

# 「フィリピンにおける持続的農業開発のための灌漑事業」

—Irrigation for Sustainable Agricultural Development in the Philippines—

平成5年9月

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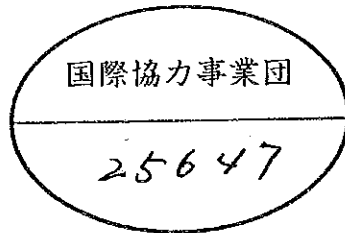
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国総研セミナー

テーマ：「フィリピンにおける持続的農業開発のための灌漑事業」

-Irrigation for Sustainable Agricultural Development in the  
Philippines-

日 時：平成5年9月27日 16:00～17:30

場 所：国際協力総合研修所 2階 大会議室

講 師：Apolonio V. Bautista

Administrator

National Irrigation Administration, Philippines

(講師略歴)

1956～60 フィリピン・サントトーマス大学卒業

1986～91 農業省地域事務所統括次官

1992～ 国家灌漑庁 (N I A) 長官



## 「フィリピンにおける持続的農業開発のための灌漑事業」

### (セミナー概要)

フィリピンでは人口の70%が農村地域に住んでおり、彼らは直接・間接的に農業活動に依存している。農業は、国内総生産の22.6%、全雇用の半分を占める主要セクターである。フィリピンの主要作物は伝統的に米とコーンであり、商用作物としてはココナツ、さとうきび、バナナなどがある。米の生産は1977年から1989年まで順調に増加したが、1990年から伸び悩んでいる。このような状況下で貧困は変わらず残っており、貧困緩和と富の分配のためには農民の生産性向上は欠かせない。しかし多数の農民が不安定なモンスーンのもたらす雨に依存しており、安定した生産を得られないでいる。

適正な農法を使用すれば、実験的にはヘクタールあたり米20トンの収穫が可能であり、12トンまでなら比較的容易に達成できるとされている。肥料の投下や害虫管理により、5～7倍のとうもろこし生産を達成した例もある。

したがって農業生産を増やすために灌漑は重要な役割を果たすが、灌漑の普及率は1992年で49.1%であり、21世紀の初頭までは政府の主要開発課題となるはずである。

N I Aは1963年6月に灌漑事業推進のために設立され、現在は農業省(DA)の付属機関となっている。N I Aの事業は、水資源の調査研究、灌漑事業の計画立案・実施、国家灌漑システム(N I S)の運営管理、共同体灌漑システム(C I S)及び私有灌漑システムの統括、N I Sの運営管理の共同体・組合への部分的委任、C I Sの修復資金の貸付けなどである。

N I Aの目標は①国家の食糧生産計画をサポートする灌漑事業、②適正なレベルの灌漑サービスの供与、③地域社会の経済的・社会的発展の保証、独立した組織としてのN I Aの運営、などである。

フィリピンにはN I S、C I S及び私有灌漑システムの3種類の灌漑システムがある。N I Sの灌漑面積が152,000ヘクタールで変わらないのは、部分的にC I Sへ、

C I Sは私有灌漑へと委譲しているからである。このように灌漑は各段階を経て、農民自身の手によって効率よく、効果的に運営されるようになる。国家レベルでの大規模な灌漑のネットワークは、施設の要所に適切な資金が分配されないという欠点があった。

計画段階で見積もられたコストや便益は、環境の劣化や施設の維持管理の予算不足によって高コスト低便益になる場合がある。例えば、農地から流出した土壌が水路内で堆積し、沈泥が堰を塞ぐといった物理的な問題が起こる。沈泥により水路の流量が制限され、結果的には収穫量に影響することになる。国家レベルでは、これらの沈泥を取り除く費用を負担し切れない。

N I Aはこのような事態を避けるための方策のひとつとして、農民を巻き込む形での事業を推進している。実際に灌漑施設を使って農業を営む農民に灌漑施設の運営を任せることにより、効率的な運営が可能となる。よってN I Aは、個々の農民や灌漑組合に対して、灌漑の運営計画の提示、対話を行うと同時に、地方自治体の農業委員会と農民・組合の調整役となる。計画が実施段階に入ると、N I Aは雨水の貯留・流出・蒸発等のデータの収集を行い、これらのデータの分析を行い、灌漑施設運営にフィードバックする。

N I Aが抱える問題としては、国内の開発計画や海外からの援助などにおいて、ダム建設や鉱業開発などが下流域での河川水の利用に影響したり、急増した人口が森林へ流入し、農地としたりする場合がある。また、農地の商業用地、工業用地、居住地などへの転換などが、灌漑組合の結成を困難にしたり、河川水を産業用・生活用水へ分配するために農業用水が制限される可能性もある。

灌漑開発のコスト上昇も大きな問題である。計画段階ではコストの低かった事業が、後に改良が必要になった時点ではコストが上がって計画を続行できない場合がある。また、計画段階で経済面での困難が予想される場合でも、別のファクターにより建設を強行する場合がある。既存の施設の老朽化が急速に進んでおり、この修繕のための費用負担を誰がするのかという問題がある。他にも施設建設資材や電力の不安定な供



給が問題である。

今後のフィリピンの計画では、1993年から2002年にかけて灌漑エリアを64%増加し、単位面積あたりの米の生産量の75%の増加を計画している。灌漑は農業の、ひいてはフィリピンの発展のための重要な要素である。現在行われている灌漑開発と既存灌漑施設の適正な維持管理が行われれば、21世紀の食糧確保と自給は達成されるであろう。そのためにはN I Aとしては持続的な農業開発を主張し、環境の劣化についても更に議論しなければならない。



September 27, 1993

## **IRRIGATION FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT IN THE PHILIPPINES**

Apolonio V. Bautista  
Administrator  
National Irrigation Administration  
Philippines

**MODERATER:** Ladies and gentlemen, my name is Hiromasa Shinozaki. I am a Deputy Director of the Research and Development Division of IFIC and today's Seminar's Moderator.

Thank you very much for coming to the IFIC International Seminar of JICA.

Today's theme of the Seminar is "Irrigation for Sustainable Agricultural Development in the Philippines". It is a great pleasure to introduce Mr. Apolonio Bautista. He is the Administrator of the National Irrigation Administration of the Philippines.

His organization and JICA have a cooperative project, "Diversified Crops Irrigation Project", so JICA has invited him in order to introduce him the Japanese irrigation system and agricultural development. On this opportunity JICA requested him to make a lecture for us to learn about Philippine agricultural development.

Now, I would like to ask him to make a speech for about one hour.

**BAUTISTA:** Thank you very much. First of all, I would like to thank JICA for the opportunity to travel to Japan and observe your irrigation development and the farms which, I believe, would be of great assistance in my work as Administrator of the National Irrigation Administration. Every travel opportunity I think is a lauding process that should be taken particularly in instances where the opportunity to discuss and share ideas with people like you is something that I have looked forward to so that when the invitation to give this lecture was brought to my attention I gladly accepted, more to learn from you and, hopefully, to also impart some information to you. I have asked that

I would give a relatively short lecture and then I would like to open myself to an open forum which I think would be more appropriate on the particular interests of some of you rather than try to address all of your concerns.

So, as an introduction to the topic, I would like to state that the Philippines is an agricultural country with about 70 percent of the population living in the countryside and depending directly, or indirectly, on agriculture-related activities for their livelihood.

The agricultural sector dominates the country's economy in terms of both resource base and contribution to the national welfare. The sector contributed 22.6 percent to the gross domestic product in 1992. And, significantly, agriculture continues to be the main source of employment absorbing about half of the total employed population.

Despite the unfavorable world market conditions in the past years, foreign exchange revenues from agriculture accounted for more than 33 percent. The country has land resources of about 30 million hectares, 10 million of which are arable or under cultivation, and of this area 3.3 million hectares are planted to rice, and 3.6 million hectares to corn, and the rest to coconut, sugar, and other crops.

You might be surprised to learn later on, in some of the reports, that sometimes the total aggregate area planted to crops is more than the absolute area because of multiple cropping and multi-story cropping that we practice in some areas in the Philippines so that you will have coconut areas that are also planted to pineapple and to papaya or even crops like coffee.

Thirty years ago, each Filipino had a hectare to himself to enjoy, to protect, to develop, or to work a part of. Today, there is less than one-half hectare, and by the year 2000 our demographers say that there will be only about one-fourth hectare to every Filipino. The population growth is very high, and on this we are very concerned.

Agricultural production is traditionally concentrated on a few main crops. Rice and corn are the major food crops, whereas coconut, sugar cane, and banana are the major commercial crops. The main banana market, of course, has always been Japan. The paddy production is steadily increased at an annual average rate of about 4.9 percent from 1977 to 1989 and then the decline starting

in 1990.

Notwithstanding the above performance, poverty remains a threat especially in the isolated areas. The "core poor" that defines the lowest 30 percent of the income hierarchy mostly live in rural areas and are dependent on agricultural activities. A majority of this are rice, corn and coconut farmers scattered in the twelve regions outside Metro Manila.

Under this setting irrigation, which is one of the primary inputs of agricultural production, plays a very important role. With the potential irrigable area of 3.1 million hectares, irrigation development in the country is only half through. Irrigation, the key to increased agricultural productivity and profitability, is one of the main priorities that is being given special attention by the government in its current efforts of boosting agricultural development in the country.

Agricultural development must continue as a priority in the national government's agenda. It will be the main focus of attention by the government in the last decade of the 20th century including, hopefully, the first few decades of the 21st century.

With the steady growth of the population, agricultural production must keep pace to meet the basic food requirements. Increased productivity of the farmer is a must in addressing the goal of poverty reduction and, hopefully, some wealth redistribution.

Government must address the issue of food security and self-sufficiency for far too many farmers are trying to survive in an environment that is constantly changing adversely. The sustainability of production is becoming more and more difficult. The survival of most rain-fed farmers depends on whether the monsoon rains will come on time and the slash and burn farmer is running out of areas to open up.

Environmental degradation is affecting already productive lands, particularly irrigated fields, but we know all is not lost for there are silver linings even in the darkest of clouds. Experiments have shown that twenty tons of paddy per year is possible. Some farmers have proven that twelve tons per hectare is relatively easy to attain. Trials have shown that rice can be produced with far less water than what is normally practiced.

The mountain farmers of northern Luzon have shown that rice can be

produced even in the steepest slopes, and the centuries under which rice terraces have been cultivated proves that sustainable agriculture is possible even in those areas.

There are also corn farmers who used to produce only one ton of corn per hectare, and by changing the variety to the new improved varieties have doubled their production without introducing any other cultural practices in corn production, and when additional fertilization and modern pest control was instituted that one ton was increased to five to seven tons per hectare per season.

Food security and self-sufficiency are both attainable. The problem really is at what cost. Investment in irrigation is one cost, and we look it as a very, very important investment.

This paper focuses on the thrust and programs of the country's irrigation agency, the National Irrigation Administration, the status of irrigation development, the present conditions and problems encountered by the National Irrigation Administration in its current efforts, and new directions towards sustainable agricultural development in the Philippines.

The National Irrigation Administration is a government corporation with a relatively independent board. It is an attached agency of the Department of Agriculture for policy direction, basically, and to insure that policy direction the Chairman of the National Irrigation Administration is the Secretary of Agriculture.

To apprise those who are not very familiar with the National Irrigation Administration, I'd like to read some of the pertinent facts about the agency. It was created under Republic Act 3601 signed on June 22, 1963, and its Charter mandated NIA to make the ten to twenty year period following the approval of the act as the "Irrigation Age" of the Republic of the Philippines. However, this Charter was amended in 1974 by PD552, and in 1980 by Presidential Decree 1702, both increasing the powers of NIA and support to irrigation development.

Specifically, the powers and functions of NIA are to investigate, study, and develop all available water resources in the country, primarily for irrigation purposes; to plan, design, construct and/or improve all types of irrigation projects and pertinent structures; to operate, maintain, and administer all national irrigation systems; to supervise the operation, maintenance and repair

or otherwise administer temporarily all communal and pump irrigation systems constructed, improved, and/or repaired wholly or partially with government funds; and to delegate the partial or full management of national irrigation systems to duly organized cooperatives or associations; to charge and collect from the beneficiaries of all irrigation systems constructed by or under its administrations such fees or administrative charges as may be necessary to cover the cost of operation, maintenance, and insurance; and to recover the cost of construction within a reasonable period of time to the extent consistent with the government policy; to recover funds or portions thereof expended for the construction and/or rehabilitation of communal irrigation systems which shall accrue to a special fund for irrigation development.

As a government owned and controlled corporation, NIA aims to develop water resources for irrigation and provide corollary physical and technical services in line with the agricultural development program of the National Government.

As so far as the background, all governments in the Philippines have spoken, as a policy, that irrigation development is a thrust that should be maintained and funded. Unfortunately, the funding is not as free flowing as the words for the need for votes by some politicians.

And so if you will look at the records, except for a few years during the Marcos era, the pronouncements of government for full irrigation development really never found itself in the General Appropriations Act, and we maintain that the General Appropriations Act is the ultimate policy statement of government.

And so we have that problem in NIA where politicians tell us to develop more and more irrigation systems and, yet, we don't receive the appropriate funds to develop that which they wish us to develop.

The general objectives of the agency are to develop irrigation systems in support of national food production programs; to provide adequate level of irrigation service; to ensure economic and social growth and development in the rural areas; and to maintain the operation of the agency as a stable and autonomous corporate entity.

The status of irrigation development of the country from 1987 to 1992 is thus, so from 46.1 percent it increased to 49.1 percent.

So we have here the three basic types of irrigation systems in the Philippines: the national irrigation systems that are a thousand hectares or more and managed by the National Irrigation Administration; the communal irrigation systems which are basically constructed by government for eventual turnover to the Irrigators' Association in a communal basis; and then the private irrigation systems.

You might ask why it (national irrigation systems) has been consistently 152,000. We maintain that figure because in most cases a private system is partially taken over by a communal system, and some communal systems are eventually taken over by a national system. And as more and more private systems are constructed, and some of them are being taken over as part of the communal and national systems, the figure relatively remained stable. But we are trying to make a more detailed figure for that.

The distribution among the regions in the Philippines is thus. Region 1 has 58 percent development in 1987, and 60 percent in 1992; Region 2 has 49.9 to 51.6; Region 3 has 57.9 to 58.7, and you will notice that Region 12 in 1987 has only 25.9, and in 1992 it jumped to 30.2, a substantial development. But the best increase is Region 11, from 45 percent to 48 and so far in Region 7 there is no national irrigation system.

And if you will look from the figures, there are more areas under communal irrigation systems than there are national systems, and if you will look at the eventual turnover of part of the national systems, eventually the majority of the irrigated areas would be run by farmers themselves, and less and less of it would be managed by the National Irrigation Administration.

Now you might ask why we have been pushing for farmer participation in irrigation systems. It's basically one of two reasons. One is government is not as efficient as the farmers in running the affairs of a system and, secondly, it is less costly for government to involve farmers to manage the systems themselves. And we have found out that as more and more farmers try to involve themselves as much as possible, democracy really is being practiced without really being fully aware why it is rubbing in on the people. It's one way of calling it "people empowerment."

Now the existing conditions and problems. I would like to discuss in relative



detail some of the actual conditions of NIA's field operations which include link tasks and activities in surface water irrigation systems, the physical infrastructure in existing operation and maintenance procedures, operations in practice as well as problems that hinder and affect its operation.

A surface irrigation system can be divided basically into four subsistence, and these are water source, water delivery, the farm, and water removal. The farm subsistence is considered to be the heart of an irrigation system for it performs the system's primary function, that of food growth for humans and animals. The water source, water delivery and water removal subsistence support the farm system.

A surface water irrigation system is viewed as a set of activities and tasks encompassing water, impounding, and release delivery and allocation to final users. In this activity, we have found out that environmental degradation has played a big role in costs of operation and in the hectare regions that are being cultivated, and eventually the cost benefits that a system had to undergo.

So when you will look at how much a system was projected to cost at the design and construction stage, and at how much benefits are currently accruing, because of the low cropping intensity cost by environmental degradation and sometimes low operation or maintenance budgets, the total accrued benefits today are not what were originally projected in the past.

So that will show why an agency like ours has really to find ways and means for it to survive and for the system to be operated as well as possible, and that is the reason why basically the involvement of farmers is helping the National Irrigation Administration in addressing this common problem.

Now, the lack of physical infrastructure is also a problem that is existing, and the issues contributing to this are some of our systems lack effective silt exclusion mechanisms resulting in the need for continuing heavy desiltation work in the systems. The worst silted system we have is the Agno River irrigation system where sometimes during heavy rainfall days as much as 1,000 tons of silt get into the main canals.

Now you might ask, "Why force the issue and irrigate?" Unfortunately, if we don't allow the water to come in, parts of the systems would not be irrigated. So it's a choice on how much you can irrigate and suffer the cost of getting the

water in and also the silt, and you have to remove the silt.

Now, if you wait for the river to clear up and let the water come in, part of the irrigated area might suffer so much that the total economic cost may justify desilting 1,000 tons of silt a day.

The erosion problems of the intake sights along canals and downstream of the structures reflect, in part, uncontrolled flows from heavy storms and typhoons, the impact of complex drainage, drainage water use, and run of patterns. This is basically some of the results of the earthquake of 1990 and the eruption of Mount Pinatubo. It has subjected a lot of our systems to destruction or partial or full damage to the structures, and until the situation is stabilized some of these systems have to be abandoned and the farmers will have to wait, and the government right now is trying to find out what we can do in the meantime while these systems are not yet operating.

Limited capacity in main canals in transporting water, causing delay in transplanting and delay in also harvesting our crop. 1993 is a classic example of a very delayed crop. We should be into our peak in harvesting at about this time. And yet, we are only starting, and the peak would be late October and November. And we foresee some problems because of delayed planting. The rains from the northeast monsoon would be coming in and sometimes you would have one or two weeks without sunshine, and drying the rice can be a major problem causing reductions in yields.

Network designs result in long canals and low canal densities relative to irrigated area, making distribution difficult. This results primarily because in the construction of some of the systems, because of delay in construction periods and increased costs, sometimes the terminal facilities get the least priority, and so you have to operate the system with very minimal investments in those areas, and it results into some of these problems.

And so in systems operations, we have basically some procedures that we have adopted, and we have looked at planning the operation of the systems that we exercise with the farmers prior to release of the water, and basically this is based on the projected available water from the rivers. So just like last season because 1992 was basically a drought year, the inflow into the rivers was dramatically reduced compared to normal, and a substantial decrease in

hectarages had to be projected and farmers had to decide with our field people the hectarages that had to be planted.

And sometimes when we don't get a consensus, farmers try to outdo each other and open turnouts and try to irrigate, and then it leads into chaos and losses among farmers who had invested in farming activities.

And so we try to look at how NIA, as an agency, can help alleviate some of those problems of farmers trying to outdo each other. And so we have come up with some procedures, and that is after making the plan we try to disseminate the plan. After discussing it with the officers of the associations, we discuss it with the members. And on top of that, we discuss the plan with the provincial and/or the municipal agricultural coordinating council which is a government and a private council among farmers and local government officials.

After that plan has been approved, then we go back to the farmers and Irrigators' Association and draw up the details of the plan. Eventually we implement the plan, and in operating the plan we try as much as possible to maintain weekly accounts of the status of the farming activities. We try to look at how controlling and measuring water along main canals, laterals and sub-laterals to the turnouts according to the target water requirement of each farmer as the situation changes.

We also have to look at daily discharge monitoring at the headworks of the systems, the laterals and sub-laterals in turnouts and also up to the field level; collecting and processing of rainfall and evaporation data within the systems; water suspension or reduction of irrigation at headworks of the systems especially after transplanting to effectively use rainfall that may be available particularly in the storage dumps; and anticipating and implementing emergency measures during droughts and floods; and also evaluation of weekly data collected for feedback for the response mechanism.

And then eventually we have a monitoring system that we have installed, and then we also are looking at maintenance of the services of the systems considering all of the limitations of the farmers and the agency and the prevailing environmental conditions in the area.

So, in practice, there are serious deficiencies in water measurement including insufficient and/or inoperable operating devices. Systems deterioration is heavy

due to siltation and/or lack of maintenance to guarantee discharges. Cropping schedules are not strictly adhered to resulting in pressures to modify pre-scheduled supplies. Gates are removed or inoperable due to farmer intervention to secure water. Water masters are unwilling or unable to continuously adjust gates in response to fluctuating discharges and changed farm schedules.

And there are many local ad hoc adjustments involving farmers and water masters which may interfere with equitable distribution of water supply, thus affecting adversely those who have to depend on the same water that has been interfered with in the upper areas of the systems.

Now, the NIA is endowed with values internal and external developments, and some of the more positive developments that have come into the agency are the intervention introduced by our cooperation with the Government of Japan and JICA and the various agencies that have been working with us.

And there are still pressing social, political, and economic and physical factors that influence the agency's courses of action, thereby affecting its performance and accomplishments. And among these problems are, one, upstream and the watershed. The problems are denudation of the forests and siltation and mining activities in the watersheds. In the dam storage and reservoir systems, we also have the additional problem of rapid sedimentation. And in the diversion dams and upturn structures, there are quarrying downstream of the dams and also siltation upstream.

You might be wondering why there is quarrying sometimes downstream of the systems. It's also because in some areas the only available quarry material is in the river and, unfortunately, some of the best material are downstream of the river, and local governments sometimes allow quarrying there.

Recently we have asked local government to put a stop to this. Otherwise, the systems would be in jeopardy, and the farms may have to go back to rain fed agriculture if the dams would collapse because of quarrying.

And in the canal systems and its structures, we also have siltation problems, bank erosion, inoperable gates and facilities. And in the farms we have encountered high seepage losses, non functional facilities, low canal density, land conversion for commercial, industrial, and residential uses. And on drainage we have inadequate drainage facilities, not only in number but also in quality. The

quantity of water to be discharged sometimes is too much for the facilities to handle, so we have flooding and crop losses.

And in the institutional area, we have organizational and development problems among our Irrigators' Associations. While we are very proud about our successes among Irrigators' Associations and how much they have contributed to the success of NIA in getting farmers to pay irrigation service fees, we still have some institutional problems that we must address.

On environmental degradation, we see the deteriorating supply of water is due to the new addition of watersheds. Pollution from mine tailings, sedimentation and siltation have been very alarming. The physical conditions of the watersheds of existing systems deserve a closer examination. The uncontrolled logging and shifting cultivation has affected the quality and the quantity of water available for irrigation.

Sedimentation and pollution from mine tailings has become common problems in irrigation system, and with this problem we have to look at how we can put a stop to this in the quickest, possible time. Unfortunately, it is not a matter of identifying the problems, for like the case of the shifting cultivators, it is so easy to plant a crop with the use of a burrow and a match stick while in the grasslands you need tractors or carabaos and plows in order to put in a crop.

And the population pressure has really been a problem, and when farmers in the hills have six or seven children, and they look around and find out that they have no other alternative but to look at the forest and clear a part of it and plant a crop. You can imagine the kind of problem and the pressure on the environment the Philippines is subjected to.

And added to this is the competing use of land and water. Agricultural lands available for needing irrigation are being heavy competitors for the use of the need for commercial, industrial, and residential areas. And, in addition to that, the limited water resources for domestic, commercial, and industrial use have subjected a refocusing of some of the traditional available water that has been used for agriculture for some allocation into industrial, commercial, and domestic uses.

The other problem that we are facing is the increasing cost of irrigation

development and, as you are all aware, in most cases, the systems that have been identified for construction usually get us a priority those that would cost less. And eventually as more and more of those are constructed, those that remain for farther development are those that were more costly to prosecute.

So we come to the point where the economic benefits are sometimes so little that the National Economic Development Authority has put a stop to some of the proposals for irrigation systems to be funded.

Fortunately, as a policy there are other considerations that have to be looked into and NEDA in some cases have addressed this adequately, and one of the classic examples is; some of the island provinces where if the grain is not produced in the island, importing it from the other provinces would be a very high alternative, and even if the economic benefits as a rule using the standard parameters would not normally allow a construction in one area, the other factors come in and sometimes those factors have played a major decision in going ahead with the project.

And I think one of the classic examples of this is the JICA project in Marinduque. That project is really a project that we think should have been done a long time ago because of the problems that the island province of Marinduque had been subjected to.

And the other projects that I think were very well recommended and decisions should be applauded are the projects in Bohol which were funded basically by JICA. It has been said that where if you will look at a problem on soils and environment, you will see all of those problems in two provinces in the Philippines—Palawan and Bohol. And I'm glad that JICA chose Bohol as a major investment area for irrigation development.

One of the problems also that we have is the rapid deterioration of existing systems. As you may be fully aware, when an agency has to depend mostly on its own resources to generate what it needs to spend for maintenance and operation of the systems when farmers don't pay their irrigation service fees, in the quantity and the time that we need to collect so that we will have something to spend, we are subjected to the situation where farmers demand service and we have to go to them and say, "For us to give you the service you have to pay." And then they would come back to us and say, "For us to pay, you must give

us the service.”

And it is in this context that we have seen how much the value of rehabilitation works from the World Bank and the Asian Development Bank and JICA have given us, for we have found out that when new investments in a system are made, generally the collection efficiency goes up and the enthusiasm of the farmers to work better among themselves is started and continuing that is much easier than starting from nothing.

Other problems that we are facing are the unstable peace and order situations in some irrigation systems and the indefinite supply of construction materials like cement during some periods of heavy construction work in the Philippines. And also the lack of a stable power supply to operate some of the pump irrigation systems that we have.

The positive side about this is that the peace and order situation is getting better and the power supply situation is also getting better. The current efforts or countermeasures being undertaken by the National Irrigation Administration to address the problems enumerated above include the implementation of the following projects.

The Irrigation Operation Optimization Support Project which is basically financed by the World Bank; the irrigation watershed management; the Diversified Crops Irrigation and Engineering Project financed by JICA; the small water impounding management projects; the participatory approach programs in irrigation development; the neo-Ford project called Cabuso which is basically a people empowerment and support service project; the irrigation management information systems to help us get a better feed mechanism into what decisions have to be made as early as possible; the earthquake reconstruction project; irrigation component; and the rehabilitation of the Mount Pinatubo affected areas which is also a JICA financed project.

One of these pioneering projects is the diversified crops irrigation project, a joint NIA-JICA undertaking supported by the project type technical cooperation program of JICA. The project is conceived to find ways of improving dry season irrigation in existing national irrigation systems with the introduction of diversified or non rice crops.

The activities of the project under phase one involves the formulation of

planning and design criteria, preparation of an irrigation engineering manual for diversified cropping, and the training of NIA technical staff in the Philippines and in Japan.

The five year technical cooperation launched in May, 1987 was completed last year. However, the project was given an extension period and the second phase has just started. We are glad to mention that the second phase started on time, and the farmers who have been identified as potential targets of the second phase have mentioned their gratitude for the implementation of phase II, and those that I have talked to have specifically asked me to convey to you how grateful they are that the Government of Japan, through JICA, has extended this assistance.

Some of the new directions the agency would like to take is to support agricultural production through sustaining adequate level of irrigation service. NIA's thrust for 1993 focuses on accelerating the completion of ongoing projects and improved and sustained operation and maintenance of the irrigation systems, pursuing the Irrigators' Association, organization and development, and also some research activities.

On the other hand, as a corporation it's striving to maintain viability. It has to evolve a lean, but efficient, organization, one which it could support from its earnings and responsive to changes in the irrigation environment. It has to find ways to increase revenue generation and promote greater efficiency for increased productivity.

The agency's program for the current year needs 7 billion pesos to be able to pursue its ongoing projects and start those ready for implementation. However, due to economic measure adopted to curve government spending, NIA's budget has been reduced to 2.3 billion pesos.

Institutional activities include organization and strengthening of Irrigators' Associations in both national and communal irrigation systems. And aside from the regular irrigation programs, NIA is also trying to implement other inter-agency irrigation activities, such as the Department of Agrarian Reforms, comprehensive agrarian reform program, irrigation component, the Department of Agriculture's highland agricultural development projects, high irrigation component, the local government units, Kagayan integrated area, agricultural



development program, which was basically a JICA assisted program; and the Department of Public Works and Highway's SWIM projects.

Under these inter-agency programs, NIA needs a lot of money, and the total budget for next year is 651 million pesos. In addition to these projects, the pioneering NIA-JICA joint undertaking in the diversified crops irrigation engineering project, phase II, which was implemented in 1993.

We hope to see the enhancement of the technical capability of NIA's staff and the farmer beneficiaries regarding this field. Over all, the project scheduled for completion this year would generate some 8,000 new hectares and the rehabilitation of more than 6,000 hectares.

In conclusion, we would like to state that under the corporate plan for 1993 to the year 2002, irrigated areas will most probably increase to 64 percent and contribute to 75 percent of total paddy production based on current production levels per hectare.

With the completion of ongoing projects and the production strategies of the Department of Agriculture, it is hoped that the rice production will increase substantially and erase the gap between production and demand.

Irrigation is a key factor in the agricultural and for the development of the Philippines. As the weather patterns change more and more adversely, productivity and profits will be dependent on irrigation. Areas presently planted to crops can insure food security and self sufficiently into the next century if irrigation development is increased and irrigation systems already built are adequately maintained.

We need more and more advocates and practitioners of sustainable agriculture. Talking about environmental degradation is not enough. Continuing positive actions are needed in the Philippines and everywhere.

Sustainable agriculture is not one among many options. It is our only option. We are trying to work hard on it. How about you? We hope that together, in some little way, whatever little effort we can put together would find a better environment so that the little effort that we can all put in several projects that we are undertaking would redound to sustaining the productivity of the farmers and insuring that at least the food security of a farmer is insured. Thank you very much.

## [QUESTION AND ANSWER SESSION]

**MODERATOR:** Thank you very much. Now I would like to open the second session for answer and question for about thirty minutes.

**QUESTION 1:** My name is Yoshiaki Kano, Director of Agricultural Cooperation Division of JICA. I am just taking this opportunity as a volunteer because my division is in charge of projects which Mr. Bautista mentioned, diversified crops, irrigation and new projects, so I also have discussed with him. However, just as an volunteer I would like to raise several questions.

One is as a figure which Mr. Bautista indicated, some region, for example Region 12 showed quite low irrigation development basis, just 25 percent. Hence Region 1 showed 58 percent. It's a quite high irrigation ratio compared to other areas. So, in the future in the Philippine, which direction would be taken by your policies to increase low irrigation area or to increase more as high irrigation areas? This is one question.

The second question is, also at the same figures you just explained it as a communal system, so would you mind saying more clearly or in detail about the definition of the communal system compared to the national irrigation system? Because these two answers would be quite useful for consideration, because JICA is now organizing the country study group, and now we are thinking of the Philippines, so this point would be one of the good suggestions which will happily be given by you. Thank you very much.

**MR. BAUTISTA:** On your first issue the figures that indicate the actual development of irrigation in those regions, there are demands from farmers and politicians for more irrigation development in their areas, in fact everywhere, but we had this idea that we have to look at what should our priorities be.

Now, the northern part of the Republic is subjected to a lot of typhoons and drought, and also some pressures on urban development is a reality that we must address.

The other one also is that the investments of government in the northern half of the country is greater than the investments in the lower half, and agriculturally if you will look at the potentials and if you have limited money the irrigation development and infrastructure development for agriculture should have more

priorities for Mindanao because Mindanao's weather pattern is more predictable. There is no typhoon and, as a rule, the productivity and the profitability of our farmers in Mindanao is more assured than those of Luzon.

Of course, the advantage of the Luzon farmers is that they are very near the market and the roads and bridges and communication is already an established investment in the area, but maybe if you will look at what new investments can be done for Luzon the diversified crops project is the answer for what the problems of most of the Luzon farmers are because during summer, in some of the systems there, the irrigated area is only 20 percent of the service area, so what will you do with the 20 percent available water? Do you plant that for more rice or do you use that to plant other crops? Which, in the Philippines setting, can be more profitable than rice? So those are some of the fields that we are looking at and the policies will really depend on how the other government agencies would look at investments in the areas, but the Department of Agriculture has just launched the key development areas where in rice we would like to invest a total approach to infrastructure into areas that are most productive and most profitable. We don't want to repeat the mistakes of the past where one road is going to another village, a bridge is being built towards one village without building the road, and then an irrigation system is going on in another village, a post-harvest facility is going on in another village, and the benefits to this are not fully used.

So if we can put all of this together, then we hope to see a better use of the investments and better economic benefits to the farmers. The problem really is, on a policy basis, how about those who are not targeted yet. Of course, we can say their time will come. Unfortunately, it is not yet now.

On the communal assistance, basically I think I mentioned that national irrigation systems are 1,000 hectares and above and communal systems are generally 1,000 hectares or below. The national irrigation systems are managed by the agency, from the dam to the headworks to the turnouts. With the introduction of the Irrigators' Association approach, we are turning over the smaller systems of the sub-systems for the Irrigators' Association to manage following the communal irrigation system approach where management of the system, the total system, is in the hands of the farmers.

Basically, the communal irrigation system works this way. The farmers identify the projects, we look at the project. If the project cost-benefits are attractive, then we organize the farmers, we tell them what their obligations are, what benefits they can get by working together, and then the system is constructed and turned over to the farmers to manage, and then they amortize the system.

We generally need from them at least 20 percent in equity. It is more like their down payment, and in most cases that 20 percent comes in the form of labor or right of way for the systems, and if they can increase that 20 percent to 30 percent up front, then the system is already theirs. They don't have to amortize it any more. The maximum period for amortization is 50 years.

If there is a need to rehabilitate the system because it is partly damaged by a typhoon, then that amount needed for rehabilitation would be an additional investment that they should amortize.

**QUESTION 2:** My name is Matsubara Eiji, Deputy Director of Agriculture Technical Cooperation Division of JICA. I have two questions. The first one, last year your agency was changed to the Department of Agriculture. Previously your agency was attached to Department of Public Works and Highways. Please tell me what is the preferable effect from the change of this organization. This is the first one.

The second one, you have inter-agency irrigation project. This means several departments participated in some rural development project. In Japan, those inter-agency projects are very rare because some bureaucratic demarcations are existing, so please tell me how do you coordinate the inter-agency merits or demerits you have, so please tell me who manages the coordination, how to implement those inter-agency projects. Thank you.

**BAUTISTA:** On your first issue, the reason behind it is that in 1987 there was a general reorganization of government, and in that reorganization the recommendation of the Reorganization Committee is that the National Irrigation Administration should be transferred to the Department of Agriculture. The reason behind their recommendation is really it is felt that the clients of the Department of Agriculture are similar, or the same, clients of the National Irrigation Administration.

While the agency has two basic functions, dam construction, design and construction, and irrigation system management, it is felt that dam construction is only for a few years while irrigation system management is an ongoing activity, and it may be best that the clients of the National Irrigation Administration, who are the same clients as the Department of Agriculture, should have a common policy base, the Department of Agriculture, and so to have the priorities of the Department of Agriculture and the National Irrigation Administration going together instead of going into opposite directions, it was decided that the National Irrigation Administration should be an attached agency of the Department of Agriculture and no longer that of the Department of Public Works and Highway's.

One problem also that arose was that the National Irrigation Administration is basically an agency run and managed by civil engineers whose priorities are really construction and not management of the systems, and in not a few cases management of the systems really suffered because of too much emphasis on construction, and with the dwindling resources available to the agency the proper division of resources that are needed for appropriate operation and maintenance and construction would be best achieved if construction activities or overemphasis is given its proper role in the agency, and so today we believe that irrigation system operation, which has suffered in comparison to construction, should be given a priority so that the operations of the system can be sustainable.

In the inter-agency irrigation projects, the problem is not really as great as you might think because in the inter-agency irrigation projects the National Irrigation Administration is more like a general contractor for design and construction of irrigation projects.

Together with that is we do the work for the formation of the Irrigators' Association into a cohesive group that will adequately be motivated to maintain and operate the systems. After that, the beauty of it if it was financed by the local government, then the Department of Agriculture and our field offices can help the local government to insure that the farmers are getting the extension services that they need for better production or for continuing institutional development from the National Irrigation Administration.

And so if it is a small system the management of the system is really not done by NIA or the agency that financed the project. It is managed by the farmers who are the beneficiaries of the project.

I think a classic example is the role of the Department of Public Works and Highway's and the other departments in the Marinduque project. As you are aware, that is more like an integrated area development project with a dam that is constructed to irrigate agricultural fields and also provide domestic water use for the municipalities near it. So, in that way, after we have constructed the system and the Irrigators' Associations have been formed, then local government can take over the initial and sustained coordination with the agencies that are needed to further give periodic assistance.

**QUESTION 3:** Mr. Bautista, my name is Yamamoto, Director of the Overseas Technical Cooperation Office in the Ministry of Agriculture. I am responsible for the coordination of all technical cooperation conducted by our ministry.

Mr. Bautista, I would like to ask a question about the policy direction in the future focusing on the rice demand-supply situation. The Philippines once achieved rice self-sufficiency a few years ago, but, then, you became deficit in rice production, mainly due to the natural calamities like volcano and some floods. But, with the continued effort of the irrigation development or other support measures, I don't think it will be long future before you will restore self-sufficiency again. Then, I would like to ask you when do you project or you will restore self-sufficiency of rice again.

As in the case in some other development countries, like Indonesia, after the achievement of self-sufficiency again, what will be your policy because while your country is stagnating in terms of rice production, other countries like Vietnam have become rice exporting country, and I think the production cost of your country may be higher than Vietnam. Then you will have a small chance to export your rice after achieving self-sufficiency. Then how will you deal with the surplus of rice production? That is my question.

**BAUTISTA:** The rice demand situation, the rice demand-supply situation, is really a very fluid situation in the Philippines. Without doing much, if the weather is good, more farmers plant rice and they get a good yield, and we are sufficient at least for the following period.

Unfortunately, in any given year one area of the Philippines is either hit by drought or by floods, and the question is should we ever use weather as an excuse for not being self-sufficient.

The issue really is economics and policy at addressing the economic problem. The productivity of the irrigated Filipino farmer is low basically because he has not been adequately compensated for his effort and his investments, so that when there is no assurance at how much his investment is going to be realized at harvest time, there is a tendency for the farmer to merely produce as much as he needs for himself and the little that he can sell because the more he invests, in some cases, the more he loses.

Now if you will impute inflation, the Filipino rice farmer of 20 years ago is better off than the Filipino rice farmer of today, so that the economics of rice farming is really working against the present rice farmer.

Now, how do we address that problem? The key production area approach is going to be implemented for rice, and that is a key grains area approach where identifying the best productive areas for rice has been mapped out, and we are now trying to get the other agencies to use that priority area as the area for investments and coordinate development projects, so that if we can reduce post-harvest losses, by reducing post-harvest losses alone in the Philippines, which can reach as much as 27 percent, to, let's say, 15 percent, then the volume that we used to be importing would be more than covered by that loss. So in post-harvest alone, we can be self-sufficient.

Now, the other thing is by concentrating as much as possible investments in infrastructure, post-harvest, including irrigation and making sure that appropriate credit becomes available in those high production areas, we hope to see farmers that are so productive that they can be profitable and eventually competitive.

Now, we hope to see in these areas at least 10 tons per hectare per year of double crop, or concentrate on one crop, produce 120 kabans or 140 kabans, which is six to seven times, and then go to other crops after that. If we can achieve that, then we really are not very far off from self-sufficiency. If we are already self-sufficient and we have maintained a measure of economic returns on our investments, then we might be competitive. If we are competitive even if the

world price of rice may go down, hopefully the excess production can be exported.

But, really, addressing some of the problems of the Department of Agriculture on a policy basis, when I was Undersecretary of Agriculture I advocated always for a marginal self-sufficiency, import some when you need some, export a little if you need to export a little, but we should never go for as much production as possible and export because the export market of the grain is so unstable. Like right now the grains that we imported from Thailand, which is already polished rice, is much cheaper than the going price of paddy in the Philippines. So if you have a situation like that, then somebody's shirt will have to be lost, and in a national scale the farmer will always demand that government foots the bill and, unfortunately, the Government of the Philippines does not have the extra money to foot that bill, so we might be better off until we are price competitive to go for marginal self-sufficiency and exports.

Now, we are also looking at how, if we are productive enough and if we can produce 10 times per hectare per year in the very productive areas, what happens to the less productive and less profitable areas? They will have to be forced out of rice and they will have to go into other crops. We are trying to develop that, plus the real excess.

We are looking at beef, cattle production. We are looking at if an area that is traditionally planted to rice can be put to forage crops and you feed that to cattle, the profitability from cattle today is better than profitability from rice.

So there is a chance that people will shift from rice as soon as other farmers become more productive and more profitable. They would have no other choice but to look for other more profitable areas to go into.

**QUESTION 4:** My name is Hideki Kanamori, Irrigation Development Specialist in this Institute. I have to explain that I am an ex-expert of DCIEP and I met you in 1988 at the Project Seminar and I was the next presentator of you, so long time no see.

Anyway, based on not only your presentation but also my experience in the Philippines, I would like you to answer some questions concerning the sustainability. I know about your country compared with other countries. There are many good factors. One is the communal irrigation project that is supported



by the farmers themselves. That is I think a very rare case in Asia and the North African countries.

The second thing is irrigation fee collection. For example, in Indonesia they just started but it was very difficult, but you have already done that.

The third good point is education. I heard there are many agricultural colleges and schools, so based on these your agriculture will be sustainable, but in your presentation you explained, shall I say, too many problems, so I would like to clarify some questions. According to your presentation, you stated many problems. Actually the case of these many problems, there I think the counteraction is to establish one comprehensive plan to recover these problems, and that comprehensive plan is a long-term plan. All the external or internal projects should be defined, I think, and I know that NIA is one of the excellent agencies in the Philippines. I think you have already established this kind of comprehensive plan. In this plan all the external and internal projects have already been defined, I think. For example, the IOSP and DCEIP with some parties are very related, and I think these are already defined, so I would like to ask you about this comprehensive plan. I believe you have it, so what kind of plan do you have, such comprehensive plan, to define, to coordinate, or arrange external and internal projects and programs? This is the first question.

The second question, even though you established the comprehensive plan, to efficiently carry out the programs and projects, still the remaining problem is the financial problem, and you explained some financial problems, so could you explain what is your direction or solution of these financial problems. This is the second question. So could you tell me your idea or knowledge about one, such a comprehensive plan, to efficiently coordinate or arrange external/internal programs and problems; and, second, is the solution about the financial problem. Thank you.

**BAUTISTA:** One of the issues that has always cropped up in the Philippines is why are we not producing enough for our own requirements, and if you will look at the records there were some years when we produced more than our requirements and, in fact, we exported but, on the whole, we cannot say that we have produced enough.

Now, if you will look at the reasons why we were able to export during some

years, it's basically because of two reasons—the breakthrough in the breeding of rice and irrigation development—so that the potentials of the early International Rice Research Institute varieties were fully taken advantage of by irrigation development.

But, unfortunately, our population has grown so much that the development of irrigation facilities has not adequately addressed the increase in population, and you might ask, but there are other ways of increasing production. Yes, but on the whole, because, as I mentioned earlier, because of the policies and the economics on rice production, the productivity has not really been very dramatic in its increases.

So when we look at this problem, we see the Irrigators' Associations as a core group of people that can be used to graduate into cooperatives and, hopefully, as cooperatives they will start marketing their own products, not as paddy but as rice, and participate in the profits of rice trading and not be subjected to the variable prices that the traders have traditionally practiced against the farmers on pricing policies, so that is one.

Another way of looking at it also is we have this problem of sustainability of irrigation water in the watersheds and in the systems, and in the micro watershed of the small systems we have forged an agreement with the Department of Environment and Natural Resources that the responsibility for maintaining the forests and the environment in the watershed that serves the irrigation system would be given to the Irrigators' Association. The philosophy behind that is whatever benefits that can be gained from a healthy environment, the first beneficiaries would be the farmers, and any damage to that environment, the first victims would be the farmers, so it is to the best interest of the farmers to take care of their environment.

Now, having addressed that partially, the question would arise how will you really get the money? Now, the real problem about money is, first, let us be realistic. The demand for the little money that is available is being fought among the different agencies that need the money.

Now, in the last few years the money for defense has been so much that the other agencies suffered in comparison. If during the Aquino years the coup were not in the magnitude that they were attempted at, we were hoping that part of

the budget for defense would have been already reallocated for other agencies because the armed forces would have been reduced.

Now, if Ramos will succeed at addressing the peace and order situation, and if the armed forces can be reduced, a lot of money can be used for development purposes, and with that we hope to see more money being made available for irrigation development, agricultural development, post-harvest, etc., etc., and when that happens it should be relatively easy to justify additional money for irrigation development because the benefits would be so clear to the policy makers of government.

The financial problem today is really something that most people refuse to understand. They talk about it but they really refuse to understand, or they pretend not to understand it.

Now, we in the Department of Agriculture see the problem on the need of education, for more funds. Those in education they see the need of funds for the Department of Agriculture, but because we are all grabbing a part of the pie that they want and that we want, so we try to refuse to accept their problem and we only want to concentrate on our problem. But if the pie can be bigger, then everybody can be satisfied on what they need and what they are getting.

So, basically, we look at the money problem as an issue that is internal in solution. We have to reduce some of the costs of government that can be reduced, and defense is one area that has eaten a lot of our resources, so if we have adequate peace and order in the country and the internal and external threat is reduced, then we can reduce the armed forces. We can have a lean and mean armed forces that would cost less. As it is now, we are saying that if we are to go into war for whatever reason, maybe we can only last one day. We would run out of fuel or we would run out of bullets.

Fortunately, there are many Filipinos who are the enemy who might also run out of bullets, but that's a factor that really has to be looked into and, hopefully, our people in Congress will see the light in it.

On way also that we are looking at is in the key development approach, we will also see a very efficient use of money, so the economic benefits from the available money should be greater. The savings or the benefits, assuming that there won't be savings because you would be investing more and more, but the

benefits would be so much that maybe there will be more money available for the following years to be invested into those that need to be invested in.

**MODERATOR:** Thank you very much, Mr. Bautista. I'm very sorry that time is up now. I think that we got useful information and suggestions about the Philippines agricultural development. With them we can continue JICA's cooperation to the Philippines and improvement.

I would like to express our cordial gratitude again to Mr. Bautista for giving such a significant lecture today. Thank you very much.

CONCLUDED



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