

Flood Control in Bangladesh: Which Way Now?

(Second and concluding part)

by Nazrul Islam

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(Continued from yesterday)

The Embankment Lobby

If ultimate consequences of embankment are so grave and destabilizing, why is it that embankments have dominated flood control thinking of Bangladesh for such a long time and continue to do so?

There are several reasons for this. The first may be categorized as misperception, which, in turn, may arise from several sources. One of these is partial nature of expertise. For example, a hydraulic engineer of urban background may have good understanding of fluid dynamics, but he may be unaware of the intricacies of floodplain agriculture. With little appreciation for all the nurturing effects of river inundation, he may indeed think that embankments are good ideas to boost crop output. Similarly, a bureaucrat may not have technical information about possible alternatives and come to think that cordons are the only way to deal with the floods. In absence of technical expertise of his own, a politician may just go along with technologists and bureaucrats' recommendation and adopt the embankment approach.

Foreign Involvement: This problem of misperception has been aggravated by considerable foreign involvement in Bangladesh's flood control program. In fact, water development efforts in Bangladesh started with institution of Craig Commission by the United Front government in the wake of the 1950 flood. Mr. Craig himself was from the US Army Engineering Corps, as were some other members of the Commission. Most of the big water development projects that were implemented during the sixties and seventies arose from recommendation of this Commission. These include the DND project, the Brahmaputra Right Hand Embankment Project, Coastal Embankment Project, etc.

Starting from that inception, dependence on foreign aid and expertise continues to be the hallmark of Bangladesh's water development efforts. The National Water Plan, which is the current blueprint for water development efforts of Bangladesh, has been formulated by the Chicago based firm Harza Engineering Company International. Various Flood Action Programs (FAP) have also been developed with the help of foreign technical experts. Foreign technical assistance comes as an inevitable part of foreign aid.

Even such fortuitous events as that of Madame Mitterand's accidentally being in Dhaka during 1988 flood proved to be of major consequence. This particular event led to considerable French involvement in formulation of Bangladesh's flood control policy. A team of 30 French engineers visited Bangladesh and reportedly advocated for embankments. For foreigners, it is all the more difficult to realize all the aspects of the organic connection that river and river-inundation have with life in Bangladesh.

It would not, however, be appropriate to lay all the blame for our ineffective flood policy on bad foreign advice. This is very clearly borne out by the reception accorded to the Eastern Water Study (EWS) report. This study was commissioned by USAID in the wake of 1988 flood for the US House of Representatives Foreign Affairs Committee hearings. The study was conducted under the leadership of Peter Rogers, Harvard Professor of Environmental Engineering. Based on careful analysis of the entire situation, this study recommended against construction of embankments.

Unfortunately, for Bangladesh government circles, this was not a welcome recommendation. They were eager to have the international community sign on to a multi-billion, mega-project of embankment construction, and therefore viewed Eastern Water Study report as basically a spoiler. This made EWS report a hot potato because, under pressure from Bangladesh government and others, even the USAID tried to distance itself from its recommendations. As Prof. Rogers informed me in a private communication, the situation reached such a point that he was once barred from flying to Dhaka from Kathmandu to attend a conference.

This makes it clear that bad foreign advice is not the sole reason for Bangladesh's bad water policy. In addition, there are powerful material interests at work. Big embankment projects are often lucrative to the government because these can bring in large amount of foreign aid. This makes some politicians happy because they can then show the electorate that they are bringing home money. Embankment projects make some bureaucrats happy because they can preside over large spending programs. Such projects can make consultant, engineering, and construction companies happy because they can all get large contracts. It is easy to extend this list of direct beneficiaries of embankment program. Add to this the possibility that some of these actors may actually be corrupt, and hope to illegally benefit from these projects, and it is easy to understand why passions can run very high.

Note that none of these actors will have to be ever personally accountable for the long run outcome of these projects. A few years down the road, the politician may be out of office, the bureaucrat may be working in a different ministry, technocrats and contractors may be eagerly working for some other project. None of them will have

to pay for the failure of the project to achieve its objective. The money for debt servicing will nevertheless come from back-breaking toil of peasants growing jute, or teen-age girls working in garment factories, or Bangladeshis doing menial work in the Middle Eastern countries.

Large budget embankment program suits donor agencies well too. There is little accountability on the part of the donor officials, because they distribute other people's (developed countries' taxpayers') money, and ultimate effectiveness of the project can touch them hardly at all.

With no personal stake in the effectiveness of the investment either at the donor's end or at the recipients' end, it is no wonder that wrong investment decisions are made. This is rather a general problem of aid financed development. History of the third world countries, Bangladesh included, is littered with innumerable examples of such bad investments.

The fact that embankment approach continues to dominate despite its obvious flaws should not therefore be too surprising. The question is what is the right approach to Bangladesh's flood problem?

Opening-Up Approach to Flood

The appropriate flood control approach for Bangladesh is to open up as much space as possible to accommodate river overflow. This follows from simple arithmetic: given the volume of water and gradient, the height of flooding decreases proportionately with the increase of area over which water can spread. This is a strategy not of flood prevention but of flood mitigation and control. The approach is based on the time-honored principle by which our ancestors lived in this area, namely, live with the rivers and benefit from them.

Of course, this does not mean that we should reproduce and cling to the pre-industrial equilibrium in its entirety. Certainly, we want to modernize and industrialize. We need more areas for urbanization, and we need faster transportation of goods and people. However, even as she tries to industrialize, Bangladesh will continue to be a delta, which, moreover, is supposed to get more peak season water and silt. We may be sitting in a high rise apartment building, hooked to a geo-stationary satellite hovering several miles over the earth through a cellular phone stuck to our ear, but under our feet, down below, it is still an alluvial floodplain. Thus, while we need to adjust the old, traditional equilibrium and accommodate the needs of modernization, we have to do it in the basic geo-physical setting of a delta.

Holland's Example: Does that mean Bangladesh will never be able to be a genuinely modern country because of her physical conditions? That is certainly not the case. The example that is very instructive in this regard is that of Holland. Like Bangladesh, Holland is also primarily a delta, created by the river Rhine. Like Bangladesh, the main part of Rhine's catchment basin also lies outside of Holland. Yet, Holland has not only successfully modernized, but also a sophisticated economy. Of course, there are huge differences between conditions of Bangladesh and Holland. Yet, Holland's example shows that it is not necessary to destroy the delta character of the land in order to become modern. Modernization effort has to be in harmony with the local physical conditions.

In Bengali, Bangladesh is called as 'nodimatrik desh'. This is indeed literally true. Rivers gave birth to this land. It is therefore fundamentally wrong to treat rivers as 'bimata' and refuse them to embrace the land. Instead of putting up embankments, we need to be as inviting to the rivers as possible, and allow them to come to us when they have the need to do so.

Is this a passive strategy whereby we just sit with folded arms and wait for the rivers to engulf us? Actually, it is just the opposite. Opening-up strategy requires huge amount of work to be carried out on a sustained basis. In the following, we indicate some lines along which this work has to proceed.

Re-excavation and Dredging: One of the most important tasks in the opening-up strategy is to re-excavate the surface water bodies. In fact, excavation and re-excavation has a central role for the opening-up approach, so much so that this approach may as well be called the Excavation Approach.

What has been happening in Bangladesh over the past years is just opposite to what was warranted. We have been eagerly filling up the surface water bodies, the ponds, dighis, khals, bils, and lakes. The pressure of population growth and urbanization has certainly contributed to this process. But, this process of filling up of the surface water bodies has been very detrimental to flood control effort.

In the older part of the delta, even historic rivers are getting filled up. For many years now, due to Farakka and other upstream diversions, the lean season flow of Bangladesh rivers has decreased. This has been particularly true for rivers in the western part of the country.

Many riverbeds now become totally dry during the winter season. This has made it possible and encouraged people to fill up the river beds and use them for other purposes. Unfortunately, as we noted, Bangladesh is headed toward a situation of extremes, whereby very low lean season flow will be accompanied by very high

peak season flow. Only a massive excavation program can enable Bangladesh to cope with this twin problem of extremes simultaneously. On the one hand, excavation will keep riverbeds wide, open, and deep so that peak season flow can pass through easily and rapidly. It will also enhance surface water storage capacity, which will thereby lower the flood height. On the other hand, the stored water in the re-excavated water bodies will counteract the shortage of water during the lean season. Unlike embankments, an excavation program can significantly enhance the dry season irrigation potential.

Sometimes it is argued that re-excavation and dredging is too big a task. Dredging of the main rivers is of course an enormous task. But that should not prevent Bangladesh from embarking on an energetic program of re-excavating the smaller rivers and other surface water bodies. In fact, Bangladesh should immediately start with a program of rejuvenating the distributaries of Padma in southwestern districts of the country. It is quite likely that filling up of these distributaries has been one reason of increased flooding in recent years of regions south of Goaland, including Dhaka. The rivers of North Bengal should also undergo this process of re-excavation as soon as possible.

There are quite a few aspects of Bangladesh's situation that should prove favourable for a nation-wide re-excavation programme. Some of these are as follows. First, Bangladesh's massive population should be a tremendous help. The density of population in Bangladesh has now reached almost 1000 per square kilometer. If the water bodies targeted for excavation constitute even 10 per cent of the area, then we would have 10,000 persons per square kilometer. With this high density of population, clearly, re-excavation should be manageable task.

Second, re-excavation programme does not require imported inputs and hence does not demand foreign currency. It is a labor-intensive operation and hence should be helpful in generating a huge amount of employment in rural areas. Also, not all the labor may have to be fully paid. With appropriate national leadership, some of this labor may be partially or fully voluntary.

Third, it is an important fact that rivers and most large water bodies in Bangladesh are under khas or government ownership. This means that in implementing an excavation program, the government will have to face fewer legal problems and fewer expenses. This should be a big advantage. By contrast, construction of embankments usually requires confiscation of land and paying of compensation to its owners. This makes embankment programme often legally problematic and financially expensive.

Fourth, the current reduced lean season flow should make the task of re-excavation technically easier. In many cases, there will no need for creating temporary diversion channels. The excavation programme can gradually move from smaller river and water bodies to those of larger size.

Note that this programme may not be limited to re-excavation only. In certain cases new canals may also be constructed. However, to save land, it is always a good idea to re-excavate the existing ones than to construct entirely new ones.

Ensure Free Passage of Water Across Floodplains: The important thing in the opening-up approach is to ensure free passage of water on the floodplains. Unfortunately, not all of these have been carefully tailored to the necessity of free passage of water on the floodplains. In particular, roads have been often constructed without adequate number and size of culverts and bridges. Travelling in the western districts, it is not unusual to find an entire river filled up from both sides and spanned by a culvert of pathetic size in the middle. A lot of roads have been cut because of either misconception or sheer greed. This has now resulted in many unnecessary obstructions and bottlenecks.

Roads are certainly needed. However, in view of Bangladesh's situation, the following principles need to be observed. First, it is better to expand and make more intensive use of the existing roads than to build entirely new ones. That is, construct new roads only if these are absolutely essential and there are no other alternatives available. Second, roads should be aligned with the rivers as much as possible. Third, in all cases, leave maximum passage for water by inserting bridges and culverts of adequate number and size.

Restoration of Water Ways: Opening up approach will have to be accompanied by emphasis on water transportation. The re-excavation program and the program of alignment and modification of roads will have to be implemented with an eye to restoration and enhancement of waterways. Note that water-transportation no longer has to be a slow mode of transportation. With engines fitted even to the country-boats, the rejuvenated water transportation will be qualitatively different than that featured in the pre-industrial equilibrium.

Revival of Fisheries: The re-excavation program will have to go hand in hand with a program of revival of the fisheries. Over the last years, fresh-water fisheries sector of the country has suffered considerably. In part, this has been the result of filling up of the water bodies. A second reason has been the increased use of chemical fertilizer and pesticides. The runoff from fields with chemical fertilizer and pesticides often had devastating effect on the fisheries stock of the adjoining water bodies. The opening up strategy will help to restore fisheries in two ways. First, re-excavation of inland water bodies and reestablishment of their connections with rivers will enhance the fishing habitat. Second, river inundation will help agriculture to be less dependent on chemical fertilizer,

thus reducing the problem of chemical run-off.

Re-direction of the Crop-research Programme: For a long time, the crop research program of Bangladesh was focussed on dry season, controlled irrigation based crops. HYV boro was the point of focus. In fact, there was a connection between this state of crop research and the embankment approach to flood control. It was thought that solution to country's food problem lay in cultivation of HYV boro, which required controlled irrigation. This provided an argument for cordons because they could facilitate controlled irrigation.

However, crop research has come a long way since those early days, and now many HYVs of ropa aman have been invented. Even some HYVs of bona aman are being tested. This direction of crop research needs to be further strengthened. Growing HYVs should not be an argument for cordons. However, in the enthusiasm for HYVs, one should not ignore the value of the traditional varieties that our ancestors created through a natural process of selection over centuries. Although their yield may sometimes be low, these varieties have other important qualities like superior taste, ability to resist pest etc. Hence, nurturing these traditional varieties should also be an important goal.

Adjustment of Rural Settlement Pattern: One of the advantages of the opening up approach is that it will not create any false sense of elevation and therefore will not encourage below-flood-level dwelling. However, it may be possible to go a little further. Government may encourage some amount of clustering and consolidation in rural settlement pattern. Such

consolidation may be helpful in several ways. First, it will be easier to save dwellings from inundation by elevating the ground level if these are concentrated rather than widely dispersed. Second, motorized road connection, though not a part of the pre-industrial equilibrium, is often proving to be a desirable ingredient of the new equilibrium. It is much easier, economic, and land-saving to provide road connection when settlements are consolidated than when dispersed. Third, consolidation is land-saving from dwelling point of view too, and consolidation also minimizes obstruction to water movement on the floodplain. Finally, consolidation may be helpful in planning and organizing joint efforts on the part of the villagers. One such effort may be construction of flood-shelter, like the hurricane-shelters of the coastal districts. The best strategy in this regard will be to raise the elevation of the local school or other such public building to a flood-proof level.

Land Leveling and Terracing: Some amount of land leveling and terracing will be helpful in reaping the benefits of river inundation. This may facilitate some flood management, if there is any scope of doing so. Land leveling and terracing will be helpful for dry season irrigation too.

Low Embankment with Floodgates: Even some low-height embankment construction may be part of the opening-up strategy. The purpose of these embankments will not be to cordon areas from flooding. Rather, these will be low barriers with enough floodgates. Such combination of low embankment and floodgates may help in manipulating the timing and extent of inundation. The earth produced from re-excavation of the rivers can be used for construction of these structures. However, careful

planning has to be done so that these structures do not prove to be new obstruction to inundation. In fact, such structures can better be thought as future goal, because more technological and institutional capability and resources will be required to construct, maintain, and operate such structures.

The above does not exhaust the possible lines of activities under the opening up approach. Many new dimensions will emerge from actual experience, as the strategy gets implemented. However, we see that the opening up approach wins on all four counts that the embankment approach loses. It preserves and enhances the nurturing effects of river inundation. It mitigates flood by spreading river overflow over larger area. It does not create a destabilizing and risky situation, and does not create new problems of drainage and sanitation. Finally, it does not entail waste of investment.

Flood Control and Population Planning

As Bangladesh strives to have an industrial equilibrium in the delta, she also needs to think hard about the size of her population. Note that the pre-industrial equilibrium had a stability feature to its population dynamics. This is manifested by the fact that the population in Bengal delta remained unchanged for several centuries prior to the twentieth century. It is only from the mid-twentieth century, the population has been rising along an exponential curve.

The population of Bangladesh in 1951 was 44 million. By 1989, it has increased to 110 million. Under projected dynamics, it will increase to 166 million by 2005, which is

and then reduce the population size. The example of China may be instructive in this regard. China's density of population is still several times less than that of Bangladesh. Yet, for several decades now, China has been actively pursuing a policy of negative population growth. Bangladesh has to strive for a similar goal. Ultimately, Bangladesh cannot hope to have a decent and comfortable living in this delta, unless they keep their numbers commensurate to the size of their country.

What about Cities?

One question that will be asked is whether opening up is the right approach for cities, even if it is appropriate for rural areas. In particular, this will be asked with reference to Dhaka, the capital city. This question deserves serious consideration.

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One embankment enthusiast may nevertheless say that what is necessary is to extend the embankment to cover northern fringes of the city as well. In that way, the entire Dhaka will be cordoned off, and there will be no more flood within the city! In other words, the proposal is to make Dhaka into another DND.

But, the experience of DND already tells us what the consequences of this are going to be. As in DND, this will encourage below flood level dwelling construction, something that has already happened in Mohammadpur and other parts of the city that are close to but inside of the embankment. With the entire city cordoned, this will become rampant.

In 1988, DND embankments were almost giving way. This year the problem became even more serious, and DND residents started evacuating. Compared to DND, greater Dhaka is many times larger. If such a large area is cordoned off, the pressure on the embankments will be immense, and it will be just a question of time before one day these embankments will give way.

If in order to minimize the pressure, the cordon is kept small, then, given the explosive growth rate, Dhaka's population will soon overflow the cordon. In fact, the cordon will only hasten this process by attracting more people to the safety of Dhaka. With time, this will build into a major source of conflict between people inside and those outside of Dhaka cordon. Dhaka will be like one of the medieval walled cities, which ultimately collapsed in the face of storming unprivileged outsiders.

Conflict will arise in yet another dimension. Dhaka's cordon will encourage all neighboring cities and towns to have their own cordons. If they prove successful, then everybody will be embankment, and this will increase pressure on everybody else's embankment. This self-defeating course of events will certainly lead to an eventual collapse of the entire structure.

In short, given Bangladesh's conditions, embankments are not the way to 'save' cities, including Dhaka. This will not solve the flood problem. On the other hand, this will put Dhaka in an even more risky situation than DND. Do we want to face the absurd prospect of evacuation of the huge population of Dhaka?

Meanwhile, cordon will create serious problems of drainage and sanitation, similar to those that exist in DND. Whenever the surrounding river-level will rise, normal gravity-flow drainage will have to be replaced by drainage through pumps. For a large and very densely populated city like Dhaka, and in a country which suffers from acute shortage of power, this is simply an outlandish proposition.

Also, being cut off from rivers all surface water bodies inside the city will gradually become unhealthy and will eventually die. The temperature moderation effect the water bodies will be lost. Dhaka will become more arid, hot, and inhospitable.

Thus, in the interest of long-term viability, Dhaka and other cities of Bangladesh should not try to cordon themselves. Like the rest of the country, the cities will also have to live amicably with rivers and benefit from them. Being situated at the heart of Bengal delta, Dhaka cannot pretend to be Dallas of arid Texas. Just as the iron bridal chamber could not save Lakhindor from Manasa's wrath, cordons, no matter how strongly built, cannot keep Dhaka out of mighty Bengal

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In 1988, DND embankments were almost giving way. This year the problem became even more serious, and DND residents started evacuating. Compared to DND, greater Dhaka is many times larger. If such a large area is cordoned off, the pressure on the embankments will be immense, and it will be just a question of time before one day these embankments will give way.

If in order to minimize the pressure, the cordon is kept small, then, given the explosive growth rate, Dhaka's population will soon overflow the cordon. In fact, the cordon will only hasten this process by attracting more people to the safety of Dhaka. With time, this will build into a major source of conflict between people inside and those outside of Dhaka cordon. Dhaka will be like one of the medieval walled cities, which ultimately collapsed in the face of storming unprivileged outsiders.

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Thus, in the interest of long-term viability, Dhaka and other cities of Bangladesh should not try to cordon themselves. Like the rest of the country, the cities will also have to live amicably with rivers and benefit from them. Being situated at the heart of Bengal delta, Dhaka cannot pretend to be Dallas of arid Texas. Just as the iron bridal chamber could not save Lakhindor from Manasa's wrath, cordons, no matter how strongly built, cannot keep Dhaka out of mighty Bengal

and then reduce the population size. The example of China may be instructive in this regard. China's density of population is still several times less than that of Bangladesh. Yet, for several decades now, China has been actively pursuing a policy of negative population growth. Bangladesh has to strive for a similar goal. Ultimately, Bangladesh cannot hope to have a decent and comfortable living in this delta, unless they keep their numbers commensurate to the size of their country.

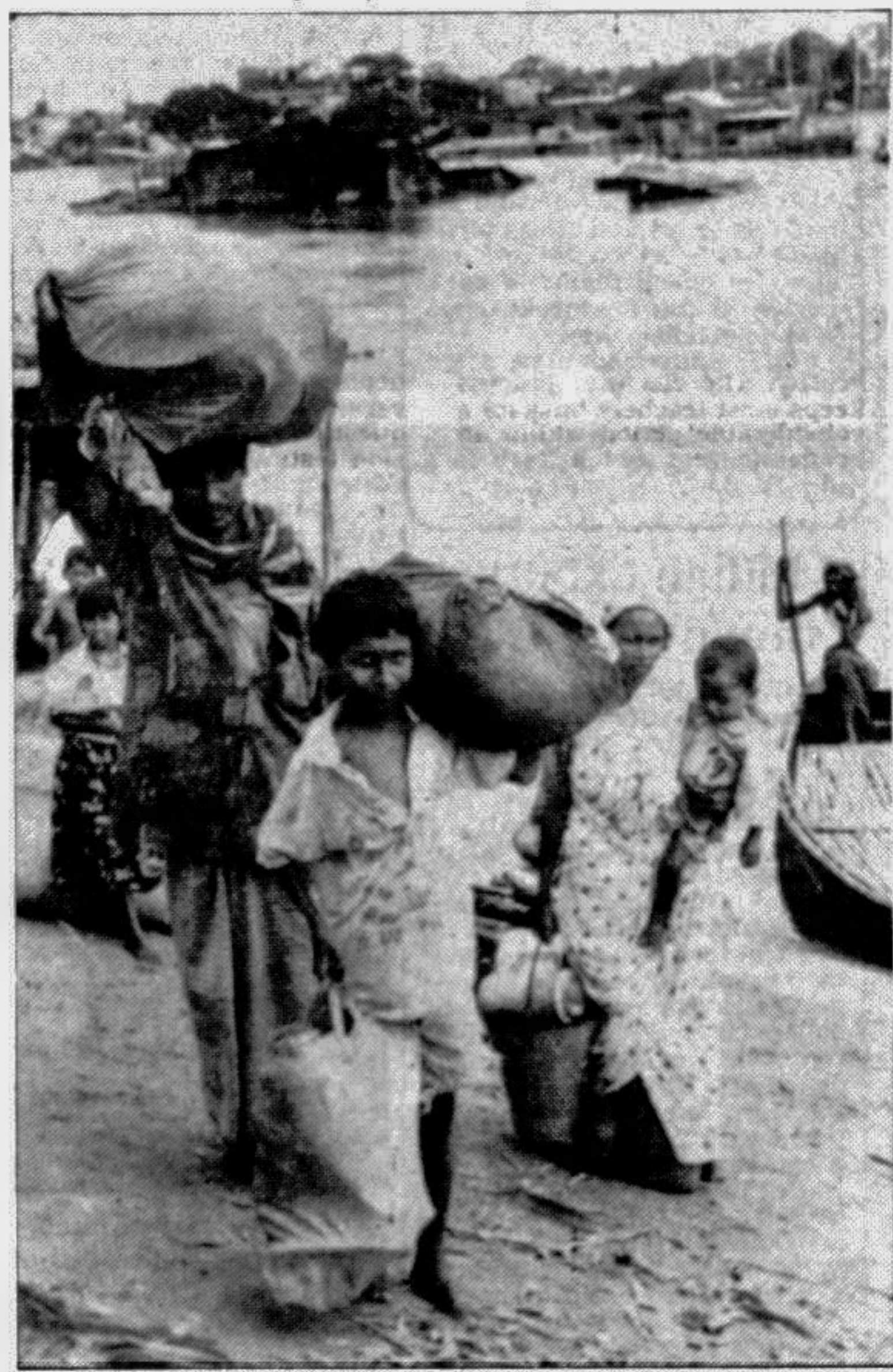
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The deluge that was: People (left) leaving their inundated homes for safe refuge, and (right) rushing for relief.



— Star photo

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Let's first look at the experience of Dhaka. In the Greater Dhaka Embankment has been partially successful this year in reducing flood in the south and southwestern parts of the city. But, as a whole, the embankment could not save Dhaka from flood. In fact, flooding in northern parts of the city has been more serious in this year than in 1988. Thus, efforts to save one part of Dhaka have aggravated flood in other parts.

One embankment enthusiast may nevertheless say that what is necessary is to extend the embankment to cover northern fringes of the city as well. In that way, the entire Dhaka will be cordoned off, and there will be no more flood within the city! In other words, the proposal is to make Dhaka into another DND.

But, the experience of DND already tells us what the consequences of this are going to be. As in DND, this will encourage below flood level dwelling construction, something that has already happened in Mohammadpur and other parts of the city that are close to but inside of the embankment. With the entire city cordoned, this will become rampant.

A Prayer for Change

UNABLE to see women crying in a corner at a funeral, early this year, a local Turkish religious leader asked them to join the men in prayer, inside the mosque. Before he knew it, he had become a national sensation; the government of the secular state, which is busy warding off strident opposition by the fundamentalists by the Islamic Welfare Party, made a call for the admission of women into mosques for prayers.

Though Islam is the dominant religion in Turkey, the country boasts a secular government, and local religious leaders are appointed by the

governments' Department of Religious Affairs. One day after the local mufti's action, the president of Turkey attended a funeral prayer which had a woman sitting in the front row.

Not only that, the Department of Religious Affairs has suggested the inclusion of women in mosques for Friday prayers, as well as the Ramadan prayers. Warding off protests from conservative quarters, the Dean of the theological faculty at Istanbul University too has supported the government's call by stressing that 'this was the practice in the lifetime of the prophet.'

— WFS/News Network