

# Strike a Balance in Use of Ground and Surface Water

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areas cannot be protected as it is very expensive and it is also not desirable to interfere with the river regime and water system that much.

What do we do about those people? The National Water Policy gives the direction that there should be flood proofing. We should encourage those people to raise their homesteads. And flood forecasting and warning system should be improved. Currently, the lead time is 24 hours. Now our target is to enhance it to 72 hours and we are negotiating it with India so that they can give us the data. So that is the way we want to handle the flood situation.

About allocation of water, this policy very clearly says that the dominance or the demand by the agriculture sector has to be reviewed in the light of growing demand of drinking water, navigation, fishery, environment, and for all other categories.

The National Water Policy also gives gradation as to how the allocation will be made in the scarcity situation. When there is abundance there is no problem. But when we are withdrawing water, say in the dry season, sometimes you will see in the rural areas that we have drawn up to the bed of the canal. That is not proper because the canal has also a claim to a portion of the water for its own sustenance. We ignore it because agriculture is given dominance or its claim is given priority. But the Water Policy says that we will have to look at this.

Related to this is the question of ground water versus surface water and their estimate has to be correctly done. We have also expressed our concern over arsenic contamination and other pollution like different toxic elements getting into water. For all these a number of legal measures will have to be taken, a set of legislation will be required. It has been indicated in the policy that will be identified under the National Water Management Plan as to what new laws are required to be passed for successfully implementing the National Water

Policy.

Finally for institutional development under the National Water Policy there is a national water council headed by the Prime Minister and a large number of concerned people who will sit, may be, twice a year or thrice a year depending on the necessity and it will give the broad policy direction.

And then there is an executive committee of the national water council headed by the Water Resource Minister. It will look after the coordination and other issues. WARPO, that we have set up as a water resource planning organisation, will try to develop it as a neutral body.

It will be in-charge of the macro-level planning in the water sector. It will also monitor the guidelines that have been given in the water policy and other activities so that one sector does not work to negate the activities of the other sector. All this will help us to manage the water in the best manner and in the optimum level. And that is what the National Water Policy says in short.

**Tauhidul A Khan:** Dr. Huda has in brief given a broad outline and objectives of the National Water Policy and Dr. Rashid Faruque has raised certain points. So I will pick up from the last point and then I will go gradually.

Dr. Faruque has talked about strengthening of the institution of Water Resources Planning Organisation. The National Water Policy states that WARPO will be the apex organisation of the government and it will be in charge of three basic things -- First, it will prepare a National Water Management Plan. Second, it will be acting as a clearing house for all the water sector projects undertaken by any agency involved in the water sector. Third, it will maintain a national water resource database.

So, quite heavy responsibility is on our part. Now the organisation we have is a little bit compact and small one. And moreover, this organisation is manned by people recruited by WARPO but at the rate of government salary structure. I am being very frank, I would have loved to have the best people in the field to work in the WARPO. By paying them the level of Taka salary I don't know whether I will be able to keep them for long.

Moreover, we are trying to recruit or get the right people for this job at the moment. We are investing quite a handsome amount of money as well as time to train them up. But I am afraid that after two or three years these fellows will not be with us. Already the exodus has started. Already few of them have resigned and gone away. While we are very sincere about strengthening our institutional capabilities, I think, we should also keep in mind what can be done to keep these people.

**Mahfuz Anam:** May I at this stage be a little provocative. In Bangladesh whenever a problem comes up the first solution is to build an institution and then the institution has a building of its own. It has to have a nice office. And then of course the facilities of that office has to grow and grow and grow while the problem for which it was actually set up remains. Say, for instance, Bangladesh Fisheries building, while the fisheries resources are going down the drain *Matsha Bhaban* is going up to the sky. I hope you will not follow that direction.

**Tauhidul A Khan:** Insha Allah not. Right now I am concerned about the people who will be actually working there. It is a building, its not the facilities, its the man or woman who will be working there. So, I am concerned about them.

that there can be some specialised kind of studies and other things. We need to have some arrangements for outsourcing some of the works.

I will just briefly enlighten you on what we are doing now. As I said one of our responsibilities is to formulate the National Water Management Plan. We are doing that in three phases. The first phase was the inception period and we have already finished that. The inception report has been widely circulated, closely examined, scrutinised not only by the government but also by all sectors of the civil society, the intelligentsia, academics and others. So we have finished that phase.

Now we are in the issues and option phase. We are trying to identify the issues and options and on the basis of that we will be formulating our strategy. As per the original schedule we were supposed to prepare an issues and option report by March 1999 and over the period of next twelve months we were to finalise it. But after consideration we thought it would be better that instead of bringing out one big volume of report why not bring out individual booklets segregating the chapters that will be in the issues and options report.

WARPO is basically made responsible for plan formulation but we are also being guided by few members of both expatriate and local experts who are working in the Water Policy advisory group responsible to the Secretary of the Ministry of Water Resources. We have another group called independent panel of experts. There are five foreign experts and five local experts who are working there. We are in constant touch with them. As a matter of fact, I would frankly say we can't move one step forward if they don't agree to us. This is basically what is happening. So we are taking their advice in every step we take forward.

Now we have talked with them and according to their opinion and their endorsement we are now proceeding with publication of about 18 different topic papers which cover a

these papers would be coming out gradually in phases and we will want to throw it out to discussions in many workshops. We discuss these in the workshop, then we get the feedback and prepare accordingly.

When we are finished with 18 topic papers we will be in a position to draw strategies. In the meantime while we are preparing the topic papers and going through the mini-workshops and other things, we are also carrying out another very extensive programme of ours, that is called PPCC, people's participation, and consultation process.

As it is mandatory on our part that we take the people in confidence, so from the very beginning we discuss these with



Tauhidul A Khan

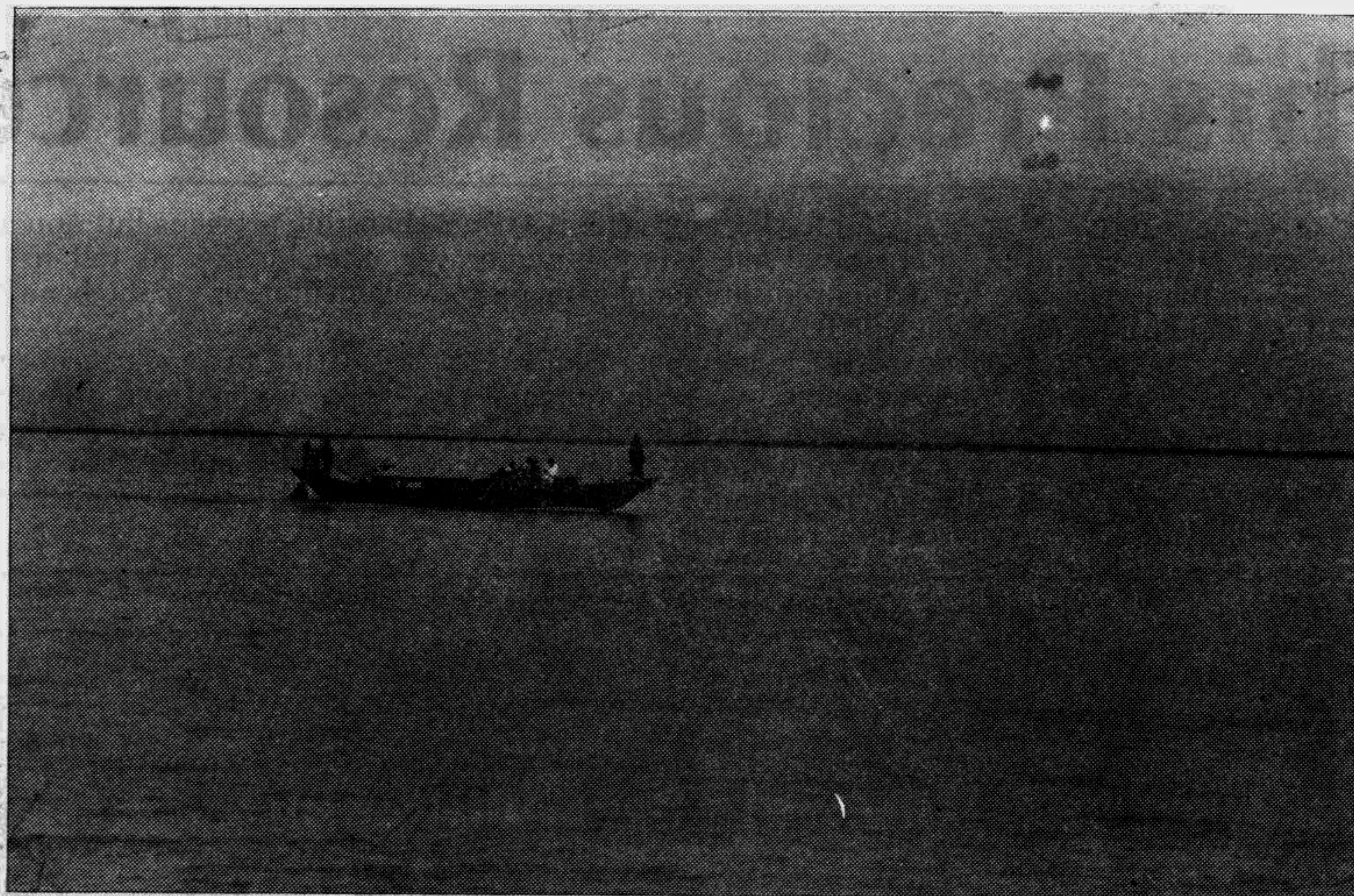
them. We have divided these PPCC programme into three phases. The first phase is already complete. I will just briefly describe what we have done. We have selected 24 areas of the country broadly divided in terms of hydrological characteristics of different regions. From village level to union level we have held discussions with both men and women. And also from the thana level to the district level.

In the first round we went to them and tried to find out their water related problems. They have identified. And then we requested them to prioritise their problems. After they did that, we tried to find out what the critical issues were. And then we identified these things and we have recorded. In their humble way whatever they found they identified and also prioritised.

Then we asked them what might be the possible options for solutions to these problems. They did it. It was basically a one way traffic at the first. They talked we listened. For carrying out this consultation process we have employed 16 NGOs. They had been working as facilitators. We have also engaged BIDS for analysing these data to bring out the reports.

Now we will be going to the second round. In the second phase we will be going to the same places again but we would be adding some more places which we thought should have been there. We will go to them and tell them: Look you have identified these things and we have recorded. Do you think we have been right in our recording? We will get their endorsement. Then we will tell them, look you have told in the previous case that these may be the causes for these problems and these may be the possible options. We had talked with other people also. Now we have brought in some other people with us, they will tell you besides the things which you have identified. There may be other ways of solving the problem. So they will discuss with them and they will come back again. This is the process we will be going through. We are taking into consideration the people very much.

Then comes the issue of environment. We are very particular about this aspect. In this re-



Rivers: Major source of precious water

spect an organisation called Environmental Geographical Information System will help WARPO in setting up an environmental set up. The Netherlands government will provide assistance for this EGIS. They are also providing equipment, software, tools, methodology, criteria and other necessary things.

And for a national water sector database, its already under preparation. We have hired Surface Water Monitoring Centre and EGIS is also helping us. We are gathering information from all the water related agencies. This database will be accessible by anybody at a nominal cost. We want to make sure that we supply the correct and accurate data as much as possible.

This national water planning process is not a new one in Bangladesh. It started in 1982-83 under an organisation called Master Plan Organisation. It worked till 1989-90 in two phases and brought out two draft national water plans. Unfortunately, because of certain flaws, those were not accepted by the government, nor the people and not even by the donors.

When MPO was closed down it was renamed WARPO. From 1990 onwards for five or six years the FAP was undertaken by the Flood Plan Coordination Organisation. It came to a close in 1995-96. The government thought that both FAP and WARPO should merge together and that is how the present WARPO should emerge. But in reality, the WARPO started to work in full swing with the beginning of the National Water Management Plan project. Actually we effectively started to operate from last year.

Basic problems about water management plan is quite simple. Managing the over abundance of water during the monsoons and water scarcity during the dry seasons. That is the basic thing but how do we do it. Lot of people talk about "bottom-up", "top-down", etc., etc. Both of them are extremes. One school of thought strongly proposes "bottom-up", but in case of water where rivers transcend not only district and regional boundaries but also national boundaries, here the "bottom-up" concept will not work properly. A combination of "top-down" and "bottom-up" will be the best thing, this is what we found.

I will now talk about the dry season problems. In the dry season there is hardly any rainfall and we depend on the ground water resources. Unfortunately for various reasons we could not exploit or harness the surface water. Many people would say that there is no surface water available in the country as the small rivers, streams and canals remain almost high and dry during the dry season. But of the total surface water available during the period 65 per cent is contributed by two major rivers, the Ganges and the Brahmaputra. Of that the Ganges contributes 18 per cent, the Brahmaputra contributes 67 per cent. These are the two major resource which still lie untapped, unharnessed. When we talk about meeting the water demands during the dry season we just can't ignore the huge surface water available. For that we need major capital investment.

**Mahfuz Anam:** So the first position is that we have sufficient surface water which can meet our basic needs. And to harness we need capital investment. So that is a basic shift in the position that we have enough surface water.

**Tauhidul A Khan:** Yes enough surface water to meet the basic needs. Now what we are doing is exploiting the ground water resources in the absence of any major supply of surface water. As of today, of the total water used for the consumptive purposes 73 per cent is being contributed by ground water.

Over the last two-and-a-half decade we have been continuously expanding the ground water irrigation system to increase our food production. At that time some people were sceptical. They had told that don't go so fast, so erratically, so irrationally because this might create adverse implications. I would not very confidently say that these are the adverse implications but what are we facing today? We are facing

the problem of arsenic and salinity intrusion in the ground water. In certain areas the ground water table is going down to an alarming level. That is why we think, as the National Water Policy rightly says, there should be conjunctive use of surface and ground water.

At the WARPO we think that we should go a step forward. We should now talk about balanced use of surface and ground water. But it cannot be done overnight. It may take three or four decades but we should start the process.

**Mahfuz Anam:** Do you have in your WARPO at the moment a feasibility study of how we can use this surface water for, as you say, meeting basic needs but in an economic manner? Is it economically justifiable?

**Tauhidul A Khan:** The WARPO is depending a lot on past studies. There had been lot of studies in terms of harnessing the waters of the Ganges and the Brahmaputra. We are not working on absolutely a new ground, we have got certain basic studies available with us.

Allocation of the water is very important. The policy has rightly said that time has come for us to think over again while we reallocate the water. So far agriculture had been the major user. But now our top priority for allocating the water is for drinking, domestic and municipal water supplies. Second is environment. Third fisheries and other things, and then comes agriculture. So the allocation priorities will change.

**Mahfuz Anam:** Does that mean that you will give less water to crop cultivation or you will increase the supply.

**Tauhidul A Khan:** We will first ensure that the people get clean and safe drinking water.

**Mahfuz Anam:** Does it mean that you actually reduce water from agriculture. Will that not hamper crop production?

**Tauhidul A Khan:** We are not going to reduce the water.

**Mahfuz Anam:** That means, you are going to augment the supply. Is it the position that if agriculture gets X amount of water it is going to continue to get X amount of water? The human needs which didn't get enough water will now get more. The supply of water is going to go up. It would be basically from harnessing the Ganges and the Brahmaputra.

**Tauhidul A Khan:** Yes that's it.

Now we can come to the flood aspect. The Water Policy very clearly says which are the places that get priority for protection against floods. So, naturally the metropolitan areas get the priority.

In the past we had been focusing our attention towards structural measures more. It is time that we make a combination of structural and non-structural measures. But I want to bring one thing to your notice.

There are several types of floods but we are concerned with the major river floods. We can improve flood forecasting and warning system and can improve flood disaster management capability, flood-proofing and other things. But for your information flood proofing is not a non-structural measure. It is a very much a structural measure.

By increasing the disaster preparedness management capability you can take care of thousands but definitely not of millions that has been affected in 1988 and 1998 floods, (six to seven million people). Disaster management is easier said than done. So we must not forget that some degree of protection must be given to the people.

**Mahfuz Anam:** I would really like to focus on ground water supply. Basically if we divide our discussion in two broad areas -- one is managing the water in the dry season which is one challenge. Other is managing the water in the flood season. And keep these two issues very different.

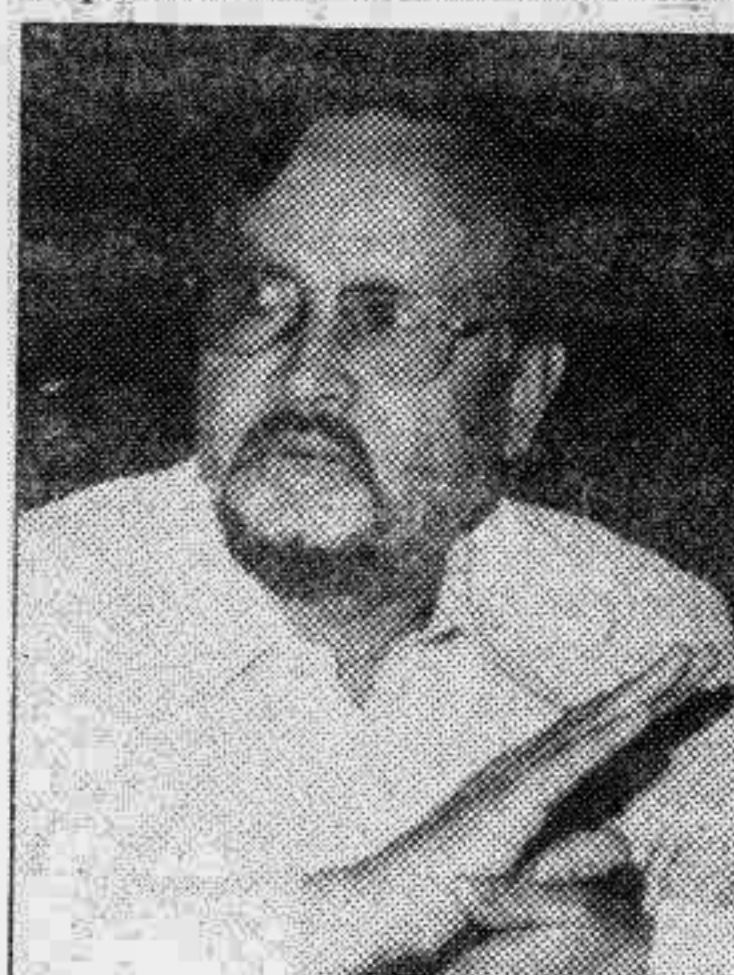
I would like at this stage to concentrate on managing the water in the dry season.

Actually two issues are important: crop water and the salinity. On the crop water issue, I think we have reached to 3.8 million hectares roughly -- the irrigated area.

David Seclar, the DG of the International Education Management Institute, says that the demand would be increasing more than 2.5 per cent. But we consider that in Bangladesh situation the irrigation demand for cereal production would be around four per cent if you want to sustain with the growth of the population. So roughly in another 30 or 35 years the demand would be doubled.

The land resources appraisal study suggests that we can go above seven million hectares of irrigated land. But not for rice alone, because we have diversified crops and cropping potentials and there is also situation where supplementary irrigation is very important. So everything should be taken into consideration.

The concern in the irrigated agriculture are primarily of the water losses. Water is lost and by the largest portion in the agriculture sector. This loss is due to the inefficient distribution system. The crop doesn't take much water but it requires an environment where we should support a standing water design for rice. The issue that we have not addressed is the improvement of the distribu-



Dr. Zahurul Karim

tion system and the on-farm water management.

I think until the local government is involved on the on-farm water management this would be difficult to address. And if this could be addressed properly then from the present level of around 40 per cent water use this could be increased to 60 per cent.

The second issue on the water is of reducing and reusing drainage water. This has to be done if we go for conjunctive use of it. This is difficult in Bangladesh. We plan to grow rice and irrigate rice, you can't grow other crops simultaneously in another piece of land. And in that situation our task would be to design the distribution system that it could suit rice and non-rice situation.

And there are examples. Specially the RDA Bogra has done some work and we have seen that there is a good prospect of combining the drainage water use for less water-demanding crops.

The third issue on reducing water use is to find technology. To produce one kilogram of rice on an average we have to apply five thousand litre of water. That is an average situation but it is worse in some areas where the soil is light. It could be seven thousand to nine thousand litres. It is too high for us because only 30 per cent of it is used by the crop and the rest 70 per cent is lost. We pump the water and it flows down through the channels.

**Malcom Wallace:** Its a very important point that needs to be clarified. There is a distinction between efficiency of farmers in irrigation practices and the fact that they are often pumping excessive amount of water which cost them a lot. And it is absolute loss to the water management system. So the water that is applied and not used generally goes either back into the streams or into the ground water table and is there still for others to use. So let us not confuse this statistics.

**Dr. Zahurul Karim:** It has several use I agree with this but I don't think that there are good studies that shows how much is recycled and used for other purposes.

I was telling about the tech-

Photo: Courtesy — Ekram Kabir

nological dimensions. Transplanting of rice takes huge amount of water, almost one third of the total crop requirement. But now there are new technology for direct seeding. And it is being tested in some fields in the northern districts. It just reduced the use of water to one third for rice. We are promoting this. However, the farmers do not want to take risk because if a stress happens for three or four days in the booting stage it is a very serious thing.

We have some statistics of per unit of water used and the profitability is much higher specially in vegetables and in the high valued crops than rice. But we cannot just take the land where rice is being grown for other crops because there are more than 10.4 million hectares marked for rice.

As for my third issue on the technology, I think the rain-fed agriculture remain the dominant one and I must tell you that research system offered is very little.

The rain-fed system specially for transplanted Aman is very important and it is still the major cereal in this country. Ten days drought in the northern districts during the T-Aman just could reduce more than 40 per cent of the yield. This has happened and the remedy for that is the supplementary irrigation.

Institution for doing this supplementary irrigation and the distribution system has not been developed. However, the government, specially the Ministry of Agriculture, has taken a pilot project on supplementary irrigation issue.

Mr. Khan has mentioned that we have got plenty of surface water to meet the reasonable demand. I agree to this statement with reservation. Where is surface water available? Not to all agri-ecological region of this country. Of the 14.3 million hectare, nine million hectare is arable land. We can locate at least eight agriable region where surface water is very dear.

Surface water for coastal region, for big reservoirs may be available. But not for all agri-ecological regions. I am not aware about the cost effectiveness for lifting and double lifting of surface water.

But promoting surface water for sustainable agriculture is undoubtedly the best and undebated subject. In that case we have to increase the water conservation technology, harvest of rain water. And this probably is the most striking feature when you combine the flood and the scarce. These two things together should be managed and we have to make our reservoir for enough use of it.

David Seclar has given four broad guidelines on the agriculture water management and those are: First, that for rice irrigated agriculture it has to be based on the best agri-ecological and land suitability so that the on-farm water loss could be reduced by 25 per cent.

The second option is that the water draining from the one land could be used subsequently for another land with improved distribution system.

The third point is salinity control. He said that any water which is not good for re-draining you make wet water-salinity, take it to the reservoir and control the level of salinity.

Recent data indicates that in the Ganges river the soil salinity and the water salinity, specially after 1996 water treaty, has considerably decreased. That means the water availability has pushed the salinity front further down.

On one hand it has allowed to decrease the salinity but on the other hand it helped promote more irrigation. So the water demand for agriculture will increase. That is a very good thing.

**Kazi Shahabuddin:** Mr. Faruque has done a comprehensive presentation of the issues involved. But there is lack of emphasis on one thing where he should have been more precise and that is on the competing demand of water. The demand for water has increased as compared to 20 years earlier. The increased demand for drinking water and also for other uses like industrial use and navigation -- all these uses are showing signs of conflict in demands. It will grow more sharp in the future.

So, while we continue to

augment the supply side I think the demand side management is becoming more prominent and important.

What does this demand side management really mean? There the concept of, as the economists call in their terminology, the water sector pricing policy comes. We solve many pricing policy in different sectors as in industry, agriculture, and in other sectors. But in water sector we face a very complex problem, because water has a unique characteristics. It is both a private good and a public good. Its benefit cannot be denied to those who cannot pay for it because it is a public good. But it should be consumed with economic value in mind.

This two principles should guide the allocation of water in the years to come because of the conflicting demand for its use. I see some of its reflection in the National Water Policy and hope that it would be adequately taken care off in the formulation of the National Water Management Plan.

Another point I would like to emphasise is, there is still some controversy and of course there will be controversy, about the availability of ground water.

The National Water Plan was not a very comprehensive one but it has some benefit. It has created a very extensive database and some modeling techniques which are still being used by WARPO and other organisations. But it has two deficiencies: Firstly, it concentrated on agriculture and secondly its analysis was governed solely by economic criteria. There was no social or environmental assessment.

But still its contribution should not be underestimated simply because it was not accepted by the government or by the donors. Who says it was rejected by the people? I am not sure because it was never presented before the people.

I think there is a big difference between the ground water assessment in the MPO and NMIDP. Mr. Faruque may remember that we tried to resolve that while formulating the document but we didn't succeed in doing that.

Why I am raising this point is because according to MPO the ground water resource will be exhausted mostly through minor irrigation, shallow tubewell, etc., by early next century that is by 2005. But according to estimate by NMIDP, the ground water resource can be exploited through shallow tubewell at least up to 2010. If MPO estimate is correct then we have to move to a less costly to more costly method -- from suction mode to force mode technology and economic cost would be more. But if NMIDP estimate is correct then we can be satisfied for another 10 years that we can use shallow tubewells to continue our irrigation.

Another point that I should mention here is about cost re-



Kazi Shahabuddin

covery. The rate now charged in the public sector surface water irrigation project is not only less, not to speak of recovery of capital cost, it cannot recover even the O & M cost. Not even 50 per cent of it. In the GK project for example, there is a flat rate of Taka 100 to Taka 300 depending on the season. But the operational cost is about Taka 600. The estimate was done about 10 years back. The ratio more or less remain the same.

The alarming thing is that what is assessed is not realised. According to some data only six per cent of the assessment is realised. The picture is very, very gloomy. However, there has been a revision of 1990 ground water ordinance under System Rehabilitation Project. As a result of that cost recovery has improved. In the Third Five Year Plan I saw that the recovery is about 30 per cent. So there is an improvement in the cost recovery but still fall short of the total funding of the O & M. And if we can assess the beneficiary, if we can form a user group association there is much scope for improvement. I hope that the National Water Management Plan will look into it.

**Mahfuz Anam:** May I request Mr. Malcom Wallace, the team leader of the National Water Management Plan to make his presentation.

**Malcom Wallace:** When we look back at the earlier plans one of the key themes has been that the MPO plan was not accepted. The FAP has raised lot of controversy and what people desperately want of the National Water Management Plan is something which is accepted, agreed and adopted within the country. And lot of the first year I would say has been spent actually discussing and to some extent trying to reach consensus on what the plan itself should be and also the process by which it needs to be developed.

We moved a lot from the originally defined approach to one that is by nature much more participatory. And we hope, as the Director General has said, over the next year in particular there will be a considerable debate in which we would welcome the newspaper participation as well. Because unless and until everyone can

accept the plan, the plan is simply a report with no value.

Heavy emphasis has gone on the people's participation programme, the consultations throughout the country. And one point which I think comes out very, very clearly and received attention this morning and is one thing everybody says that they want safe reliable drinking water supply. And therefore although it is not a huge quantitative issue, it is incumbent on the plan to respond to that voiced opinion. So whatever else the plan must do, it must seek to respond to that. Now that raises a whole range of issues both in terms of the problems in urban areas with the rapid urbanisation and the question of investment level that may be necessary to cope with what is rapidly approaching a crisis situation in terms of urban water supply. But in the rural areas, it comes back to this competing issue who get the first crack of ground water because most of the rural water supply is far dependent on ground water.

The comment on the fair availability of estimates of ground water, I think, is fairly answered. When NMIDP did its assessment it was not an attempt to rework the national water resource issue of ground water. It was an attempt to identify where the new technologies, suction mode technologies were likely to come in and in what numbers. The project looked at



Malcom Wallace

and understood the fact that in many areas the earlier MPO estimates were apparently been exceeded and the cheap suction mode tubewells were much more numerous than had been originally anticipated.

On the National Water Management Plan, it is clearly incumbent on the plan and WARPO to improve the estimate based on a lot more information than was available 10 years ago. I would stress the word "improve" because I think that we will find progressively the knowledge and the understanding of how ground water acts, in detail, will be improved year by year. And we hope to improve it significantly in the current National Water Management Plan. But it will carry on because the ground water in this country is a very complex subject. So there will be improvement and there will be working estimates.

There are many, many issues that have to be discussed in the total debate for the National Water Management Plan. But I think I should focus on only one issue which I think needs to be carefully considered and thoroughly debated.

If one accepts that for the time being both rural agriculture and rural domestic water supplies are the main competitors for use of ground water, with the passage of time more surface water will become available. So in the nearer term you got both shallow tubewells and hand tubewells competing for the same water. What we are seeing is that agriculture is driving seasonal water levels down frequently below the cheapest of the hand tubewells. According to this, that most probably the draw down for agriculture will reach actually the economic limit and not necessarily resource limit. And that is beginning to approach now and farmers cannot afford to suck water beyond certain limit. So if that be the case and that limit is beyond cheapest of the hand tubewells for rural water supply, then how do we respond to this. There are two possible ways of doing this. One, I would say is in view of some, that there should be increased regulations of use of ground water for agriculture. The other says that regulation will be counter active, counter productive and not very efficiently employed and that it would be better simply to pay for increasing the depth of the hand tubewells. That raises a supplementary issue -- who pays? Should it be the government or should it be the private sector?

There is a very central issue around the question of dry season and ground water. And one that needs to be thought through by people so that when the plan is put together there is a common view on the course of action. I am not going to suggest that there is a clear cut answer to it.

**Mahfuz Anam:** Can I ask for a clarification. If I have understood Dr. Shahabuddin correctly that there were two estimates. One said that the ground water will run out by 2005, the other said it would be 2010. So am I to understand that at least by 2010 we are going to run out of ground water?

**Malcom Wallace:** No, I think you misunderstood. Basically there are two types of irrigation, abstraction technology for agriculture. There are the suction pumps which basically sit on the ground surface and like a straw suck the water up. As soon as the water gets deep enough it is too hard to suck it up. So there is a natural limit to that technology. That technology is cheap, affordable and produces a very good return for

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