

# Dioscoro L. Umali

## Father of Philippine Plant Breeding

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## INTRODUCTION

**Dr. Dioscoro L. Umali** was one of the first ten academicians of the National Academy of Science and Technology Philippines (NAST PHL) selected in 1978. In 1986, Academician DL Umali was conferred the Order of National Scientist, the highest award bestowed on a Filipino scientist by the Philippine government.

National Scientist Umali is recognized for his scientific contributions to pioneering breeding researches on abaca, rice, hybrid corn, and the ornamental *Mussaenda*, his mentorship of many students who became scientists and research administrators, as an institution builder, and his inspiring leadership in trailblazing agriculture, agrarian reform, and rural development.

### Chasing His Dreams

The young Dioscoro, nicknamed Diosing, and his brother, Telesforo, grew up in his mother's hometown of Biñan, Laguna about 38 km south of Manila, where he started his schooling. He transferred to Manila for Grade 7 in Tayuman in the 1930s so that he could be accepted in a high school in Manila. He completed his secondary education at West (Torres) High School, now Torres High School, during which time he developed his skills in public speaking and debate, as well as in singing, folk dancing, and acting. Diosing completed the four-year course in three years despite the heavy extracurricular activities. The young man wanted to follow the footsteps of his father, Captain Cesario Umali, a merchant marine, and had planned to join the US Naval Academy. But to allay the fears and apprehension of his mother, Edilberta Gana-Lopez, he decided to forgo his initial dream and enrolled in BS Agriculture (BSA) at the University of the Philippines College of Agriculture (UP CA) in Los Baños, Laguna. He finished his BSA in 1939 after which he joined the faculty of UP CA as an instructor.

In 1946 the promising DL Umali was sent to Cornell University as a University Fellow to pursue PhD in Genetics and Plant Breeding. At this time, he had married Zenaida Lopez and had two children, thus, he worked extra hard and finished his PhD in 1949 to be able to return to his family. Diosing and Zeny were blessed with five children—Dioscoro Jr., Irma, Rico, Dina, and Celia.

### Outstanding Scientist and Visionary Leader

In 1949, he started the breeding of rice, abaca, coconut, and mussaenda in the Department of Agronomy of UP CA. With coworkers and students, Dr. Umali studied the classification of Philippine Musae including those of abaca and its relatives. They identified relatives of abaca such as Pacol as sources of resistance to major diseases such as abaca bunchy top and mosaic viruses. They successfully made F1 hybrids of varying resistance against the diseases from crosses between the abaca and their relatives. These bunchytop virus resistant abaca hybrids remain important as starting materials for the country's current abaca breeding program. By 1958, Dr. Umali's research program on the breeding and selection of superior rice varieties and the development of hybrid corn adapted to Philippine conditions had produced 14 outstanding rice varieties and five outstanding corn hybrids. With students, he also conducted basic studies on rice to elucidate the nature of lodging and dormancy of the seed. Dr. Umali had correctly predicted that makapuno coconut could be grown by culturing its embryo on nutrient medium and that it would grow to bear 100% makapuno nuts. [This was proven by the work of Dr. Emerita V. de Guzman then a faculty member of UP CA in the 1960s-1970s]. The scientific contributions of Dr. Umali include the development of different varieties of the *Mussaenda philippica*, popularly known as Doñas. Thus, Dr. DL Umali is known as the *Father of Philippine Plant Breeding*.



The strong Division of Plant Breeding which DLU (as he became popularly known) had led produced not only crop varieties and research programs but also an outstanding crop of mentees which include 4 National Scientists, Academicians, university presidents, heads of government departments, heads or high-ranking officials of international or regional organizations, leaders in non-government organizations, and leaders in the seed industry in the country. The Division of Plant Breeding also became the seed that led to the establishment of the Institute of Plant Breeding in 1975, through the leadership of one of Dr. Umali's mentees, Dr. Emil Q. Javier.

### **The Institution Builder and Administrator**

An institution builder, Dr. Umali, not only built the interdisciplinary plant breeding team of UP CA which attracted the best students and also obtained huge research grants that funded the rice and corn research program of the country. Under his leadership as dean for ten years (1959-1969), he led the massive infrastructure building, upgrading of facilities and faculty with a USD 6 million educational loan from the World Bank and transformed UP CA to become truly a premier College of Agriculture not only in the country but in Southeast Asia as well. While dean, Dr. Umali also served as Vice President for Agriculture and Forestry Affairs and later Vice President for UP Los Baños. He later became Undersecretary of the Department of Agriculture. In 1971, he was appointed as Assistant Director General and Regional Representative for Asia-Pacific of the United Nations Food and Agriculture Organization (FAO).

Among the many awards of Dr. Umali were: 5 honoris causa degrees from national and international universities; Outstanding Achievement and Leadership in Rice and Corn Research, Republic of the Philippines, 1953; Presidential Award, Malacañang, 1969; Outstanding Filipino Award, Philippine Jaycee Senate, 1992.

### **As NAST PHL President**

National Scientist Umali served as second president of NAST PHL from 1989 to 1992 considered as expansion years of the Academy. To strengthen the advisory function of NAST PHL, President Umali created task force committees to address important concerns such as disaster and environment, environmental management, rice, and collection of biological specimens. Even at



this time, he recognized the need to address concerns about climate change, waste management, and disaster preparedness. During his term, NAST PHL steered the activities that led to the establishment, enactment, and implementation of the Guidelines on the Collection of Biological Specimens through a Memorandum of Agreement signed by various heads of agencies in 1990. This MOA was subsequently superseded by the Executive Order on bioprospecting (EO 247 s.1995). NAST PHL, under the leadership of NS DL Umali also led the consultations, revision, and finalization of the biosafety guidelines on the research and development and use of genetically modified organisms that led to the signing of EO 430 s.1990 creating the National Committee on Biosafety of the Philippines.

During his term, President Umali continued and expanded the recognition functions of the Academy. In addition to Outstanding Young Scientists, the categories of Philippine Science Talent Search, NAST PHL-TWAS Science Prize, and Outstanding Publication Awards were started to be awarded. International linkages were strengthened by hosting a regional seminar workshop on biotechnology and forming new linkages. To disseminate the outputs of various forums and consultations including the Academy's Annual Scientific Meeting, NAST PHL expanded its publications releasing

monographs, conference proceedings, scientific outputs of its member scientists, and the Academy's journal Transactions NAST PHL.

Throughout his long career in various institutions, Dr. Umali restructured research systems to address poverty and unemployment and influenced "the orientation of agricultural research and development policies of the Third World countries in Asia for the disadvantaged sector."

On July 1, 1992, this indefatigable and selfless man, "dynamic and passionate soul who had always searched for ways to ease the anguish of the poor", National Scientist Dioscoro L. Umali, died of a massive heart attack, but his legacy lives on.

### **Selected Excerpts from National Scientist Dioscoro L. Umali's Speeches**

The following are excerpts from some of Dr. Umali's speeches containing his views on agrarian reform and rural development, people's participation as a basic human right, effects of climatic variation, and agricultural technology for small farmers. In a message to the young University graduates, Dr. Umali exhorted them to be "the heroes we never were—and live." Early on he recognized the importance of people's participation in addressing important societal problems of the country. Being an agricultural scientist and a natural leader, he provided wisdom and inspiration through his speeches to different audiences here and abroad.

### ***On agrarian reform and rural development***

"...we often mistook rural poverty and hunger as the problems; today we see that they are just the symptoms or consequences. The real and basic problems which lie deeper are the unjust economic, social, and political structures. It is these that distort and constrain the development process and deny to millions the chance for a more human life.

...The issue is not technology, important though this is. It is who controls the agricultural resources and who benefits from them. Inequality in control over productive resources is the primary constraint.

Furthermore, the increasing attention being paid worldwide to human rights has focused even more sharply on the rural poor.

...Despite the surge in gross national products, poverty has not been contained. It is, in fact, spreading. This has hammered home the point that development occurs only when the basic needs of the poorest are met, and their right to participate in decisions that shape their lives are fully secured.

...In closing, I wish to stress that the task of helping the rural poor, while difficult, is achievable. The success stories of agrarian reform and rural development in China, Japan and Korea show that the poor can be reached regardless of ideology or socio-political system. Surely, a better life for the poor is within our reach. We have the resources, the technology and the human capital to do this. But is the will there? ..."



**From:** Statement, Opening Session of the Inter-Country Consultation on the Follow-up to the World Conference on Agrarian Reform and Rural Development (WCARRD) in Bangkok, 31 October-November 1979.

### ***On people's participation: a basic human right***

"...The topic is not new. In fact, it has been around for years

What then is this "people's participation in development" that our needs are pushing us to look at more closely?

Like the blind men's elephant in the fable, it can mean many things to many people. And the disagreement and double speak rise when one begins to ask: Who participates in what? When? How and why?

To the politician, participation can range from the common man getting a word edgewise in a television forum or voting.

Some bureaucrats understand the term as: The minimum degree of consultation that can be got away with, in doing what they think is good for the people.

For the economist, participation sometimes means levels of employment, share of women in the labor force, etc.

Some technocrats see participation—if at all—as getting governments, if not people, to accept their "expert" prescriptions for technological change.

In more recent times, and under the impact of teachers as disparate as Pope John Paul II on one hand and Mao Tse-tung on the other, many have come to regard participation as: The voluntary involvement of people, in self-determined change. It grows out of the "conscientization" or critical awareness of institutionalized social injustices and helps build their capacity to redress these.

People's participation is based on the democratic conviction that there are extraordinary possibilities in ordinary people.

Such concepts inevitably have found their way into United Nations studies. A UN Research Institute for Social Development paper, for instance, defines people's participation "as influence on the decision making process at all levels of social activity and social institutions."

As for people themselves think of "People's Participation", is it not ironical that we still have to develop the will and skill to ask them, let alone find out?...

Today, our world is hurtling forward in a process whereby large populations, endemic poverty and high fuel costs threaten to fuse into a food-energy crisis. The management capacities of our institutions are already strained.

In devolving power to the smallest, functional unit of people's organizations, government is not only discharging a role it is best suited for, namely: Definition of broad policy and catalyzing people to innovate and create. It is also ensuring its own survival..."

**From:** Statement at the Loyalty Day Celebration at UP Los Baños, College, Laguna, Philippines. 10 October, 1981.

### ***On evolving trend of agricultural science and technology in developing countries***

"The biggest challenge that agricultural scientists face today is how to continuously generate technology that will help ensure food security and income stability for the world's poor, and at the same time preserve and enhance the environmental life support system as it relates to long term human welfare.

Throughout Asia, the quality of human life is at a desperate risk due to rapid growth of population and its increasing food requirements; environmental degradation and scarcity of arable land due to population pressure; protectionism and declining prices at the world's market of export agricultural commodities; high cost of imported production inputs; massive use of nonrenewable resources; trade hazards of modern technological achievements; uncertainties due to natural disasters; and, worsening extent of absolute poverty, especially in the rural areas.

Even with past scientific achievements, the scientific world cannot afford to be complacent.

Our present understanding of the physical, biological, economic and social circumstances surrounding agricultural production and rural development is far from perfect. Furthermore, there is that persistent gap between what is technically feasible in the research stations and what is adopted by farmers in their field.

There are still multifarious questions about food security and sustainability of production.

Human population growth and activities are changing the natural environment in many ways, too often to its detriment and that of people.

There is question of how agricultural productivity can be further increased in a way that will significantly benefit the rural poor.

During the last two decades, the contribution of science and technology has been impressive in some parts of the world, but lagged behind considerably in large areas of the developing countries, leaving particularly the living conditions of the rural poor worsening. The task for the future will not be only to increase overall rate of food and agricultural production to satisfy the needs of expanding populations, but also to ensure that all levels of society are benefitted.

The common goal, therefore, is to increase productivity through ecologically sound farming systems, particularly for farm families in such a way which will provide simultaneously food and nutrition security, sustainable production and family income, and equitable distributions of benefits within the farm, family, the community, and the country.

...Consistent with this emerging scenario and challenges, the priorities and strategies for science and technology for the developing countries for 1990-2000 and beyond are as follows:

1. Intensified agricultural production
2. Regenerative agriculture
3. Bio and organic fertilizers and carefully planned integrated plant nutrition
4. Agricultural biotechnology for increasing production of crop and food products and relieving pressures on natural resources
5. Fossil energy conservation in agriculture
6. Conservation of biological diversity and sustainable development of environmental resources
7. Agricultural technology for small farmers”

**From:** Paper presented at the Plenary Session of the 2nd ASEAN Science and Technology Week at the Westin Philippine Plaza, CCP Complex, Manila, January 30-February 3, 1989.

### *On effects of climatic variation*

“Mother Nature has always been bountiful to us. It has given us rain, wind, clouds, sunbeams and even the rainbow. There is beauty and harmony in all its creation. But human frailties upset the orderliness of nature, resulting in environmental and climatic changes.

Man has always been imposing on nature. It is now clear that climatic changes are inevitable due to man’s past and present whims and endeavors.

Research on the interaction of climatic variability and human activities tend to focus mainly on impact and less on the range of adoptive and adjustable mechanisms available for coping with variable climate. There are several issues that we might take into consideration in... dealing with the effects of climatic variation. They are:

1. Climatic variation in relation to productivity of crops which includes the following:
  - a. Soil degradation in relation to climatic evaluation
  - b. The effects of climatic variation on cropping systems in plant disease control, postharvest losses and food preservation
  - c. Development of crop germplasm with improved resistance to environmental and biotic stresses
  - d. Exploiting fertilizer effect of higher level of carbon dioxide
2. Preservation of diversity—establishment of germplasm banks and preservation of natural habitat of plants and animals
3. Reforestation of denuded mountains and upland catchment areas or watersheds
4. Effect on aqua-ecosystem—fresh water and marine ecosystem
5. Air quality and acid rain
6. Depletion of ozone layer—biological effects of ultraviolet rays
7. Greenhouse climate and its effects on ecosystems

The livelihood security of Asia’s teeming population is adversely affected by the climatic changes which result in the appalling deterioration of the basic life support system.

There is a direct relation between climatic transformation deterioration and long-term human welfare as it relates to increase and perpetuation of human poverty.

It is for this reason that we are having this forum on climatic changes and effects.”

**From:** Welcome Remarks, Science Literacy Forum, National Academy of Science and Technology PHL, Manila, June 29, 1989.

***On: Be the heroes we never were—and live***

“I know that invitations to deliver commencement day addresses in this premier university of our country are not taken lightly.

Why then do I agonize through these traditional rituals? Where does this hesitation flow from?

It expresses a sense of worry and guilt.

I wonder if, in more ways than one, our generation may have failed your generation. How then does one impart the customary commencement counsel, if the old have not come up fully to the expectations of the young?

Our profligacy years past, for example, dissipated your inheritance of abundant God-given resources.

Our once magnificent dipterocarp forests have been ravaged. Our rivers are polluted with silt; our coral reefs destroyed by blast fishing, its mangroves decimated and Laguna de Bay is now a dying lake. If this plunder is not checked, the Philippines will experience increasing poverty, despair and spiral downwards into “the ranks of the very poorest of nations”.

Today, our legendary Philippine mahogany forests are just that—legend. Out of the original 30 million hectares of trees, only 900,000 hectares of virgin dipterocarp forest remain... Over the past 25 years, we sold over 101.6 million cubic meters of prime logs abroad. We subsidized developed countries with cheap timber. Much of that income was salted abroad. And yet the cutting continues unabated.

Erosion of invaluable top soil is the twin of deforestation...

Half of our endemic forest flora, with irreplaceable genetic building blocks, is now gone. ...The same is true with wildlife...

For most of my life, I’ve worked with farmers, here in the Philippines and in other parts of Asia. I came to discover that they have the capacity to distill wisdom from daily life into pithy proverbs. And one of these illustrates the issue of flawed stewardship I’ve raised.

“We do not inherit the land from our parents,” farmers often say. “We merely borrowed it from our children.”

...In politics, your heritage from us is a mixed bag.

It is true we wrested political independence, resisted a foreign invader during World War II, and established democratic government. And there were those of our generation who stood up to the recent and unlamented dictatorship.

“People Power” redeemed the shameful acquiescence—not to say active collaboration---of many to the farce of “constitutional authoritarianism”.

Nonetheless, our less than sterling performance-imposed burdens you never sought. You must now painfully rebuild democratic institutions, gutted during our watch.

Unfortunately, this reconstruction is to be carried out in a wasteland of moral values that we are leaving you and your heirs...

There are more poor people in the Philippines today than at any time in our history.

Poverty is the breeding ground of social unrest. We have insurgency in our midst. No counter insurgency program can restore peace and order without a mass base support of the people. The hard historical evidence shows that there is no military solution to poverty, hunger and injustice—the root causes of insurgency...

Agrarian reform guided by principles of growth with equity, social justice and people’s participation is the only appropriate political instrument to alleviate rural poverty and malnutrition...

CARP is the most comprehensive effort in our history that addresses the social, economic and equity issues of agrarian reform. Let us prove to the world that we can implement agrarian reform in a democratic system where the economics of need, not of greed, prevails. I

rally the youth of the land to respond to the challenge of our agrarian reform which is the center piece of the program of President Aquino's government...

Another tempest is being stoked by one of the most powerful of social forces: rapid population growth... There will be an additional 60 to 80 million Filipinos by the year 2020, at a time when you the graduates, will just be at the peak of your professional lives.

Demands on whatever is left of our natural resources will be unprecedented in Philippine history. More than a third of our people, by that time, will be crammed into ill-prepared cities, in Cebu, Iloilo, Davao and herein Manila.

A full quarter of our people live on public lands...They have few options beyond destroying the environment or going hungry...

But candor compels me to warn that your generation, once again, will be left holding the bag. Your children will be drafted to quell future insurgencies and other consequences of today's unwillingness to accept the social responsibilities of wealth.

We pray that, aside from a commitment to social reform greater than we have shown, you will in the 1990s, design policies and programmes to favor the poorest.

We hope that you learn the lesson we never fully grasped: that "a man's life does not consist in the abundance of his possessions"; that sharing and equity constitute the first seeds of your survival.

It has not been easy for me to speak to you in such bleak terms. I have to admit that it is not a rose-tinted commencement speech that one usually hears. But realism compels me to say: **Be the heroes we never were—or perish.**

Yet, there is, in this call to heroic service, much that will enable you to check and reverse the deterioration of our vital life support systems, in the process, **you will rise to full stature as mature men and women.**

There is now an awakening, both in the Philippines and elsewhere, to dangers that threaten our environment....

Nature has also an amazing God-given capacity to regenerate...

Your education places you in a unique position to do this. As you assume positions of responsibility, you can ensure that development policies and programmes of the 1990s improve the quality of people's lives; that these increase their options beyond shared poverty. Let me remind you that poverty is the worst pollution of mankind.

There is consensus on future policy directions. We must revive economic growth with equity...

We must stabilize population growth with methods consistent with individual conscience.

We must be imbued with a sense of urgency in adopting less fuel energy-intensive approaches to growth and in curbing ostentatious consumptions.

Both at the individual and policy level, we have to aggressively seek to conserve our resource base....

This calls for new people-centered policies and more responsive government complimented on broader private participation in the economy.

The 1990s is your decade...

Our planning and decisions in the 1990s will leave their mark well into the 21st century—which belongs to your children. ..

Go then and rebuild our scarred land. Go and be heroes we never quite managed to become—and live.

***Mabuhay kayong lahat at salamat po.*** (Long live and thank you)

**From:** Address, Commencement Ceremony, University of the Philippines Diliman, Quezon City, April 29, 1990.

### ***On agricultural technology for small farmers***

The biggest challenge that Filipino agricultural scientists and their colleagues elsewhere face today is: How do we continuously generate technology that will help ensure food security and income stability for the poor?

Throughout Asia, the capacity of our agricultural and natural resource systems has been savaged by the pressures arising from all quarters. These include the rapid growth of population and its spiraling food requirements; environmental degradation and scarcity of arable land; trade protectionism and declining



prices at the world's market of export agricultural commodities; high cost of imported production inputs; massive use of nonrenewable resources; hazards of modern technological achievements; and uncertainties due to natural disasters.

All these are reflected in the spreading blight of absolute poverty, especially in the rural areas.

Because of poverty, more than half of the people of the world over live in conditions that stunt both physical and mental well-being...

Support for small farmers to enable them to move beyond subsistence production is necessary. But it is not a sufficient condition for alleviating rural poverty.

In fact, food self-sufficiency does not of itself, imply freedom from hunger...

The "Green Revolution: spread the new high-yielding varieties in developing countries. Today, approximately 44% of wheat and 60% of rice now planted are HYVs...

They brought immense benefits to medium and large farmers. But they did little to help small farmers. Scientific work on other equally important staple crops such as beans, root crop, and coarse grains remains on the agendas. For the moment at least---the "Green Revolution" has bypassed the marginalized farmers...

For the 1990s as well as into the early part of the 21st century, our task will be variants of our present assignment: to increase overall rate of food and agricultural production and---even more challenging to our collective wisdom and shared humanity---how to equitably distribute the benefits to satisfy the needs of expanding populations, without mortgaging in the process our children's ecological future.

The common goal, therefore, is to increase productivity through ecologically sound farming systems, particularly for poor farm families...

It is this segment of our rural population who claim, alas with basis, that much of today's technology is beyond their constricted economic and social environment. Very often, such technology even creates hardships for the unskilled and illiterate women.

It is this situation that has brought to our attention the issue of traditional technology. In all countries, traditional technology evolved over the years from the crucible of economic survival; it also forms part

of their cultural pattern. Traditional technology is a source of cultural pride for them. It is a way of life and not just as a means of livelihood. This deep-rooted strength argues that there are sound scientific reasons for many traditional practices. It is our task to approach these practices with unbiased eyes and, with the most rigorous of scientific analysis, discover their strengths and integrate them with the modern.

There are bright prospects of making the poor farm families economically and socially viable by blending incrementally traditional and modern technology, combining the strengths of both but avoiding the weaknesses. Thus, we can come up with development strategies which focus on technologies that are socio-culturally compatible, ecologically sound, more dependent on renewable forms of energy, low capital requirements, scale neutral, and high potential for employment generation.

What is called for are technologies that do not build in seeds of social discrimination and which recognize women as equal partners in development.

These types of appropriate technology are within our reach. But they can be designed only by men and women who wield their scientific skills, intensely creative and innovative ways of identifying research for the improvement of the quality of life for those Mahatma Gandhi called "the lowest, the least, and the lost".

Such scientists have that rare gift to see that the stark conditions under which farmers struggle bear little resemblance to those prevailing in antiseptic agriculture research stations. Unless we exert special effort to keep these realities before us, the resulting technology often turns out to be irrelevant to the actual needs of the farmers.

A plant geneticist does not operate in an economic and social vacuum. His selection, for instance, of the plants he breeds must reflect the deep human needs and economic realities of specific regions.

It is this relevant factor that has given value to farmer-to-scientist and community level approaches to problem identification. This dialogue no doubt is more demanding; but it fosters a more realistic appreciation of the economic and social environment in which agricultural development takes place.

**In the final analysis the most challenging task for us is to humanize the way we generate and develop technical solutions for agriculture problems that impinge upon the lives, hopes, and dreams of so many people.**

This is therefore a plea for a new approach of doing agricultural research which is as important as technology generation itself. It calls for a multidisciplinary approach, with involvement of biologists, economists, and sociologist.

If agricultural science and technology for the poor is to be pursued, scientists' values must change. Only a recasting of values can help us understand the small farmers and their needs and problems. The Sacred writers wrote of "replacing your stony hearts with a new heart". There is much truth to this.

Above all, our work as scientists must be imbued and shaped by a social philosophy that accepts the truth that farmers are the alpha and the omega, the starting point and conclusion of our research. If research is to bear fruit, it must be in partnership with them. Otherwise, we wither into irrelevance...

Research programmes must systematically expose the scientist to the rigors of daily farm work. This exposure is critical for relevance credibility.

...In fostering an interdisciplinary approach to problem solving, it is essential to have researchers work as a team—without dampening their individual creativity.

Publication of an increasing volume of institute research work, in both national and international scientific journals, is essential. But this is not a one way street. From the very start, researchers must be encouraged to help prepare a report of their work to the people in their own language and idiom, supported with simple charts and exhibits the people can easily understand and appreciate.

The well-being of the small farmers is therefore a challenge to technical, economic and social ingenuity to those of us who have been given the gift of scientific training.

It is a gift that we can repay only in the measure to which we apply it to help the poorest to move upward from deprive lives. After all, poverty remains the greatest pollution of mankind.

**Source:** Not identified

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