DATA FOR PROJECT MANAGEMENT AND NATIONAL POLICY DIFFICULTIES IN OBTAINING GOOD STATISTICS A REVIEW AND APPRAISAL OF THE MASAGANA 99 PROGRAM

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BY

KENNETH F. SMITH
Management Consultant, The PRAGMA Corporation

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF AGRICULTURE

ACCELERATED AGRICULTURAL PRODUCTION PROJECT

THE SULO HOTEL
QUESON CITY,
REPUBLIC OF THE PHILIPPINES

9-10 NOVEMBER 1987

FOR THE DIRECTOR

ACCELERATED AGRIGULTURAL PRODUCTION PROJECT

DEPARTMENT OF AGRICULTURE, REPUBLIC OF THE PHILIPPINES

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> The Government are very keen on amassing statistics. They collect them, add them, raise them to the Nth power, take the cube root and prepare wonderful diagrams. But you must never forget that every one of those figures comes in the first instance from the village watchman, who just puts down what he damn well pleases.
>
> Sir Josiah Stamp
> Inland Revenue Department
> Great Britain (1876-1919)

Performance Measurement is an important aspect of a monitoring system — i.e. the ability to determine, periodically, the extent to which the project is proceeding towards, and attaining, its stated objectives, and to alert management to potential problem situations where remedial action may be required. The Masagana MIS was the most comprehensive, systematic, approach to gathering detailed data on activity and support to the target farmers, and as such the MIS data series was used for monitoring and comparative program analysis. For instance, the NFAC Management Committee would refer indications of credit problems (highlighted by TABLES J, K, L, M & N[1]) to the bank representatives; TABLES E, F, G and H[2] were inputs for the National Grains Authority (NGA) in forward planning for procurement, transportation and storage of the harvest; the apparent need for broad area plant protection identified as a major provincial problem on the multiple-choice checklist — TABLE P — would be handled by the Bureau of Plant Industry; fertilizer procurement and shipping schedules were modified based on reported provincial planting accomplishments against

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[1] TABLE J — Percentage of Supervised Farmers Requiring Credit; TABLE K — Amount of Approved Loans by Credit Source; TABLE L — Hectares Financed as a Percent of Hectares Planted; TABLE M — Average Size of Loan per Hectare; and TABLE N — Total Repayment as a Percentage of Cumulative Loans Approved.

[2] TABLE E — Projected Harvest; TABLE F — Masagana 99 Production Performance; TABLE G — Masagana 99 Production Performance in Irrigated and Rainfed Areas, and TABLE H — Cumulative Area Harvested as a Percentage of Area Planted.

targets (TABLES C and D[3]); and the need for workload adjustments (indicated by TABLE O[4]) was reviewed with selected national and provincial officers. Furthermore, during MIS staff follow-up visits to the provinces, the Governors often reviewed their comparative standings and current issues — as outlined in the reports — with the team; and many PFDs used the monthly MIS feed-back reports to deal with similar management and resource allocation issues on the local level.

From the MIS information available, a number of retrospective observations can also be made about the Masagana program's implementation, and the quality of the data. Masagana planting targets were met (or exceeded) each season except Phase V, and even though affected by weather and other problems, the area harvested also generally exceeded expectations (except Phases II and V). It is noteworthy however that Masagana's overall program target of 99 cavans per hectare — although attained by numerous individual farmers — was never reached in the aggregate.

PHASE	MASAGANA PLANTINGS TARGET (000 Ha)	ACTUAL (000 Ha)	(%)	HARVESTED ACTUAL (000 Ha)	(%)	PRODUCTION (M Cavans) (@ 44Kg/Ca)	MASAGANA YIELDS (Ca/Ha)	PERCENT TARGET (%)
I	600.0	707.5	118%	681.9	114%	56.7	75.6	76%
II	400.0	451.8	113%	380.1	95%	30.0	78.9	80%
III	901.6	1,131.1	126%	927.0	103%	63.3	68.3	69%
IV	579.3	706.3	122%	695.1	120%	58.6	84.3	85%
V	1,140.1	1,086.3	95%	1,043.7	92%	87.6	84.0	85%
VI	646.3	667.9	103%	645.6	100%	50.0	77.5	78%

TRIANGULATION OF MIS DATA

The monthly Masagana 99 MIS reports were used by NFAC and other agencies for operational program management purposes. There were no illusions, however, about the dubious quality of data reported by extension agents on their own performance, or by farmers responding to questions from government officials and strangers conducting surveys on

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[3]TABLE C — Masagana 99 Planting Performance in relation to Masagana 99 Target-to-Date, and TABLE D — Masagana 99 Planting Performance in Relation to Total Target

[4]TABLE O — Production Technician Workload Analysis

highly sensitive personal income-related matters. NFAC (and other organizations) therefore also attempted to verify these data through other means, as well as to conduct independent research on this contemporaneously popular topic. Several of these special studies and "unofficial" reports, as well as PAECON's "official and authoritative" Philippine government rice statistics, are reviewed to help draw some conclusions about the degree of accuracy (and ultimate utility) of the Masagana MIS data series, for as Irving Spergel says:-

> We have to live in the world as it is and use all the resources and "goodies", adulterated as they may be. . . . Different views of the elephant, even through different sets of ill-fitted glasses, are helpful. Hopefully the views are not of different elephants.[5]

Some of the principal sources, methods, and findings, were as follows:-

MASAGANA MIS STAFF PROVINCIAL YIELD FOLLOW-UP SURVEYS

The NFAC/MIS staff targetted "exceptional" provinces to visit for field follow-up assistance, and to conduct data verification surveys. While many provinces were visited regularly for consultation, because of staff and time limitations surveys to verify reported yields were conducted in only a few provinces. Nevertheless, both the field experience and the survey findings were useful to NFAC staff to gain and maintain an appreciation for the field working environment, the difficulties inherent in obtaining program production data, and to better assess the quality of the data received.

These surveys were approximately one week "quick-and-dirty" on-farm visits, observations and interviews of Masagana participants, conducted by teams of specially-trained NFAC/PAECON MIS Division staff, and NFAC Program Evaluation staff. The respondents were selected by stratified random sampling methods; a standardized questionnaire was used, and the interviews were selectively back-checked by a roving NFAC MIS Division supervisor. The preliminary findings from these surveys were presented to the Provincial Governor and the Provincial FPO at the conclusion of the field visit, and copies of the final report were

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[5]Irving Spergel **

usually transmitted to them (as well as key personnel in the central offices of NFAC and the Department of Agriculture) within two weeks.

In general, these surveys revealed that there was a tendency on the part of the production technicians in the provinces to exaggerate the yields of their farmer-cooperators. The findings from some of these surveys -- compared with MIS data reported by the production technicians (for the same area and time period) -- are shown below.

TABLE

Period	Province	YIELD (CAVANS/HECTARE) Survey	MIS Report	MIS DIFFERENCE Ca/Ha	Percent
Jun 75	Laguna	100.0	126.0	+26.0	26%
Oct 75	Nueva Ecija	55.0	79.0	+24.0	44%
Mar 76	Tarlac	43.9	71.0	+27.1	62%
			Mean		44%

While these surveys are limited in that they do not provide comprehensive time coverage, are not available for all provinces, and there is wide variance in the yields between the provinces surveyed; nevertheless in each case the inflationary trend in the MIS-reported data is apparent -- on the order of 44 percent.[6]

SPECIAL STUDIES DIVISION, DEPARTMENT OF AGRICULTURE, MASAGANA 99 PHASE EVALUATIONS

Completely independent of NFAC's surveys and the Masagana Program, the Special Studies Division (SSD) in the Planning Service of the Department of Agriculture conducted an annual, randomly-drawn, survey to present a national picture of all major rice growing areas. The respondents included approximately one thousand (1,000) Masagana farmer-participants and five hundred (500) farmer non-Masagana participants, as well as selected production technicians and representatives of credit agencies. These surveys were extensive

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[6]Compounding the difficulty of (and contributing to the confusion in) analysis is that the standard unit of measure -- the *Cavan* -- for paddy rice (*palay*) was also changed during the Program from 44 kilos to 50 kilos.

questionnaires which covered many different aspects of farming beyond yields, such as marketing and farmers attitudes.

In so far as yields are concerned, a review of the SSD reports indicates differences in yields between Masagana and non-Masagana participants of approximately 11 cavans[7] per hectare (21%) in favor of Masagana farmers, as shown in the table below.[8]

TABLE

PHASE	SSD Survey Non-M99 Ca/ha	SSD Survey M-99 Ca/ha	Difference M-99 Ca/ha	Difference M-99 %
I	47.7	54.1	+ 6.4	13.4%
II	45.0	54.7	+ 9.7	21.6%
III	51.4	63.2	+13.0	23.0%
IV	54.8	73.5	+19.9	34.1%
V (Irr)	57.1	66.9	+11.1	17.2%
(Rfed)	42.5	49.7	+ 8.4	16.9%
VI(Irr)	52.1	63.9	+11.8	22.7%
(Rfed)	36.9	44.8	+ 7.9	21.4%
		MEAN	11.0	21.3%

Comparing the Masagana yields indicated in these survey reports with the MIS-reported yields for the same period[9] over-reporting is

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[7]Cavans computed at 50 kilos/cavan

[8]Note: The means are not weighted because the base data from which the yields are derived are not consistently cited, nor is this important for our purposes. Nevertheless, the comparison still provides a rough approximation of the magnitude involved.

[9]Adjusting the data from 50 kilos/cavan, to the 44 kilos/cavan ratio in use at the on-set of the Masagana program; for consistency.

indicated in the MIS data of approximately 12 cavans per hectare, or some 21 percent,[10] as outlined in the table below:-

TABLE

PHASE	SSD Survey Non-M99 Ca/ha	SSD Survey M-99 Ca/ha	MIS Report M-99 Ca/ha	Difference M99 MIS-SSD Ca/ha	Difference %
I	54.2	61.4	75.6	+14.2	23%
II	51.1	62.2	78.9	+16.7	27%
III	58.4	71.8	68.3	-3.5	- 5%
IV	62.3	83.5	84.3	+ 0.8	1%
V (Irr)	64.9	76.0	(All) 84.0	+ 8.0	11%
(Rfed)	48.3	56.5		+27.5	49%
VI(Irr)	59.2	72.6	(All) 77.5	+ 4.9	7%
(Rfed)	41.9	50.9		+26.6	52%
			MEAN	+11.9	21%

This finding is lower than, but within the range of error of, the aforementioned NFAC/BAECON MIS surveys of selected provinces.

IPC/SSRU RESEARCH REPORT

Under the direction of Father Frank Lynch, S.J., the Social Science Research Unit (SSRU) of the Institute of Philippine Culture (IPC), Ateneo de Naga,[11] conducted a number of incisive studies on rural development. One such study[12] in October 1973 — which

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[10]E.P. Mariano, "Masagana 99: Phases I & II" Special Studies Division (SSD), Planning Service (PS), Office of the Secretary (OS), Department of Agriculture (DA), Diliman, Quezon City, Republic of the Philippines, Report L 74-6, [Restricted], October 1974; I.P. Carlos, "Masagana 99: Phases III & IV" SSD, PS, OS,DA, Report L 76-27, [Restricted], September 1975; I.P. Carlos, "Masagana 99: Phases V & VI" SSD, PS, OS,DA, Report L 76-35, [Restricted], September 1976; E.C. Quisumbing, I.F. Carlos & L.B. Darrah, "An Evaluation of the Masagana 99 Program" SSD, PS, OS,DA, Report L 78-23, [Restricted], May 1978, -- which was an update of a paper first presented at the Conference on Strategic Factors in Rural Development in East and Southeast Asia, held in Manila, December 18-22, 1976, sponsored by the Council for Asian Manpower Studies; and NFAC MIS Division "Performance Summary" Phases I-VIII, undated. Note: Permission to use "Restricted" Philippine Government Department of Agriculture Reports expressly granted by Department of Agriculture Secretary Arturo Tanco, Jr.

[11]Naga City, Camarines Sur province, in the Bicol Region

[12]Frank Lynch, S.J., "Rice-Farm Harvests and Practices in Camarines Sur: Do Compact Farms, Masagana 99, and the *Samaheng Nayon* Make a Difference?", Ateneo de Naga, Naga City, Camarines Sur, SSRU Research Report Series, No. 2, January 1974.

. interviewed 600 rice farmers in Camarines Sur -- concluded that while irrigated land was indeed more productive than rainfed, the yield differentials between Masagana participants and non-participants was more significant for the rainfed areas.[13]

TABLE **

FARM TYPE	YIELD (CAVANS/HECTARE)		M-99 DIFFERENCE	
	Masagana	Non-Masagana	Number	Percent
Irrigated	60	57	3	5.3%
Rainfed	55	44	11	25.0%

Lynch also cited a similar study conducted in the province of Cavite on a sample of irrigated farms, where the average harvest was 49 cavans/hectare for Masagana farms, and 42 for Non-Masagana -- a difference of 7 cavans per hectare, or 17 percent in favor of Masagana participants.[14]

In essence, while the objectives of the IRC/SSRU research differed from the SSD studies, the SSRU findings with respect to Masagana yield differentials fell within the same general "ballpark".

BAECON STUDY OF SELECTED MASAGANA PARTICIPANTS IN ILOILO PROVINCE, CROPYEAR 1976/77

Iloilo in the Western Visayas region, is one of the major rice growing provinces in the Philippines. As such, the province was frequently the focus of efforts to improve productivity, as well as the source of data for subsequent analyses. Director Jesus Alix of the Bureau of Agricultural Economics reported the findings from one such longitudinal study by BAECON[15] which compared the yields of 135 selected farmers before, and during Masagana as follows:-

TABLE **

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[13]Frank Lynch Study, p. 32.

[14]See Marlin Van Der Veen, "The Philippine Masagana 99 Rice Production Program of 1973: A Cursory View from Cavite Rice Paddies", (Manuscript., July 1974), cited in Frank Lynch Study, p. 36.

[15]Jesus C. Alix, "The Impact of the Masagana 99 Program on Small Farmer Production and Income in the Philippines", Paper delivered at the FAO Workshop on Price and Income Support, and their Impact on the Small Farmer. Bangkok, Thailand, January 22-27, 1979, pp.16. [Note: Alix's yield data was reported in "Metric Tons per Hectare". I have converted this to 44 kilo Cavans, to facilitate comparison and interpretation.]

SEASON	M-99 PHASE	YIELDS (CAVANS/HECTARE) Pre M-99	M-99	INCREASE Ca/Ha	Percent
Regular	PH VII	44.1	58.9	14.3	34%
Palagad	PH VIII	48.4	66.8	18.4	38%

The BAECON analysts conducting the study examined various contributing factors and attributed proportionate increases for the yields, to the Masagana methodology as follows:--

Regular: 4.3 ca/ha, or 10% } For all Paddy
} i.e. Rainfed
Palagad: 9.2 ca/ha, or 19% } & Irrigated

and as much as 26% For Irrigated Paddy; which is not inconsistent with the aforementioned NFAC/BAECON MIS, and SSD surveys.

LEWIS STUDY

Gary Lewis -- former Associate Director of the U.S. Peace Corps in the Philippines; consultant for Management Audit to the Philippine Ministry of Agriculture, and subsequently assistant to the leader of a USAID-sponsored Kansas State University contract team "Integrated Agricultural Production & Marketing Project" -- conducted a study of the first twelve Phases of the Masagana Program (i.e. Crop Years 1973 - 1979), focussing on the extension-outreach impact of the Production Technicians.[16] As a part of his research, Lewis ran a multiple regression study to test several hypotheses concerning production, essentially using the Philippine Department of Agriculture's Special Studies Division (SSD) data.[17] This analysis indicated

> a 32.2 percent increase in average yields from Phase I to Phase XII, with harvested yields in Phase VIII (77.8 cavans of palay per hectare)[18] increasing 43.8 percent over yields in Phase I.[19]

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[16]Gary E. Lewis, "The Extension-Outreach Component of the Masagana 99 Rice Production Program in the Philippines", (Ph.D. Disseration, Laurence University, California, unpublished, March 1980).

[17]E.C. Quisumbing, I.P. Carlos, and L.B. Darrah, "An Update of Paper First Presented at the Conference on Strategic Factors in Rural Development in East and Southeast Asia: An Evaluation of the Masagana 99 Program", Ministry of Agriculture, Manila, Philippines, May 1978.

[18]calculated at 50 kilos per cavan.

[19]Lewis Dissertation Study** p. 74.

An interesting side-light from this study, for our purposes, is Lewis's finding with respect to rice production which was sold or retained by the farmer:

> M-99 was designed to increase rice production which would be available to the general population. Farmers with less than one hectare of land generally keep a high percentage of their rice yields for home consumption and, therefore, generate little real income which can be used for repayment of production credit loans. Because of this, farmers participating in M-99 generally farm larger parcels of land than non-participating farmers.[20]

Lewis's data on Masagana farmers and the percentage of production sold is significant because the estimated yields were sometimes based on the amount of palay sold, rather than what was actually produced.

Another interesting finding by Lewis was that the impact of Masagana 99 -- in terms of average yields produced per hectare -- peaked in Phase VIII[21] with an increase of 43.8 percent over Phase I.[22]

MATEO-BAYANI STUDY

A multiple regression analysis of Masagana 99's production and productivity by Elsa Mateo-Bayani[23] -- one of NFAC's MIS officers -- concluded that the most important variable in explaining variation in yield was the percentage of area irrigated.[24] In so far as the use of high yielding variety seeds, and the Masagana 99 methodology was concerned, her major findings were that:

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[20]Ibid. pp. 75-76

[21]Lewis, p. 92.

[22]Lewis, p. 74.

[23]Elsa P. Mateo-Bayani, "A Study of the Masagana 99 Rice Production Program in the Philippines", Master of Agricultural Development Economics Dissertation, Australian National University, May 1977, pp. 99-124.

[24]Mateo-Bayani Regression Analysis, p. 117.

> when HYV adoption was introduced into the equation, an additional yield of 4.28 cavans was attained.[25] When the M-99 program was introduced it contributed 3.43 cavans per hectare. . . . The 3.43 cavans contributed by the M-99 participation is far below the differential yield between M-99 participants and nonparticipants [Emphasis mine] . . . which ranged from 7.5 cavans to 14.6 cavans in the same period (CY 1973-74 to CY 1975-76). . . . HYV adoption is part and parcel of the M-99 program package and, therefore, it is hard to isolate the effect of HYV adoption from the M-99 program. . . . On the other hand, it is also possible that HYV adoption by itself is actually more important in increasing yield than the M-99 program.[26]

Mateo-Bayani also noted substantial regional differences in production and productivity.

> Central Luzon was outstanding. . . . In terms of yield per hectare, this coefficient means an additional 9.759 cavans. Explanation could largely be attributed to a greater and better rice land area; that is, irrigation rates were high, more farmers adopted HYVs, farmers were more accessible to extension, credit and marketing facilities, and other support services that were not always readily accessible to other regions in the country. . . . Yield in Central Visayas was lower than the yield in other regions. In Central Visayas, the main crop is sugar. Further, their staple food is not rice but corn and most farmers tended to grow sugar and corn instead of rice. The lower yield in this region can also be partly explained by the heterogeneity in farming.[27]

BAECON INTEGRATED AGRICULTURAL SURVEY (IAS)

While Masagana was the nation s priority rice program, directed at increasing small farm production, it only encompassed about one-third to one-half of the total rice production hectarage in the Philippines. National rice statistics were therefore developed from a broader base. Although various offices and managers were free to conduct surveys and gather data for program planning and management

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[25]Note: This was based on a 50 kilo cavan. In 44 kilo terms, these figures scale up as follows:- 4.28 = 4.98, 3.43 = 3.99, 7.5 = 8.52, and 14.6 = 16.59.

[26]Mateo-Bayani Regression Analysis, pp. 109-110. This is a significant point. Many farmers adopted the High Yielding Rice Varieties, but did not participate in the Masagana program, or necessarily follow the 16 recommended *Makabagong Paraan* steps for Masagana production.

[27]Mateo-Bayani Regression Analysis, pp. 116-117.

purposes, BAECON[28] was the "official" gatherer and guardian of Philippine national agricultural statistics.

The principal source of BAECON data for rice production was a quarterly "Integrated Agricultural Survey" (IAS). The IAS was initiated in the crop year 1968/69, and improved data collection techniques were incorporated into the system during the 1969/70 crop year. The IAS is a purposive, nationwide, sampling of approximately 100,000 farmers who are permanent respondents, selected in 1970 on a stratified random basis. Rice farmers are a subset of all farmers, stratified by type -- Irrigated, Rainfed and Upland, however Masagana participants are not separately identified in this stratification. Surveys are conducted by teams at the municipality level, but the data are aggregated centrally, and are not considered meaningful below a regional level.[29] To conduct the survey (as well as to perform other duties), BAECON maintains a staff of 1,200 regular employees assigned to BAECON Field offices in the provinces, and in addition hires some 2,000 temporary data collectors for approximately two weeks every quarter during survey rounds.

Although some BAECON personnel worked closely with NFAC and the Provincial PFOs on a part-time basis to prepare the Masagana MIS data and reports, and conduct follow-up field surveys, as an organization BAECON did not let this involvement influence them but maintained a detached air from Masagana operations and simultaneously gathered, processed, and published its "official" IAS data with conclusions which were at odds with NFAC's program management reports. A comparative summary of BAECON IAS and NFAC MIS data is shown below:

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[28]Reorganized in May 1987 as the Bureau of Agricultural Statistics (BAS)

[29]For example, Northern Luzon, or The Visayas, consisting of several provinces. Significantly, some of the provinces in the region are not even rice production areas.

TABLE **

CROP YEAR	M-99 PHASE	BAECON/IAS (All Farms) Ca/ha[30]	NFAC/MIS (M-99 Only) Ca/ha[31]
1973/74	I & II	37.6	76.7
1974/75	III & IV	37.0	75.1
1975/76	V & VI	39.8	81.5

The glaring differences between BAECON's official statistics on rice production and yields, and the levels observed by others was a constant source of frustration and acrimony, especially after the early Phases of Masagana reports were refuted by BAECON, but the issue was never fully joined, and the discrepancies were never resolved. Throughout the Masagana program, the Philippine Department of Agriculture continued its schizophrenic stance -- using NFAC MIS data for program monitoring, management and publicity purposes, and BAECON data for "official" analysis and economic policy decisions;[32] while outside agencies constantly questioned and criticized both.

A closer examination of the MIS and BAECON data and a "residual" analysis reveals the intolerable inconsistency between these two data series.

Residual Analysis

If one assumes that the overall BAECON data is accurate and deducts the MIS-reported data from that total, then one can only conclude that the Masagana MIS data is grossly overstated, for by separating the Masagana data from the national total, the residual (i.e. non-program) attainments were impossibly low. The data for

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[30]Cavans @ 44 kilos/cavan

[31]Weighted average from the Two phases

[32]This was particularly difficult for the Secretary of Agriculture in estimating availability of rice from harvest, private and public rice stocks, consumption rates, as well as for making import/export recommendations. See for example: Kenneth F. Smith "Philippine Rice Production for Crop Year, July 74 - June 75", Memorandum to Mr. Thomas C. Niblock, Director, USAID/Manila, November 29, 1974, p. 9 -- in which the quality of available data is assessed and the conclusion (from that data) is that "the Philippines could have either a surplus of over 9 million cavans, or a deficit of over 12 million. This represents almost a +/- 10% range for error, which is much too large for comfort."

1973/74, for instance, indicates a residual yield for the non-Masagana farmers of 20.8 ca/ha which is only about 57 percent of a normal good year, and little more than half the national average yield (63 percent) for the disastrous 1972/73 year which precipitated the Masagana program.

TABLE **

RESIDUAL ANALYSIS OF PALAY PRODUCTION AND PRODUCTIVITY
BAECON & M-99 MIS DATA

CROP YEAR	ALL FARMS			M-99 FARMS			RESIDUAL (NON M-99)		
	HAS Mils	PALAY M MTs	PALAY[33] Ca/Ha	HAS Mils	PALAY M MTs	PALAY[34] Ca/Ha	HAS Mils	PALAY M MTs	PALAY[35] Ca/Ha
1971/72	3.3	5.3	36.3	-	-	-	-	-	-
1972/73	3.2	4.6	32.8	-	-	-	-	-	-
1973/74	3.5	5.8	37.6	1.1	3.6	76.7	2.4	2.2	20.8
1974/75	3.6	5.9	37.0	1.6	5.4	75.1	2.0	0.5	5.7
1975/76	3.7	6.4	39.8	1.7	6.1	81.5	2.0	0.3	3.4

While 20.8 cavans per hectare is not inconceivable for marginal rice land production, it is highly unlikely that all but marginal farmers joined the specially-targetted Masagana production program. Furthermore, the residual data for the 1974/75 and 1975/76 crop years — with the non-Masagana residual falling to 5.7 and 3.4 cavans/hectare respectively — is absurdly low.

The results are somewhat more plausible if one allows for the SSD survey finding that the Masagana MIS productivity data was overstated by some 21%, as this would place the residual yields in the double digit (i.e. 15 - 26 cavan/hectare) range.

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[33]Numbers don't compute exactly due to rounding.

[34]Numbers don't compute exactly due to rounding.

[35]Numbers don't compute exactly due to rounding.

TABLE **

RESIDUAL ANALYSIS OF PALAY PRODUCTION AND PRODUCTIVITY
BAECON & M-99 MIS DATA

(Adjusted to reflect 21% MIS overreporting of productivity (Ca/ha))

CROP YEAR	ALL FARMS			M-99 FARMS			RESIDUAL (NON M-99)		
	HAS Mils	PALAY M MTs	PALAY Ca/Ha	HAS Mils	PALAY M MTs	PALAY Ca/Ha (Adjusted Yields)	HAS Mils	PALAY M MTs	PALAY Ca/Ha
1971/72	3.3	5.3	36.3	–	–	–	–	–	–
1972/73	3.2	4.6	32.8	–	–	–	–	–	–
1973/74	3.5	5.8	37.6	1.1	3.1	63.4	2.4	2.7	25.6
1974/75	3.6	5.9	37.0	1.6	4.4	62.1	2.0	1.5	17.1
1975/76	3.7	6.4	39.8	1.7	5.0	67.4	2.0	1.4	15.9

If the Masagana MIS "exaggeration factor" is increased even further to 44% — as Masagana's own MIS follow-up surveys indicated was possible — the overall results can be reconciled with "reality", as indicated below, although the yield differential between Masagana and non-Masagana is still much higher than (i.e. in excess of 100% instead of the +/- 25%) indicated by other studies.

TABLE

RESIDUAL ANALYSIS OF PALAY PRODUCTION AND PRODUCTIVITY
BAECON & M-99 MIS DATA

(Adjusted to reflect 44% MIS overreporting of productivity (Ca/ha))

CROP YEAR	ALL FARMS			M-99 FARMS			RESIDUAL (NON M-99)		
	HAS Mils	PALAY M MTs	PALAY Ca/Ha	HAS Mils	PALAY M MTs	PALAY Ca/Ha (Adjusted Yields)	HAS Mils	PALAY M MTs	PALAY Ca/Ha
1971/72	3.3	5.3	36.3	–	–	–	–	–	–
1972/73	3.2	4.6	32.8	–	–	–	–	–	–
1973/74	3.5	5.8	37.6	1.1	2.6	53.3	2.4	3.2	30.3
1974/75	3.6	5.9	37.0	1.6	3.7	52.2	2.0	2.2	25.0
1975/76	3.7	6.4	39.8	1.7	4.2	56.6	2.0	2.2	25.0

The first major issue is thus whether the MIS reports are exaggerated, whether the BAECON surveys are understated, or both; and if so, to what extent. Secondly, given that discrepancies exist, of what utility is such data for evaluative purposes?

Marginal Analysis -- New Area Production v's Existing Area Productivity

A close examination of the DAECON IAS data juxtaposed with the Masagana MIS data indicates that -- at the margin -- new area production contributed more to the program than increased productivity. First, from the "before" and "after" IAS data, the net change in area farmed and total annual production obtained from that area can be calculated:-

TABLE **

NET CHANGE IN OVERALL PRODUCTION OF PALAY
FROM CY 1972 (BASELINE) TO CY 1976 (PROGRAM END)

	HAS MIL	PALAY M Mts	PALAY Ca/Ha[36]
1972 (Baseline)	3.3	5.3	36.3
1976 (Program End)	3.7	6.4	39.8
NET CHANGE	.4	1.1	

Since the 1976 data above was comprised of:-

Masagana	1.7	4.2	56.6
Traditional	2.0	2.2	25.0

the 1976 Crop Year increase of 1.1 million tons production of palay and the expansion of 400,000 hectares over the 1972 Crop Year could have been accomplished by any permutation within the "Worst Case -- Best Case" scenario range depicted on the following page:-

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[36] @ 44 kilos per cavan.

CHANGE IN PRODUCTION OF PALAY ATTRIBUTABLE TO NEW AREAS AND METHODS AND/OR TRADITIONAL WAYS CY 1976 BAECON & MIS DATA

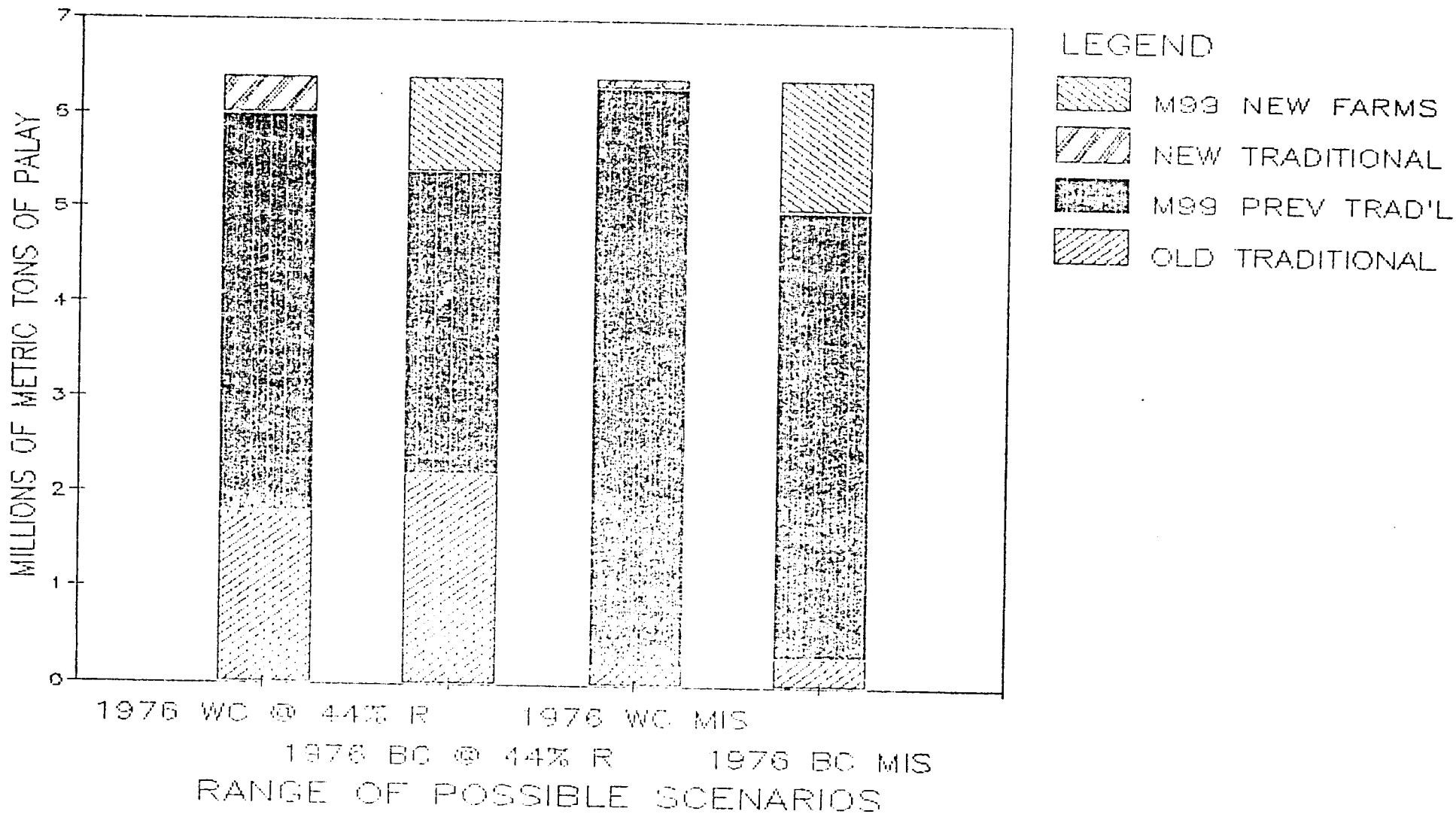

TABLE **

COMPARATIVE ANALYSIS OF ALTERNATIVE SCENARIOS -- EXPANDING HECTARAGE V'S IMPROVED NEW METHODS ON EXISTING HECTARES

Using official palay production and productivity in Crop Year 1976 from LABCON & Masagana MIS data (adjusted to reflect 44% MIS overreporting of productivity (Ca/Ha))

	HAS MIL	1976 PALAY M MTs	1976 PALAY Ca/Ha	1972 PALAY Ca/Ha	'76-72 NET CHANGE Ca/Ha	Change in Prod'n PALAY M MTs 1976 Attributable to Area Method[37]	%[38]
A. Worst Case -- (Assuming all the increased area is farmed traditionally)							
Old Traditional Farms (Same as 1972)	1.6	1.8	25.0	36.3	-11.3	-0.8	
New Traditional Farms (since 1972)	.4	.4	25.0	-	+25.0	+0.4	36%
Sub-Total	2.0	2.2					
Masagana Farms (Previously Traditional Farms)	1.7	4.2	56.6	36.3	+20.3	+1.5	
TOTAL	3.7	6.4			NET CHANGE:	+1.1	100%
B. Best Case -- (Assuming all the increased area is farmed under Masagana)							
Old Traditional Farms (Same as 1972)	2.0	2.2	25.0	36.3	-11.3	-1.0	
Masagana Farms (Previously Traditional Farms)	1.3	3.2	56.6	36.3	+20.3	+1.1	
Masagana Farms (New since 1972)	.4	1.0	56.6	-	+56.6	+1.0	91%
M-99 Sub-Total	1.7	4.2					
TOTAL	3.7	6.4			NET CHANGE:	+1.1	100%

In essence, even allowing for a 44 percent deflation in Masagana 99 MIS reported data, somewhere between 36 and 91 percent (or an average of 63.5 percent) of the increase in production was attributable to increases in hectarage. If the Masagana MIS yields are taken at face value, the attribution is even greater.

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[37] ([M HAS x 1976Ca/Ha x Kilos/Ca /1000] - [M HAS x 1972Ca/Ha x Kilos/Ca /1000]) = Change in M MTs Palay attributable to Method; i.e. ([1.6 x 25 x 44/1000] - [1.6 x 36.3 x 44/1000] = 1.76 - 2.56 = -0.8

[38] ([M MTs Palay by New Area/Net Change in M MTs Palay] x 100); i.e. ([0.4/1.1] x 100) = 36% and ([1/1.1] x 100 = 91%

TABLE **

COMPARATIVE ANALYSIS OF ALTERNATIVE SCENARIOS -- EXPANDING HECTARAGE V'S IMPROVED NEW METHODS ON EXISTING HECTARES

Using official palay production and productivity in Crop Year 1976 from BAECON & Masagana MIS data (accepting Masagana MIS data at face value)

	HAS MIL	1976 PALAY M MTs	1976 PALAY Ca/Ha	1972 PALAY Ca/Ha	'76-'72 NET CHANGE Ca/Ha	Change in Prod'n PALAY M MTs 1976 Attributable to Area	Method[39]	%[40]
A. Worst Case -- (Assuming all the increased area is farmed traditionally)								
Old Traditional Farms (Same as 1972)	1.6	.2	3.4	36.3	-32.9		-2.3	
New Traditional Farms (since 1972)	.4	.1	3.4	-	+3.4	.06		5%
Sub-Total	2.0	.3						
Masagana Farms (Previously Traditional Farms)	1.7	6.1	81.5	36.3	+45.2		+3.4	
TOTAL	3.7	6.4			NET CHANGE:		+1.1[41]	100%
B. Best Case -- (Assuming all the increased area is farmed under Masagana)								
Old Traditional Farms (Same as 1972)	2.0	.3	3.4	36.3	-32.9		-2.9	
Masagana Farms (Previously Traditional Farms)	1.3	4.7	81.5	36.3	+45.2		+2.6	
Masagana Farms (New since 1972)	.4	1.4	81.5	-	+81.5	+1.4		127%
M-99 Sub-Total	1.7	6.1						
TOTAL	3.7	6.4			NET CHANGE:		+1.1	100%

In other words, a mean of 66 percent (a minimum of 5 percent and a maximum of 127 percent[42]) of the increase in production could be attributed to increases in hectarage. In either case, this leaves a

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[39]([M HAS x 1976Ca/Ha x Kilos/Ca /1000] - [M HAS x 1972Ca/Ha x Kilos/Ca /1000]) = Change in M MTs Palay attributable to Method; i.e. ([1.6 x 3.4 x 44/1000] - [1.6 x 36.3 x 44/1000] = 0.24 - 2.56 = -2.3

[40]([M MTs Palay by New Area/Net Change in M MTs Palay] x 100); i.e. ([0.06/1.1] x 100) = 5% and ([1.4/1.1] x 100 = 127%

[41]Numbers don't add due to rounding

[42]127 percent increase in new area is compensating for the tremendous loss in production on the residual existing area

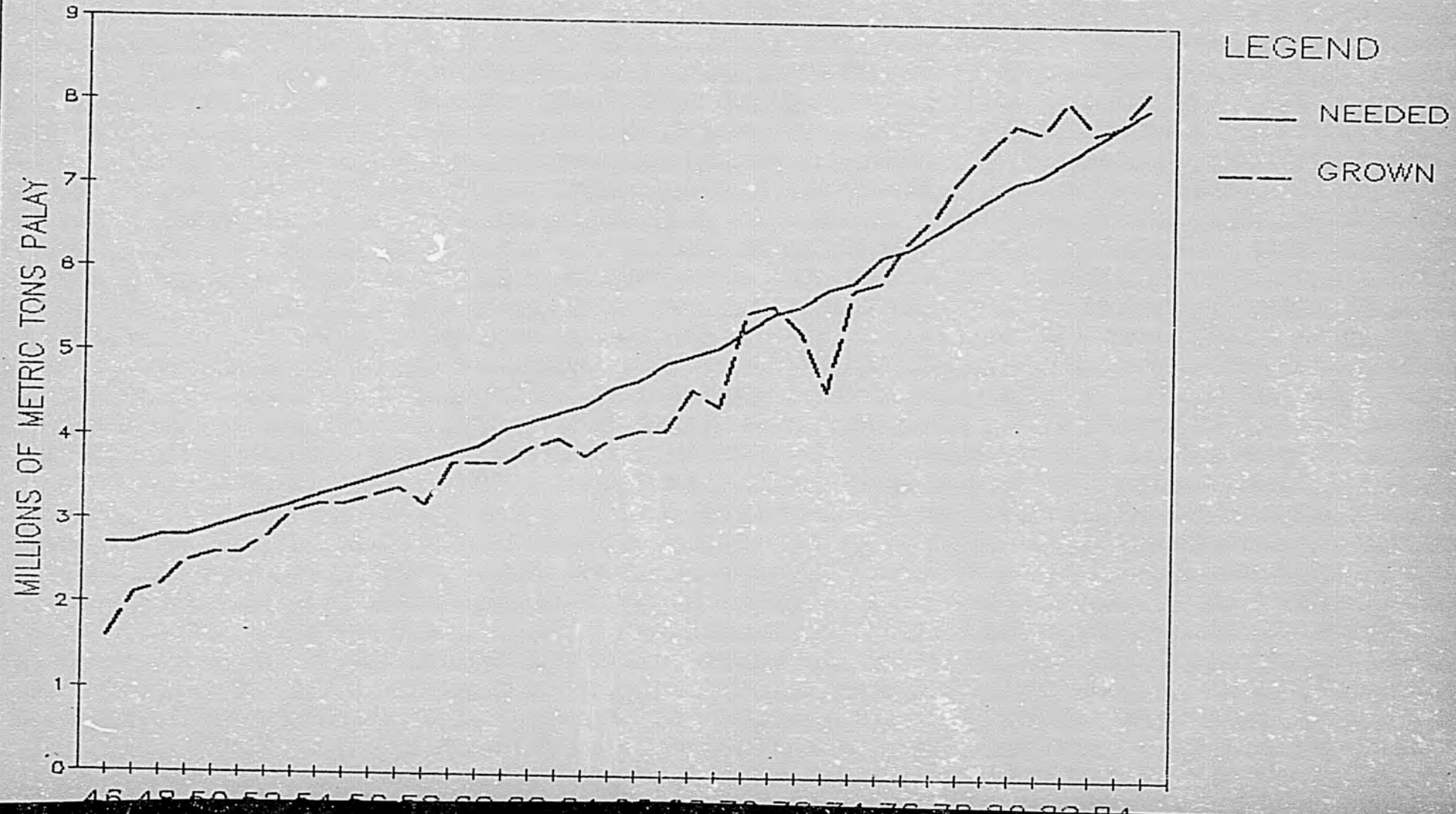
mean difference of only 36.5 to 40 percent of the increase attributable to increased productivity on existing hectarage.

Another aspect worthy of further explication is the perspective one takes in measuring progress. Development projects are usually formulated to provide "more and/or better" quantities/qualities of something which is seen as desirable. That something can usually be measured. In the case of the Masagana Program, for instance, a target of "99 cavans per Hectare" (@ 44 kilos per cavan) was established, and was readily measurable. The fact that the program fell short of this objective and only attained 84.3 cavans/hectare at its peak performance (or 85% of its target) -- if one accepts the reported yield at face value -- is the typical way of measuring accomplishment. However this approach tends to cast performance in a negative light, obscuring a very real accomplishment -- i.e. the fact that under the Masagana program, from the same data it can be seen that average small farmer productivity was raised to 84.3 cavans/hectare from a base of 36.3 cavans per hectare; in other words, an increase of 132%, or more than double what it was before.

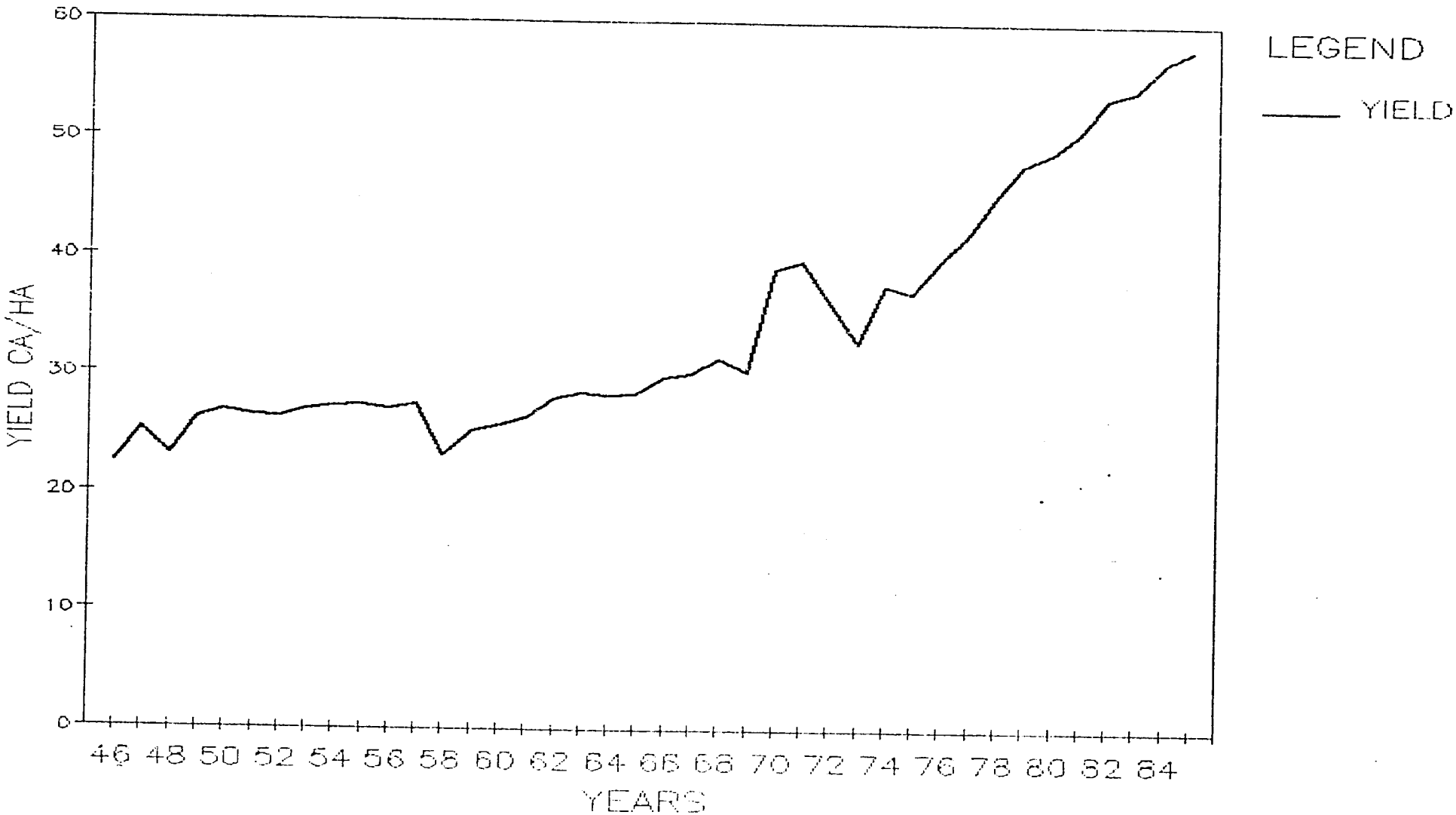
In any event, although the yields were below the 99 ca/ha targetted, the Masagana Program did break the long pattern of under-productivity, and set the stage for continued growth and self-sufficiency, even with the continual incursions of population growth. This is not simply statistical sleight-of-hand but *de facto* accomplishment -- as opposed to *a priori* conjecture -- and is thus a much sounder basis for measuring progress.

In establishing palay policy and setting production objectives -- while 99 cavans per hectare was technically feasible, and "99" was incessantly drummed into the national consciousness as a popular target -- from a National Self-Sufficiency standpoint, 50 cavans per hectare would have been an acceptable "fall back" position, other things being equal.

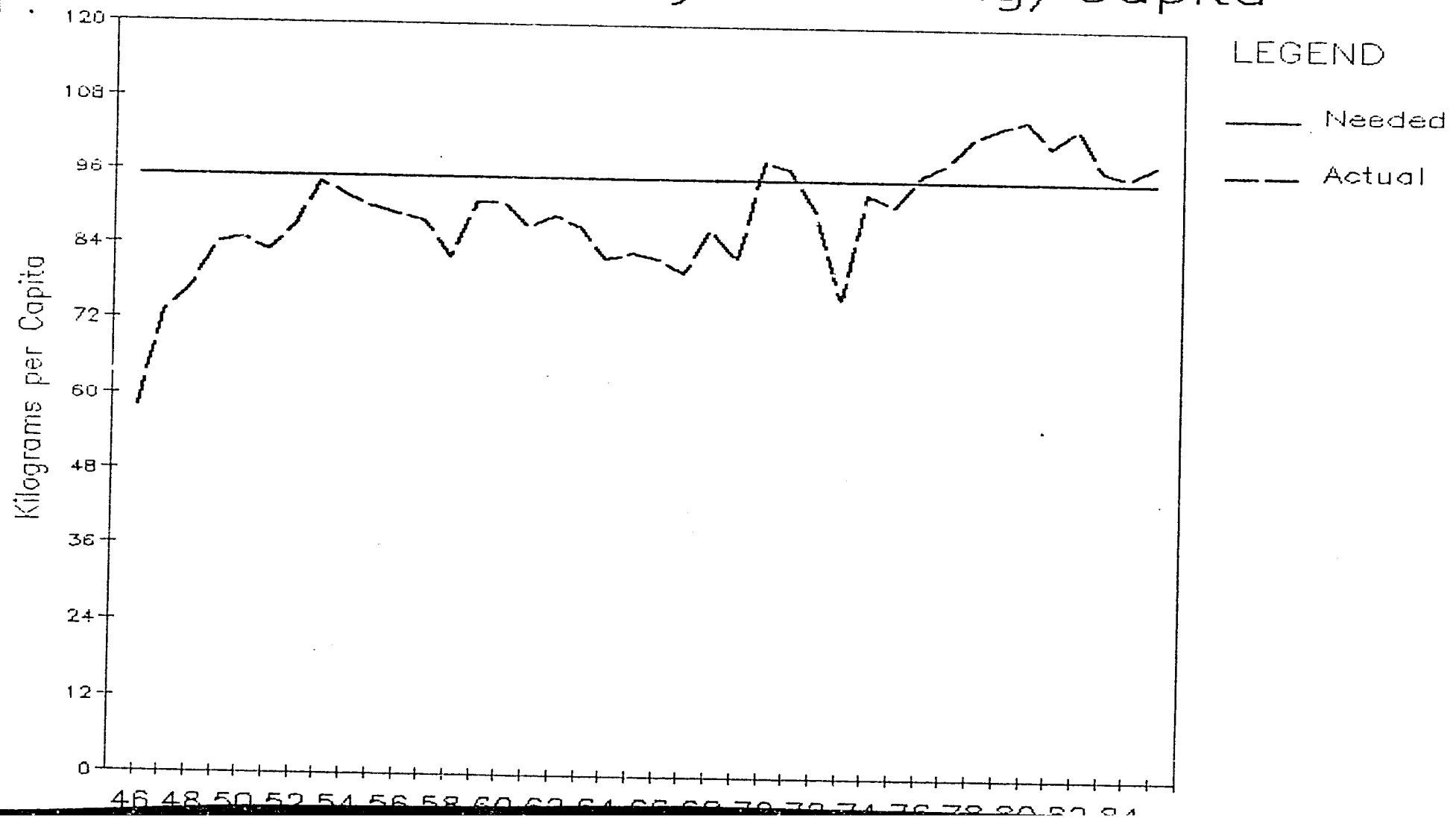
PHILIPPINE PALAY PRODUCTION & SELF-SUFFICIENCY @ 95 Kg/Capita Crop Years 1946 – 1985



PHILIPPINE RICE PRODUCTIVITY
CAVANS/HECTARE
@ 44 Kilos per Cavan
CROP YEARS 1946 — 1985



PHILIPPINE RICE SELF SUFFICIENCY
CROP YEARS ENDING JUNE 1946 — 1985
Self—Sufficiency = 95 Kg/Capita



A 50 cavan/ha "*Masama na 99*"[43] might have been "sufficient" to attain national self-sufficiency, but it would have been far from adequate in terms of individual farm-production economics. For example, an income-production study conducted in Iloilo in 1972 (and repeated in 1975)[44] indicated that the more input-intensive and expensive high yielding technology of Masagana 99 was only profitable when levels of production exceeded 60 ca/ha. Furthermore, production between 60 and 99 cavans/hectare, while profitable, incurred considerable capital outlay as well as risk exposure. In effect, rice farming was not economically more advantageous (compared to traditional "low input-low output" methods) for most categories of farmers until threshholds at the 100 ca/ha range were reached.[45] Despite both the technical feasibility for increasing production levels to 99 cavans per hectare, and the public pressure to do so, <u>the actual increases apparently experienced by Masagana farmers were (for the most part) only marginal</u>. Assuming that farmers were rational, this tends to support the hypothesis that basic economic considerations — i.e. "production-possibilities", "supply-demand", and the law of diminishing returns — were overriding constraints to higher yields rather than a lack of technical knowledge or credit.[46]

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[43]"*Masama na 99*" — "It's a bad 99"; — a contemporary Tagalog pun for a Masagana participant's crop failure!

[44]Kenneth F. Smith, "Palay Productivity and Profitability in Iloilo 1971-72: A Comparative Analysis" USAID/Manila, December 1972. Also Jessie Divinagracia and Kenneth F. Smith "Palay Production and Profitability for Small Scale Farmers, Iloilo, 1975. An Economic Analysis of the "Masagana 99" Technology". Department of Agriculture, Quezon City, Philippines, June 1976.

[45]There are several categories of farmers — i.e. Owners, Leaseholders, Share-tenants — whose profitability is a function of their mortgaging/renting/sharing arrangements. The study examines several of these. The findings are too broad-ranging for the purposes of this study; but the essential point is that the farmer's goals are not necessarily synonymous with national objectives to increase yields. At various thresholds, the additional cost and effort may not be considered worthwhile. "Complacency economics" — i.e. the relative desirability of "resting" after a "satisfactory" level of income has been attained, rather than striving to achieve higher production and productivity — is a significant factor in the equation.

[46]Kenneth F. Smith, "Palay Productivity and Profitability in Iloilo 1971-72: A Comparative Analysis" USAID/Manila, December 1972. Also Jessie Divinagracia and Kenneth F. Smith "Palay Production and Profitability for Small Scale Farmers, Iloilo, 1975. An Economic Analysis of the "Masagana 99" Technology". Department of Agriculture, Quezon City, Philippines, June 1976.

DATA SERIES DISCREPANCIES - SOME ALTERNATE HYPOTHESES

Follow-up interviews with NFAC and BAECON officials elicited a variety of opinions about the accuracy of available rice statistics, and the following speculation was offered for the data gap:-

* BAECON has the most highly trained and experienced statistical survey personnel in the agricultural statistical assessment business. Therefore, their estimates are better than any others.

* BAECON has "confidence" in the integrity of its people, and its methods.

* BAECON and NFAC MIS data are not that far apart when adjusted for overreporting by production technicians.

* Masagana farmers are not stratified in the BAECON Surveys (IAS), thus a true picture of Masagana 99 production is not presented.

* IAS farms are treated equally for selection -- not weighted by rice area for sample stratification. Thus small farm bias exists.

* BAECON has a built-in bias to report the yields from small parcels of land on which rice is grown by multi-crop farmers. Such yields are traditionally less productive than larger areas, but the data is extrapolated and rounded to the nearest hectare.

* If BAECON has more funds, it could do a better quality job.

* BAECON personnel are not equipped or supported to cover all the area they are assigned.

* BAECON obtains a lot of its information from the FFOs and production technicians at the field level.

* Many BAECON surveyors only work part-time -- they don't see the "big picture".

* BAECON has historically underestimated yields because of poor survey techniques and scant field coverage.

* BAECON has to take a conservative stance, and err on the side of underreporting. The economic and political penalties for overreporting are too high.

* National yields are much higher than BAECON is willing to allow.

* Most of the more productive (i.e. irrigated) farmers are Masagana 99 participants, whereas BAECON survey respondents run the gamut from them to marginal subsistence farmers.

* Farmers have no incentive to report accurately.

* Farmers have major incentives to underreport production to BAECON agents.

* Farmers may deliberately understate yields to keep the government from figuring out their real income.

* The IAS has fundamental problems of measurement. Harvesting is staggered throughout the year but data is only obtained quarterly. Thus a lot of BAECON data is dependent on farmer recall.

* BAECON asks farmers to estimate what they are harvesting now -- often before it is measured.

* IAS data "must be low". Farmers competing for "Outstanding Farmer of the Year" typically have yields in the 200 - 250 ca/ha range.

* Farmers like to brag to Production Technicians and their neighbors, and compete for "Farmer of the Year" awards.

* Many farmers do not accurately know their farm size or rice production area. Even if the farm was measured by BAECON in 1970, many changes have taken place since then. Crops are often rotated and sugar or corn substituted for rice.

* Reported cavans/hectare yields are inconsistent because two base measures are used:- the area of the farm planted, and the area actually harvested -- i.e. that which survived the storms, drought and insects. CARDAI uses the former. Farmers and production technicians tend to use the latter.

* Many former rice farms were converted to housing sub-divisions, or minimal road-ways laid out on them -- to avoid land reform annexation. While they continue to plant rice, both the area planted and production are generally lower.

* Many farmers concepts of production are different from the technician's or the statistician's. Farmers often consider "production" to be their marketable surplus (after paying labor and creditors in-kind, and retaining some palay for personal use). Also, they often do not distinguish between "production" (i.e. total cavans harvested) and "yield" (i.e. cavans per hectare).

* When the government converted from 44 kilo cavans to 50 kilo sacks for measurement purposes [July 1975], production technicians just started reporting "cavans" as "sacks".

* Although the 50 kilo "sack" is the government's official measure -- it is artificial. Farmers in Central Luzon typically reuse cavan-size (44 kilo) fertilizer sacks, while in Mindanao, larger sacks which hold 56 kilos (or more) are in general use. In the Visayas, grain is often kept in larger, variable sized (100 kilo +) wicker and reed bins and no precise measurement is made until sold, if then. In most places the yield is usually estimated by "ocular inspection" (i.e. "eye-balled") rather than weighed. Thus there is plenty of room for error.

* Masagana Production Technicians have a built in bias to inflate reports of yields. They receive a cash bonus based on their farmers achieving targets.

* Production technicians "supervise" more farmers than can be physically monitored, on-farm, in a month. Therefore they do not report accurately on production, but only estimate; or accept what the farmer tells them, without checking it.

* Production technicians are supposed to maintain records on individual farmers, but usually these records are not up to date when inspected by NFAC officers. Masagana Production Technicians thus have to estimate yields for their reports. They have a tendency to overstate the results.

* Production technicians do not get paid until they turn in a report. Therefore they turn in reports, whether they have the data, or not.

CONCLUSIONS

Although the Masagana data was reported by production technicians and FFOs with vested interests in inflating the results --- and it appears that this in fact did occur --- NFAC actively worked to limit the error rate by its follow-up visits and surveys. The NFAC MIS data was thus more comprehensive, sharply focussed, extensively gathered, intently monitored, scrutinized and cross-checked than the smaller, more broadly ranging, less frequently conducted BAECON IAS sample: and served a useful purpose for NFAC and the Provincial managers (Governors, Mayors, FFOs and others) as a basis for making decisions in managing day-to-day program operations --- which the IAS was unable to do.

The MIS follow-up surveys indicate the potential range for error in specific provinces, while the SSD studies are probably a more representative reflection of the overall situation. However, while useful for project management, the MIS data is not an adequate basis for extrapolation to the National level. Although the BAECON data appears to be on the low side, and there are many plausible explanations for this, unfortunately there is no objectively verifiable evidence to determine its degree of accuracy. Thus, for better or worse, two series of statistics persist:-

1. the "official" pessimistic BAECON IAS data, and
2. the higher "unofficial" Masagana series

which although internally processed in a consistent manner, are largely irreconcilable. Given the long litany of data collection hazards in the Philippine rice production sector, however, it is apparent that unless the inadequacies in the BAECON IAS system data are rectified, no judgements can (or should) be made regarding National economic agricultural policy without a great deal of trepidation.

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