



## Programme

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### Summaries of Presentations

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### Profiles of Speakers



<b>PROGRAMME</b>
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PART I - 14:00 to 16:00

**SPIRITUALITY, KNOWLEDGE AND PRACTICE**

Chaired by **Joji Cariño**, Commissioner  
World Commission on Dams

*Dreaming Water and Making Rain in Aboriginal Australia*

**Tjama Freda Napanangka & Joan Nagomara**, Great Sandy Desert (Australia) with  
**Barbara Glowczewski-Barker**, Centre National de la Recherche Scientifique  
(France)

*"If you eat from the forest, you must protect it. If you drink water from the river, you  
must conserve it" - Water conservation and the Karen people of Thailand*

**Joni Odochao**, Karen Village Headman (north Thailand) with **Chayan  
Vaddhanaphut**, Chiang Mai University (Thailand)

*Water Rituals and Conflicts: managing a scarce resource in the Pacific Islands*

**Milika Naqasima-Sobey**, University of the South Pacific (Fiji)

*A History of Water Resource Access in the Kalahari: San perspectives on the role of  
modern technology in dispossession and poverty*

**Joram Useb**, Assistant to the Co-ordinator, Working Group of Indigenous  
Minorities in Southern Africa (Namibia) with **Cornelis VanderPost**, Kuru  
Development Trust (Botswana)

Discussion Period

PART II - 16:30 to 18:00  
ROUND TABLE

**IMPACTS OF WATER DEVELOPMENT PROJECTS ON  
INDIGENOUS COMMUNITIES AND ENVIRONMENTS**

Chaired by **Judith Mbula Bahemuka**, Sociologist  
University of Nairobi (Kenya)

*Indigenous Peoples and Large Scale Water Development*

**Joji Cariño**, Commissioner, World Commission on Dams (Philippines)

*Water, Livelihood and Dams: Experiences from Thailand*

**Chayan Vaddhanaphuti**, Chiang Mai University (Thailand)

*The Fate of a River: from social product to energy production (Cree Indians and  
Hydro-Québec)*

**Marie Roué**, Centre National de la Recherche Scientifique (France)

*Where waters once flowed... - The impacts of large scale coal mining on Hopi lands*

**Vernon Masayesva**, Coyote Clan of the Hopi, northern Arizona (USA)

Debate

PART III - 18:00 to 18:30

**CD-ROM PRESENTATION**

*Yapa - Ritual Art of the Central Desert: Water in Walpiri cosmology and society  
(Aboriginal people of Lajamanu, Australia)*

**Barbara Glowczewski-Barker**, Centre National de la Recherche Scientifique  
(France)

## Dreaming Water and Making Rain in Aboriginal Australia

**Tjama Freda Napanangka & Joan Nagomara, Great Sandy Desert, Australia**

Australia is the driest inhabited continent on earth. The bulk of the landmass is arid, offering extreme climatic conditions and little permanent surface water. While Aboriginal peoples occupy the entire continent, the desert populations, in particular, have made water and water sources a fundamental part of their culture.

Living in such an environment, Aboriginal people have elaborated a vast and intricate understanding of the physical features of their country, which also encompasses powerful spiritual and mythical components. Central to this is the *Tjukurrpa* or Dreamtime. This is a space-time where ancestors of all shapes and sizes, some human, some animal, travel the country and create the landscape through their actions. Some of these ancestors are beneficial, others brutal; some formed hills and stones as they moved, others continue to change form, leaving behind a legacy of particular foods or plants. These stories are usually part of a song line, which is the path of an ancestor or a group of people, whose journey can cover hundreds or even thousands of kilometres. By singing the country and the stories, Aboriginal people learn about these ancestors, their country and themselves.

Relationship to water sources is a key feature of all these stories or song lines. All water sources, whether permanent or intermittent, whether secret or public, were made by ancestors as they travelled and remain a living proof of their eternal presence. One may be the landing spot of the ancestral kingfisher, another the place where the ancestral dingos attacked an emu, and yet another, a place that a hunting man struck the ground with his spear. For these reasons, water is at the focus of countless secret/sacred sites. These locations may be accessible to all group members or reserved exclusively for men or women's law and ceremony business, or specifically for youth. The primary destinations for such cultural expressions are the creeks, waterholes (*mulytju* in the *Kukatja* dialect), soakwaters (*tjumu*), springs and wells (*paniya*) that are found throughout the desert, some of which are seasonal and others 'living water' (permanent springs inhabited by the life force of the ancestors).

This mythological aspect of water is layered densely with the many different levels of understanding of the environment that Aboriginal people possess. The stories are the people and are the place. People identify with story places as part of their being: *Tjukurrpa*. When Aboriginal people take up painting and other modern forms of cultural/artistic expression, they apply these new techniques to an age-old tradition of recording the water sources - the lifeblood of the desert.

*Tjama Freda Napanangka* was born around 1937 in the Great Sandy Desert (West Australia). Her mother was of the *Kukatja* tribe and her father of the *Ngardi*. As a young girl, she witnessed the first white settlers coming to this part of the country and the destruction they brought with them. Waterholes were fenced off, soakwaters degraded and traditional travel and ceremonial routes became unusable as cattle and white men (*khartiya*) overran the land. *Tjama* has vivid stories of Aboriginals being

*shot, and like most other desert Aboriginals, her family had little choice but to move to the comparative sanctuary of mission life. One of the major Law Women of Wirrimanu, Tjama is involved in all levels of women's ceremony and law, and also deferred to in many aspects of communal law. She is also heavily involved in the Kapululangu Women's Centre. She has become a prominent artist at the community-based Warlayirti Artists with an impressive list of exhibitions to her credit. She has contributed to several publications, including Yarttji: Six women's stories from the Great Sandy Desert, 1997 Aboriginal Studies Press, Canberra, which was short listed for the NSW Premier's History Awards in 1998.*

*Joan Nagomara was born in 1953 at Balgo Old Mission, where she attended the Catholic School before furthering her studies at the new community site of Wirrimanu. Her parents, Albert Nagomara and Rita Kunintji, were born in The Great Sandy Desert, and became adult before they had any regular contact with white people. They both began painting for the community-based art centre, and gained national reputations. Joan began painting in 1996, and has remained an active member of the Adult Education Centre in Wirrimanu and of the church. She does translation work for various community organisations and travels to the country of her parents and her youth, to hunt and maintain cultural links. Joan's works, as one of Warlayirti Artists' emerging painters, are attracting increasing attention.*

**"If you eat from the forest, you must protect it. If you drink water from the river, you must conserve it" - Water conservation and the Karen people of Thailand**

**Joni Odochao, Karen Village Headman, Thailand**

The Karen are an indigenous people of Northern Thailand. They maintain close ties with their natural milieu, and nature is both a spiritual dimension of their life and a source of livelihood. The Karen have their own cultural categories for water, which can be roughly translated into English as *hot water, warm water, spring water, cold water, plant water, rain water*, etc. They have knowledge of the specific purposes for which each of these categories of water should be used, not only for people, but also for animals. For water, in the Karen worldview, is not only for themselves but also to be shared with fish, turtles, birds, cattle and other animals. According to the Karen: *If you eat from the forest, you must protect it, and if you drink water from the river, you must conserve it.* Protecting forest and other natural resources and respecting the spirit of nature are means by water is protected and conserved.

Development has encroached upon the Karen way of life and their traditional uses of water. Development disrupts the ways of nature and brings water shortage. The Karen, animals and the forest have lost their access to water. Better watershed management based upon indigenous knowledge and indigenous peoples' participation can make an important contribution to water conservation.

*Joni Odochao was born in 1946 in a Karen village of Northern Thailand. He lost his parents at 7 years of age and learned how to farm from his elder sisters. At 17, he became Christian and he has been schooled through an adult education program. He is married to Reemoo, a Karen girl from a nearby village. They have 5 sons and 4 daughters. Elected as headman of his village, Joni has become much involved in*

*development activities. He believes strongly in Karen wisdom and uses it in his everyday life and in development.*

*Since the 1970s, many major changes have taken place in the highlands: several villages have become “modern”, many youth have migrated to the city, and forest communities have been trespassed by outsiders. These changes and the erosion of Karen culture have led Joni to think seriously about environment. He decided to become involved in a campaign to protect forest and wild animals in accordance with Christian and Karen beliefs, and to convince others about the value of forest and other natural resources. He also set up an alternative school in his village to teach Karen children to learn Karen wisdom. During the 1980s, Joni began to collaborate with NGOs who respect him for his vision on resource management and his leadership. He became actively involved in the campaign for community forest management and has served as an advisor and resource person for several NGOs as well as government agencies and universities. He also was instrumental in developing local curricula for hill tribe people's education emphasizing their own culture, so that hill tribe children would continue to understand and respect their own knowledge and ways.*

## **Water Rituals and Conflicts: managing a scarce resource in the Pacific Islands**

**Milika Naqasima-Sobey, University of South Pacific, Fiji**

Fiji is an island group in the south-western Pacific that comprises 844 high islands, cays and islets of which 106 are inhabited. There are a number of large rivers on the high islands, the deltaic plains that support agriculture. Indigenous Fijians make up 51% of the population and they use freshwater for a number of purposes. Water from streams and creeks, rainwater collected in rooftop catchments and groundwater from boreholes are used for drinking, bathing, cooking and cleaning. Water plays an important role in traditional ceremonies such as the installation of chiefs where the traditional drink, *yaqona*, is prepared using “fresh” water. There are also ritual bathing ceremonies that accompany installations, and water rituals associated with births and deaths. An example of the latter is the cleansing rituals of pallbearers. After washing in the river or sea, that area is placed off-limits to fishing for the duration of the mourning period which can be up to three months. In this manner, these ritual practices act as an indirect conservation measure allowing the replenishment of fish stocks.

While water is abundant on the high islands, it can be a scarce resource on many of the smaller islands in the Fijian Group. Many of the islands in the Yasawas and Lau Group depend on rainwater collected from rooftop catchments and stored in community or privately owned tanks. The inhabitants of one of the islands, Vanuavatu, conserve their scarce freshwater resources by bathing regularly in the sea and using traditional coconut oil to counter the effects of the saltwater. Another conservation measure on islands with limited water supplies is to drink coconut milk instead of water. To manage freshwater resources during periods of drought, groundwater, rather than stored rainwater, is used for washing. The importance of water in national development will also be discussed. In recent years, there have been a number of conflicts between traditional landowners and Government, or commercial enterprises. For example, landowners are battling to be compensated for land and water resources taken over by the Government's largest hydropower scheme.

Another contentious issue has been the site of water extraction being used by the country's main exporter of 'spring water' and the involvement of indigenous Fijians (landowners) in a rival company that aims to market the same product. There are large forest reserves on native land that have become sources of conflict between the Government, who wants them to be preserved as catchment areas and the native landowners, who want the land developed.

*Milika Naqasima-Sobey (University of the South Pacific, Fiji) has worked as a lecturer at the University of the South Pacific for the last 11 years and has also been actively involved with the Women & Fisheries Network, a regional NGO. Through her involvement with these organisations, she has worked with communities on projects ranging from the management of aquatic resources, to community workshops to raise awareness of environmental issues affecting freshwater resources. Ms. Naqasima-Sobey completed her Masters on the fishery of the freshwater clam, *Batissa violacea*, which provides the basis for the largest freshwater fishery in Fiji, one largely dominated by women. Over the past two years she has been increasingly involved in training villagers in coral reef and fisheries monitoring methods. She is currently involved in a project with traditional resource owners, which may lead to the establishment of Fiji's first legally recognised Marine Protected Area. Her work experience covers five Pacific Island countries: Fiji, Vanuatu, Solomon Islands, Tuvalu and Federated States of Micronesia.*

### **A History of Water Resource Access in the Kalahari: San perspectives on the role of modern technology in dispossession and poverty**

#### **Joram /Useb, Working Group of Indigenous Minorities of South Africa, Namibia**

Centuries ago the San (Bushman) were the only inhabitants of the semi-arid Kalahari area in southern Africa. They lived in family groups as hunter-gatherers on their territorial area termed N!ore. The size of a N!ore, based on available natural resources, is approximately 5000 to 30000 ha. The migrations of the San were linked to the seasons. The various San groups respected each other's territorial boundaries. However, they assisted each other by permitting visiting San to collect food in their area if it had become scarce in another N!ore. In accordance with San customary law it was considered a serious crime to collect food without permission from another group's N!ore. Water, being an essential resource for the San living in the harsh Kalahari environment, was never refused to anyone. The location of a San settlement within a N!ore was commonly next to a reliable water source. San moved only to other places when their water source was drying up.

**TRADITIONAL WATER SOURCES:** The San used various water sources and even invented a technology to pump water out of the ground. Sip-wells were places where San sucked water through the sand using straws. These places were often situated north of salt pans, with a sand dune at their southern end. To obtain water, the San shovelled the upper layer of the whitish sand to the side. They prepared a hole with their digging stick into which they inserted a straw cut from the Kalanchoe plant, with grass filters attached to lower and upper ends. The sand around the straw was compacted and left for half an hour to accumulate moisture. By using their mouths to create a vacuum, the San sucked water out of the sand and then stored it in ostrich eggs, sealed and buried for later usage.

The San also knew of rare artesian springs that provided fresh water all year round. Rainwater, which collected in rocky depressions, was used but not appreciated as it was often greenish or had a brackish taste. Other sources were pan-like areas that store rainwater for 3 to 9 months. This water was generally only used during the cooler season when mosquitoes were decreasing and the danger of malaria limited. Melon fields in the Kalahari (Tsamma melon are 90% water) and water-bearing tubers were and still are collected by the San throughout the year. Trees, such as Marula and Manketti, have holes where rainwater and dew collect. The San sucked this water from the holes with straws.

DISPOSSESSION: Drastic change occurred when Bantu and European settlers invaded San territories with their livestock during the 17th C. Ironically, the San custom of sharing, thus assisting the new settlers to locate good pasture and water, led to their almost entire dispossession. The melons, the water-bearing tubers, edible berries, fruit and plants from the bush were eaten by livestock. Game was pushed out of the N!oresi or hunted with firearms. The San only realised the extent of this dispossession after the ever-increasing livestock had depleted water and food resources. Without these resources - the bases of their livelihood - the San were forced to work for the intruders who established a serf-master relationship.

The settlers also introduced new technologies such as boreholes. Pumping masses of water from deep in the ground, they became its owners. Subsequently, the sip-wells of the San dried up and soon after the San lost control of their ancestral land. The settler's concept of individual land ownership completely disempowered the San. Now they were forced to live on their ancestral land as servants dominated by others. Anthropologists also contributed to San dispossession. By terming the San "nomadic" they provided governments of the southern African region with easy justification for not allocating land or services to the San. Officials argued that San, roaming around from one place to the next, had no need for land and services.

Although dispossessed of our land, disempowered and marginalised, we are forming our own organisations. Governments begin to hear our voices. The government of South Africa has returned a substantial piece of land through their land restitution programme. The government of Namibia has granted a conservancy that allows the San to manage natural resources in their area. Only the government of Botswana continues moving people out of their N!oresi to make space for the tourism industry in the Central Kalahari Game Reserve. We will not give up. We will continue to unite and exchange our experiences with other indigenous people in Africa and from around the world, so that we can learn from each other.

*Joram /Useb is a member of the Hai//om community residing in Outjo, a small town near the Etosha National Park, once the Hai//om's ancestral land. Born in 1975, he obtained an International General Certificate of Secondary Education in 1996. Joram was a member of the Student Representative Council and a farm worker during this time. Since 1999 he has been appointed the assistant to the WIMSA co-ordinator. Joram /Useb is committed to assisting the Hai//om community, one of the San groups in Namibia, in settling problems in a democratic and transparent manner. [WIMSA (Working Group of Indigenous Minorities in Southern Africa) was established in 1996 at the request of the San in South Africa, Botswana, Namibia, Zambia and Zimbabwe. It provides a platform for communities to express their problems, needs*

*and concerns. WIMSA advocates and lobbies for San rights, facilitates information exchange among San communities and other concerned parties, and provides training and advice on tourism, integrated development projects and land tenure.]*

## **Indigenous Peoples and Large Scale Water Development Programmes**

**Joji Cariño, World Commission on Dams, Philippines**

This presentation goes beyond an examination of indigenous water use and visions towards a broad overview of indigenous encounters with large-scale water programmes: specifically the disproportionate negative impacts of large dams on indigenous communities in different parts of the world. Ancestral lands and common resources have been flooded and subsistence economies undermined; social and political institutions overwhelmed; cultural and sacred sites lost; women have suffered greatly; human rights abuses and conflicts have proliferated and many communities are now much worse off than before. What can be learned from these experiences? What are the values, principles and practices that need to be elaborated to redress the social and ecological imbalances at the root of the current water crisis? What can be learned from the survival cultures of indigenous peoples in order to move towards ecological and equitable approaches that promote water for life, people and the environment.

TRANSCENDING PARTICIPATION IN DEVELOPMENT: Stiefel and Wolfe contextualise "popular participation in development": "Development (is) a process of incorporation, with traditional group relationships and institutions gradually but inevitably being incorporated into new, modern and larger economic, social and cultural settings. In the course of this process, pre-existing livelihood arrangements, values and channels of representation (usually vertical) would break down. ... Participatory efforts could thus be viewed as "struggles over terms of incorporation". The problem is not that some are being included and others excluded. The problem is that poorer strata/groups are being incorporated - "included" - on highly unfavourable terms; they are being excluded from control over the decisions and regulative institutions that govern these processes.

Against all accusations of being "anti-development" and "backward-looking", the survival and revival of indigenous communities today reflect not only hard-fought struggles over terms of incorporation in development, but also the underlying assertion of respect for cultural diversity and indigenous modes of living and resource use which uphold respect and balance with human, natural and spiritual laws. Negotiations around large dams by indigenous communities highlight the need for dam developers to recognise pre-existing natural and community water and land uses, to respect indigenous rights and to negotiate prior informed consent of indigenous communities. Emerging international standards, national law and good corporate practice increasingly reflect these principles.

ECOLOGICAL FOOTPRINTS AND CULTURES OF SURVIVAL: Educational philosopher Bowers makes a case for ecological learning from non-modern cultures by contrasting cultures of progress and cultures of survival: "Cultures of progress envisage future expansion. They are forward-looking because they offer ever-larger hopes. A culture of survival sees the future as a sequence of repeated acts of survival. Each act pushes



the thread through the eye of the needle, and the thread is tradition.” Growing awareness of one’s ecological footprint, and of each society’s consumption of the earth’s resources increasingly makes us all survival societies. The notion of “sustainable development” emerging from the contemporary ecological crisis, begins to understand the wisdom of indigenous ways and the imperative for inclusion of indigenous peoples in a common survival strategy. Far from being cultures of the “past”, indigenous peoples as survival cultures par excellence are among the most promising contemporary examples of wise water use, and are willing partners for sustainable development.

*Joji Cariño (World Commission on Dams and Tebtebba Foundation, Indigenous Centre for International Policy, Research and Education) is an Ibaloi-Igorot from the Cordillera region of northern Philippines, and has worked as an educator, researcher and advocate for indigenous people's rights in the past 25 years. Her work on forests, dams and eco-cultural diversity has spanned the local to global arenas, from community-based organisations like the Cordillera Peoples Alliance and the International Alliance of Indigenous and Tribal Peoples of the Tropical Forests, to diverse areas of UN work with indigenous peoples. Her work on issues of large dams covers the Chic and Agno River basins in the Philippines, and more globally as Commissioner on the World Commission on Dams.*

## **Water, Livelihood and Dams: Experiences from Thailand**

### **Chayan Vaddhanaphuti, Chiang Mai University, Thailand**

Villagers living along the Mun River, one of the largest tributaries of the Mekong River, have long been dependent upon fishing and fish trading due to an abundance of fish migrating upstream. The ecology of the Mun River consisted of rapids, shallow and deep channels, crevices and fresh water wetlands providing fish habitats and spawning areas. Villagers’ livelihoods were heavily dependent upon fish and the environment. A large hydropower dam built in 1989 blocked the migration of fish to spawning grounds upstream and the impoundment of the large reservoir above the dam completely destroyed fish habitats and spawning grounds. Besides the resettlement of thousands of villagers, the Pak Mun dam drastically changed the villagers’ way-of-life. Villagers have protested against the dam not only because their lives have been disrupted, but also because their environment has been drastically altered. The voices of these people, affected by “development”, have not been heard by the government or by the World Bank.

*Chayan Vaddhanaphuti was born in 1943 in Chiang Mai Province, Thailand. He was educated in a secondary school in Chiang Mai, and later went to study in Bangkok for his Bachelor and Masters degrees. He joined Chiang Mai University in 1971 where he has taught course in development, research methodology, resource management and politics of ethnic minorities. He served as director of the Social Research Institute at Chiang Mai University for 8 years. During his directorship at SRI, he coordinated a research project on “Community Forest Management” and directed several research projects, such as ethnic minorities and development, HIV/AIDS prevention and care. He has worked closely with NGOs and now serves as chairman of the Northern Development Foundation, an umbrella NGO in Northern Thailand that aims to support and strengthen people organizations in resource management. He also worked as a consultant for UNDP’s Highland People’s*

*Development Program in Cambodia where he helped formulate policies for highland people development and ethnic rights. Recently he has investigated the social aspects of Pak Mun Dam, one of the largest in Thailand.*

### **The Fate of a River: from social product to energy production (Cree Indians and Hydro-Québec)**

**Marie Roué, Centre National de la Recherche Scientifique, France**

Since the 1970s, the La Grande River (James Bay territory, subarctic Canada) has been at the heart of conflicts between the Cree Indians of Chisasibi Nation and the Quebec State. When Premier Bourassa announced his "project of the century"- a series of hydroelectric megaprojects throughout the La Grande drainage basin - he encountered strong opposition from the Cree and the Inuit. After much struggle and negotiation, a "treaty" was signed in 1975 between the State, the developers and the indigenous populations. In this presentation, the environmental and social impacts of large-scale hydroelectric development will be discussed, and we will examine the opposition between two worldviews, two relationships with nature, that have confronted each other over the destiny of a river.

The hunting, fishing and trapping bands of the James Bay Cree are so intimately tied to the drainage basins that the rivers themselves serve to define and designate the social group. "Those of Chisasibi" are the people who for generations have sought their livelihood along the *Chisa-sippi* or 'big river', in the Cree language. But today, the Chisasibi Cree find the water from their taps distasteful and disgusting, and this despite the installation of an ultra-modern water treatment plant. They recall times when the river's waters were so pure that they were renowned throughout the region: their virtues were praised by visiting Cree, as if they were spring waters. After coming together to trade furs at the mouth of the river in summer, the Cree returned inland in the fall via the corridors of travel provided by the river, its many tributaries and myriad of lakes, to arrive at their winter trapping territories. The waters of the La Grande River, whether flowing freely in summer or frozen over in winter, constitute the travel routes *par excellence* of the Cree - "our highways" as they say today. The numerous species of fish that inhabit the river and lakes represent a central component of their diet. While fishing techniques varied with the season, the catch was always plentiful. Fishing provided stable year-round nourishment in this sub-arctic ecosystem where most animal populations fluctuate seasonally and cycle over multi-year periods. And the late summer gatherings of Cree families, fishing at the First Rapids, provided through the networks of cooperation, sharing and giving, an exceptional moment of social cohesion and well being.

But this same place, the First Rapids, was also coveted by the engineers of Hydro-Quebec. Where the Cree saw a traditional site for coming together and feasting, one abounding with anadromous fish, the engineers saw a place where the river dropped precipitously, where large volumes of water flowed, and an ideal site to turn turbines and generate electrical power. In the preface to Bourassa's book "Power from the North", former US Defence Secretary James Schlesinger reveals his utilitarian vision of water. In his view, rivers are an "unutilized and renewable resource". Bourassa expresses sincere regrets to see rivers running freely into the sea instead of producing:

"Every day millions of potential kilowatt-hours flow downhill and out to sea. What a waste!"

These are the two diametrically opposed visions of nature, and of the relationship between humans and nature, to be explored in this presentation.

*Marie Roué is an anthropologist at the National Centre of Scientific Research (CNRS-France). Her research has taken her first among the Sami, reindeer herders of northern Norway and then to northern Quebec (Canada) among the Inuit and the Cree Indians of James Bay. She is currently the director of an interdisciplinary research team at the National Museum of Natural History, which focuses on the relationships between societies and nature.*

### **Where waters once flowed...**

#### **The impacts of large scale coal mining on Hopi and Navajo lands**

##### **Vernon Masayesva, Coyote Clan of the Hopi, United States of America**

Since 1970 the Peabody Coal Company has been withdrawing an average of 4,000 acre feet of water annually from the Navajo or N aquifer in Northern Arizona for the purpose of operating a coal slurry line. The slurry line carries coal mined at the Black Mesa strip mine (the largest in the U.S.) 273 miles to the 1,580 megawatt coal-fired Mohave Generating Station in Laughlin, Nevada. According to the United States Geological Survey (USGS) the N aquifer is a pristine source of primarily ice age (10,000 to 35,000 year old) water that underlies Hopi and Navajo lands. For centuries, the aquifer has served as the primary drinking water source for both tribes and, until recently, has provided a steady, year-round flow of water to springs located on the reservations.

According to people who know the land, these springs are now drying up, possibly because the annual rate of aquifer withdrawal exceeds the rate of natural recharge. The USGS has estimated that the natural recharge rate for the confined N aquifer is 2,500-3,500 acre feet per year. Since Peabody began pumping water from the aquifer, water levels in wells that provide drinking water for the Hopi and Navajo communities have also dropped dramatically. Hopi hydrologists have warned that these wells could run dry within the next century. And for the Hopi and the Navajo, "water is the source of the life."

The Peabody coal slurry line is the only one in existence in the U.S., as slurry lines are generally considered a non-economical means to transport coal. In fact, the slurry line was built in part as an experiment to test equipment intended to be used in other countries like China and Russia. The Peabody slurry line bases its economic viability on the ability of the company to obtain water at a price well below its true market value. When the original water lease was signed in 1966, the Hopi payment was only \$1.67 per acre foot. No one at the time thought that water pumping for the purpose of supplying the slurry line would reach the present-day level of 4,000 acre feet per year.

In 1998, Peabody paid the Hopi and the Navajo tribes a total of \$3.78 million in royalties for the use of 4,032 acre feet of water or 1.3 billion gallons. \$ 3.78 million for 4,032 acre feet of water amounts to 3 mills (\$0.003) per gallon or 30¢ per 100

gallons. Yet if sold into the marketplace at the current average Bottled Water Industry wholesale bottled water price of \$1.30 per gallon (retail price is \$5 per gallon), this same amount of water would be worth \$1.7 billion.

According to Hopi hydrologists, the present rate of N aquifer withdrawals by industrial, municipal, and domestic users cannot sustain tribal communities in the Black Mesa region. A solution is urgently needed to help Navajo and Hopi People reduce the extraction of pristine waters below natural recharge levels without jeopardizing the economic benefits of the mining operations.

***Vernon Masayesva** was born in the Third Mesa village of Hotevilla, deep in the Hopi homeland. Born into the Coyote Clan, one of Masayesva's responsibilities is to serve as a protector of Hopi land, water and people. Masayesva, 58, walks the Middle Ground between Hopi and Euro-American societies. Fluent in Hopi language and culture, Masayesva is also a consummate advocate for ecological and human rights. He studied political science for his Bachelors degree and received his Masters in education administration from Central Michigan University. Upon his return to Hopiland, he headed the first Hopi-run contract school. He was elected to the Hopi Tribal Council and served as Chairman and head of the Hopi Tribe from 1989-1993, becoming deeply involved with the defense of water and fossil aquifer. Masayesva was selected for Outside Magazine's Environmental Honor Roll as a result of his defense of Black Mesa water and his legislative work to protect burial sites in Arizona, and was declared an "Environmental Hero" by the Grand Canyon Trust.*