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Editor

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CHAPTER 5

Ava: A Living Tradition of Reverence for Water Among the Zoroastrians

Shernaz Cama

> Water is probably the only natural resource to touch all aspects of civilization from agricultural and industrial development to the cultural and religious values embedded in society (…). The need and demand for water (…) has been a driving force of social, economic and cultural development throughout human society. (Koichiro Matsuura, Former Director General of UNESCO 2003)

The west coast of India links together several cultures, spreading across the Indian Ocean and the Persian Gulf. The areas surrounding these water bodies were linked by trade, culture and oral practices across millennia. In Western India, the people of Gujarat have used their acumen in trade to replicate some of the best practices and crafts of this region and the world. The sea has been the source of riches—material, intellectual and spiritual, creating an intercultural amalgam along the coast of Western India. Knowledge transfers happen at different times and under different circumstances. Here, one such transfer and amalgamation is the

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reverence for water in the Indo-Iranian tradition. Ava, in the Zoroastrian tradition, is similar to various Hindu goddesses. Ava continues to be revered, particularly in the Bharuch region of Gujarat, and brings from Zoroastrianism both practice and precept, which can be studied as a special case of the traditional Indian conservation of water.

Water in Zoroastrianism

Ardvi Sura Anahita, a popular Zoroastrian *Yazata* or deity, is celebrated as the goddess of waters in the "Ava (or Aban) Yasht" ("Hymn to the Waters"), one of the longest of the Avestan hymns. Her full name signifies that she is powerful and immaculate. She represents in Zoroastrian cosmology the heavenly spring from which all waters on the earth flow. Her source is on top the mythical mountain, Hukairya, in the celestial region, and her descent from the heavens can be compared to the descent of the river Ganga in Hindu cosmology.

> Strong and bright, tall and beautiful of form who sends down by day and by night a flow and motherly waters as large as the whole of the water that run along the earth (…). (Darmesteter 1980, vol. 23, p. 57)

In the allegory, Ava, is believed to give strength and swift horses to men, and knowledge to priests and teachers, while women are under her special care:

> The maids of barren womb, longing for a lord, will beg of Thee a strong husband;
> Women, at the point of bringing forth, will beg of Thee a good delivery. (Darmesteter1980, Verse 87, p. 74).

Clothed in the garments of beavers, Ava is represented wearing gold earrings and a gold necklace around her neck, while her head is encircled with a gold crown shimmering with a hundred stars. Her white arms support a golden mantle, her shoes are golden and she drives a chariot of four white horses "the wind, the rain, the cloud, and the sleet" (Darmesteter 1980, Verse 83, pp. 69–83). The pomegranate of Anahita figures in Zoroastrian sculpture, art and ritual; it reflects Ava's fruitfulness, health and immortality.

While Zoroastrianism is generally associated with fire, it is essential to realize that without cleansing water, there can be no fires of purification.

The Zoroastrian tenet of *Asha* or harmony celebrates the sacred nature of all creation including Fire, Water, Earth, Air, Plant, Animal and Man. The tangible and intangible environmental traditions of the Zoroastrians strive to inculcate a sense of responsibility towards all aspects of nature. This concern and reverence through rituals and oral traditions have become, across millennia, an integral part of Zoroastrian daily life and practice.

In the *Bundahishn*, the Pahlavi text of Creation, each day is dedicated to an angel, symbolized in the material world by a flower. Ava Yazad, the deity of water, is depicted in a Parsi *kor* or sari border by the water lily, her representative flower (Cama 2016, p. 281) (Fig. 5.1).

Historically, Anahita, later known as Ava Yazad, became a patron goddess of the Sasanians. At Naqsh-i-Rustam, a Sasanid necropolis, King Narseh (293–302 AD) attributes his elevation to the will of "Ahura Mazda and all the Yazads and Anahid, who is called the Lady." His investiture, carved at Naqsh-i-Rustam, proclaims his devotion to Anahita, showing himself as receiving the diadem of rule from her, a crowned and amply robed figure (Boyce 1979, p. 116).

Fig. 5.1 Ava Yazad, the angel of water depicted in a Parsi *kor*, or textile border, with the water lily, her representative flower. Archives of Parzor Foundation

The contribution of the ancient Zoroastrian people to world thought, ecology, symbolism and craft is largely unknown. It was not always so, for the Persian Empire was the largest empire of Western Asia during antiquity. The Persian Empire shared boundaries with Egypt, Greece and later, Rome, on the Western frontier, while Indians were neighbours in the East, as were various Central Asian tribes on the steppes. The Chinese also became neighbours as the Persian Empire spread. The Indian and Iranian links are particularly strong, leading Prof. Lokesh Chandra to refer to them as "Cousin Cultures" (Lokesh Chandra 2000, pp. 12–17).

The Iranian plateau, with mountains running north-west to south-east, was essentially a cold desert. However, it was a region of contrasts; wherever water was available, this dry region would yield abundantly. Walnut and pistachio trees; and valleys with figs, pomegranates, oranges, lemons and mulberries flourished when Ava bestowed her blessings. Therefore, the inhabitants of the Iranian plateau were aware since early historic times about the beneficence of the element of water, and developed a wide network of artificial irrigation through canals and the systems, which later became the *qanat* or *karez* (Ghirshman 1978, pp. 94–96). This Persian method of making arid salt deserts fertile and green is recorded by Polybius (*Historia X. 28*), and later spread with the Persian Empire across the Middle East and into greater India, in the mountains of Baluchistan (Cama 2016, pp. 19–21).

According to tradition, the Achaemenid King Darius, like Cyrus the Great, took a personal interest in horticulture and arboriculture. He is recorded as praising his satrap Gadatas for transplanting eastern plants and trees:

> I commend your plan for improving my country by the transplantation of fruit trees from…the furtherest parts of Asia.

In Damascus, Darius planted vines to permanently supply grapes for products enjoyed at court, introduced the first pistachios in Aleppo, imported sesame into Egypt and rice of high quality into Mesopotamia (Ghirshman 1978, pp. 182–204). Millennia later, Vita Sackville-West, fascinated by the gardens of Persia, praised them: "The Persian gardener (…) in many cases, a *Guebre*, a representative of the ancient Zoroastrian religion" (Vita Sackville-West. "Persian Gardens" in Arberry 1963, p. 281).

The *Vendidad* text echoes this spirit of improving both life and creation, which fits into the humanistic practices of the Zoroastrian faith; a need to engage in welfare for the general good:

> He who sows corn, sows righteousness. (*Vendidad III: 31*) (Darmesteter Part I 1980, p. 29)

Cleansing with pure water is essential in both Zoroastrian rituals and life. The *padyab-kusti* is a ritual purification before any prayer or before entering the Fire Temple. Well water, from the *Agiary* well, though now more often tap water, is used to wash the hands and face before untying and retying the *kusti* or sacred thread in this little ritual of purification. A *nahn* or purifying bath is essential before all ceremonies, for instance, the *Navjote* or initiation into the religion, a wedding, or cleansing rituals including the one performed forty days after childbirth. The final *nahn* is the bath given to the corpse of a Zoroastrian person by her/his family members just before the funeral rites.

Ethics and rituals mingle in the core Zoroastrian ceremony of the *yasna*, or act of worship, having similarities with the Vedic *yagna*. The *yasna* ceremony today is rapidly disappearing. Once performed every morning in the great *Atash Behrams* or Temples of the Highest Grade, it is totally lost in Iran, and few priests in India remain with either the knowledge or the rigour for the performance of this long ritual. At the heart of this act of worship is the need to strengthen each new day in our world of *Asha*, against the counter principle of *druj* (disorder, pollution and evil). Its intention is evidently to remind man of his duty of protecting and nurturing the harmony of this world of Ahura Mazda (Lord of Wisdom).

All the seven creations are represented in the *yasna* ceremony. The only objects of veneration are natural things; as the priests pray at dawn, they draw water from the temple well, enact the long ceremony with it, and in its presence "awaken" the fire of mental and physical illumination. By doing this, they cleanse and drive away the negatives of darkness and ignorance. While reciting the *has*' or seventy-two chapters of the *Yasna* text, they evoke the whole story of creation and sanctify the living creations before them in a *temenos* or sacred space (Fig. 5.2a, b).

Goat's milk, a strip of the date palm, twigs from the pomegranate tree, *darun* or flat unleavened bread and *haoma* or ephedra are used

Fig. 5.2 The *yasna* ceremony of consecration. Parzor Archives

during the *yasna*. At the end of a complex ritual of uniting all these aspects of nature and energizing them comes *ab-zohr* or the praise of water. Now consecrated, the water is carried back to its source, the temple well, in the light of the new day. As the priest prays and pours the water back into the well, he is giving back to nature its own element in an energized form. The final part of ceremony thus strengthens the source of life. This is a way of reminding men of their duty to keep water sources pure and strong, while it also symbolizes that man's duty is to keep the mind—the source of all actions, equally pure and strong (Cama 2002).

So, Zoroastrians treat water not just as a life-giving entity, but as a living element. Water is protected by the Amesha Spenta Haurvatat, an angel associated with health and prosperity. Flowers and sweets are offered to water on *Ava Mahino*, *Ava Roj*, the birthday of water. One of the festivals still regularly observed in India, the Avanu Parab, is celebrated by lay Parsis who go to a water body near them—the sea, river or a well in the temple grounds. The temple grounds are decorated for this occasion with flowers and *rangoli* patterns made with chalk and lime, often depicting fish. Often a *ses* or ritual tray is prepared with a lit *divo* or *afargan*, (fire censer) a coconut, sugar crystals, rice, flowers and a pastry made with sweetened lentils called *dal-ni-pori*. After reciting their *kusti* prayers and the "Ava Niyayesh" or Hymn to Water, the coconut is broken, and its milk, the flowers and a few pieces of the sweet are offered to

Ava Yazad. Parsis may collect some of the water to carry home and splash on the thresholds of their rooms to protect and bring well-being to the home and its inhabitants (Jenny Rose in Stausberg and Vevania 2015, pp. 388–389). The Ava Yazad prayer is also recited by women to enable and sustain a pregnancy, have an easy delivery and a healthy baby.

It is a sin to pollute water sources or even disturb water at night when it is asleep. Water is associated with joy. The festival of Tirgan, dedicated to the rain and popular in Iran, is celebrated during the thirteenth day of the month of Tir (early July of the Gregorian calendar), in the heat of summer (Fig. 5.3). Various games are played with water and it is sprinkled in homes and on the occupants. The use of water to celebrate *Tirgan* is accompanied by a custom of tying thin silken threads of the seven colours of the rainbow on the wrists of all women and children, particularly in the Yazd region of Zoroastrian Iran. These bracelets called "Tir-O-Baad" or Rainbow Bands are named after Tir, the deity of rain, and Govad, the deity of wind. They are worn for ten days and then discarded on the day devoted to Govad, when they are tossed into the air

Fig. 5.3 *Tir-O-Baad* or Rainbow bands. Parzor Archives

for the wind to carry them away. Mobed Niknam records that the following song accompanies this action:

> Tir! You go away! Let the wind come!
> Sorrow, go away! Happiness, come in!
> Sufferings, leave! Sustenance come!
> The bunch of pearls comes! (Niknam 2000, p. 42)

After Emperor Akbar was inspired by the High Priest of Navsari, Dastur Meherji Rana, the festival of Tirgan was established as a feast day at the Mughal court, and referred to as the "Eyd-e-Golabi" or Festival of Rosewater. A Mughal era painting depicts Emperor Jehangir (1605–1627) participating in this festival, also known at the court as The Spraying of Water (Niknam 2000, p. 384).

The Zoroastrian Calendar with its rites and rituals thus stresses environmental awareness, teaching a reverence, care and compassion for earth and its surroundings. Pilgrimages in the desert of Yazd conduct the pilgrim to Pirs, shrines with springs of pure fresh water, often associated with "The Lady." These include the shrines of Pir-e-Banu Pars and Pir-e-Sabz or Chak Chak. According to Mary Boyce, these were shrines to Anahita, which were adapted by the Yazdi Zoroastrians after times of persecution as legends of these holy places (Boyce 1975, pp. 250–251). These are popular stories of the fugitive princesses, the daughters of Yazdegird III, who were protected by the mountains as they escaped from their Arab persecutors.

These shrines in a dry desert have perennial water flowing from springs, creating little pools. Pir-e-Sabz, now the most popular of pilgrimage sites, is a dramatically beautiful sanctuary where, on a dry mountain, a pool of water is fed by a spring that flows, seemingly miraculously, out of the bare cliff (Fig. 5.4). This shrine may well have been dedicated to "Anahid of the Waters," but is now dedicated to the youngest of the Persian princesses, Nikbanu, who is believed to have been absorbed into the rock like her elder sister, Banu Pars. The maidenhead fern is said to be her hair, and the huge tree that shades the sacred rock is said to have grown from the stick she used during her escape.

Zoroastrianism is a "religion of action," and to make the *Spenta* or bountiful earth fruitful and happy, both the practical and mystical are combined in the water harvesting systems used in the Middle East as well as in those that spread to India through Zoroastrian migrations.

Fig. 5.4 Pir-e-Chak Chak also called Pir-e-Sabz. Parzor Archives

The Iranian plateau, as stated earlier, is very poorly watered and dependent on the snow melting in the mountain ranges. From the time of the Achaemenians onwards, this scarce water was brought to the towns and villages by an ingenious system of underground tunnels called *qanat*. Their rounded openings, which gave access to the main line for purposes of cleaning and ventilation, were a familiar feature in the Iranian landscape.

There, wherever the *qanat* made water available, lush greenery and trees, nourished by this water were shown up against the brown of the desert. The *shamal* or hot northerly winds can blow at gale force, yet through the ingenious combination of water bodies and *badgirs* or wind catchers, Zoroastrians, not only made the hot desert cool and habitable, but also created beautiful Persian gardens.

Skilled workmen would dig the underground *qanat* at a slight gradient to permit the water to flow long distances. *Ab Anbars* or water tanks were interspersed at regular intervals along the path. Those who dug the canals and the water storage areas were regarded as the true heroes of the community. The High Priest of Iran, Mobed-e-Mobedyan Firouzgary, recalled recently in an interview how the Dastooran Mohalle of Yazd has followed a long-established lifestyle. One of his earliest memories of childhood was helping the family in fetching water from an eighty-step, deep underground neighbourhood *qanat* (Vanshika Singh in Cama 2016, pp. 242–243).

The earliest evidence of irrigation in Baluchistan goes back to the beginning of the third millennium BC when farming communities impounded rainwater to use in their fields. These structures are known even today as *gabarbands*. There were also *gobrikarez*, underground water channels, which provided abundant water supply, and are also ascribed to the Zoroastrians. The Zoroastrian links with Central Asia can be seen in the word *Gubere* itself (Boyce 1979, p. 147). Anil Agarwal has recorded the *gabarbands* in *Dying Wisdom*, his seminal book on traditional water harvesting. These *gabarbands* were probably built by Zoroastrians after the Achaemenid emperor Darius (550–486 BCE) annexed Sind and Punjab in 526 BC (Boyce 1979, p. 21).

The rapid growth of population in Asia has encroached upon all resources—air, water, flora and fauna, each one essential to maintain the environment in a holistic balance. The lack of water and the loss of traditional water harvesting systems has led to an alarming drop in water supply. Today, the world is facing a water shortage of global magnitude,

and attempts are being made to literally "turn the tide." Since 2012, the International Union for Conservation of Nature (IUCN), has been working in Baluchistan to revive the traditional Iranian *karez* system. These are underground galleries for water supply.

Used for over 2000 years in Iran and for many centuries in Afghanistan and Middle East, karez and qanats improved community life enormously. Till a hundred years ago, fruit trees and crops accompanied a relatively thick vegetation and forest cover in this region. This had been made possible by the ancient water technology of Iran. Replaced by modern means such as diesel or electric tube wells, the *karezes* were being abandoned by rural communities. IUCN identified two causes of abandonment—environmental abandonment and cultural abandonment. The first refers to biophysical causes such as earthquakes, falling water tables and silting up of tunnels. The cultural abandonment occurred when routine and laborious maintenance was ignored due to newer technologies and socio-political changes in land use (*Turning the Tide* 2012, pp. 3–6). With the abandonment of the *karez*, a large proportion of local knowledge was rapidly being lost. The IUCN realized that the *karez* was not just an engineering wonder, but a remarkable social phenomenon.

Even today, the methods of creating these systems follow the Iranian model. The *karez* is dug by two diggers called *muqanni*. They dig a vertical shaft and load the soil into buckets, which are pulled to the surface by a windlass. Guide shafts are dug at regular intervals and the tunnel is lined with reinforcing stone. Gases and air low in oxygen are hazards—the diggers watch their oil lamps for warning signals. The ventilation shafts are shielded at the top with walls and hoods.

Recent excavations and written records clearly show that the Persian plateau was the birthplace of this system. As early as the seventh century BC, the Assyrian King Sargon II had reported that during a campaign in Persia, he had found an underground system for tapping water. His son, Sennacherib, used this "secret" to build an irrigation system around Nineveh, and constructed a *qanat* on the Persian model to supply water to the city of Arbela.

Egyptian inscriptions disclose that the Persians taught this system of irrigation after Darius I conquered that country in 518 BC. Scylax, a Captian in Darius's navy, built a *qanat* that brought water to Karg from the Nile river, a hundred miles away. It is believed that this contribution, remnants of which are still in operation, may have been partly

responsible for the Egyptians friendliness to their conqueror and their bestowal of the title "Pharaoh" on Darius (*Turning the Tide* 2012, p. 3) (Fig. 5.5).

All the arid regions conquered physically or culturally by ancient Persia adopted the technology of the *qanat* using the generic name "Persian works." By tapping deep groundwater, settlements were able to survive in arid regions. In Baluchistan until 1970, about 3000 such systems were in use, and the agricultural economy was totally dependent upon the supply of *karez* water. Vitruvius, the first systematic historian of technology, gave an account of the *qanat* system in technical detail in his work *De Architectura* (about 80 BC). Later, in the ninth century AD, at the request of a Persian Governor called Abdullah Ibne Tahir, a group of writers compiled *Kitab-e- Quniy*, a treatise on the subject (*Turning the Tide* 2012, pp. 5–6).

Fig. 5.5 Darius I (c. 550–486 BC), the Achaemenian Emperor, represented as an Egyptian Pharaoh. Parzor Archives

In Baluchistan, a *karez* being used is seen as social capital: groups work together to improve welfare. There is social cohesion, collective action and cooperation, and this promotes equitable access for all. There are laws governing the use of water, which, having existed for centuries, have been strengthened by tradition. All water-related disputes are solved within the framework of a Jirga or tribal institution.

The importance of the *karez* can be seen from this Balochi proverb: "A mosque should be demolished if it obstructs the course of karez" (*Turning the Tide* 2012, pp. 5–12).

Water Harvesting in India: The Bharuch Case Study

In India, water harvesting can be found in ancient texts and treatises on agriculture and architecture. Kautilya's *Arthasastra* tells us that a sovereign "should build irrigation systems with natural water sources or with water to be brought in from elsewhere" (Agarwal and Narain 1997, p. 11). The first dated proof of a dam and irrigation system in India dates to the Mauryan period. The Junagadh inscription of King Rudradaman makes a specific mention of a dam built by Pushyagupta, the Governor of Chandragupta Maurya (323–300 BC), and canals provided by someone called Tushaspha under Ashoka the Great (272–232 BC). The name "Tushaspha" suggests that he was a Zoroastrian. The structures studied were found throughout the north-western part of the subcontinent, with varying means of construction, all involving "immense skill in labour and engineering" (Agarwal and Narain 1997, pp. 20–21). Built of solid stone on slopes, they were proportioned in accordance with the gradient of the land. Their object was both to collect a layer of alluvial soil over dry and barren rock as well as control the distribution of water.

After the 1980s, tube wells put an end to communal management of water resources across Asia, *karezes* went dry due to the depletion of water and the system was on the verge of collapse. This was accompanied by a terrible drought, which affected 74% of the population, and as desertification increased, pasturelands and agriculture lands were degraded. From 2007 onwards, a concerted effort to bring back the *karez* system began. The water yield increased the farmland from 60 acres to 300 acres at one trial site and a number of communities began working with IUCN for the revival of their *karezes.* By 2012, these had resulted in new orchards and tremendous communal benefit (*Turning the Tide* 2012, pp. 14–18).

All traditional societies learnt to live with the environment. In India, water was an ephemeral resource. When the monsoon came, there was water and there was life; once the rains ended, however, the land became dry and life became difficult. Indians, over the centuries, developed a range of techniques to harvest every possible form of water, from rainwater to ground water and flood water. In Gujarat, the Thar desert extends over the Kachchh region and parts of Jamnagar, Mehsana, Ahmedabad, Rajkot and Junagadh districts. Water is a scarce commodity and traditionally, wells and tanks were the principal means of water harvesting in this region.

Step wells, known as *vav* or *vavadi* in Gujarat, are also called *baoli* or *bavadis* in Rajasthan. These were important historically and ritually, commanding a social and cultural presence. Women till today make offerings of coconut, grain and milk to the goddess in the Step well, while these were also used in the heat as a cool place for social gatherings. On trade routes, they provided resting places to travellers and caravans. Many of these are deserted or dirty today, while *kunds* or tanks are also almost completely lost or filled with rubble.

The Iranian and the Indians therefore already shared a level of devotion and care for water conservation and management when the Zoroastrians landed in Gujarat from the eighth century onwards. However, unlike the *qanat* or *karez* underground systems, the Parsis of southern Gujarat, particularly Bharuch, adapted to the Indian climate and learnt of the potential of rainwater harvesting after the monsoons. The Parsis following the original ideas of the *badgir* created a system of water harvesting for drinking purposes; they used special techniques of filtration, quality control and purity to check the rainwater through taste as well as smell, before permitting the start of collection of the rain into their *tanka* (or cistern) system.

There are intermittent filtration processes, including at the intake point in the pipe as well as the vent of the *tanka*. The filter used finally is made up of a copper colander. All the filters are overlaid with muslin cloth while potassium permanganate and other salts are used as disinfectants. A study of the Parsi *tanka*-s revealed that the inhabitants relied on these methods for drinking water throughout the year. Water samples from two *tanka*-s checked with WHO water quality standards found that the Parsi *tanka*-s provide drinking water within the WHO permissible limits (Development Alternatives Report 2001). This study also suggested further technical feasibility studies of the Parsi *tanka*-s and

their construction material, which might provide the answer to this water remaining potable for several years.

The *tanka*-s of Bharuch are found across social strata. In the small houses of the Parsi *vad* or housing cluster/urban area, these were constructed within and below the kitchen area, while in larger homes, there was a separate space for the *tanka* (Fig. 5.6). All the *tanka*-s Parzor has studied are very old structures, more than a hundred years in age. A perpetual shortage of water in Gujarat has inspired people to appreciate the value of conserving and storing this resource in all conceivable ways. Bharuch, with a population of 1,70,000 as per the Census of India, 2011, shows dependence on ground water for its survival. It exemplifies the small Indian town in many ways. The municipal water supply is just enough to cover basic needs of the people, at best. Long queues at public distribution sites indicate the shortages. Overdependence on well water has rendered many wells brackish and the water table has fallen sharply. In such a situation, the *tanka* is of great benefit.

The *tanka* is an underground tank, accommodated inside the house, usually under the kitchen or dining room. It is made of chiselled blocks of stone in lime mortar, unlined and made waterproof by an indigenous herbal mix. The ingredients used for the *khari* not only rendered the inside surface waterproof and sealed minor cracks, but also prevented bacteriological growth inside the *tanka*.

Essentially a form of rooftop rainwater harvesting, the *tanka* system was practised by the Parsis as almost a religious ritual, and stories are told of an obstinate Parsi from Jambusar village who died of thirst while travelling because he refused to drink anything but *tanka* water! The largest *tanka* found during Parzor surveys in Bharuch is located at Mr. Rohinton Jambusarwala's home "Gulshan." He adheres strictly to traditions handed down orally through generations to ensure the purity of the water he collects.

When the rains begin at the start of the monsoon, the first rains clean the rooftops. During the start of the monsoon season, several glasses of water, kept outdoors, are examined regularly for their purity. The day of the rainwater collection can be recognized through the smell and taste of the water in these glasses. At this exact point of time, the water is deemed suitable for collection. The sluices are then opened; the water, as stated, passes through several types of filters before it is allowed into the *tanka* below the house. Pipes lead from all parts of the roof to the final *boiya* or copper colander. This *boiya* is covered when the water is being

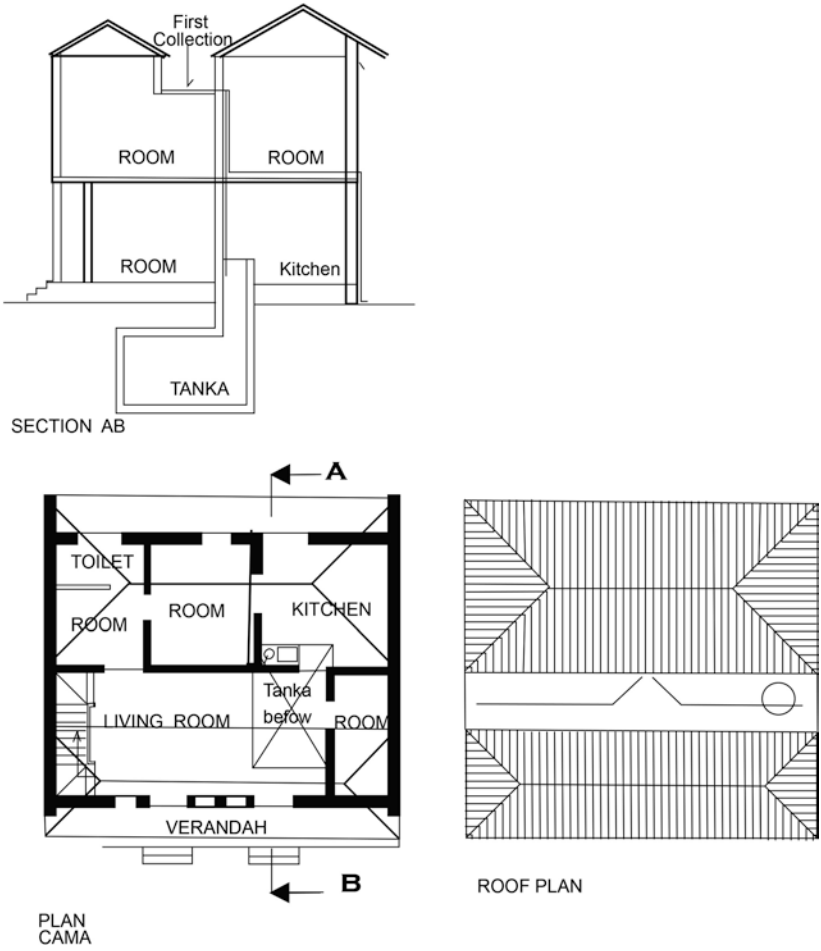

Fig. 5.6 Cut section and plan of the Cama House, Bharuch vad, depicting the position of the *tanka*. Drawing by Prof. Kavas Kapadia. Parzor Archives

collected, with layers of the same white muslin cloth used for making the *sudreh* or sacred shirt of the Zoroastrian (UNESCO Parzor Recordings 1999–2001).

The size of the *tanka*-s studied in Bharuch is large enough to store sufficient drinking water for a family for a period of six to eight months.

An average storing capacity of a *tanka* is around 25,000 litres. Some *tanka*-s are virtually like independent cellars, with 8–10 feet of filling over them. With sizes reaching nearly 20 feet by 60 feet and heights of 12 feet, arches and vaults were needed to support the earthwork and the superstructure on top of the *tanka*. Architecturally, the *tanka* withstands this huge volume of water because it is built using arches, recalling the fact that, thousands of years ago, the arch and the squinch originated in the ancient Persian Empire.

Since the bottom of the *tanka* is well below the lowest level of the house, there is no outlet provided; when it is required to be cleaned, it must be emptied manually. Almost all *tanka*-s are large enough for people to enter and walk about inside. The *tanka* floor slopes into a sump right under the point from where the water is drawn out. The *tanka* feeds on the rainwater collected through roof runoff. A simple system of collection, via a 3 inch to 4 inch pipe, depends on successive sumps whose water is collected and overflows on its way to the *tanka*. Settled impurities are flushed out through an overflow pipe.

In fact, the complete water runoff of the first couple of days of the rainy season is just made to run down the overflow pipe, ensuring a maximum cleaning of all surfaces in contact with the water. Once the owner is certain of the cleanliness of the rainwater, the overflow is plugged. This starts to direct the flow of the water into the *tanka*. The *tanka* has a hatch cover, which is kept closed except for the time when water is needed to be pulled out of the well—by a bucket on a pulley.

The water retention capacity of these *tanka*-s is measured in the form of a particular "danger level," indicated inside the *tanka* by the depiction of a sculptured "fish" along the inlet neck of the *tanka*. Filling the tank above this mark is considered dangerous as the hydraulic pressure inside may well exceed the retaining capacity of the tank wall.

The *tanka* is filled gradually till the "fish" mark and the water stored away, to be used long after the rains have stopped. The hygienic manner in which the water is collected and stored, the opening of the hatch to ensure ventilation in such a way that direct sunlight never enters the *tanka*, and judicious use of the water, are all ways to make the water last as long as possible, for it is a most precious resource, especially in the hot summer months. Most owners clean the *tanka* only once in five to ten years.

During collection, several prayers are recited to Ava Yazata, and it was believed that only Zoroastrians should work on the creation or

the cleaning of the *tanka*. However, in later years, other communities have participated in the creation and cleaning of the *tanka*-s. Parsis in Bharuch till today trust *tanka* water, and often will not drink water from other sources. Each evening, an oil lamp is lit outside the *tanka*, and prayers and flowers are offered to this precious water resource, which not only provides drinking water but also keeps the entire household cool during the hot summers.

Tanka-s in a *vadi* or mansion can be very big, and those in the Parsi *vad* or mohallas are usually smaller. Apart from providing drinking water, since the roof of the *tanka* creates the floor of the house, they keep the building cool throughout the year. The *tanka*-s, built without cement or concrete, have withstood devastating earthquakes in Gujarat for the past 300 years. Even when houses fell during the 1917 earthquake, *tanka*-s, full of enormous volumes of water, remained unaffected. If sunlight falls directly on the stored water, it is believed that the water can become contaminated. *Tanka*-s are therefore carefully planned to prevent any type of contamination. As stated, no direct sunlight is allowed into the *tanka*, and the well from which the water is drawn is vertical, while the storage space is horizontal to it (Fig. 5.7).

The *ghara* or container must be lowered very gently into the well; if it hits against the *tanka*, there is danger of it cracking. The last *tanka* to be built in Bharuch was over eighty years ago. A *tanka* is emptied only during the monsoons, yet the water remains pure and free of any harmful bacteria. When emptied, some water is stored in huge ceramic containers, because without the pressure of the water, there is a danger of the structure collapsing if the monsoons are delayed for more than fifteen days. When totally emptied, as mentioned earlier, a crystalline disinfectant and sealing agent, *khari*, is used to seal up any cracks in the structure. Hence the *tanka*-s, as part of the cultural heritage of the Zoroastrians, living in an area that has scanty rainfall, are an ecologically valuable system of water harvesting from which there is much to learn (Development Alternatives Report 2001).

The system survives today due to the sheer belief and tenacity of the few people who use it. It is disheartening to know that there are others in the town who consider the presence of the *tanka* in the house a nuisance, and would rather have it filled up or permanently closed off. In fact, new owners completely demolish old homes, including the *tanka*, and rebuild in the "modern Bombay-style" flats.

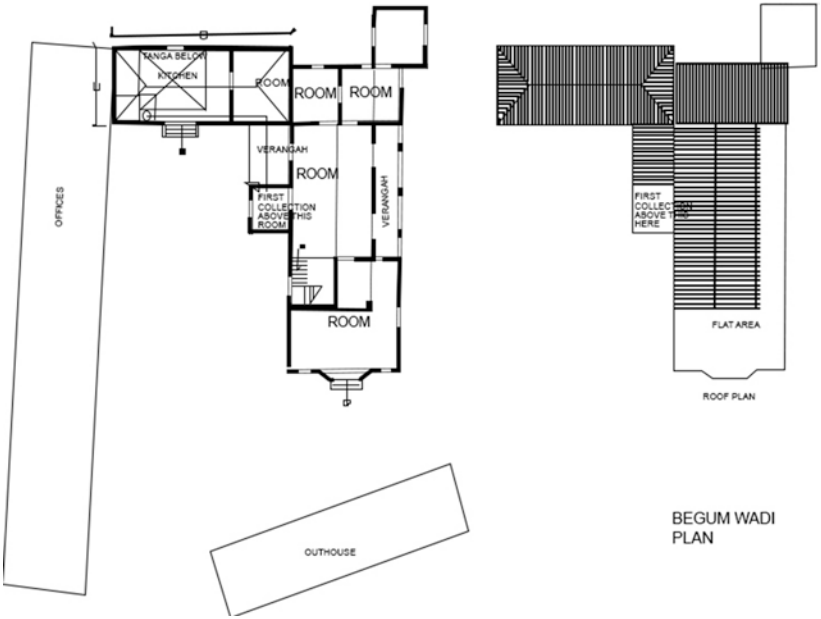

Fig. 5.7 Plan and roof view of the Begumvadi in Bharuch, depicting the position of the *tanka* and the rooftop water harvesting system. Drawing by Prof. Kavas Kapadia, Bharuch. Parzor Archives

This destructive attitude has taken a heavy toll on the social and cultural traditions, as well as this heritage. Historical buildings of heritage value lie unprotected and vandalized. Traditional water systems depended heavily on the coordinated operation of a society, that must today recognize and care for these traditional systems. In a world of global warming, water is becoming a source of great anxiety and conflict. The principle of water harvesting is to conserve and care for a precious natural resource, to recharge the ground and meet the needs of those who live on this *Spenta* (Bounteous Earth). This system ensures equity and justice not only to man but also to plants and animals—in fact, the whole living community. It relates to the micro-environment in an organic and holistic manner.

Modern water technologies, imported without due regard to local needs, have had an enormous impact initially, but have then thrown up serious problems within a century. A holistic balance for water management is needed today in all parts of the world.

Zoroastrians believe that to restore the world to its perfect stage, *Ahura Mazda*, the Creator, needs the help of all beneficent beings. The rituals of the Zoroastrian religion, some of which have survived from pre-history, are therefore concerned with the nurture and protection of all creation and the need to preserve it from destructive evil.

Asia, particularly India, needs water conservation today in every form, to support an ever-growing population and its thirst for water, may it be for drinking, for agricultural purpose or other types of development and improvement in standards of living. The area surrounding Gujarat has always supported valuable contributions, across land and ocean in varied fields. It has also supported across history, positive migrations both for trade and for shelter. The Zoroastrian refugees brought their cultural and religious concern for water to the western coast of India, contributing to a multicultural ethos, which took the best from every part and absorbed it into a new living culture. The tanka system, an offshoot of the Iranian *karez* contributed in the past, and continues to contribute today. Such multicultural sharing of oral traditions of an ancient society can therefore bring new perspectives and hopefully participate to the ecological understanding and the careful use of water resources in the future, not only in Gujarat but across India.

If ever an intervention was required to bring man and nature together again in our world, it is now. The message is very clear that issues of common concerns—issues such as water—will need to be tackled jointly by world governments and people at a global level.

As we have seen with the *karez* of Baluchistan, there are a few systems of water storage that can be rejuvenated. The efforts of Parzor, the project initiated by UNESCO to document and conserve the traditional practices and customs of Parsi Zoroastrians in India, and of *Darshak Itihas Nidhi* of Gujarat coming together, are important in this context. If traditional water harvesting systems can meet even part of the domestic and agricultural requirements, they will promote a judicious use of water, a concern once again for Ava, "The Living Goddess," who makes this world fertile, green and clean.

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