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NARRATOR -
JOHN JONES:

This week, has the world enough water to survive, and how Ahmadu Bello is tackling some problems concerned with our water resources, but first news of yet another journal of African Studies. It's called "Research in African Literatures", and is published by the African and Afro-American Research Institute at Texas. Our producer Gwyneth Henderson has been having a close look at it for us. Gwyneth.

GWYNETH HENDERSON: Well John, "Research in African Literatures" is certainly an impressive looking journal - well produced and fairly glossy - and it is in fact the official journal of the Literature Committee of the African Studies Association of America and of the African Literatures Seminar of the Modern Language Association. So, predictably perhaps, the first edition, at least, is nearly all on what Americans are doing in the literature field.

There is an article, for instance, by the Director of the North Western University Press, Robert P. Armstrong called 'The Narrative and Intensive Continuity: The Palm-Wine Drinkard' - concerned of course with Amos Tutuola's famous book. And another is by Philip A. Noss, Assistant Professor of African Languages and Literature at the University of Wisconsin on 'The Performance of the Gbaya Tale'. But there is too one contribution each from Belgium, Britain, France and Africa - the last two being in the University Report section of the Journal,

where there's information on current research at individual institutions. The African one comes from Professor Eldred Jones at Fourah Bay College, the University of Sierra Leone. Then the Journal also includes the usual Conference news, and book reviews. Well I said earlier, it was fairly glossy, and so to me the most surprising and pleasing fact about "Research in African Literatures" is that it will be sent to interested individuals absolutely free - and to libraries and other journals on an exchange basis. So if you have an interest in receiving the journal as it is published twice a year, please write to us and we'll pass on requests - the address is 'University Report', BBC, London. And of course please do write if you have any queries, comments or suggestions on anything you hear in the programme.

JOHN JONES:

Thank you Gwyneth - and I'll just repeat the address: 'University Report', BBC, London. And we look forward to hearing from you.

Now water: well I suppose there are very, very few countries in Africa that don't suffer from having either too little water or too much at a time, or even indeed, both at different times of the year. Nigeria, for example, has both. In the North, in Zaria for instance, they have a very high rainfall of something like 44 inches in three months, which has then to last them for the other nine months of the year. While in the South they have plenty of rain all the year round, but then there is the problem of draining the land to make it suitable for farming, and providing clean, safe drinking water from rivers which are often contaminated. Well someone who's dealing with these problems in Nigeria - and coming up with some very interesting answers - is Professor John Sandover, Head of the Department of Civil Engineering at Ahmadu Bello University, Zaria. But just how big a world

problem is water - we're always hearing that we are not going to be able to feed our exploding population. Does this mean we don't have enough water to feed crops, animals and ourselves as well? Well when Professor Sandover came in to visit us while on leave in Britain, our producer Gwyneth Henderson asked him first whether the world has enough water resources to survive.

PROF. SANDOVER: I think that one of the things people don't realise is that not only are our food resources limited, but our water resources are quite strictly limited. You can calculate exactly how many people can survive on this planet without decreasing the actual volume of resource of water. There is a limited amount of water - there are a limited number of people one can keep with it.

GWYNETH HENDERSON: So in fact as the mortality rate decreases, particularly in countries like Nigeria, Uganda or wherever it may be, the amount of water that is available is going to create a serious problem.

PROF. SANDOVER: Yes, in fact what we are doing in one way is self-defeating. We try to purify the water, we try to make the water cleaner for people to drink, to clean out the diseases, the bacteria in it, and this improves the life expectancy of the people, but at the same time that means we are providing a bigger problem in our population, which means that the total amount of water has got to go round even farther. So all this is, I'm afraid, a self-defeating problem, unless we take measures at the other end, that is to try and control our population.

GWYNETH HENDERSON: But, given the fact that at the moment we are just trying to increase our water resources, what are you in fact doing at the moment at Zaria?

PROF. SANDOVER: Our biggest job at the moment is basically a very simple one. We are trying to collect all the data we can. I know it sounds very, very limited, but none the less, in the area where we are, there is only one place for which we have records. And it is essential for our kind of work, that before we start we must know such things as how much rain falls. Even more important than that, how much rainfall in a short period of time, so that we can design things to take care of this. For instance, last year, we had six inches of rain falling in an hour and a half, which just about flooded everything, and yet this was an extremely localised storm - the main University campus was deluged, and yet a farmer only three miles away got only half an inch of rain in the same period. So it is tremendously important for us to know what amount of water we are going to have, and also how quickly it is going to fall, and what period of time it is going to fall.

GWYNETH HENDERSON: Will you be able, when all this data is collected in fact be able to forecast to an extent how much water you can expect and how much water therefore you can expect to conserve and use?

PROF. SANDOVER: Yes, within limitations at the moment we can say that the average amount of rainfall one can expect in any year is 44 inches in Zaria. But on the other hand, there are techniques being developed which will allow us to predict, not tremendously accurately but at least to give us some idea in the future, how the variations in rainfall are going to occur. We should be able to from world-wide meteorological data be able to predict that next year is not going to be such a good year, or the next three years are not going to be three such good years, and for us in the long term this is very important, because if we get a very, very heavy rainfall this year, then in the following year, even if we get a bad rainfall,

we can still get a lot of water from the ground because a lot of this year's water has gone into the ground.

GWYNETH HENDERSON: Well in the short term for individual farmers who for nine months of the year don't get any rain for their crops and so on, what sorts of answers are you working on - how can you help them?

PROF. SANDOVER: Two main ways at the moment. One is we are looking into the problem - how much mechanical equipment can we expect the farmer to be able to use? The other thing is, we are trying very hard to provide dams - designs for small dams which can be used by the local villagers so that we hope in future they will be able to, with only a minimum amount of supervision, be able to design and build a small dam. In fact we are doing one near the University at the moment. One of our M.Sc. students has worked on the design of the dam, and next year we've raised £2,000 from the Nigerian Tobacco Corporation, to whom we are very grateful for this, and this money will be used for the spillways which we have to make of concrete, and for various odds and ends of labour - perhaps we'll hire a bulldozer to do some of the clearing, but the bulk of the work, and we do emphasise this, must be done by the local people.

GWYNETH HENDERSON: But £2,000 is still a lot of money, and way beyond the resources of most villages. Is there not some other way of maybe even say in terms of tanks, rather than small dams?

PROF. SANDOVER: Even if you only reckon that the average usage of water by a family is 5 gallons a day, and you have a hundred families in a village and an average of 5 people to a family, that's 500 people in a village requiring 5 gallons a day, that's two and a half thousand gallons a day, and multiply that by 30,

so that's seventy to eighty thousand gallons a month, multiply it by 12, you are talking about a tremendous amount of water. Tanks have been tried in various parts of the world, but they're not just the answer. They are only a very limited day by day resource. No, I think the dam is the answer. What we have got to do next is, right we are going to spend £2,000 on this one, but our next job is, how can we, using local materials and local labour, make a spillway which is very much cheaper and which is still safe. One of the problems is you build - local people have done this from time immemorial - they build a dam over the river, and then the first good storm that comes along, it just floods up behind the dam, overtops it, and away goes your dam. We've got to find a method whereby the local people can build one, and build one safely that will stand up for a number of years, because in this one we are talking about, there are still 17,000 cubic yards of material. Now 17,000 cubic yards is a lot for a small village to place, and if they take a year to do it, the whole of a dry season, they don't want to tackle this job again in the next 10-15 years. So we've got to some how or other provide a design, a plan whereby they can do this much more cheaply, but the idea this year, is to show a local village that it can be done; that they can do it. Once we have done that, we'll have much less difficulty in future in persuading other people to do it and experimenting.

GWYNETH HENDERSON: Presumably, this sort of water will in fact be enough for crop irrigation and so on as well. How are they then going to irrigate the land from a dam? Are you going to help them with this too?

PROF. SANDOVER: There's no real need to help them on this one, it's very simple. You put a number of pipes in your dam, and you just put bungs in them. And then as

the water level goes down, they reach in and undo the bung, and so as the water level drops they can run the water from one side of the dam to the other, and they always irrigate downstream. You try and put your dam in the upper reaches of the stream, where usually the soil is not very good anyway, and then they conduct it in little channels. This is one of the most exciting things I've found, that the local farmers, even now, teach us a few things. They use, at the moment, to raise water from the river bed, the old machine called the shadoof, which is just a long stick with a big ball of mud at one end, and they have the bucket on the other end, remarkable mechanical contrivance, and they raise the water like this, something like at about half a gallon every thirty seconds, and they run it into their little channels and they irrigate areas of probably half an acre, an acre, and they run the water for distances of several hundred yards. They have found that the easy way to do it is to lay some black polythene in the trough, very cheap and very easy, and they all do this because they conserve a lot of water. We hadn't thought of doing this, but we will continue it beyond there, and the next thing is to take their idea of taking the polythene and then lay sticks across the top and then we lay the polythene sheet over the sticks as well, so we've almost got an enclosed tunnel, and this greatly reduces evaporation. Evaporation rate in the north accounts, out of a dam or reservoir, for six feet in a year. So if you've got a reservoir which is only six feet deep, if you don't use any water out of it, you lose all your water just by evaporation. So we've got to try and, this is another thing we are trying to do, the Americans have tried a lot on this, this is using very thin layers of material on the lake to stop evaporation. But nobody has yet successfully done this, but at least we can stop it when it comes from the lake behind the dam into the irrigation areas.

GWYNETH HENDERSON: How big an area of land would you be able to irrigate from the sort of dam that you are now building compared to the sort of irrigation processes the farmers have been using?

PROF. SANDOVER: At the moment I would say that during the dry season in this little village which we are talking about, the farmers probably irrigate about an acre. With our scheme, we'll not only provide all the water the village needs for drinking, and if we fence it properly for their cattle, we can irrigate up to ten acres.

GWYNETH HENDERSON: Well, it sounds a pretty good short term answer, but obviously you're not banking on this to be the long term answer as well. What is the long term answer?

PROF. SANDOVER: This is part of it, to try and get as many places in the country with their own water supplies. But we've also got to teach the people, I know this sounds terribly patronising and I don't mean it this way, but we've got to teach the people how to clean their water, to purify it, so that they can use it. This is a tremendously important thing; I don't think we have said this yet, but it is an interesting fact, if we could clean all the water in the villages throughout the north of Nigeria, it's only an estimate on my part, but agreed to by our Medical Faculty as being a very probable estimate, we could reduce the infant mortality rate by half, that is only by purifying the water. This would mean that instead of one child in two dying under the age of five, one child in four would die, and I come back to my old saying that, we are going to multiply our problems the other way if we do this. But this is one of our long term objectives. Another one is, how can we obtain water from the

ground, that is underground water, in sufficient quantities for village use, and in fact the local authorities near Kano, one hundred miles north of us, have set up windmills to run pumps to pump water. And this is something we are very interested in together with our mechanical engineering department, we are going to try and build cheap windmills.

JOHN JONES:

Things really moving on water at Ahmadu Bello University in Zaria. Professor John Sandover, Head of the Department of Civil Engineering was talking to Gwyneth.

And that's it for another week so as usual until the next time, from me, John Bankole Jones, it's goodbye for now.

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