



The purpose of this quarterly digest brought out by the Centre for Ganga River Basin Management and Studies (cGanga) led by the Indian Institute of Technology Kanpur is to disseminate valuable traditional and scientific knowledge assimilated from national and international sources on various aspects of management of water and river restoration and conservation among concerned institutions and citizens.

SO THAT RIVERS MAY FLOW TILL ETERNITY...

In the previous issue of Pragyambu we had presented the analysis of various traditions associated with festivals and their impact on the environment. The present issue of Pragyambu is also centred on another such sensitive subject linked to our emotion, belief and tradition as well as to the environment and rivers. In this issue of Pragyambu, we shall discuss about funeral rites after people die. Obsequies are observed in different ways in different communities and different social groups or classes. In Hindu, Jain, Sikh and Buddhist religions dead bodies are consigned to flames for the final rites.

An essential for funeral rites is wood which comes from trees and forests. Now, population increase and deforestation are continuing unabated in our country. The traditional practices of funeral rites thus come under scrutiny. Since forests play important roles in rivers systems, the shrinkage of forests affect rivers too.

Rivers are life-giving, human interaction with rivers continues throughout life, and even after death the relationship between the physical human body and river remains for some time. This is the reason why this issue of Pragyambu focuses on the activities after death. Let us try to learn what is the effect of different funeral rites on our environment. Are some of these rites eco-friendly whereas others are harmful to the environment? Are modern techniques such as electric cremation completely environment-friendly? Let us look for answers to these questions based on scientific, factual and logical arguments.

Most people around the world, including India, perform the last rites of the dead body by combustion of the body. In several Asian countries, cremation is an integral component of religious tradition. Western countries have

adopted the practice of cremation in modern times because according to their tradition, the body should be buried after death. Considering various administrative, environmental and financial problems with burial in present circumstances, a large section of the population in western countries is adopting cremation. Among these followers of different religions in countries like United States, Britain, China, South Korea, Japan, Netherlands, France are opting for cremation (electric cremation) instead of burial of dead bodies. In the United States, approximately 60 percent people are opting for cremation over burial and this number could reach up to 80 percent by the year 2035. In most western countries, people decide in advance whether after death their funeral rites would be by burying their dead bodies, or cremation or some other available alternative.

In the Indian context, followers of Hinduism, Sikhism, Jainism and Buddhism practice funeral by cremation of the dead body. This method of last rites is centuries old and is deeply embedded in the sentiments of Indian people. The description of last rites and methods is found in the Rig Veda and this tradition is continuing since the Vedic era. All over India, an uniformity is seen in the rituals associated with the last rites.

In the last five decades, funeral rites have been a subject of discussion in India due to different reasons. Changes have been suggested to this tradition as well as some new alternatives have been provided to common people. However, even today most people prefer to bid final farewell to close relatives by cremation only. In traditional funerals (known as "mukti-dham" or Moksh-dham"), the dead body is placed on a pyre of logs and cowdung cakes in the midst of relatives, the pyre is lit,

and the body is offered to fire, thus bidding final farewell to the deceased. In India, this tradition of funeral is being followed for centuries.

There are two reasons behind this method of last rites being in discussion -- first, the smoke emanating during the funeral rites is considered responsible for air pollution. The second reason is the felling of trees in order to provide wood for the funeral. Due to these two reasons, environmentalists advocate a change in this practice. Another aspect associated with this traditional funeral method is its cost. The cost of these rites is high due to the usage of wood, due to which poor people are compelled to take financial help from others for these rites. On the other hand, some extremely poor people, being unable to observe proper funeral rites, simply discharge the body into sacred rivers.

In other countries in the world, in several other religions and cultures, there is a tradition of funeral by burial. Even this tradition of bidding the final farewell to the body is not completely eco-friendly. According to a research report published in the Sydney Morning Herald (Australia) burial has 10% more negative impact on the environment as compared to cremation. Some chemicals are also put around the body while burying it so that the body can decompose fast. These chemicals affect the groundwater. Methane gas is released during decomposition of body which has negative impact on the environment. Besides, if the person had died by some serious infection, then the burial of the infected body is not appropriate from the perspective of community health. This is the reason that in several countries during the global pandemic, relatives of people who had died from Covid infection were persuaded to cremate the dead bodies instead of burial. This was done

because the body decomposes faster when burnt and there is no possibility of any type of infection spreading in the surroundings.

In the Indian context, there have been many discussions on funeral rites and cremation, and in 1960 the first electric crematorium was started in Kolkata. After this, in several metropolitan cities the facility of electric cremation was made available to people. In Kolkata, which had already been under the influence of renaissance and reformist thinkers, people gradually started using this facility. A similar situation developed in Mumbai where people gradually adopted this facility. In Bangalore and Delhi also people have accepted it. Other than these cases, electric crematoriums could not gain public acceptance at other places in India. Under such circumstances, operation of these centres appeared expensive to the district administrations and these facilities started shutting down in several cities. Thus, these facilities started to shut down in several places due to operational problems at some places, at other places due to non-usage by people, and at yet other places because of pressure of high costs on the administration.

Electric cremation was once again in public discourse in India during the first and second waves of the pandemic. This time people accepted it because of social distancing norms, the predicament of not being able to keep the corpse at home or in mortuary and inability of relatives to attend the funeral rites. After the ending of pandemic, crematoriums in cities other than the megacities are empty again, and people are giving preference to funeral by traditional method.

WHY DIDN'T THE PUBLIC APPROVE?

One of the major reasons behind electric cremation not getting widespread public acceptance is the centuries-old belief and the rituals performed during the last rites, which are performed to ensure that the soul leaving the body proceeds towards heaven. In traditional cremation, after the deceased is placed on the pyre, she/he is lit by fire ("mukhagni") by a son, grandson or other close relative. It is not possible to perform this ritual in electric cremation. Apart from this, some rituals of last rites are also not possible to perform during electric cremation such as:

- Relatives also offer oblations to the pyre, which is not possible in electric cremation.
- Kapal Kriya is performed some time after offering "mukhagni", it is believed that

only after Kapal Kriya the soul leaves the body and moves forward, but this cannot be done in electric cremation. It is believed that only after Kapal Kriya, the memories of the previous birth are erased and the soul moves towards a new life.

- In traditional pyres, along with wood, cowdung cakes, camphor, ghee and incense are used. Because of these ingredients, acrid odour does not emanate during cremation. On the other hand, in the process of electric cremation, since no incense materials is used, foul smell is generated. Due to this, relatives of the deceased feel uncomfortable and the people of nearby settlements are also distressed by the smell.

OTHER CHALLENGES

There are other challenges in cremation with electricity. For example, if the deceased has a pacemaker (a small machine fitted in the heart) in the body, then it has to be removed before cremation because the burning of the pacemaker can cause the entire furnace to malfunction. America and other European countries are far ahead of India in terms of demographic data, where all information about the deceased becomes available quickly and on the other hand, in terms of medical facilities, the speed of work is faster in western countries, so it is easy to remove machine parts from the body of the deceased. If we compare this to India, the process of removing the machine from the dead body can prove to be slow and complicated, and it is also difficult to get the consent of relatives for surgery on the dead body.

CHALLENGES AND ENVIRONMENTAL CONCERNS FROM INDIAN PERSPECTIVE

There are several challenges in the large scale operation of electric crematoriums in the Indian context, such as:

CREMATION ON WOOD MADE OF COW DUNG

Under this option, with the help of a machine, the body is cremated on a pyre prepared from cow dung wood that closely resembles actual wood. Cow dung is in any case used in the process of cremation. With this method all the rituals of last rites can be completed, which is not possible in electric cremation. The question arises here: How will the raw material i.e. cow dung be supplied for the manufacture of this wood?

We all know that cow dung and its products are still an integral part of daily life and business in small villages and towns in our country, but this whole process is unorganized at local levels, if it is organized and planned properly, then this supply is possible, it will also help in solid waste management in many areas. On the other hand, promotion of livestock is included in the policy of many states, including Uttar Pradesh, which brightens the possibility of fulfilling this demand.

UNINTERRUPTED POWER SUPPLY

Electric cremation plants require continuous power supply. Even today, there are many villages and small towns in India where

Is Electric Cremation Completely Environment Friendly?

The above reasons explain why electric cremation could not become popular in India, but here we also have to investigate whether electric cremation is completely eco-friendly? In electric cremation, the furnace has to be preheated before starting the cremation process. During cremation, continuous electrical energy has to be provided at the rate of 300 kW per hour (300 kwh) for at least 75 minutes, only then complete combustion of the body can take place. This amount of energy cannot be said to be small in the Indian context.

In electric cremation, the body is incinerated at a temperature greater than 1200 degrees Fahrenheit. This method of cremation is very popular in the United States, and a variety of modern techniques and filters have been adopted to reduce pollution from cremation furnaces, but treating the carbon dioxide produced by combustion is still impossible. The electrical combustion of a body releases 534.6 pounds of carbon dioxide into the environment. At the moment we cannot compare it with the traditional pyre whose data is not available.

there are power cuts, so how will there be continuous power supply for 24 hours?

In case of any technical fault or if the power supply stops, then combustion of the body cannot be left incomplete. Therefore, most electric crematoriums currently operating have been provided with the facility of diesel powered generators. The burning of dead bodies with electricity generated by running diesel generators cannot be termed as environment friendly.

POLICY DECISIONS AND PLANS

“Mokshadham” or cremation grounds exist in every village, town and city as death is an integral part of our social life. It would take a long time and resources to build such a large number of electric crematoriums. What impact will all this construction work have on the environment? How will the land be acquired to set up this facility? What will happen to the trees, grass, bushes on that land? There are many questions whose answers are not found in the master plans of our cities or with urban governance bodies. If the option of electric cremation is to be adopted on a large scale in India, then the central and state governments will have to formulate a policy and develop these facilities in a planned manner, and this is a long process.

ELECTRICAL ENERGY GENERATION AND THE ENVIRONMENT

The biggest question is how will the amount of electrical energy required for the operation of so many crematoriums be supplied? In our country, hydroelectric energy supplies a major part of the electricity demand of the population. The process of generating electricity by damming rivers has many environmental challenges. Controversies and questions related to many dam projects still persist. The displacement caused by building big dams is a big problem in itself. If electricity is generated by burning coal and then the dead body is burnt with that electricity, then how appropriate it would be to call this type of burning environment-friendly is also a challenge.

MIDDLE PATH TO PROVIDE A SOLUTION

Funeral is an emotive social issue in which no change can be imposed on the general

public. In this matter, we have to find a middle path which is environment-friendly and gives a dignified final farewell to the dead human body, respecting the sentiments of the general public. Some of these options are described below:

The Funeral Pyre of the Altar – The followers of Arya Samaj perform the last rites on the funeral pyre. Broadly speaking, it can be said that the funeral pyre is given to a human being on the “havan kund” and an altar-like pyre is erected at a depth of about four feet below the ground. The use of wood in this method is very economical. It is being adopted by followers of Arya Samaj in many cities for years.

Improved Wood Cremation – In this method, a wooden pyre is decorated on a metal perforated sheet placed on a high platform and the last rites are completed. Air enters from the bottom of the pyre during combustion, so the process of combustion is completed faster. Also consumption of wood is 2 to 3 times less as compared to the traditional method. Therefore, the cost also comes down and it can also be termed appropriate for the environment. This method has been accepted by the public in Muktidhams of Gujarat and Uttar Pradesh.

THE PYRE WILL BE MADE BUT WOOD WILL BE SAVED

cGanga (Centre for Ganga Basin Management and Studies) under the Environment Technology Verification program has tried to introduce such a

technology for the funeral method, which is eco-friendly and religiously affordable while incorporating social traditions.

In this sequence, various methods developed by Green Revolution Foundation, New Delhi seem to resolutely present eco-friendly alternatives to the final rites. The options being made available to the general public by the said organization are as follows:

GAS BASED CREMATION

This organization has also provided the option of gas based cremation to the general public, in which there is no need of wood. If seen from the point of view of forest conservation, it appears to be an eco-friendly option. In the past, the National Green Tribunal, while issuing a directive to all states, had asked the states to increase their efforts in this direction, emphasizing on trying out eco-friendly methods of last rites.

ELECTRIC CREMATION

Green Revolution Foundation has removed the complexities of its operation by using new techniques of electric cremation. In the past, 100 kilowatts of electrical energy had to be provided continuously for the plants that were set up for electric cremation. This was the reason that the cost of their operation was very high. The newly developed plant requires only 80 kilowatts of electrical energy, which also does not have to be provided continuously for twenty-four hours. Its pre-heating (that is, heating the system before use)

SAME TRADITION, NEW METHOD

In this option, the last rites are performed on a wooden pyre as per tradition. After completion of all funeral rituals including Kapal Kriya, the body is automatically sent into a small roomy chamber attached to the pyre, actually the body is laid on a bed made of stainless steel. After completion of religious rituals, the body reaches the closed chamber along with the bed, where the combustion is completed. Various filters are installed in the closed chamber and air is blown into the closed chamber through blower pipes. On the other hand, the fine particles of smoke and ash released during combustion are released into the atmosphere after being treated in filters, so that the harmful gases and fine particles containing the smoke do not reach the atmosphere. Only 80 to 100 kg of wood is required to complete the cremation with this method whereas usually 300 to 400 kg of wood is required in traditional wood pyres. In this manner, we can reduce the environmental impact of traditional funeral rites to a great extent by adopting minor changes in the traditional method. With this method, after cremation, the relatives can store ashes and bones as per tradition.



Fig 1: Briquettes resembling chopped wood and logs prepared from Gobar (cow dung).



Fig 2: Advanced wood-based cremation with provision for performing all rituals and controlling emissions that could economize on wood equivalent of saving two trees per cremation.

also takes less time. Hence the cost of its operation also comes down. The shortcomings due to which the option of electric cremation could not become popular among the general public and among district and city administrations in some places in the past have been removed in the new plant. So it is expected that this time this option will get more public acceptance than before.

BIOMASS BASED CREMATION

The Tata Energy Research Institute (TERI) and other institutions are involved in developing biomass gasifier infrastructures, in which the process of combustion will be completed with the help of chipped wood. In this method the consumption of wood will be halved as compared to the traditional method, and the combustion process will be completed in a period of one to one and a half hours. Later, relatives will also be able to collect bones and ashes. Similarly, an organization in Gujarat is trying to develop a system of cremation with solar energy. Cremation facility using CNG has been started at a muktidham in Pune.

THERE ARE OTHER WAYS TOO

It is not easy to make any comment on an extremely sensitive subject like funeral rites. The tradition of cremation has a history of five thousand years. Such a tradition cannot be changed easily, but some subtle and relevant changes can be made in this tradition according to modern times, so that the original structure of its constitution is not affected. Several such options have been suggested above. Apart from these, by implementing concepts like "Smriti Vans" and Urban Forests around Muktidhams, we can maintain a balance between the continuity of tradition and environmental protection.

IMMERSION OF BONES ("ASTHI") AND RIVERS

On the third day of the funeral, the ashes of the pyre and the bones within the ashes are immersed in holy rivers. Such immersion of ashes and bones in rivers does not cause any pollution whatsoever. Our bones are basically made of calcium phosphate. After immersion of bones, these elements get reunited in nature. In this manner the cycle of human life from creation to immersion is completed. The

mineral salts derived from the immersed material gradually enter the river system as nutrients and become part of the aquatic life cycle.

FROM TODAY UNTIL ETERNITY...

Rivers have great importance in Hinduism and the journey of religion from ancient times to modern times continues like the flow of a river. As per the need of time and circumstances, the vast community following Hinduism has adopted many incremental changes in their daily life following the basic religious directives. It is also said that change is the law of nature. The rituals that take place after death have also not remained untouched by change. If we analyze the changes in these activities, then we will find that in the past these activities were performed only by the



Fig 3: Advanced cremation with provision for performing all rituals and regulating emissions using alternative energy source (electric or LPG/CNG). All photographs courtesy Green Revolution Foundation, New Delhi.

son or grandson, today daughters also perform the last rites of the family members according to need and circumstance.

Many people, treading the path of charity, pledge while alive that their organs should be donated after death and their family also cooperates in fulfilling this wish of the deceased after her/his death. Many people even donate their entire body to medical colleges so that the students studying medical science can be helped in their studies. Even in these situations, the discharge of cremation traditions have to be re-conciliated.

When society can accept these changes, we hope that society will consider the options mentioned in this issue of Pragambhu and adopt these options for the sake of their own forests, rivers and environment. When we accept such small changes in our lifestyle only then will our rivers flow uninterrupted from today till eternity.

CONTACT US

Centre for Ganga River Basin Management and Studies (cGanga)

Indian Institute of Technology Kanpur, Kanpur 208 016, Uttar Pradesh, India

Email: info@cganga.org, Website: www.cganga.org, Contact No.: +91 512 259 7792

©cGanga, 2023