



Evaluation of the “Report of the Fact Finding Committee
on Amrit Mahal Kaval, Challakere, Chitradurga District, Karnataka”

Prepared by:

Mark Chernaik, Ph.D.
Staff Scientist
Environmental Law Alliance Worldwide, U.S

Qualifications

I obtained the Degree of Doctor of Philosophy (Ph.D.) from Johns Hopkins University in the year of 1990 and the Degree of Juris Doctor (J.D.) from the University of Oregon in 1993. I have served as Staff Scientist for the Environmental Law Alliance Worldwide (ELAW) from the year 1993 to the present day. My opinions and research in environmental matters have been cited favourably in judgments of the Supreme Court of India, the Supreme Court of Pakistan, the European Court of Human Rights, and the Supreme Court of Belize. *M.C. Mehta v. Union of India*, 1999-(003)-CLJ 0361–SC; *Shehla Zia v. WAPDA*, PLD 1994 (SC) 693; *Belize Institute for Environmental Law (BELPO) v. Department of Environment (DOE)*, Claim No. 302 OF 2007 (Order dated 28 June 2009). Further, in June 2005 and in February 2011, the European Court of Human Rights relied extensively on my work to reach landmark decisions (*Fadeyeva v. Russia*; *Dubetska v. Ukraine*) regarding the rights of individuals exposed to toxic substances.

The Fact Finding Committee failed to take into account numerous and recent publications available in the scientific literature pertaining to the biodiversity of the land under question

Under the Terms of Reference assigned to the Fact Finding Committee by the National Green Tribunal, the following pertains to the biodiversity of the land under question.

4. Characteristics of the biodiversity of the region

I. Biodiversity in and around the land under question

1. List of Flora, especially the list of specific grass that indigeneous/Amrit Mahal cattke feed on in the lands under question.
2. List of indigenous grass Flora
3. List of Wild/domesticated food crops
4. List of Economically useful flora
5. List of medicinal plants

6. List of fauna
7. List of Indigenous fauna
8. List of Migratory fauna
- V. Environmental suitability of the area for the proposed activities

With respect to this Term of Reference, the Fact Finding Committee included the following in its report:

“This area includes plants and animal species which are adapted to arid scrub conditions. Only one study pertaining to the Characteristics of Biodiversity of the land allotted to IISc, Khudapura has been carried out by Centre for Ecological Sciences, IISc, Bangalore during June, 2011. Till date, no other studies on the Characteristics of Biodiversity have been carried out either in Varavu Kaval or in Ullarti Kaval. As per the studies carried out by IISc, it appears that, the Amrit Mahal Kaval in Khudapura has rich vertebrate and plant species. Among the vertebrates 6 species of Amphibians, 14 species of Lizards, 5 species of snakes have been listed. Further, IISc research team has listed about 80 species of birds besides the occurrence of Black Bucks, Foxes and Hares (Annexure 1). The FFC team observed the presence of peacock, few species of birds and a small herd (4 numbers) of Black Buck. The occurrence of fecal matter of Black Bucks near the sheep farm suggests the presence of Black Buck.

“The committee was informed by Member Secretary, Karnataka Biodiversity Board that they have not conducted any biodiversity study in these Kaval lands at Challakere. Since the climatic conditions of these areas are almost similar, the Bio Diversity Board opines that the Flora and Fauna listed by IISc research team for Khudapura may be taken as representative biodiversity of the whole area (Annexure 2 - E-mail from Bio Diversity Board).”

The total list of references in the Fact Finding Committee Report includes only the following 11 publications, one of which is undated, and 3 of which were published more than 25 years ago.

“Literature Reviewed

- “1. Centre for Ecological Sciences. (2011). A Precious Heritage. Bangalore: Indian Institute of Science.
- “2. D N Das, M. K. (n.d.). Malnad Gidda Cattle - A Valuable Native Breed of Karnataka.
- “3. D R Prasanna Kumar, B. Z. (2013, February). Periodical Census to Monitor Blackbucks Population at Jayamangali Blackbuck Conservation Reserve, Mydanahalli, Tumkur District, Karnataka. International Journal of Environmental Protection, 3(2), 27-30.
- “4. Gupta, R. K. (1971, July). Ecology of Challakere Taluk, Chitradurga District of Mysore State, with reference to Development and Conservation of Natural Resources in the South Indian Arid Zone. My Forest, 13-30.
- “5. Kunaji, C. (1998). Amruthmahal Tali. Bangalore: Prakruthi Prakashana.
- “6. Maithreya Institute for Environmental and Rural Studies. (2011). Amruth Mahal Breed of Cattle's, Kavals (Grasslands) and its Bio-diversity - A Study Report.

- “7. Mason, I. L. (1996). A World Dictionary of Livestock Breeds, Types and Varieties. Fourth Edition, 273.
- “8. R W Philips, N. R. (1953). Zebu Cattle of India and Pakistan. FAO Agriculture Studies, 19, 256.
- “9. Rahway, N. J. (1985). Cattle Breeds of the World.
- “10. Rice, B. L. (1897). Mysore - A Gazetteer Compiled for Governemnt. Mestminster, Archibald Constable and Company.
- “11. V T Hiremath, T. C. (2011, September). Phytotherapy associated with Jaundice in Chitradurga District, Karnataka. Int. J. Med. Arom. Plants, 1(2), 162-165.”

It is clear, then, that the Fact Finding Committee never undertook one of the fundamental steps of a scientific inquiry: conducting a thorough search of the peer-reviewed scientific literature for publications pertaining to a question at hand. In the present-day scenario, there are abundant and free resources available for Committees to conduct thorough searches of the peer-reviewed scientific literature, one of them being Google Scholar.¹

If the Fact Finding Committee had conducted a thorough search of the peer-reviewed scientific literature for publications pertaining to a question at hand (biodiversity in and around the land under question), then it would have found numerous additional publications that are necessary to take into account to fulfill the Terms of Reference regarding biodiversity. For example, a quick (1-hour) search of Google Scholar using the key terms ‘Chitradurga’ AND (biodiversity OR wildlife OR grassland OR flora) yielded several scientific studies, all of which are freely available in full-text format, and all of which would have considerably enhanced the Fact Finding Committee’s understanding of the issue at hand. What follows is a list (in reverse chronological order) of studies that the Fact Finding Committee should necessary have reviewed as part of the fundamental step of its scientific inquiry:

Kumara, H. N., & Singh, M. (2012). Distribution, den characteristics and diet of the Indian Fox *Vulpes bengalensis* (Mammalia: Canidae) in Karnataka, India: preliminary observations. *Journal of Threatened Taxa*, 4(14), 3349-3354.

“Occurrence of the Indian Fox in different districts of Karnataka: Chitradurga: Occurs in all Taluks.:

Devagiri, G. M., Hubballi, S., Pujar, G., Murthy, M. S. R., Trivedi, S., & Debnath, B. (2012). Mapping and Characterization of Bio-rich Areas Using Satellite Remote Sensing in Southern Karnataka, India.

“Importance value index (IVI) indicates the dominance of *Anogeissus latifolia* with gregarious *Hardwickia binata* mixed forest patch in Chitradurga district.”

¹ <http://scholar.google.com/schhp?hl=en> “Google Scholar provides a simple way to broadly search for scholarly literature. From one place, you can search across many disciplines and sources: articles, theses, books, abstracts and court opinions, from academic publishers, professional societies, online repositories, universities and other web sites. Google Scholar helps you find relevant work across the world of scholarly research.”
<http://scholar.google.com/intl/en/scholar/about.html>

Naik M, R., Venugopalan, V., Kumaravelayutham, P., & Krishnamurthy, Y. L. (2012). Ethnoveterinary uses of medicinal plants among the Lambani community in Chitradurga district, Karnataka, India. *Asian Pacific Journal of Tropical Biomedicine*, 2(2), S470-S476.

“Lambani tribe, who are generally poor and live in remote areas, use ethno veterinary medicine (EVM) for the primary healthcare of their animals. The use of plants reveals their interest in ethnomedicine and further research on these species.”

Tiwari, R., Somashekhar, H. I., Parama, V. R., Murthy, I. K., Kumar, M. M., Kumar, B. M., ... & Ravindranath, N. H. (2011). MGNREGA for environmental service enhancement and vulnerability reduction: Rapid appraisal in Chitradurga District, Karnataka. *Economic and political weekly*, 46(20), 39-47.

“The activities undertaken under the Mahatma Gandhi National Rural Employment Guarantee Act in Chitradurga district, Karnataka, were assessed for their potential to enhance and provide environmental services. Key programmes implemented in 20 villages during 2009 were studied using rapid scientific assessment methods. An indicator approach was adopted to analyse environmental services such as water for irrigation and improvement in soil quality. The status of environmental services before and after implementation of the activities was examined and vulnerability indices were constructed and compared. The activities were found to have reduced the vulnerability of agricultural production, water resources and livelihoods to uncertain rainfall, water scarcity and poor soil fertility.”

Hiremath, V. T., and T. C. Taranath. "Traditional phytotherapy for snake bites by tribes of Chitradurga District, Karnataka, India." *Ethnobotanical leaflets* 2010.2 (2010): 2.

“The investigation reveals that the local health healers/tribals used 15 plants belonging to 11 families with 12 formulations (02 multiple applications and 10 single plant applications. The study reveals that roots were most frequently used (09 species), followed by leaf extract (04 species), latex and gum with one (01) species each. The study also reveals that many people of the district still continue to rely on traditional medicine for their primary healthcare.”

Vijaykumar, M. M. J., & Taranath, T. C. (2010) Survey on Ethno medicinal Plants of Jogimatti Forest Chitradurga District, Karnataka, India.

“The survey indicated that, the study area Jogimatti forest has of medicinal plants to treat a wide spectrum of human ailments. It is evident from the interviews conducted in different villages; knowledge of medicinal plants is limited to traditional healers, herbalists and elderly persons who are living in rural areas. This study also points out that certain species of medicinal plants are being exploited by the local residents who are unaware of the importance of medicinal

plants in the ecosystem. The investigation concluded that even though the accessibility of Western medicine for simple and complicated diseases is available, many people in the studied parts of Chitradurga district is still continue to depend on medicinal plants, at least for the treatment of some simple diseases such as cold, cough, fever, headache, poison bites, skin diseases and tooth infections.”

Hiremath, V. T., & Taranath, T. C. (2009). Ethnomedicinal Plants and Associated Traditional Knowledge of Jogimatti Forest, Chitradurga District, Karnataka, India. *Ethnobotanical Leaflets*, 2009(12), 5.

“The study reveals that leaves, stem/bark were most frequently used [18 species], followed by seeds [13 species], Fl/fl.buds [09 species], roots [08 species], fruits [07 species], entire plant [04 species], and latex [03 species] for the treatment of various ailments like eye ailments, joint pains, paralysis, urinary infection, eczema, fever, rheumatic complaints, inflammations, leprocy, cough and cold, herpes, rheumatism, ring worms, asthma, wound/burns, renal pain etc. The study also showed that many people of Chitradurga district still continue to depend traditionally on medicinal plants for primary health care. Therefore, the present study is an attempt to present some interesting ethnobotanical observations in connection with Jogimatti forest of Chitradurga district.”

Kumara, H. N., & RAJ, V. V. M. (2007). 11. THE GREAT INDIAN BUSTARD ARDEOTIS NIGRICEPS: ARE THEY DISAPPEARING IN KARNATAKA?. *J. Bombay Nat. Hist. Soc.*, 104, 2.

“Rahmani and Manakadan (1990) reported the occurrence of Bustard as unconfirmed reports based on personal communication with many researchers in Bijapur, Raichur, Dharwad, Bellary, Chitradurga, Tumkur, Hassan and Mysore, and further they stated that the Bustard is definitely known to exist in Dharwad.”

Singh, M., & Kumara, H. N. (2006). Distribution, status and conservation of Indian gray wolf (*Canis lupus pallipes*) in Karnataka, India. *Journal of Zoology*, 270(1), 164-169.

“We estimated a total number of 555 wolves in Karnataka, which is the most conservative estimate (Table 1). The relatively higher number of wolves was found in Gulbarga, Bijapur, Bagalkot, Belgaum, Gadag, Koppal, Raichur, Bellary, Davangere, Haveri, Chitradurga, Tumkur and Kolar.”

Ramachandra, T. V., & Kamakshi, G. (2005). BIORESOURCE POTENTIAL OF KARNATAKA.

“Miscellaneous forests: The thorn and scrub type forests are found in several parts of Chitradurga, Bellary, Raichur, Gulbarga and Bidar districts. Some of the remaining patches are made up of *Acacia*, *Albizia* and *Hardwickia*.”

In its report, the Fact Finding Committee concluded:

“4. Bio Diversity:

“The only information on Bio-diversity of Amrit Mahal Kaval pertains to Khudapura as published in Rapid Bio-diversity Survey conducted by Centre for Ecological Studies, IISc, Bangalore. Study reveals Khudapura to be rich in flora and birds and a few species of their fauna. Since, information on bio-diversity in Ullarti and Varavu Kavals are not available, mere extrapolation of information of Khudapura to other kavals may not provide the true picture of the land. Further, the rapid bio-diversity survey has not quantified the population of each of the species. Hence, in the absence of information on density of each of the species, it may be premature to conclude the richness of the bio-diversity of the kaval area. It is appropriate that the beneficiaries of the land as also the Bio-diversity Management Committee of the region including other R&D institutions should establish the diversity and density of species of flora and fauna and then implement appropriate steps to conserve the same.”

However, because the Fact Finding Committee never informed itself of the issue in question by conducting a thorough research of the scientific literature, this conclusion cannot be relied upon.

The Fact Finding Committee and the Principal Secretary, Department of Forest, Ecology and Environment failed to take into account evidence of forest lands within the Amrit Mahal Kaval

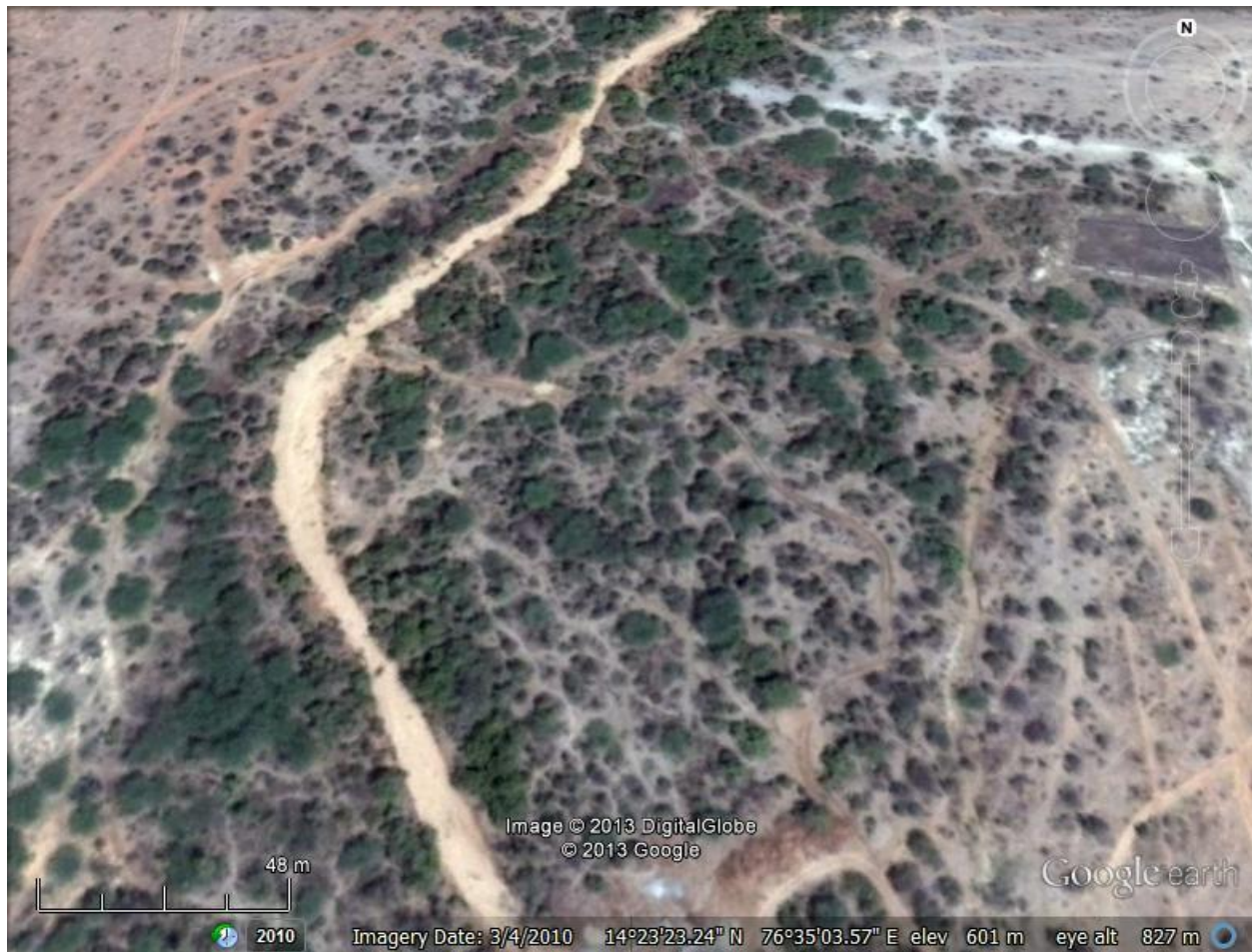
According to one of the scientific publications that the Fact Finding Committee failed to take into account “thorn and scrub type forests are found in several parts of Chitradurga [including] patches are made up of Acacia, Albizia and Hardwickia.²

Ramachandra, T. V., & Kamakshi, G. (2005). BIORESOURCE POTENTIAL OF KARNATAKA.”.

“Miscellaneous forests: The thorn and scrub type forests are found in several parts of Chitradurga, Bellary, Raichur, Gulbarga and Bidar districts. Some of the remaining patches are made up of Acacia, Albizia and Hardwickia.”

Many of these forested areas are readily apparent on satellite images of the lands in question, including the one below, at 14° 23.5’ N, 76° 35’ E:

² Ramachandra, T. V., & Kamakshi, G. (2005). BIORESOURCE POTENTIAL OF KARNATAKA.”



In its Statement of Objections, the Principal Secretary, Department of Forest, Ecology and Environment, State of Karnataka, claims: “It is humbly submitted that the Areas of the Amrut Mahal Kavals granted to various organizations as listed in para 2., do not have any dense/thick growth of trees to consider them as ‘forests’ by dictionary definition.

The satellite image above, from April 2010 and lying near the very center of the Amrit Mahal Kaval, strongly suggests that the Principal Secretary, Department of Forest, Ecology and Environment, State of Karnataka, is incorrect.

The Fact Finding Committee failed to take into account the potential of the Bhabha Atomic Research Centre nuclear fuel reprocessing facility to contaminate the environment

With respect to the proposed BARC facility, the Fact Finding Committee Report states:

“Being a major giant in Scientific Research, BARC is aiming to produce upgraded fuel useful for nuclear power generation. The organization is planning to set up a Special Materials Facility (SMF) project to meet the future requirement of upgraded fuel for use in power sector. The SMF project involves different types of activities like chemical processing of raw material, mechanical assembly and testing of special purpose machines and auxiliary supporting facilities for isotopic separation involving physical process. The

project also benefits the locals in terms of employment both in skilled and semi-skilled category, development of infrastructure such as schools, hospitals and road and involvement of industries of raw material supply and machining/fabrication jobs. Thus there will be an overall development of the area which will benefit the livelihood of people.”

Waste generated at nuclear power plants are categorized as low-level waste, intermediate-level waste, and high-level waste.

“High-level waste is spent fuel, when discharged from reactors. It contains fission products and elements generated in reactor core. It accounts for 95% of the total radioactivity in the process of electricity generation... Spent fuel contains approximately 96% uranium (95% ^{238}U and 1% ^{235}U), 1% plutonium, 0.1% minor actinides (Neptunium, americium and curium) and 3% fission products.”³

Spent fuel may be treated as waste or reprocessed. Reprocessing of spent fuel involves the chemical separation of uranium and plutonium. “The material produced from fuel still existing in spent fuel is called mixed oxide of uranium and plutonium (MOX).”⁴ Hazards associated with MOX include “hazards arise from the toxicity of plutonium and from the fact that the 'critical mass' of plutonium dioxide in which chain fission reactions can start up is only a few kilograms.”⁵ “All commercial reprocessing plants in the world use the method called Plutonium–Uranium Extraction (PUREX)... In PUREX process, spent fuel is cut into small pieces, which are dissolved in nitric acid and subjected to a process of solvent extraction using tributyl phosphate (TBP). Uranium and plutonium are separated at this stage from fission products and minor actinides, which are kept in acid.”⁶ Uranium and plutonium are then separated and purified. “The rest of the liquid, which contains fission products and minor actinides is processed and glazed, and then is encapsulated in a steel container.”⁷

The figure below, reconstructed from Silverio & Lamas (2011), is a scheme of PUREX reprocessing process.

³ Silverio, L.B., Lamas, W.Q. (2011) An Analysis of Development and Research on Spent Nuclear Fuel Reprocessing. *Energy Policy* 39: 281-289.

⁴ Ibid.. at page 283.

⁵ El-Hinnawi, E.E. Review of the Environmental Impact of Nuclear Energy. *IAEA Bulletin* 20(2): 32-42

⁶ Silverio, L.B., Lamas, W.Q. (2011) An Analysis of Development and Research on Spent Nuclear Fuel Reprocessing. *Energy Policy* 39: 281-289

⁷ Ibid., at page 283.

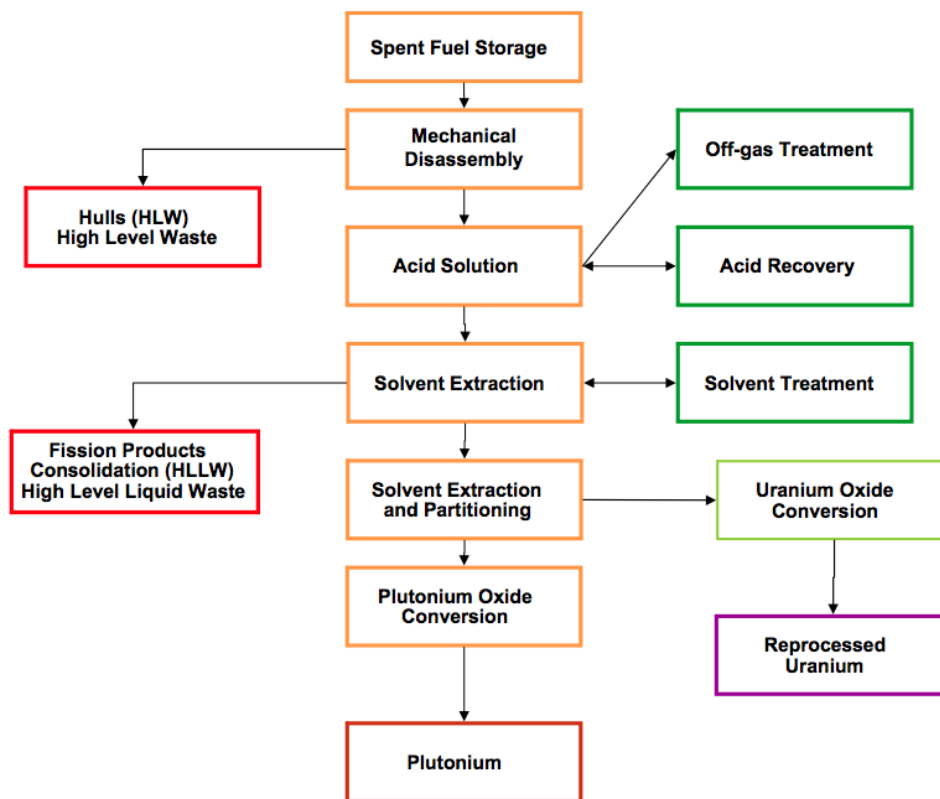


Fig. 6. Scheme of PUREX reprocessing process.

The Fact Finding Committee Report discusses none of the environmental risks associated with undertaking the above processes within the Amrit Mahal Kaval. The Fact Finding Committee Report conclusion that “the project also benefits the locals in terms of employment both in skilled and semi-skilled category, development of infrastructure such as schools, hospitals and road and involvement of industries of raw material supply and machining/fabrication jobs ... thus there will be an overall development of the area which will benefit the livelihood of people,” is an unbalanced conclusion because it fails to take into account any of the potential environmental and public safety risks of processing uranium- and plutonium-containing spent nuclear fuel using a reprocessing scheme that involves the generation of high-level nuclear wastes, off-gases, and high-level nuclear liquid wastes.

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