşeni commune (900–1,200 m) which could become an international resort within a few years with difficult, medium and easy skiing in three separate areas (Plate 3). According to plans finalised by Swiss designers in 2001, the piste will be backed up by a major accommodation complex for 12,000 people (including private holiday houses), with sports facilities and a commercial centre, at Avrămeşti-Galbena plus smaller developments at Bubeşti for some 500 and Vârtop for 700, with a hotel business area offering a range of services at the latter (Figure 6). Strict planning control is needed to regulate 'wild' developments, already evident at Galbena. Hence the ACC strategy for protection in nine areas immediately west of Alba Iulia/Aiud, as well as for the national park buffer zone. Meanwhile Cluj County Council has formulated a local 'Plan Urbanistic de Zona Protejată' for the valleys of the Someş Cald and Someş Rece which restrict new building to specific areas. However, for both social and ecological reasons small-scale development in sustainable rural tourism are desirable. There is substantial literature on this type of development (summarised in Turnock 2001) and the ENGOs of the Apuseni are also highly supportive like 'Clubul de Turism Montan "Vox Montis" Oradea'. A number of local associations ('Asociaţia turism rural') are now in existence: for example Albamont have been active in the cases of Livezile, Ocoliş, Râmeţ, Poşaga and Sălciua.

CSRE believe that half a million tourists each year could generate 500 jobs for locals (Pop, 1997a, p. 80). This would involve an industry reaching international standards, including a better infastructure (electricity and roads); excursions based on scenery and traditions; but with taxes payable according to the routes and services used. They see the need for a considerable amount of new buildings and commend traditional styles for the remote areas. In the context of the national park, Padiş would form the core with the existing hostel ('cabana') enlarged by a visitor centre and tourist agency with restaurant, shop, parking, showers, wood distribution and waste management. Camping would be strictly regulated with no camping allowed beyond the limits at either the Cabana or at La Grajduri (another site in the heart of the park). Forest cantons would serve as information points and tourist literature would increase way beyond present levels (Pop and Togor 1997). Limited development in the core would then be backed up by additional facilities close to the three main 'gateways' into the park. Each would require its tourist office and shops with information, literature, publicity and entertainment including folklore programmes plus accommodation in the form of campsites and local agrotourism networks.

The western approach is from Cluj-Napoca and Huedin along the valley of the Someş Cald (Doda Pilii and Ponor). Here there are facilities at Beliş and Lake Fântânele with a scatter of accommodation including ANTREC's 'Centrul de Promovare a Agroturismului Baloga' which includes 40 addresses (with room for 150 persons): half at Sâncraiu and the rest spread between Băişoara, Baloga, Beliş, Ciucea and Poieni. Second, there is access for walkers from the south (Albac, Arieşeni and Gârda – but for vehicles only via Poiana Horea) which is well served by ANTREC, but also by Opérations Villages Roumains (OVR) with around 50 addresses represented by 'Izvoarele Arieşului' which has developed its publicity through an office in Albac ('Casa Muntelui'). It encourages hiking across the well-populated mountainsides ('Muntele Oamenilor') in the heart of nature where major scenic attractions are 'Gheţarul Scărişoara' and the nearby gorges of Cheile Ordâncuşei. Third, there is the eastern approach from Beiuş, Pietroasa and Boga, with accommodation on local farms (though without a strong local network) and a local attraction in the Bears' Cave.

However, it is unfortunate that the northern approaches are difficult except via Beliş or Răchiţele: there are three buses daily to Răchiţele from where it is an 18 km walk to Cabana Ponor (also known as Doda Pilii) on the route to Padiş while Vlădeasa and Pietrele Albe peaks and Vârfuraşu Cave can be reached from Săcuieu (north of Răchiţele) via Cabana Vlădeasa. Stâna de Vale is accessible from either Beiuş or the Drăganul and Iad valleys but it is a long walk of some 20kms southeastwards from Stâna de Vale to Padiş. Even the 'main road' through Padiş (Beiuš-Pietroasa-Padiş-Răchiţele-Huedin) is unsurfaced over the high ground, but its improvement is controversial. Even more so is Bleahu's (1969) suggestion that a new road be built from Casa de Piatră (the limit of the road from Gărda de Sus) through Padiş to Stâna de Vale, which would place Padiş in a truly central position. There is a link between Padiş and Stâna de Vale but only for TAF ('Tractor Alpin Forestier') use: however only special 'exploitation' tractors can negotiate the route which is not officially on the map. Fortunately, it is generally agreed that transport should be improved on the routes between the principal towns (like Oradea-Deva), with services provided according a hierarchy of urban growth centres, e.g. Câmpeni and Stei, plus key villages like Dobreşti, Tileagd and Şuncuiuş; resorts like Stâna de Vale; and villages like Budureasa, Curătele and Pietroasa where

tourism could provide alternatives to unsustainable forestry (Bleahu and Bordea 1981, Măhăra, 1999).

Caves are of great importance for both conservation and tourism development, especially for individuals and small groups, provided that care is taken to avoid polluting underground water and collecting 'souvenirs' (Cocean, 1980, 1995). Despite their remoteness, more caves could be opened up, like Coiba Mare, Coiba Mică and Huda Orbului and, where local authorities do not have the resources, caving clubs (like 'Clubul de Speologie "Sfinx" Gârda' and 'Crysis Oradea') are much involved in regulating public access – marking trails and providing information and emergency medical assistance – while controlling abuses such as dumping rubbish, camping and cutting wood in reserves and buffer zones (Câmpeanu-Sonea, 2001). 'Asociaţie de Speologie-Montanologie "Emilian Cristea" Alba Iulia' (already referred to in connection with social work) conserves ecostructures in caves in the area area of Bedeleu, Poşaga, Râmeţ and Sălciua. Meanwhile, 'Clubul de Speologie "Z" Aleşd' collaborates with CRSE on tourist development in karst areas of the Pădurea Craiului, with an information office in Aleşd and tourist access to Butan and Vadu Crişului caves; also research into water supply from caves in the Aleşd-Aştileu area. 'Speo Club "Cristal" Oradea' also protects caves in collaboration with CRSE in addition to working in partnership with French caving groups.

Some caves are very well-organised e.g. Bears' Cave ('Peştera Urşilor') at Chişcău near Pietroasa, accidentally discovered by quarry workers in 1975; extending over 1,000 m on two levels. Skeletons of the extinct cave bear (Ursus spelaeus) indicate that nearly 200 animals were trapped in their den by an earthquake (Rusu, 1981). Meziad Cave is famous for cavern fauna, while 'Gheţarul Scărişoara' – situated at a height of 1,166 m and documented in 1863 by Adolf Schmidt and by Emil Racoviţa in 1927 – is one of only ten caves in Europe sheltering a relict glacier. Further work by Emil Pop in the 1960s indicated that a block of 7,500 cu.m of ice was 3,500 years old: a few centimeters of ice close to the entrance melt each summer but the maximum temperature in the cave is only one degree celsius (compared with minus seven in winter) and so the rest of the 15 m-thick block remains frozen. Rain turns to snow before it lands at the entrance and visitors must negotiate a small snow-field to enter the cave, cross the glacier and descend through the 'Biserica' ('church') into 'Palatul Sânzienii' with stalactites and stalagmites in both ice and limestone (Rusu and Cocean, 1992). Figure 7 shows the cave layout and also the system of underground drainage in which the cave is just one element.

ENGOs are also active in promoting other aspects of local sustainable tourism. The hiking routes into Padiş have already been referred to, but the network extends across the massif including the Pădurea Craiului, north of Stâna de Vale, Vlădeasa north of Răchiţele, Muntele Mare lying to the east of Poiana Horea and Şeaua Ursoaia (Calin, 1998) and the Bihor Mountains south of Arieşeni and Vârtop. From Vârtop it is possible to walk south via Corcubata Mare to Avram Iancu where other 'drumuri moţeşti' continue to Baia de Criş and Hălmăgel (Popescu, 1998). The 'nedea' custom still draws people to the mountains for social contact and commercial exchange, as at Găina on the watershed between the Arieş and Criş systems south of Avram Iancu, where the maidens' fair ('Târgul de Feţe') is held on the last Sunday before July 20th: an important cultural festival and tourist objective with good opportunities for marketing handicrafts. Ethnographical museums which exist at Albac, Lupşa and Râmeţ reveal much concerning traditional lifestyles but Gârda de Sus retains traditional costume of Dacian inspiration and three days of festivities follow a death in accordance with pastoral custom 'mioriţa'.

There are some fanciful stories concerning the descent of the Moţi peasants from Celts and the legend of the 'Golden Fleece': trapping particles of gold with fleeces laid in rivers by Argonauts following the Danube upstream into Transylvania. However, the mining industry does have a fascinating history which could be better presented, with its geological and economic dimensions including the early use of tubs on wooden rails, e.g. Petru şi Pavel mine at Bucium Poieni (Roman et al. 1982). The gold mining museum at Roşia Montană has 400 m of winding galleries called 'Citadels of Gold': discovered in 1971–1972 and prepared for tourist access during 1973–1975. There is also processing equipment: two traditional crushing mills with nine and 12 stamps respectively; a 19th century-type 'Californian' crushing mill used in the area in the inter-war period; and a more modern installation preparing ore for flotation (Sîntimbrean, 1989). Miners at Bucium have a ceremonial uniform as in Slovakia and Silesia and Hungarian communities also retain traditional costume at Calata (Nagykalota) and Rimetea (Torocko), south of Buru, not to mention rich carvings on the houses at Călăţele (Kiskalota). On the political side, the exploits of Avram Iancu contribute to the symbolic significance of the Apuseni as 'fortress of the national spirit'.

These efforts are being supported by foreign investors and tour companies. Belgian capital has helped in the establishment of Green Mountain Holidays which is based in Izvoru Crişului (near Huedin railway station). Run by Johan Pyfferoen and his Romanian wife, the company does well in Dutch and German markets offering 'action and challenge in remoter parts of the Apuseni' since people from mainland Western Europe are happy to drive to Romania; whereas the area is less attractive for UK people who fly to Bucharest and find Bucovina, Făgăraş Mountains and Maramureş more attractive. Hiking and cycle tours are available as well as treks, photo safaris and a range of sports: caving, rock-climbing, abseiling and kayaking. Journies on horseback from Beliş and Fântânele reach the mountains of Capul Dealului (1,310 m) and Piatra Fulgerată (1,428 m); while the cycling involves circuits: for conventional cycles via the Arieş and returning via Cabana Ponor/Doda Pilii and Fântânele, while mountain bikes negotiate a circuit within the main massif (Table 3). Tourist agencies in Western Europe are helping to publicise these opportunities. For example, 'Roving Romania' developed out of the charity 'Link Romania' as a specialised service for small-scale tourism in Romania and is now included in the 'Discover Transylvania' product offered by Enzian Travel Service of Rufford, Lan-

cashire. These operations are managed by a small group of people who are committed to Romania and seek to develop sustainable tourism projects sensitive to the fragility of the country's culture traditions and wildlife. They support the rural economy by using accommodation in villages, employing Romanian partners and supporting rural craft industries. The emphasis is on tailor-made personal itineraries – off the beaten track by Landrover with accommodation in homes, chalets and forest lodges or by simpler forms of transport offered by the Green Mountain company.

A new initiative: the Carpathian ecoregion

These local efforts to encourage more sustainable development can be placed in a wider framework through appreciation of the need to treat the Carpathians as a single unit. This wider international perspective developed in the early 1990s in the context of large carnivore conservation and has been developed recently by the WWF into a programme that is complementary to work in the Danube Basin and fully supported by the relevant governements. The intention is that sustainable development should be encouraged throughout the Carpathians through negotiation between ENGOs and local stakeholders while areas with particularly high biodiversity should be part of the developing European network of protected areas. As already noted above, the Apuseni has been identified as one such area and the approximate limits are shown on Figure 1. Evidently the scheduled area is much larger than the existing national park but the methodology is based on natural units which are then combined as they stand into protected areas according to the biodiversity profile. Hence the area takes in the whole of the high ground and a large area to the south. At the same time the westernmost part of the park is omitted because it has geological interest but not outstanding biodiversity. It remains to be seen what the impact of this initiative will be. But certainly there will have to be a new look at woodland management and the planning of tourism and opportunity for fuller use to be made of the considerable capacity built up in recent years by the locally-based ENGOs which should be integrated into the WWF networks.

Conclusion

The Apuseni Mountains demonstrate very clearly the need for reclamation to cope with pollution problems arising from mining activity and the processing of minerals. Equally, it is evident that biodiversity conservation must the combined with sustainable solutions to problems of local community development. In both cases initiatives have been taken by government since 1989 but the resources available have been modest and the necessary contact with the local population has not been maintained, partly because the communities themselves are not adequately organised. ENGOs have played an important role with both types of problem, maintaining a diverse range activities to protect both people and natural resources. It is particularly significant that many of the ENGOs are working in partnership with each other so that a unified monitoring system can operate through CRSE. The literature has recognised their contribution and there is now a wider appreciation of the importance of community and private sector participation, through inter-institutional cooperation and partnerships with government. The issues are being set out more clearly and initiatives are being taken. More resourcing of less-favoured areas – and progress with tourism projects like Arieşeni-Vârtop – should generate new jobs and moderate pressure om natural resources to the point where stakeholders can all join in supporting a conservation programme.

Yet the problems of the region have by no means been solved and the influence of the ENGOs is limited. While they are doing effective conservation work as well as supporting communities and maintaining a degree of coordination, there is not enough consistency in the way that environmental issues impinge on the working of central government. A decade on from the declaration of national parks for the Apuseni and other mountain regions there is still no administration in force. And while the political pressure for woodland restitution has been irresistible, an unfortunate element in the procedure required Romsilva to relinquish control over the relevant areas before the new owners were able to take responsibility for their protection. The rehabilitation of the mining areas like Zlatna is far from complete, while the controvery over new development at Roşia Montană is clearly a social and environmental issue in a class of its own. The proposal to devastate the area over a 20-year period in a way that will effectively terminate a historic gold mining industry and destroy its classical roots, with the additional hazards of the cyanide process, is clearly at variance with the principle of sustainability that should be embraced by all European Union candidate countries. And the lack of transparency creates anguish for the local community which has to make decisions without ready access to comprehensive official documentation on the companies involved and the decision-making processes already carried out at national and local level.

The project could affect perception of the wider region where small light industries and rural tourism linked with agriculture, forestry and biodiversity is being seen as a key to the future, notwithstanding the pollution problems which already exist. In such a situation, albeit driven by a desperate search for capital for regional economic restructuring, it is ironic that a nominally democratic process should so closely resemble the approach to resources taken by the previous regime.

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