



International workshop “Uranium, Environment and Public Health”, UrEnv 2013

Tourism in the Naturtejo Geopark, Under the Auspices of UNESCO, as Sustainable Alternative to the Mining of Uranium at Nisa (Portugal)

Neto de Carvalho C^{a*}

^a *Geopark Naturtejo da Meseta Meridional – European and Global Geopark under UNESCO. Geology Office of the Municipality of Idanha-a-Nova - Centro Cultural Raiano. Av. Joaquim Morão, Idanha-a-Nova 6060-101, Portugal*

Abstract

Nisa uranium ore, associated with the granite of Nisa-Albuquerque, was discovered in 1957 during prospecting campaigns by Junta de Energia Nuclear. Several fruitless attempts were made to exploit this, the largest uranium ore body ever found in Portugal. Since 2006, the municipality of Nisa has been included within the Southern Meseta Naturtejo Geopark, a member of the Global Geoparks Network developed under UNESCO. Nisa represents a huge potential for innovative geotourism. The wide diversity of tourism resources should be developed to deliver experience-based thematic tourism routes to support the increase in lodging, restaurants and active tourism enterprises in the region.

© 2014 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Selection and peer-review under responsibility of the Instituto Politécnico de Castelo Branco

Keywords: Geopark; sustainable tourism; economic diversification; Nisa; Portugal

* Corresponding author. Tel.: +351 962 804 169; fax: +351 272 320 137.
E-mail address: carlos.praedichnia@gmail.com

1. Introduction

Nisa municipality, a territory with a large geodiversity, contains most of the main geological units of Naturtejo Global Geopark (Fig. 1). Its geodiversity is represented by 23 geosites, including 3 geo-monuments which are vital to the understanding of the geological history of the Southern Meseta Naturtejo Geopark. The geo-monuments have provided the basis of a strategy for sustainable development that is becoming established in the region due to ongoing projects involving Nature Tourism, Health and Well-Being and Cultural & Landscape Tourism. There is a remarkable, but still rather unexploited potential, for using the protected areas and geo-monuments for environmental education and tourism. This was also recognized in the Local Agenda 21 and in the newly revised Nisa Master Plan. However, over many decades, and particularly in recent years, this potential is threatened by the possibility of uranium opencast mining¹. This article shows how the geological heritage and geological resources are being used for the benefit of local communities and how they might be developed in the future.

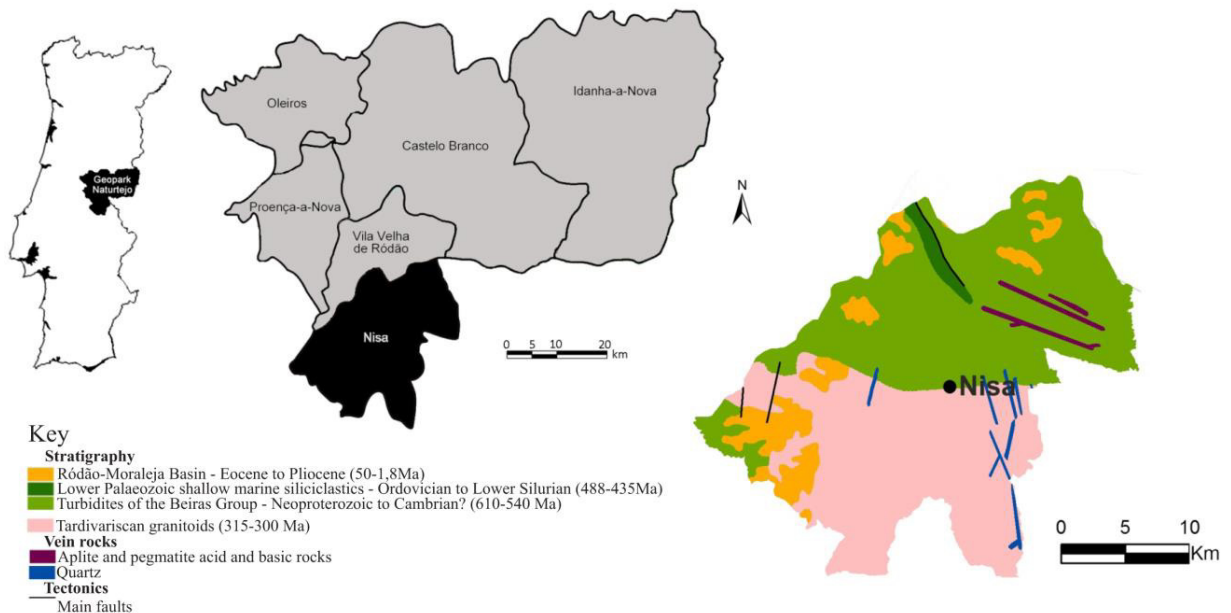


Fig. 1. Location of the municipality of Nisa in the Naturtejo Global Geopark territory and the simplified geological map.

2. Geoparks and Naturtejo Global Geopark

The European Geopark Network (EGN) is part of the Global Network of National Geoparks (GGN) developed under the auspices of UNESCO. The EGN aims to protect Europe's outstanding geodiversity, to raise awareness in the general public about the geological heritage and to support local economic development in Geoparks². It functions as an active network for sharing information and experiences, proposing new products, defining common strategies and progressing through EU funded projects. The GGN functions through an *ad hoc* cooperation between Geoparks and UNESCO. In September 2013, the GGN included 100 Geoparks in 30 countries. The GGN, under the auspices of UNESCO, aims to provide a platform for experts to cooperate and develop best practices for preserving the geological heritage for future generations. The Geoparks use their landscapes as a means for educating the public about geo-conservation and environmental issues, for geotourism and for sustainable economic development³. They also provide research facilities for the geosciences. Naturtejo Geopark became the first European Geopark in Portugal in 2006, and

since this time has been actively involved in protecting its geological heritage and promoting sustainable local development. Naturtejo E.I.M, the management body of Naturtejo Geopark, was established in 2004 and involves a partnership between the municipalities and public and private organizations. The municipalities within Naturtejo Geopark, Castelo Branco, Idanha-a-Nova, Nisa, Oleiros, Proença-a-Nova and Vila Velha de Ródão, cover an area of 4624,4km². The Geopark aims to be a territory for excellence in three main areas: conservation, education, tourism and geotourism⁴. The Inventory of Geological and Geomining Heritage of Naturtejo Geopark under the remit of Naturtejo included 23 geosites in the municipality of Nisa, most of them (18) were already protected under Portas de Ródão Natural Monument and Natura 2000 sites S. Mamede and Nisa-Lage de Prata⁵.

Nisa mineral deposit, whose area is defined by the Decree-Law 338/72 from August 25th, contains uranium phosphates and oxides disseminated in the metamorphic contact zone between the Neoproterozoic turbidites of the Beiras Group and the Nisa Granite^{6,7}. The eight ore bodies, discovered in 1957 by Junta de Energia Nuclear and Empresa Nacional do Urânio, included Nisa (Maria Dias), Tarabau, Lameirancha, Palheiros de Tolosa, Vale do Castelo and Ladeira de Roma. Situated close to the town of Nisa, they occupy an area 5 km in length and 800 m wide following an E-W trend. Currently the Nisa mineral deposit area is owned by Empresa de Desenvolvimento Mineiro (EDM), a public company whose major responsibility is to provide environmental remediation for abandoned mines. It is considered to be the largest uranium ore deposit in Portugal with estimated reserves of 3080 tons⁸. The most important ore body lies 2 km W from Nisa, between this town and the village of Montes Claros. Its shallow depth and the concentration of uranium oxides makes the site economically viable for opencast mining, despite the area being included mostly in Ecological and Farming National Reserves (PDM, 2010). In 1999 the Nisa Mining Enterprise Project was proposed by EDM. This still active project involves between 6 and 10 years of opencast mining to a depth of 30m for the extraction of 6.3 million tons of mineralized rocks to obtain 650 tons of U₃O₈, at a current value of over 47 million Euro. According to the National Institute of Statistics, in 2010 the total profit made by the mining industry in Portugal was 975 million Euro, corresponding to less than 1% of GDP. In recent times some experts⁸ and EDM representatives have defended the idea that the extraction of the main mineral deposits from Nisa is necessary because they seriously threaten the health of the population. However, with respect to the concern for public health, a map showing the natural radiation risk to human activities and soil use in potentially dangerous areas within the municipality of Nisa is lacking. Also Nisa does not have a strategy either for raising public awareness or for education in schools to address and prevent the risk to health.

A resolution from the Council of Ministers from September 2012 approved the National Strategy for Geological Resources – Mineral Resources, which highlights the strategic importance for mining metallic mineral resources, also refers strongly to the need for conserving the geological heritage. One of its guidelines is “Sustainability in natural resources management, through the consideration of the geological and mining heritage as a central element in territorial planning and management”. The inclusive development of Local Agenda 21 defines thermal springs, local products and countryside tourism as the roots for the sustainable development of Nisa, under the umbrella of Naturtejo Geopark supported by UNESCO. Based on the policies for sustainable development which have functioned successfully over 15 years, decision makers and local communities distrust the proposed mining enterprise in Nisa. Public investment in the new thermal spa complex and the new Monte Filipe 4-stars Hotel, a private initiative, are the most recent examples of a strong priority for the sustainable use of the landscape and natural resources. For these reasons public initiatives, such as “Movement Nisa Uranium, No”, were created and are actively seeking to defend the sustainable use of the landscapes where people have lived for millennia.

3. Sustainable alternatives for social and economic development in the region of Nisa

Nisa occupies a special location on the map of Tourism in Portugal. As part of the Tourism of Alentejo Board, Nisa also benefits from Tourism in the Central Portugal Region due to its position in the Administration Board of the Association of Municipalities “Natureza & Tejo” and consequently of Naturtejo, EIM, the company responsible for the management of Naturtejo Global Geopark. Recently, Nisa has participated in transborder funded programs for

tourism development, such as Taejo Internacional, with the neighbouring Province of Extremadura. Working together since the inception of the Geopark, the Naturtejo team has been studying the geodiversity and assessing the geological and mining heritage of Nisa with the view to establishing their value and importance. This work⁵ has selected 23 geosites of local, national and international relevance, such as Portas de Ródão and Conhal do Arneiro⁹⁻¹¹. However, more scientific work is necessary to acquire an in-depth understanding of these sites. Naturtejo, together with the Nisa authorities, has established management plans to assess and prioritize this heritage in terms of its benefit for local communities and visitors. The appreciation and conservation of this heritage, which is in conflict with the proposed uranium mining, must be based on the development of management plans which stimulate further scientific research and widen the range of the use of geosites. It is worth providing regular training for guides and rangers who will be able to interpret the geological heritage for visitors and thus foster new active tourism companies. It is highly necessary to develop educational and tourist resources with a wide choice, which are easy to find and use. It is essential to ensure that current and future tourism projects in Nisa have facilities which encourage overnight stays in the area. In this respect projects including the Ródão/Conhal do Arneiro Landscape Interpretative Centre, the House of the Stone from Alpalhão and the Fadagosa Interpretative Centre in the old thermal spa are important. These three new resources, together with already existing facilities, such as the Museum of Clay and Embroidery, will contribute to the development of a new tourist route which crosses the whole of the region. This route, through a ramifying network of footpaths, connects all the villages and is included in a wider-scale framework of tourist sites and events from the municipalities constituting Naturtejo Geopark. With this permanent route focusing on geological resources, gold, clay, water and granite (Fig. 2), it is possible to develop or revitalize existing schemes and introduce new innovative events and projects. The Stone Biennial project, with its connection to the millennial landscapes, served a similar purpose in

its early stages of development, to the present requirements of the people of Nisa. Some proposals, as potential alternatives to mining include:

- Organizing the existing and projected tourism offer in parallel with the increasing demand for lodging, restaurants, handicraft shops and outdoor tourism companies;
- Developing a tourism brand “Nisa Natura” based on the prevailing natural heritage (Fig. 2) and focused on the purity of Fadagosa de Nisa thermal springs¹²;
- Encouraging visitors from the main motorways crossing the area (IP2, N18, N118) by marketing the brand Nisa Natura at the main gateways to the Geopark and advertising the significant tourism resources in the main access points and towns;
- Strengthening in situ interpretation of the significant archaeological, monumental and cultural heritage sites in Nisa, Amieira do Tejo, Montalvão, Salavessa, Alpalhão, etc.
- Improving the Roman gold mine of Conhal do Arneiro with interpretative equipment (Ródão/Conhal Landscape) and footpaths to protect the ancient tailings from erosion;
- Connecting the Route of Flavors and, in particular, the nation-wide famous Nisa Cheese, and other well-known handmade products, such as the “Barro Pedrado” or “Stoned” Pottery (Fig. 2), to their natural and landscape origins, enabling the visitor to know how they are produced, and consequently to foster hands-on tourism;
- Using Tejo and the history, landscapes and heritage connected to the great river, particularly the km-wide terraced olive groves and the Rock Art;
- Developing tourist programs and activities within the scope of Naturtejo Geopark, under the auspices of UNESCO, together with other municipalities, namely a calendar of thematic trekking and cycling events, boat trips, local thematic festivals such as Nisa Cheese regional fair, Tejo Festival connected with river products, etc;
- Revitalizing the contemporary art Stone Biennial of Alpalhão, as a means of promoting nationally and internationally the granite “Blue from Alpalhão” as an economically relevant geological resource, following a strategy of sustainability, associated with the development of a large Land Art Center at Alpalhão (Fig. 2), through partnerships with national and international universities related to art.



Fig. 2. Tourism resources and products from Nisa: (a) Natural Monument at Portas de Ródão; (b) Roman Gold Mine placed in the graben of Arneiro-Vilas Ruivas (Conhal do Arneiro); (c) Fadagosa Thermal Complex; (d) Historical village of Amieira do Tejo; (e) Traditional architecture and the Land Art (“Blue granite from Alpalhão”); (f) The famous “Pedrado de Nisa” made with local clay and white quartz; (g) Nisa cheese (PDO) is known national wide and was awarded with several international prizes; (h) Hotel Monte Filipe, at Alpalhão

Acknowledgements

The author thanks the Municipality of Nisa for its support for the fieldwork developed in the last ten years under the Inventory of Geological and Geomining Heritage of Naturtejo Geopark. The Municipality of Vila velha de Ródão and the photographer Pedro Martins are credited for the Fig. 2a and 2e, respectively. Tony Ramsay, honorary senior lecturer of the School of Earth & Ocean Sciences of Cardiff University, is most appreciated for reading and thorough revision of the English translation of this paper.

References

1. Neto de Carvalho C. A ameaça de abertura de uma mina de urânio em Nisa: o direito das populações à integridade ambiental e sócio-cultural da paisagem. In: Neto de Carvalho C, Rodrigues J., Jacinto A, editores. *Geotourism & Local Development*. Câmara Municipal de Idanha-a-Nova; 2009. p. 195-9.
2. Zouros N, McKeever P. Geoparks: Celebrating Earth heritage, sustaining local communities. *Episodes* 2005; **28(4)**: 274-8.
3. Eder W, Patzak M. Geoparks - geological attractions: a tool for public education, recreation and sustainable economic development. *Episodes* 2004; **27(3)**: 162-4.
4. Neto de Carvalho C, Rodrigues JC. Building a Geopark for fostering socio-economical development and to burst cultural pride: the Naturtejo European Geopark (Portugal). In: Florido P, Rábano I, editors. *Una visión multidisciplinar del patrimonio geológico y minero*. Cuadernos del Museo Geominero; 2010. p. 467-479.
5. Neto de Carvalho C, Rodrigues J. Património Geológico e Geomineiro de Nisa: caracterização do território e sua integração no Geopark Naturtejo. *Açafa Online* 2012; **5**: 91-168.
6. González-Menéndez L. Petrologia del batólito granítico de Nisa-Albuquerque. *Revista de la Sociedad Geológica de España* 2002; **15**: 233-246.
7. Solá AR, Neiva AMR, Ribeiro ML. Geocronologia, petrologia e geoquímica dos granitoides do NE Alentejano (transição ZCI/ZOM): significado geodinâmico. *Ciênc Geol* 2010; **I**: 281-290.
8. Dias JMM, Neiva JMC. Realidades e perspectivas da exploração de urânio em Portugal. In: Cotelos Neiva JM, Ribeiro A, Mendes Victor L, Noronha F, Ramalho MM, editors. *Ciências Geológicas: ensino, investigação e sua história*. Associação Portuguesa de Geólogos/Sociedade Geológica de Portugal; 2010. p. 15-23.
9. Calado C, Calado C. Notícia sobre vestígios de exploração romana de ouro aluvionar no concelho de Nisa: o Conhal do Arneiro. In: Brandão JM, editor. *Actas do Congresso Internacional sobre Património Geológico e Mineiro*. Lisboa; 2002. p. 265-272.
10. Neto de Carvalho C, Gouveia J, Chambino E, Moreira S. Geomining heritage in the Naturtejo area: inventory and tourist promotion. *Actas do 3º Simpósio sobre Mineração e Metalurgia Históricas no Sudoeste Europeu* 2006; 595-606.
11. Deprez S, Dapper M. The Conhal do Arneiro (Nisa, Nordeste Alentejano, Portugal). A geoarchaeological view on ancient gold exploitation in a Late Quaternary Tagus riverine landscape. *Geogr Fis Dinam Quatern* 2008; **31**: 129-138.
12. Mota Pais MFA. *Avaliação da vulnerabilidade do sistema aquífero da captação da Fadagosa de Nisa (concelho de Nisa)*. Tese de Mestrado, IPCB: Castelo Branco, Portugal; 2011.