

The Desert Ahead.

At two minutes past five the muezzin across the valley began the age-old call, his amplified song wailing out across landscape calling the faithful to prayer. Moments later, sounding slightly hurried, the singer in the minaret over the road joined in. The voices, though unified in message, were disjointed in time, dopplered by distance and distorted through over-driven speakers, and lent a distinctly Harkonen feel to the proceedings. The sound died as suddenly as it began, the near absolute stillness of the arid landscape flooding back to fill the valley with crystalline serenity. Which was promptly shattered as Abdul the donkey fired up in the compound below us, a godly and righteous cacophony of indignant hawing and squealing complaint, reminding the Imans that he, not they, would have the final say and stating for the record that all men and animals alike were beasts of burden in this harsh place.

We were amongst the jumbled mass of broken ridges and foothills that lie near the coastline of north-western Africa where the mighty Atlas Mountains finally rolled down to meet the green Atlantic swells. It was an arid semi-desert of ochre and dun earth and rock, the sandstone cap of Africa laid bare and broken to be eroded by water and wind. It was softened only by the sparse covering of low trees, their rounded and seemingly verdant forms obscuring the real struggle for survival evidenced by the small waxy leaves, interlaced with vicious thorns. Even the succumbed remain as hard as iron, the spiked branches on the ground still dangerously viable and the standing dead trees seemingly petrified and frozen, the fine branching-like skeletal fingers pointing accusingly at the lack of clouds. Life ossified before it died in this landscape, then it ossified some more.

It was the kind of landscape that troubled souls walked into to find peace, only to stumble out emancipated and crazy-eyed, spouting mad ideas that infect millions. A baked and broken prospect where prophets prospered and donkeys died in the traces. It was also a slow place of absolute peace, the distant cries and bells of goat herders, the ever-optimistic song of birds and Abdul the donkey periodically enlivening our days. What at first glance appeared an almost monochromatic palette changed by degree with the setting sun, the hills lighting up through shades of golden brown, red and purple, and the light itself seemed to hang in the air, languid and warm.

Generally speaking, the harsher the environmental conditions, the fewer species that were able to fill niches within it. And here, the tree of life, the argan, was one of the few hardy enough to persist. And persist it had, for argan are thought to be among the world's oldest known tree species and have been around for an estimated eighty million years. Extremely deep-rooted and particularly drought-tolerant they appeared as increasingly stubborn survivors playing their key role in holding desertification at bay.

The Souss-Massa is an area of three million hectares of bone-dry argan forest, although to call it a forest was a stretch by my understanding of one. More correctly it was an agro-forestry system with husbanded trees at stockings between 30 and 100 stems per hectare, lots of rocky baked earth, goats, and not much else. But regardless of definition, the argan forest I saw appeared under obvious and ongoing stress. Across three separate areas where we stayed and drove locally, I estimated mortality of standing trees at around thirty percent. Lacking real sampling or measurements, with only an opinion formed on short-term observation it was difficult to gauge the seriousness of the issue. Could we expect the desert to bloom after seasonal rainfall, overnight converting into verdant pasture of abundance and plenty? Was the picture I saw consistent year-round? Over how long had the tree death occurred? A double language block prohibited me asking the very people who could have told me. On examination, a seemingly dead tree exhibited one tiny green leaf on an ossified branch. Was it the last breath of life clinging on with desperate tenacity, or was it the first indication of new growth ready to burst forth from the hibernating near dead? A definitive answer was not

possible without study lasting across seasons, and probably decades, but when you considered the already patchy stockings, the effect was noticeable, and you could almost see the negative feedback loops starting. A thirty percent reduction in canopy and shading effects must increase direct sunlight on the soil and result in increased ground temperatures at a localised level, putting more heat stress on the surviving trees. Worryingly, there appeared no obvious pattern, with mortality spread across aspect and altitude, ridge and gully and soil fertility and moisture gradients. The leading indicator of a healthy functioning forest ecosystem was naturally occurring regeneration, and most worryingly of all, there was no evidence of any.

A quick search of historical rainfall patterns indicated a declining trend over seventy years, but logic dictated that the argan trees had been riding that roller coaster since time immemorial and had likely survived worse. Likewise, an average temperature increase of one or two degree over fifty years was not likely to stress this particular eco-system to the point of collapse. More telling perhaps, was the huge amount of development happening on the coastal plains. Since Agadir was destroyed in a 1965 earthquake, the rebuild had been un-constrained, expanding relentlessly to meet its destiny as a fly-in holiday destination for hundreds of thousands of Europeans desperate for sun and dry heat. The localised development was a metaphor for Morocco's and Africa's burgeoning populations and exponentially increased demand on the aquifers.

The introduction of goats to the landscape, thought to have occurred around five thousand years ago, classified as an example of a long-term ecosystem driver. Much as the Aboriginals harnessing of fires to foster hunting grounds modified then dramatically changed Australian forested landscapes, it was possible here to imagine thousands of years of grazing pressure by preferential browsers eradicating some species and shaping the survivors. An agriculturalist's understanding of stocking levels and carrying capacity of the land might also have been misplaced here. There had to be a formal method to control the numbers and regulate grazing patterns and while this land, in those terms, probably supported one stock unit every three or four hectares, goats browse in mobs, moving across the ground and seeking out all plant life, with young argan seedlings presumably favoured. And they operate in three dimensions, climbing into the argan trees to target fruit and fresh growth. Like Hemingway's analogy about a man going broke, plant species disappear slowly at first, then all at once. Couple this constant over-grazing with a millennium of fuel-wood harvesting and there was no biomass or duff layer in the dry dust, nothing to start making soil with, nothing being given back to the forest.

The argan-zone was home to some five million people, their villages, scattered across the landscape and blended into the hills, camouflaged but ever present and the stillness belied the presence of villagers. And the people liked their goats. They were, of course, an important part of this rural economy, but in reality, with the carrying capacity of land so low, they were very unproductive, giving so little milk and meat as to be perhaps classified as that most honest of agricultural endeavours, the lifestyle choice. There was also, as is commonly occurring in most rural subsistence areas, reported labour shortages as people were less willing to accept traditional roles. Most of the goat-headers I saw were older men, poorly paid, but it was reported that many children, hardly paid at all, did the job with reported increasing delegation to girls, as males left rural areas for better opportunities on the coastal plains.

Walking through the trees I contemplated what a goat-herder must think about all day. How does the human mind deal with twelve-hours with little or no human interaction, and worse, no wife, day after day? Moving slowly between the shade of the trees in quiet solitude, would you develop a new branch of mathematics, a fourth law of thermodynamics or the definitive philosophical argument for the existence of God, or would you just be mind-numbingly bored? I could not but wonder if most goat-herders were offered an alternative life they wouldn't jump at it like Iranians at a green card lottery. The so-called developing world was full of 'quaint and charming, artisanal village-based' occupations that might have been considered vital by the air-conditioned staff at UNDP, but whose practitioners would probably willingly exchange for the chance to move to the city and work in a shop.

It was also wonderful to see age-old practices around water-use and conservation in action, evidenced by the terracing on hills and gullies and barriers to slow down surface run-off for those occasions when it rained. I reflected on the future opportunity to use technology, the 'internet of things' with sensors regulating piped water, to nightly feed individual trees a measured amount of water. I read that some German agencies had been here for years advising on forestry. Women's Argan Oil Co-Operatives abound and products are well marketed, but to me it all seemed so very UN, focused on important issues while the critical one slid.

In truth, I was pretty worried after my short visit because like Hemingway's afore-mentioned analogy about a man going broke, ecosystems collapse slowly at first, then all at once. Given the chance I would have fenced off a reserve, removed all the goats and prohibit fuelwood removal, purely to see what this desert forest would do if we let it. Northern Morocco was as verdant and productive as any part of the world and could easily substitute milk and meat production losses from taking goats out of the argan forests. Other options could be found for cooking and heating and other income streams developed, but as we know, it's slightly harder to replace a lost forest or resurrect an ecosystem.

Regardless, I loved the dry heat of the place and was thrilled by the coming road-trip across the high passes of the Atlas then beyond the anti-Atlas into the true desert. I remember fondly long-ago young-man memories of the Tibetan Plateau and Taklimakan and regaled my wife with stories of sand-storms and drinking Chinese brandy for breakfast with Uighur truck drivers in Aksu after a ten-hour bus trip from Hami across the face of Mars. I could not wait to wrap a blue sheet around my head and stand in the sunset on a dune with my robes blowing artfully in the wind. Perhaps no other landscape promised romance and beauty as much as the true desert. It touched us so because we knew we could visit but could not survive long there. But I desperately hoped we could sort these argan trees out, because we did not need it getting any bigger.

Near Agadir, Morocco