



Transylvania Schools' Booklet 2019

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1. Study area and research objectives

The Saxon communities of the lowland Carpathian Mountains have been managing the Transylvanian landscape in a traditional manner since the 12th Century. Each of the 200 Saxon villages in the foothills of the Carpathians had a distinctive fortified church where the villagers took refuge in times of threat. The layout of these villages has remained virtually unchanged since the 18th century with village houses either side of the valley stream, with each house having a strip of land at the rear. In addition, each household traditionally has strips of arable land and damp hay meadow in the valley bottom and larger parcels of hay meadow further up the valley. Taking a cross section through the valleys of this region, the villages and arable strips of land would be found in the valley bottom with hay meadows and pasture for cattle and sheep above. Forest still blankets the steeper slopes of the valley.

Cattle and sheep are owned by different households but grazed on the common unfenced pasture areas with a cow herd and shepherds accompanying them. The cows return each night to their owners in the village and are milked in the courtyards before being turned out the following morning and grazed under the supervision of an elected cow herd on the lower pastures. Sheep are turned out in May and graze the upper pastures in large flocks with shepherds and do not return to the valley bottom until the onset of winter in November. The sheep are milked by the shepherds high in the valleys and the milk used for cheese making. At night the sheep are fenced in sheepfolds with the shepherds sleeping at spaces around them to prevent bear or wolf attacks.

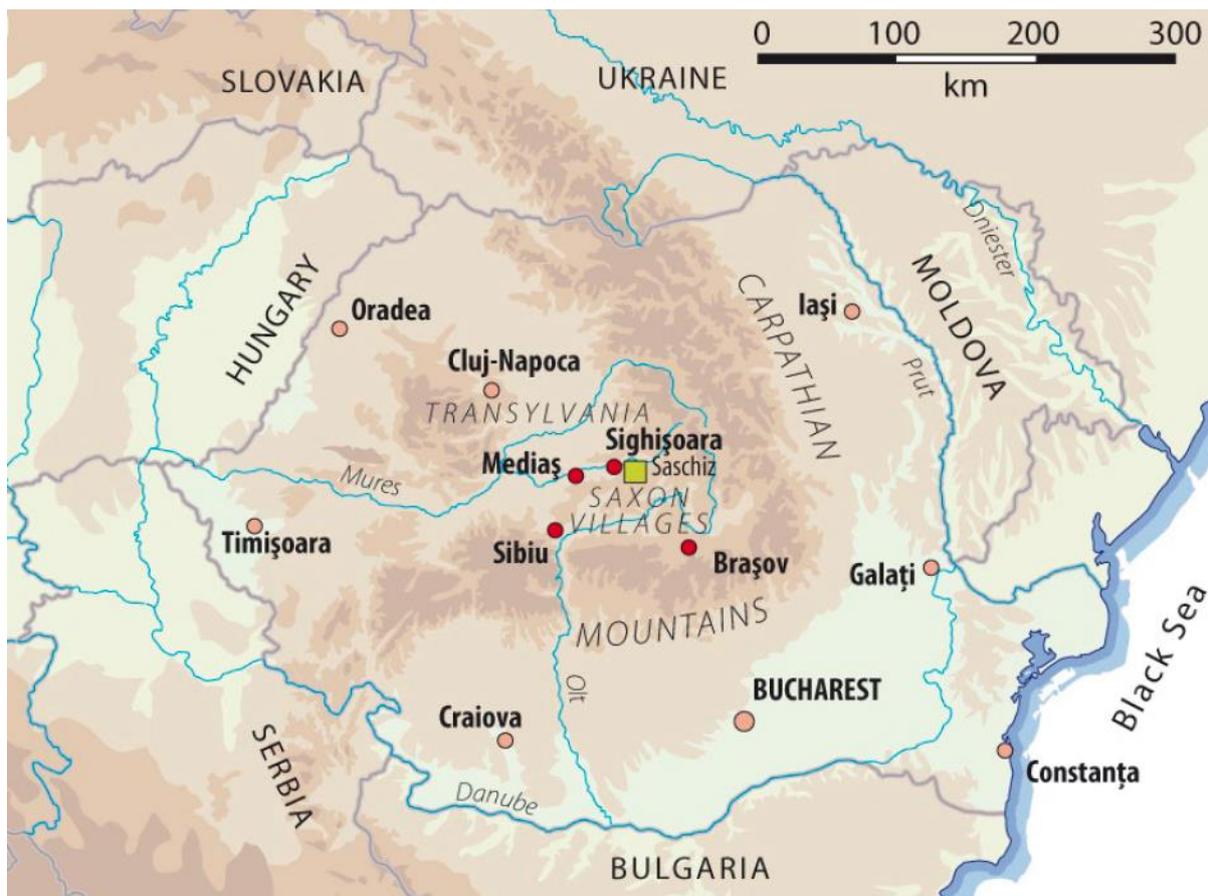


Figure 1. Map detailing the region of Transylvania in the foothills of the Carpathian Mountains where the expedition shall take place.

food and guides for the surveys and long treks. During the 2019 season at least 8 valleys within the Special Conservation Area will be surveyed.

2. Itinerary for Schools

Structure of the expeditions

The group will fly into Cluj-Napoca international airport on a Tuesday and be transferred to Sighisoara, the closest town to the majority of the villages, which is approximately 3 hours away. Staying in a hotel overnight, the group will have the opportunity to explore Sighisoara the following morning before being picked up at around midday and taken to the first village.

This is an expedition where the flights can be purchased on line from the budget airline Wizzair (<http://wizzair.com/>) to Cluj-Napoca and the arrangements for the transfers to and from the airport can be made by Opwall (internaltravel@opwall.com).

This expedition is different to the other Operation Wallacea Expeditions in that the teams are mobile throughout the two weeks and will be spending 6 nights in two picturesque Saxon villages of the foothills of the Carpathians. Each team will visit key survey locations in the nearby valleys and villages. Whilst based in the villages the group will split into teams that will complete surveys of the valleys and hills with the following objectives:

- To quantify the relative abundance between years of wolves, bears and other large mammals from reports of attacks on sheep, signs and camera trap footage.
- To quantify the relative abundance between years of birds from replicate bird point counts.
- To quantify the relative abundance of small mammals between years through repeated annual trapping effort.
- To quantify the relative abundance and diversity of butterflies between years by repeated annual transects and for moths by light trapping.
- To quantify changes in the landscape such as change in classification of grasslands (between high and low nature valued), changes in field size and crops to be correlated with changes in sheep flocks and cow herds.
- To quantify changes in the distribution of target meadow plant species from repeated annual quadrat surveys.

Itinerary for Saxon valley surveys

The survey areas are located in the North East, central and the West of the Sighisoara Tarnarva Mare Natura 2000 site. Survey sites have been chosen using aerial photographs and they will sample a significant area of the Natura 2000 site and concentrate in particular on biodiversity hotspots. In each area the students will be split into one of five groups and over the course of the two weeks will have the chance to participate in each of the study teams for two days. They will also have the opportunity to try and locate bears, visit local farms, attend local cultural festivals and experience the unique architecture of the area (the Natura 2000 site has three UNESCO world heritage sites).

Table 1 Indicative schedule for the school groups in Transylvania

Day	Activity
Tuesday	Arrive in Cluj-Napoca and transfer to Sighisoara
Wednesday	Arrive and move to village 1 to be surveyed. Introductory lectures and divide into 4/5 teams.
Thursday	Village 1 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Friday	Village 1 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Saturday	Village 1 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Sunday	Village 1 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Monday	Village 1 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Tuesday	Village 1 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Wednesday	Move to village 2
Thursday	Village 2 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Friday	Village 2 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Saturday	Village 2 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Sunday	Village 2 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Monday	Village 2 surveys – farm team, grassland team, birds team, bats, small mammal team and large mammal team.
Tuesday	Finish at final village at 10am and drive back to Sighisoara
Wednesday	Transfer from Sighisoara to Cluj for flight

3. Research Activities

Grassland Plants

The plant team will be focusing on 30 target species which are good indicators of grassland types or have medicinal use. Transects will be completed in low, medium and high nature value grasslands along the different sample routes where the presence of different key species will be noted. Because this area contains some of the most diverse grasslands in Europe this project will be a chance to work in a spectacular and rarely seen habitat.

Butterflys

The butterfly team will be covering the same 50m transects as the plant team, recording the butterflies encountered and using sweep nets to catch and identify the rarer species.

Farm Surveys

The farm survey team consists of one staff member and one translator who make an effort to visit local farms and use questionnaires to gain data on the numbers of sheep and cattle in pendulation, crops grown, machinery used and the area of land owned. While students do not accompany these visits in order to not overwhelm the farmers, the farm survey team simultaneously arranges visits to take place at a later time, to allow the students to see subsistence farming and gives a unique insight into the culture of rural Transylvania.

Bird Point Counts

The team will walk one of three transect routes (East, West and valley bottom) starting at dawn until late morning and stopping every 500M for 10 minute point counts to record all the birds seen or heard. If any species of particular interest (such as the woodpeckers, corncrakes and owls) are recorded, the team will try to return to the area for call backs and mist netting for further study. Note the routes and times spent on each activity need to be recorded carefully so they can be replicated in future years.

Bird Ringing

A bird ringing program is underway alongside the local Romanian bird group Milvus, where mist nets are set up in the same location each year. Birds are ringed and recorded, and all recaptures of birds rung in previous years are noted and recorded.

Small Mammals

In the evening small mammal traps will be set in a variety of habitats and the team the following morning will check and empty these traps.

Large Mammals

This team will complete a long transect on both the East and West of the valley; recording all tracks and signs of bears and other large mammals and to install/check camera traps to be checked upon leaving village. As the large mammals are of particular interest we can build as much presence information as possible. There will also be the opportunity to go for out with an experienced village local close to dusk for the opportunity to see bears.

4. Lectures and learning outcomes

Transylvania Ecology course

The students will also be completing a Transylvanian Ecology course comprising the following lectures:

Lecture 1 – Transylvanian landscapes - Fundatia ADEPT, The Carpathian mountains, a brief history of Romania, Natura 2000 site - Târnava Mare, The Saxons and their farming systems.

Lecture 2 - Sampling techniques: This lecture explains the science behind the sampling methods students will be using and the highlights the importance of indicator species.

Lecture 3 – Biodiversity in Târnava Mare: This lecture investigates the meaning of biodiversity, endemism, hotspots and looks at the particular biodiversity in this area of Romania. There is a short biodiversity quiz at the end.

Lecture 4 - Classification 1: The principles of classification are explained and related to the herpetofauna (amphibians, snakes) and mammals of the Romanian Carpathians. Bears are considered in more detail which can lead to a discussion about trophy hunting and eco-tourism.

Lecture 5 - Classification 2: An introduction to bird classification and then a detailed look at the Bird diversity in traditionally managed landscapes - birds of Eastern Europe (corncrakes, owls, and woodpeckers). There is also a summary of the butterflies and moths found in the area.

Lecture 6 – Conservation strategies in Transylvania - This lecture asks ‘what is conservation?’ and then has a more detailed look at the conservation strategies used in Transylvania (EU Habitats and Birds Directives, ecotourism, traditional products).

Learning outcomes

The students should achieve the following learning outcomes from the fieldwork, practicals, lectures and discussions/activities:

- Be able to define traditional Saxon village farming methods
- Be able to identify threats to traditional farming practices and how these might affect the ecology
- Be able to identify key indicator species of traditionally managed hay meadows and pasture
- Be able to identify 10 species of butterfly
- Be able to identify 10 species of amphibian and reptile and understand their ecological niches
- Be able to identify 20 species of east European bird
- Be able to describe how bird surveys are completed and the advantages and disadvantages of each
- Be able to describe how bear populations are surveyed
- Be able to describe nature conservation strategies for Transylvania

5. Links to A levels

The following tables highlight how your Opwall expedition relates to the AS and A level syllabuses across all exam boards. The red and blue blocks indicate that the keywords listed are covered on our expedition (through lectures, practical's or in discussion topics) and that these keywords are also within AS or A level topics as shown.

Topic	Biology	AQA		C	CCEA		C.Int		Ed/Sal		OCR		SQA		WJEC		AP	IB	
		S	2		S	2	S	2	S	2	S	2	H	AH	S	2			
Evolution, Classification and DNA	Evolution; Speciation; Species; Endemism; Gene pool; Allopatric; Sympatric; Isolation; Variation; Adaptive radiation Adaptation; Wallace; Darwin		♦	♦		♦		♦	♦		♦		♦	♦		♦	♦	♦	
	Classification; Taxonomy; Binomial system; Dichotomous Keys	♦		♦	♦		♦	♦	♦	♦			♦	♦				♦	
Ecology and Ecosystems	Ecology; Habitat; Niche; Abiotic; Biotic		♦	♦	♦		♦		♦	♦	♦					♦	♦	♦	
	Biome; Ecosystems; Rainforests; Desert; Coral reefs; Mangroves; Marine; Coasts; Hot arid; Semi-arid; Woodland Bush; Tropics; Tropical		♦	♦		♦	♦				♦					♦	♦	♦	
	Populations; Competition; Interspecific; Intraspecific; Predator Prey; density dependent; independent: Symbiosis		♦	♦		♦	♦				♦					♦	♦	♦	
	Succession; Climax community		♦			♦			♦	♦	♦					♦		♦	
	Biodiversity	♦		♦	♦		♦	♦	♦	♦					♦		♦	♦	
	Practical work; Field techniques; Ecological sampling; Random sampling; Transects; Capture, mark, release and recapture; Biodiversity indexes; Data handling and presentation; Quadrats; Statistical testing; Measuring; GIS; Research tools		♦	♦		♦				♦	♦	♦	♦	♦			♦	♦	♦
	Written reports; Research project; Report; Case studies			♦					♦				♦	♦		♦	♦	♦	
	Sustainability	♦		♦					♦	♦		♦				♦			
Agriculture, Human activities, Conservation and Sustainability	Agriculture; Agricultural impact; Agricultural exploitation; Cultivation crops; Food production; Sustainable agriculture; Sustainability; Forestry; Timber; Deforestation; Fisheries; Over fishing; Deforestation; Human management; Human effects; Human activities	♦				♦						♦	♦			♦	♦		
	Fair-Trade; Coffee; Rain Forest Alliance; Ecotourism; Tourism; Carbon trading; Greenhouse gas emission control (REDD+)															♦			
	Indicator species; Pollution; Climate change; Global warming Carbon footprint; Fossil fuels		♦	♦		♦			♦	♦		♦					♦	♦	
	International conservation; Endangered species; Invasive species; Biological control; Pests; CITES; Ethical, Local; Global	♦	♦	♦		♦		♦			♦	♦	♦			♦		♦	
	National Parks; Wildlife reserves							♦										♦	
	Environment; Environmental monitoring; Environmental impact; SSSI																		
	Animal behaviour; Primate Social behaviour; Courtship; Territory; Co-operative hunting; Herbivores; Grazing	♦		♦	♦			♦				♦	♦	♦		♦	♦	♦	

Table: Highlighted in Black are topics that you might experience at your research site. Key: C = Cambridge. Pre-U, C.int = Camb. Int. CCEA = N.Ireland; Ed/Sal = Edexcel Salters, S= SQA ; Edex = EdExcel; IB = International Bacc; AP=Advanced Placement (v. 20/11/14)

Topic	Geography, APES and ESS	IB ESS	APES	AQA		CCEA		Edex		OCR		WJEC	
				S	2	S	2	S	2	S	2	S	2
	Levels: S=AS 2=A2	Geography											
Evolution, Classification and DNA	Evolution; Speciation; Species; Endemism; Gene pool; Allopatric; Sympatric; Isolation; Variation; Adaptive radiation Adaptation; Wallace; Darwin												
	Classification; Taxonomy; Binomial system; Dichotomous Keys	◆											
Ecology and Ecosystems	Ecology; Habitat; Niche; Abiotic; Biotic	◆	◆							◆			
	Biome; Ecosystems; Rainforests; Deserts; Coral reefs; Mangroves; Marine; Coasts; Hot arid; Semi-arid; Woodland Bush; Tropics; Tropical	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Populations; Competition; Interspecific; Intraspecific; Predator Prey; density dependent; independent: Symbiosis	◆	◆										
	Succession; Climax community	◆											
	Biodiversity	◆	◆		◆			◆					
	Practical work; Field techniques; Ecological sampling; Random sampling; Transects; Capture, mark, release and recapture; Biodiversity indexes; Data handling and presentation; Quadrats; Statistical testing; Measuring; GIS Research tools	◆	◆		◆	◆		◆		◆	◆	◆	
	Written reports; Research project; Report; Case studies	◆	◆		◆		◆	◆		◆	◆		
Agriculture, Human activities, Conservation and Sustainability	Sustainability	◆	◆		◆		◆			◆	◆		
	Agriculture; Agricultural impact; Agricultural exploitation; Cultivation crops; Food production; Sustainable agriculture; Sustainability; Forestry; Timber; Deforestation; Fisheries; Over fishing; Deforestation; Human management; Human effects; Human activities	◆	◆		◆		◆						
	Fair-Trade; Coffee; Rain Forest Alliance; Ecotourism; Tourism; Carbon trading; Greenhouse gas emission control (REDD+)					◆	◆		◆	◆		◆	
	Indicator species; Pollution; Climate change; Global warming Carbon footprint; Fossil fuels	◆	◆			◆	◆		◆				
	International conservation; Endangered species; Invasive species; Biological control; Pests; CITES; Ethical, Local; Global	◆			◆					◆			
	National Parks; Wildlife reserves							◆					
	Environment; Environmental monitoring; Environmental impact; SSSI												
Behaviour	Animal behaviour; Primate Social behaviour; Courtship; Territory; Co-operative hunting; Herbivores; Grazing												

Table: Highlighted in Black are topics that you might experience at your research site. Key: C = Cambridge. Pre-U, C.int = Camb. Int. CCEA = N.Ireland; Ed/Sal = Edexcel Salters, S= SQA ; Edex = EdExcel IB ESS = Env Systems and Societies; APES = Advanced Placement Env. Science (v. 20/11/14)

Reading and research questions

Many students are now involved in producing Independent Research Projects (IRP) as part of their 2 year educational programme and many hope to carry this out whilst on an Opwall Expedition. If you are an IB school you will be involved in the EE or Extended Essay or if in the UK an EPQ or Extended Project Qualification. Those involved in CoPE will also have a similar task in which they carry out some research. There are many similar projects in most countries.

One of the key features of all of these 'Essays' or 'Projects' is that you have to choose your own research question but it is often difficult to find out exactly what is happening at each Opwall research site. To help in this, we have produced a 'Research' lookup database on the Opwall website – <http://opwall.com/epq-research-topic/> but you can also 'download' a more detailed version as an Excel Spreadsheet.

The database lets you find out what is happening at each site and there are links to pdf files and video clips. You can search the 'database' using a variety of filters such as research area and location.

This booklet also contains detailed information on the research projects you will be involved in and this may help you to locate your particular area of interest.

The type of IRP will vary but it is less suitable for individual investigations where you collect your own primary data although in some cases you might be able to get hold of raw data and you will often have the opportunity to help collect some of this data yourself. You will certainly have the opportunity 'on-site' to meet up with the scientists involved which will allow you to get a deeper insight into your research question.

Many of you will also have seen the Wallace Resource Library (WRL) which contains many datasets based around the research being carried out and it has been prepared by the actual Opwall scientists involved. It is a very valuable source of ideas with comprehensive datasets to look at and study.

Demo version – <http://wallaceresourcelibrary.com>

Do also make use of the research library on the OpWall website - <http://www.opwall.com>

How does it work?

Once you have an idea send an email to schoolresearchprojects@opwall.com with your initial ideas and contact details so that one of the academic staff working with Opwall can contact you to discuss possible research questions. We can also send you further information to help you choose a suitable title for your research site.

Once you have decided on a title you will then be asked to complete a registration form (supplied on request) which we can then forward to the appropriate country manager or scientist. This will then inform those at the research site about what you are hoping to achieve plus for us to give you as much assistance as we can.

In some cases we will also be able to provide you with data sets from previous years which some students will find very useful.

Deadlines: Although each school will be operating their own schedule we would like registrations to be completed at least 3 months before their expedition begins although the earlier the better.

Demo version – <http://wallaceresourcelibrary.com>

Do also make use of the research library on the OpWall website - <http://www.opwall.com>

Background

Akeroyd, J. R. & Page, N. (2006) The Saxon Villages of Southern Transylvania: Conserving Biodiversity in a Historic Landscape. In Gafta, D. & Akeroyd, J.[R.], Eds (2006) Nature Conservation: Concepts and Practice, pp. 199–210. Springer Verlag, Heidelberg, Germany.

Akeroyd, J. R. (2006) The Historic Countryside of the Saxon Villages of Southeast Transylvania – www.amazon.co.uk

Lonely Planet Guide to Romania - <http://shop.lonelyplanet.com>

Downloads from <http://www.fundatia-adept.org/?content=publications>

- A Taste of Transylvania
- Saschiz brochure
- Food and Culture tours
- Tarava Mare Walking brochure
- Nature200 in Romania
- Sighișoara-Târnava Mare Natura 2000
- ADEPT
- Village environmental projects

ID Guides

- LasloRakosy - Brief Guide to Butterflies and Moths of Sighisoara-Tarnava Mare Natura 2000 Site – order via ADEPT website
- James Roberts – Romania – a Bird watching and Wildlife Guide – www.amazon.co.uk ISBN 0951351362

Research areas and activities being carried out in Transylvania (February 2015):

- Farm surveys: plotting farm usage around villages linked with GIS technology.
- Farming changes in the Tarnava Mare region and how these are likely to impact on biodiversity.
- Bird surveys: walking long transect sample routes that traverse the valleys either side of the village. In the evening call-back surveys are also completed for corn crake and owls.
- Changes in bird communities in Tarnava Mare and habitat associations
- Butterfly communities as indicators of habitat changes in Tarnava Mare
- Plants surveys: ^[1]_[SEP]The plant team will be focusing on target species which are good indicators of grassland types or have medicinal use
- Butterflies: ^[1]_[SEP] surveys: 50m transects as the plant team, recording the butterflies encountered and using sweep nets to catch and identify the rarer species
- Moth surveys: Light trapping will also be completed for moths in the evenings, with early mornings then spent identifying those species caught.
- Herpetofauna: standard searches around the edge of river and wetland areas for amphibians
- Large mammals: camera traps in key locations in the forests and on the valley transects in order to capture sightings of large mammals.

- Small Mammals: setting small mammal traps late at night which will be checked and emptied each morning.
- Niche separation in small mammals and their use as indicators of habitat change.
- Distribution of abandoned land in the Tarnava Mare region.

Useful contacts/information

Fundatia ADEPT is a UK and Romanian registered charity which promotes agricultural development and environmental protection in the Tarnava Mare area of Transylvania in Romania.

Their primary objective is the conservation of one of Europe's last medieval landscapes through appropriate economic regeneration of the farming communities. ADEPT has been working since 2002 with farmers, local communities, universities, other NGOs, and government at all levels in order to solve the range of problems threatening the survival of this remarkable landscape and of the small-scale farming communities living within it.

Fundatia ADEPT is carrying out an integrated programme linking economic and social benefits with biodiversity conservation, and raising local capacity for good management in the future. They bring together Romanian and wider European expertise to carry out innovative nature conservation and rural development projects that are firmly rooted in local communities. Their website provides detailed information in English and Romanian, for local people and visitors who are interested in protecting this area, and similar High Nature Value landscapes in Romania and in Europe more widely.

<http://www.fundatia-adept.org/>

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In UK (0907 292 0102) Calls charged at GBP 92p per minute and calls from mobile networks may be charged at a higher rate.

Eire (Ireland) (1550 475 970) Calls charged at EUR 95 cents per minute and calls from mobile networks may be charged at a higher rate.

From Romania only: 0903 760 160 Calls charged at RON 2.68 per minute and calls from mobile networks may be charged at a higher rate.