

INGSA CASE STUDIES

***ABRON:
FUTURE MARINE RESOURCES IN POST-OIL ECONOMY***

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Background and context

Abron is a country with the population of 4 million. Much of Abron is covered by a large sandy desert. With less than 10% of the land used for agriculture (mostly pastures on the southern and eastern slopes of the central mountain range), the country had been historically sparsely populated by nomadic tribes of camel herders. Most of the population today lives along the coastline in particular in and around the capital and the largest urban centre, the historic port of Babra. Traditionally, the economy had relied on trade and export of limited agricultural goods (dates, camels, cattle and fish) but the discovery of petroleum reserves in the early twentieth century has dramatically increased the national income, and transformed the country. The past governments had exploited this resource aggressively and the reserves have been depleted while extensive exploration has not discovered new sources. The recent fall in oil price, along with the potential for declining production, are hurting the economy. Abron's GDP per capita, once one of the highest in the world, has started to decline. As yet, the sluggish economy has not disturbed the political consensus. The ruling party, linked to the hereditary ruler's family, has been in power since democracy was established two decades ago. Yet in the last election growing concerns over the future economic direction boosted the opposition, which made real gains.

While Abron has benefited in past decades from the global reliance on petroleum, it is increasingly at high risk of particularly harsh effects of climate change. The already high average temperature is likely to increase further, desert areas are expanding, and the rising sea levels may inundate the coastal urban and agricultural areas. The historical main water source, the Abron/Afristan aquifer, which is shared with Abron's larger neighbour, Afristan, has been severely depleted by over-extraction. Water has become a source of tension between the two countries. The already scarce land suitable for agriculture is likely to reduce further. Increasingly concerned with food security, the government of Abron is encouraging the development of agriculture fit for the current and predicted climate conditions. However, access to water is a major obstacle. Not only are water tables dropping, but also the salinity of existing water sources is increasing. The country runs a number of desalination plants but their operation is getting more expensive as the brine is pumped back into the sea. With a long coastline, fishing, largely controlled by several rich tribal families, has traditionally been a core part of Abron's economy. It remains important, although fishing stocks have to be managed carefully and there are fears of the impact of rising temperatures and salinity on the marine life.

Concerns about food and water security are part and parcel of broader concerns about the post-oil future for Abron. There is a broad understanding that Abron must transition to sustainable energy sources, and that it must develop an oil-independent economy. The nascent high-end tourist industry is built around diving and snorkelling in the area of little explored coral reefs. But there is some doubt about its viability following the disastrous effects on the reef tourism in Afristan by a Travel magazine article and CNN Travel documentary. These reportages pointed to the rapid loss of colour from the reefs caused by ocean warming, and also to a high-profile case of a tourist imprisoned for

inappropriate behaviour on a beach. There is already some hint of loss of colour in the Abron reef, but advocates for tourism say it still offers some of the best diving in the world. While other new branches of economy (such as shipping) are being developed, they do not secure enough income to sustain the same, or even similar, standard of living to which the Abron's population is used – and certainly not enough to support expensive and necessary infrastructure such as desalination plants.

Problem

Abron lies along the edge of the continental plate. Abron Sea was formed through the movement of the (still widening) Babra Rift. The sub-seafloor is active, with hydrothermal vents on the sea floor and temperatures of 60 °C. A string of volcanic islands, which belongs to Abron, is situated parallel to the Abron coastline some 180 kilometres to the east. Coral reefs surrounding these islands are the sites of developing tourism.

While it has been known for long time that the area around these hydrothermal vents is mineral-rich, no detailed exploration has been done. An international mining company with unique expertise in seafloor rare mineral mining has approached the government of Abron for the prospecting rights. The proposal hinges on the hypothesis that the area is rich in rare minerals used in batteries, in particular cobalt, arguably the most expensive mineral in the world. The company, Future Ocean Energy (FOE), claims that the existing data indicate that Abron sea floor may contain enough cobalt to make Abron energy-independent post-oil.

The project has attracted much attention within the government, however there is also significant opposition. The same area has been proposed for the establishment of a marine protected area, the largest in the region. It has an exceptionally diverse ecosystem with 146 species of fish not found anywhere else. Coral reefs are an important part of this ecosystem; a visiting scientist from a major marine biology centre in Europe has warned that contamination from the seabed mining will hurt those coral reefs as the ocean currents take the debris in their direction

Furthermore, in 2016, a team of archaeologists, working on one of the largest and until recently uninhabited volcanic islands (now the site of an eco-tourist diving resort), found human bones, as well as some tools, dated to around 60,000 years BC, exceptionally well preserved in the volcanic ash. The bones had been sent to the leading ancient DNA laboratory in Europe, which has established that they belonged to archaic humans possibly related to Denisovans, an extinct species (or subspecies) of the genus *Homo*, previously found in Siberia. This amazing discovery was the subject of a National Geographic documentary. The finding has the potential to dramatically alter the understanding of human evolution as the location of the island does not fit with the current maps of the spread of Denisovans. Two international teams in collaboration with the local university are now applying for funding to conduct further research on other islands of the volcanic archipelago. The Minister of Science and Culture has asked his officials to check whether the island meets the criteria for the UNESCO World Heritage site.

The Minister of Science and Culture, Minister of Tourism and Minister of Environment, with support of some other cabinet members, are arguing that mining prospecting should not be allowed in the area of such high environmental and scientific significance and sensitivity. They point out that the evidence on which Future Ocean Energies is basing its claims is weak, that the proposal does not account for the safe disposal or storage of tailings, and that Abron should first explore a variety of

sustainable energy sources that, combined, could provide a good energy cover: tidal power, high altitude wind turbines, and solar. The Minister of Agriculture and Fishing has also sided with this group. While he is cautious about the potential of these energy sources, he is under the pressure by leading fishing families and their companies in the country to oppose the seabed mining project. The fishermen are nervous about the potential impact of mining on this ecosystem in particular because of its high value as a spawning area.

Other cabinet ministers, led by the Minister of Energy and Minister of Economic Development, are arguing that the country cannot afford the luxury of rejecting the application: Abron needs to find resources that would set it up for post-oil future. Also, prospecting, they promise, will not cause significant environmental consequences.

The debate has spilled out into the public sphere. There was initially much support for the argument of the Minister of Energy, and excitement about the possibility of finding cobalt in the Abron territorial seas. However, marine biologists from the local university (who are collaborating in a large international project aimed at finding high-value molecules from marine organisms) have entered the discussion, arguing that there is a strong economic, alongside environmental and cultural/scientific, reason **not** to mine in the area. Namely, the diversity of species is based on the genetic diversity driven by the unusual conditions including high temperatures and high CO₂ concentration. These genes could in the future of a changed climate become extremely useful, for instance in the development of genetically modified agricultural organisms. But a clerical authority has warned against the development of genetically modified organisms, currently banned in Abron. An international environmental lobby group issued a press release suggesting that the finding of an archaic human species (or subspecies) right in the middle of this area may not be coincidental: it could tell us something about human adaptation to unusual environmental conditions – a view scoffed at by a leading European evolutionary biologist.

Opponents of the FOE application argue that allowing mining—even prospecting—could irreparably ruin this unique environment. Even if cobalt is found, it is not certain that the payoff will be as high as expected, because there is an international push to find a cheaper, more accessible replacement. The global ore market is notoriously volatile, a leading economist has warned, and the venture may turn out to be a loss. Media figure prominently in the debate. A local newspaper has been promoting the potential of tourism; the rights for tourist developments on the island famous for its coral reefs are owned by the editor's brother. Their youngest brother is the chief executive of the Ministry of Tourism.

Future Ocean Energy has now informed the government that it will not wait forever. Abron's neighbour, Afristan, has expressed interest in their work and expertise, and is willing to give them the prospecting licence at conditions better than those discussed by Abron. The battle over water, alongside historical and constitutional differences, means that the relationship between Afristan and Abron could be described as rather competitive; a position championed by the Foreign Minister. Although Afristan's coastline and territorial sea are smaller than Abron's, it could gain an advantage over Abron, should the mineral be found. At the same time, another newspaper has published a story about the connections between the Minister of Science and Culture and a board member of a nuclear power plant construction company based in Asia. Indeed, the Minister has spoken at an energy conference about the potential for nuclear power in small countries such as Abron, while the CEO of the company has met with government officials to discuss nuclear power.

The ruler has summoned the Prime Minister to say that the contention within the cabinet must be resolved and decisions must be made, so that the country can move on. He does not want the opposition party gaining more support simply because the governing party cannot make a sensible decision.

The prime minister feels under immense pressure and asks the newly established Science and Innovation Council which is chaired by the former Vice Chancellor of the National University of Abron, and who has acted unofficially as his science advisor, to advise him on how to proceed and address the issue.

ABRON

Notes for the mentors

Considerations

- Separating scientific from non-scientific issues
- What are the options? What are the risks, benefits and spill-overs of each of the options?
- What are the knowns and what are the unknowns?
- Is there research that could improve the decision?
- Risk assessment

Stakeholders from whose perspective the problem should/may be considered:

1. Minister of Energy
2. Minister of Environment / Environmental Protection Agency
3. Minister of Economic Development
4. Foreign Minister
5. Minister of Science and Culture
6. Prime Minister
7. Ministry of Tourism
8. International ancient DNA community
9. Future Ocean Energy company (mining industries)
10. Fisheries and fishing community
11. National and international environmental organizations (e.g. Greenpeace)
12. Scientists/local university (different disciplines)
13. Abron's neighbour Afristan
14. Media

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