

Bio-resources and empire building: What favoured the growth of Vijayanagara Empire?

K. N. Ganeshaiah*, R. Uma Shaanker and R. Vasudeva

Bioresources fuel the emergence of empires and civilizations; political will and social milieu can only catalyse the growth and establishment of the empires that are otherwise sustained by and only by, their biological resources. Emergence of Vijayanagara, as one of the richest empires in the world history, could be attributed to an opportunistic trading of its natural resources, viz. sandal, spices and diamonds, for the guns and horses. The military strength thus gained by the empire helped its growth and dominance over its rival regimes in the north. Similarly, its decline could be traced to the loss of control over, and reduced market value for, the same natural resources. History illustrates that those regimes that efficiently (and not necessarily sustainably) usurp the natural resources, gain political and military dominance over the competing regimes. For sustaining their own over-consumptive patterns of living, these super powers obviously turn to usurp resources from weaker regimes. The exploited poor regimes who are forced to live on limited (and sustainable) use of resources would continue to be weaker and be dominated by the super regimes. Till this vicious cycle is broken, the philosophy of sustainable use of resources continues to be an evasive strategy. Sustainable use of resources has to be a global mantra; else it would be a myth.

Keywords: Arthashastra, bioresources, guns and horses, Vijayanagara empire.

Emergence of empires and evolution of species

WHY did the Roman Empire grow in Greece, Pharaohs establish in Egypt and Vijayanagara Empire emerge at Hampi?

Why are chimpanzees abundant in Africa, kangaroos in Australia and jaguars in South America?

These two questions are not totally unrelated as it may appear, especially if we seek answers in the conditions that facilitated the emergence of empires and the evolution of species. Just as spread of a species is the consequence of its ability to convert resources available in the habitat for its growth, reproduction and exclusion of other competing species, the growth and spread of an empire could also be viewed as a consequence of the ability of its citizens to effectively usurp the resources available (from within or outside the empire) for growth, prosperity and dominance of their regime. The regime that effectively usurps the natural resources at its disposal to dominate over its competing regimes (dominate any way, including military strength), would obviously gain access over a

wider geographic area, and to the resources therein. The additional resources thus garnered would further facilitate its dominance and geographic spread. This feedback cycle of usurping resources to build the military strength and invade other areas, gaining access to additional resources, and using these to further strengthen the military dominance results in the emergence of a strong, dominant empire. Not surprisingly, these same steps seem to have shaped the economic, political and military strategies employed by the presently strong nations of the world and also by the colonial British who ruled a greater part of the globe during the 18th and 19th century^{1,2}.

In this article, we argue that natural resources may have played a major role in the growth and emergence of the Vijayanagara Empire as a dominant regime in Deccan India during 13th–16th century AD. We show that the European discovery of India offered an as yet, unrealized market and value for the natural resources of the Vijayanagara Empire, which contributed to their economy to purchase military power. This resulted in a meteoric growth of the Empire. We also trace that the eventual loss of ownership on, and a consequent reduction in the barter value of, the very natural resources that contributed to its growth resulted in its decline. As an extension of this example, we argue that natural resources could have played a major role in the growth and establishment of several other great empires of human history.

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Rise and fall of the Vijayanagara Empire

The Vijayanagara Empire took birth around AD 1333 at Anegondhi along the banks of the Thunga-Bhadra River near the present Hospet, Bellary District, Karnataka^{3,4}. Two brothers, Hakka and Bukka, established the kingdom with the blessings of a sage called Vidhyaranya. The empire gradually spread to cover the entire Deccan India (Figure 1) and reached its nadir during the reign of the Telugu-speaking king, Krishnadevaraya (1505–40) from the Tulu dynasty of Karnataka. During his regime, the capital at Hampi and the empire saw enormous growth^{3–8}. Even to date relics at Hampi depict the glory it had once attained. The splendour and richness of the empire became so well known all over the world that it attracted a large number of scholars, travellers, merchants and visitors from far-off places such as China, Arabia and Europe. The impressions of the glory of this empire, left behind in a wealth of material written by these scholars and travellers, have helped in the reconstruction of the history^{3–8}.

Krishnadevaraya laid down his crown during the late 1530s and almost 35 years later, the empire fought its last and famous war with the Moghuls under the leadership of Ramaraya, the son-in-law of Krishnadevaraya^{3–6}. Though for political and legal reasons, Ramaraya was not the de facto king but only the chief minister, he literally ruled the entire kingdom with the puppet king Sadashiva at the forefront. The war he fought and lost at Rakkasathangadi or Talikota signified the decline of the Vijayanagara Empire because, despite a few subsequent efforts, the kingdom never bounced back to the glory it once had.



Figure 1. The Vijayanagara Empire during Krishnadevaraya's rule spread from Orissa to Sri Lanka and covered almost the entire South India. Its capital was at Hampi and Penukonda was an important fort south of the capital.

Military strength

During the Vijayanagara period, horses and guns were the most crucial military arsenal sought after by the rulers^{3–5}. Horses owned by any regime were a measure of its military strength as they offered the most needed agility for a lightening attack on, and escape from the enemies. Horses were being imported from outside and every regime in this part of the world was aiming at strengthening its knighted warrior units. At the same time, each regime would employ strategies that would prevent the potential enemies from strengthening their horse-borne army. It is recorded that the Vijayanagara kings bought the rights to purchase horses from the Portuguese, even if it meant a heavy cost, so that their enemies in the north were deprived of these important war arsenal^{3,5,7,8}.

Before the arrival of the Europeans, horses were being supplied to them by the Arabs, who clearly exploited the unsuspecting kings of Vijayanagara. For instance, it is said that the Arabs tricked the rulers of Vijayanagara to pay for even horse tails, claiming that they were of horses that had died during the course of shipping^{3–5,8}. However, as the Europeans arrived in India, the Arab monopoly over the supply of horses declined. This is evident from several historical notes and anecdotes. For instance, referring to the political relations that were established between Albuquerque at Goa and Krishnadevaraya, Sewell³ writes thus: 'Krishna Deva's anxiety was to secure horses. ... what he wanted (from them) was horses and again horses, for perpetual wars against Adil Shah. Albuquerque... declared that he would prefer to send cavalry mounts to him (Krishnadevaraya) rather to supply them to the Sultan of Bijapur...' Sewell³ goes on 'It appears that, in 1544 AD, Krishnadevaraya offered Albuquerque £20,000 for the exclusive right to trade in horses...', which though he refused in the beginning agreed to later. Heras⁵ cites an anonymous letter of a traveller, written in Venice to ser Zuane di Santi, dated 10 November 1511, and kept in *Biblioteca Magliabecchina* of Florence, 'the King Narasinga (Vijayanagara) has sent ambassadors ... in order to establish a perpetual friendship with the king of Portugal... to establish alliance'. Heras goes on to write: 'Krishnadevaraya proposed... his desire of getting horses ... He (king of Vijayanagara) sent another Legation.... This friendship between both powers still subsisted in the year 1526' (see notes at the end of the book⁵ for other similar details). Consequently horses became relatively cheaper for the Indian rulers. More so, because the Europeans had to be competitive to wean the Indian buyers away from the Arabs. In turn, Europeans also gained because the most important commodities for which they sailed all the way to India could be bought in abundance directly from the source at a cheaper rate, than they could have from middle men – the Arabs. As Rama Sharma writes⁴: 'They (Europeans) were impelled by a desire to trade on their own behalf (than through Arabs) and benefit by it'. Pre-

cisely assessing the threat by the Europeans, the Arab traders did all they could to dislodge the European establishments here. Though Vasco da Gama was welcomed (by Zamorin) at first, later on being instigated by Arab merchants whose monopoly of trade da Gama's arrival had threatened, he was ill-treated and forced to leave Calicut³. On the other hand, to Vijayanagara especially the arrival of the Portuguese was a godsend... Narasa's successors readily made use of it in their struggles against their Mussalman enemies⁴.

Another powerful arsenal the Europeans brought with them was the gun. This new weapon with which the enemy could be eliminated at distances that arrows and swords could not reach, had begun to offer an invincible military power to regimes that possessed them. Obviously the Vijayanagara kings began to trade their natural resources with the guns and horses of the Europeans. There was a handshake between the Europeans and the kings of Vijayanagara for mutual interests³⁻⁵, it helped the regime become militarily stronger, invade the weaker neighbouring regimes and expand in geographic area to gain access to more of the same biological resources, viz. sandalwood and spices.

In the following we illustrate a strong spatial link between the geographic spread of the regime and the distribution of natural resources on which its economy depended. We argue that the political boundary of Vijayanagara was perhaps shaped by the availability of these resources in Deccan India.



Figure 2. Distribution of different natural resources during the Vijayanagara reign. Spices were available along the Western Ghats region, sandal in almost the entire Deccan India and diamonds in Rayalaseema, especially at the Raichur Doab region.

Natural resources

Sandalwood

About 80–90% of the geographic distribution of sandalwood in Deccan India overlaps with the regime of Krishnadevaraya and the later kings⁹⁻¹³ (Figure 2). This overlap has in fact rendered it the cliché 'Chandanada Nadu', i.e. the land of sandalwood for Karunadu, another name for the regime of Vijayanagara^{4,9}. Though the regime had officially recognized three Dravidian languages, Kannada, Telugu and Tamil, historically Vijayanagara began as Karunadu or Karnataka, the land that traditionally became associated with sandalwood^{3,8,10}.

Sandalwood was a priced commodity for both Arabs and Europeans¹⁰. While it is generally believed that Europeans colonized Asian countries mainly for spices, that sandalwood also played a significant role in the political wars of the time is not widely known⁹⁻¹². History records that Portuguese used to deploy military units from Goa to Timor, a small island in the Pacific Ocean for gaining access to the sandalwood resources available there. The fort built by them in the central part of Timor was later invaded by the Dutch, who in turn began establishing their sandalwood extraction units in the southwestern part of the island. However, deploying additional military units from Goa, the Portuguese tried to regain control over the sandalwood resources of the island and did partially succeed with the help of the Tomasse, a new breed of warriors born out of marriages between the natives and Portuguese soldiers who had earlier settled there. Finally their prolonged conflict was resolved by dividing the entire island into the Eastern and Western halves between the Portuguese and the Dutch¹⁴.

The Indian chandana (sandalwood) was superior in terms of its oil quality^{9,12,13,15} and hence the Portuguese and later the British buyers turned towards it. Obviously, the Vijayanagara kings who had the most sandal resources under their territory, had a greater leverage in trading it for guns and horses. Thus Vijayanagara rulers had economic reasons to occupy fresh territories of sandalwood, and retain those under their control so that they gain complete control over this important resource. Such control over resource became much more important in the background of the renewed business prospects that opened with the arrival of the Europeans and the military superiority gained with such association. Quite reasonably, several of Krishnadevaraya's expeditions to different parts of the Deccan could have been driven by this economic potential of sandalwood.

Spices

It is well known that spices changed the history of the world owing to their value that often challenged even that of gold^{16,17}. Having been exploited by the Arabs over

centuries, the Europeans were determined to explore the spice-yielding countries, trade with them directly and/or invade them. The arrival of Vasco da Gama in India during 1498 (and again in 1502) followed by other sailors and business vessels after 1505, opened up a hitherto unseen market for spices of India, especially that of pepper. The pepper-philic tongue of the Europeans had incredibly hiked the value of the spice: just a handful of these seeds could relieve the long-term debts of the sailors. Pepper was so highly valued that the workers on vessels shipping it were prevented from having pockets on their dresses, lest they steal this black gold!

Just as the Europeans were beginning to establish along the west coast of India (during the first decade of the 16th century), and opened up the market for spices of the Western Ghats, Krishnadevaraya was crowned the king of Vijayanagara (AD 1509). He immediately realized that the new market provided him a greater opportunity to cash in on the spices compared to that he could have from the Arabs. The latter, who were exploiting sellers in the east and buyers in the west, were now replaced by the gun-selling Europeans, who also could supply horses to the regime. The prospects of this business were realized by the rulers of Vijayanagara even before Krishnadevaraya: Vira Narasimha offered his sister, in marriage to the prince of Portugal³⁻⁵! Krishnadevaraya and his followers pursued these efforts to capitalize on such established business relations with the Europeans and further helped in strengthening the military superiority of the regime. As the demand for, and value of, spices increased, Vijayanagara invaded into the entire west coast covering the Western Ghats – the hotbed of spices and bioresources (Figure 2). In fact, there were repeated wars between the Portuguese and the Vijayanagara rulers to gain control over these areas, their strong business relations notwithstanding!

Thus the distribution of sandalwood and spices, the two most important biological resources for which the Europeans sailed across the unknown oceans to reach India, appears to have shaped the growth and expansion of the Vijayanagara Empire. However, another natural resource that perhaps contributed in consolidating this dominance of the empire was diamonds (and natural gems).

Diamonds and other natural stones

The most vivid and frequently encountered description of Vijayanagara Empire is that, in its capital Vijayanagara – the present Hampi, markets were flooded with diamonds, pearls and gemstones^{3,7,8}. The country, and the capital in particular, was so rich that these precious stones and diamonds were being sold in ‘measures’ along roadsides in the market. That these descriptions are not exaggerations is evident from other historical details as well. The area enclosed between, and some parts surrounding, the two rivers, Krishna and Thunga-Bhadra near Raichur (Raichur

Doab), was the major source of the world’s diamonds (Figures 2 and 3) till the 16th century, when the first diamond mine was developed in South Africa. Prior to this, Vijayanagara was perhaps the only empire in the world (extending to Sri Lanka, the other source of diamonds) that extracted diamonds on a large scale³. The Vijayanagara Empire having located itself at the southern edge of this diamond-zone (Rayalaseema), had full control over extraction.

History records that the administration at Hampi had declared its ownership over all diamonds above 25 megalyns (carrots) extracted from the mines; only those smaller than this could have been marketed by the extractors and merchants³. Most wars between the Moghuls and Vijayanagara kings were fought in the Raichur Doab, adjoining the richest diamond area. The very reason for the establishment and continuation of the Empire’s capital in this region was perhaps to have a close monitoring on the extraction in these mines. Human obsession with diamonds had always created a huge market for them and Vijayanagara, with a hoard of them in its possession, could have commanded a good deal of control on the world market. Obviously these diamond mines provided an important source of economy with which the empire could trade for guns and horses to build its own military strength.

Irrigated agriculture

Vijayanagara rulers were known for enhancing the agricultural area under irrigation. In fact, during the establishment of the capital, irrigated land was offered free of tax² for a specified period of time, so that the farmers could settle down and cultivate grains much needed for the capital’s



Figure 3. An artist’s reconstruction of the market at Hampi during the Vijayanagara period. This painting is now available at the exhibition at Hampi.

settlers. It is likely that this strategy also may have substantially contributed to the stable growth of the empire (we thank Madhav Gadgil for bringing this possibility to our notice). However, it is interesting to note that at least some of the major irrigation projects were built with technical help from the Europeans (from the chronicles of Nuniz; Krishnadevaraya also built a lake for water, which lies between two lofty serras. Since he had no means in the country for making it, ...he sent a messenger to Goa to ask the Governor to send some Portuguese masons. The Governor sent Joao della Ponte, a great worker with stones, ...he told the king...to have the lime prepared, at which the king laughed for in his country when they built a house they did not know how to use lime. Authors note: K.N.G. has surveyed the area around Hampi and one tank that fits this description is Bukka Raya Kere). Nuniz writes: 'By means of this... they irrigated rice field and gardens...he gave the people the lands which are irrigated by this water free for nine years until they had made their improvements'. Thus the arrival of the Europeans also altered the use of natural resources such as water and land, which may have certainly contributed to the growth of the Empire.

Distribution of natural resources of the Vijayanagara Empire

Thus the distribution of the three groups of natural resources, viz. sandalwood, spices and diamonds, appears to have shaped the geographic spread, economic growth and military dominance of the Vijayanagara Empire in South India (Figure 2). While it may be difficult to unequivocally establish that expansion of the regime was primarily to gain access to these resources, it is unlikely that the rulers were not aware of the value of these resources. Irrespective of whether or not the invasion was prompted mainly by these resources, it is highly likely that they did contribute to the growth of the regime as a dominant empire in the region. It is also tempting to propose that the surprisingly dangerous expedition of Krishnadevaraya to the eastern parts, viz. Orissa and Telangana, was prompted by the availability of red sanders (Figure 2). While historians interpret this risky venture as a foolish attempt to feed his ego, considering that red sanders or 'raktha chandana' (*Pterocarpus santalinus*), one of the highly valued trees of the times, was abundantly available in these areas, it is not surprising that the king's motive lay in the economic benefits. In fact, on his return he celebrated his victory by bathing the deity at Tirupathi in gold coins!

Fall of the Empire

There are a number of instances suggesting that indiscriminate extraction of resources could have led to the

decline of empires and of civilizations¹⁸. Similarly, loss of control over the resources which in turn would affect their military strength, could also have led to the decline of empires. This seems to be the underlying cause for the decline of the Vijayanagara Empire. With the discovery of diamonds in South Africa during the 16th century, diamond mines were established there on a large scale. The diamond-cutting industry that emerged along with the mines in South Africa also attracted the world market. These developments could have affected the market value of Vijayanagara's diamonds and hence the income. Further with the establishment of the British all over South East Asia, pepper and other spices were extracted from elsewhere and also spice cultivation was extended on a mass scale to non-traditional areas. Both these affected the value of the Indian spices and hence the Empire's buying capacity (of guns and horses). Gradually, with the spread of the British rule in India, sandalwood was also brought under the monopoly of its ruling, pushing the local leaders' resource base further down. In fact, while the Vijayanagara Empire grew continuously till the mid 16th century, it began to decline both in its geographic spread and strength from the end of the 16th century. And the Vijayanagara Empire never regained its past glory. Just as the arrival of the Europeans provided a surge to its growth, establishment of the British in India costed its survival per se.

Arthashastra of empire-building

Diamonds, sandalwood and spices were always there; but why did the earlier rulers fail to cash in on them? Perhaps because of the lack of opportunities. The Vijayanagara rulers could use them more effectively than earlier rulers because of the fresh market opportunities created by the Europeans, who also brought with them the marketable military power. In fact there are evidences, albeit indirect, to suggest that even before the Vijayanagara Empire, regimes that readily recognized the value of natural resources did emerge as strong empires. For instance, the Mauryan regime of the 3rd century BC, viewed as among the biggest empires in the world, recognized the importance of natural resources as the base to build its power. Its minister Chanakya, considered as the intellectual powerhouse behind the emergence of the kingdom and well known for his political and economic strategies, has in fact referred to sandalwood and gems as the 'royal resource base' of the kingdom. In his famous *Arthashastra*, Chanakya had enlisted mines and productive forests as important among the 67 resource bases^{19,20}. He also outlined methods to identify and characterize at least nine types (species, subspecies and provenances) of 'chandana' from within and outside the country. Similarly, he also outlined the sources and values of different pearls and gems. Thus the Mauryan Empire ought to have capitalized on the pur-

chasing power of these natural resources to build its own military power.

Similarly, Vijayanagara rulers could barter what they had in abundance with what they needed the most, to dominate and grow as a powerful empire because of the opportunity that came by with the Europeans arriving in India. It is likely that this process underlies the emergence and growth of the most successful regimes in history. Europeans cannibalized the weaker regimes of the world with their emerging technological resources, viz. sailing vessels, explosive powder and guns. All these offered them invincible power to usurp resources from far-off areas which they used to strengthen their might and dominate the globe.

Effective usurpation versus efficient use of natural resources

Empires do not grow in vacuum nor on mere social and political will. Growth of an empire is contingent on the availability of natural resources and their uses. In this sense, perhaps the most immediate task of an invading regime would be to grab and usurp the available resources in as effective a manner and in as less time as possible. It is not essential that the invading regime uses the accrued resources efficiently or sustainably; rather it would tend to effectively usurp (and maximally exploit) the resources such that if, and even before, the rightful owners resist invasion, the invaders would have looted their share. This precisely was the approach employed by the British East India Co, when they exploited the tropical forests of Central and South East Asia for teak, iron and spices. In fact, under these conditions the invaders are likely to conserve their own resources in their native lands while exploiting them in the invaded regime. This is perhaps reflected in the strategic reluctance of USA to extract gas from its own sources at Alaska but employ all subtle tactics of invasion to hasten the extraction of oil from Central Asian countries. Such exploitation of foreign resources need not necessarily be a result of geographic invasion; it could be manifested from a political and economic dominance as well. India for instance has banned the felling of trees in its own forests as a conservation strategy, but imports wood from other countries irrespective of the policy on felling there!

Thus, the global politics of resource exploitation would always render the mantra of *sustainable resource use* an ineffective strategy. A country that is less aggressive on its neighbours and practices sustainable resource-use policy would always be weaker compared to another regime that would effectively usurp (and not efficiently use) its resources to aggressively invade, and to gain access to the natural resources of other countries. Obviously a truly aggressive country would dominate and gain political and/or military control over the resources of those that

use their own resources sustainably. The dominant country would perhaps even propagate the culture of, and impose if needed, a sustainable use pattern of resources in the weaker countries, so that they remain perpetually weaker, which is to the former's advantage!

The mantra of sustainable use pattern however does look logical as a long-term strategy provided it is universally adopted. But as long as there are political and military hierarchies among countries, the alphas and betas among them would take all measures to ensure the perpetuation of this hierarchy. This in turn perpetuates the effective use of resources by the dominant and efficient use by the weak. Thus the mantra of sustainable use would be 'apparently' for the good of poor countries, while indeed it is to the advantage of the rich countries. One wonders if herein lies the answer to the puzzle that financial agencies (such as World Bank), controlled by the dominant countries, insist so much on the sustainable use of resources in developing countries (that receive the loans), while the developed countries that offer financial resources to these agencies, themselves do not conform to the sustainable use pattern. Sustainable use pattern is logically unbeatable as a long-term strategy provided the preacher and preached follow it together.

Death of civilizations

Though the political regimes that usurp resources grow well and dominate, it is also true that civilizations have killed themselves by over exploiting their natural resources. One of the best examples is that of the Easter Island^{18,21}, whose native population collapsed because of over exploitation of a particular palm, *Jubilia* sp. This palm, once abundant on the Island, was felled indiscriminately for preparing canoes and for using as rollers to move the stone statues across the Island. Simultaneously, its regeneration was also affected as its nuts were harvested for food by the native settlers. Gradually, the population of the species declined and disappeared from the Island. The natives could not prepare canoes and hence could not venture into the ocean and hunt dolphins – their major food source. They then resorted to indiscriminately hunt birds and lizards, leading to the extinction of more than a dozen of these species on the Island. Eventually when the natives were left with little to eat on the island, they fought severely among themselves and the population collapsed from several thousands to a few hundreds^{18,21}.

While the history of Easter Island teaches us that we cannot afford to be indiscriminate in using our natural resources, it is also important to learn that we cannot be discriminative in applying its lessons. Easter Island is a completely isolated piece of land amidst the ocean, just as our planet is in the universe. Hence lessons from the ecological disaster on Easter Island are to be practised uniformly by all humans who share this planet 'island'. The

lesson is clear: Do not overeat! Unfortunately the distribution of per-capita 'eating' of our natural resources is highly non-uniform across countries and seems to correlate well with the intensity of preaching of sustainable use of resources (and correlated positively unfortunately). The over-consumption or over-usurpation of resources by the First World would obviously affect the survival of the entire humanity. If we need to avoid an ecological disaster in the planet, lessons should be learnt immediately.

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