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FINAL ANALYSIS OF THE CHAMA RICE PROJECT

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INTRODUCTION

With a grant of $1,166,224 received in May 1981 from the Agency for International Development, Africare and the Ministry of Agriculture and Water Development (GRZ) undertook a three and one half year program to increase rice production and small farmer incomes in three areas of the Chama District: Kapilingizya, Simulemba, and Chifunda. MAWD had originally proposed the project in January 1980, coincident with GRZ's Third National Development Plan, as part of Zambia's renewed effort to become self sufficient in basid food grains. A flexible division of duties was agreed upon at the project's outset: the Ministry would act as the primary implementing agency, Africare would supply requisite development expertise, and USAID would provide the majority of the funding. The project was subsequently extended to September 1986.

This report is divided into two main sections which will discuss:

I. The Project to Date
   A. Production and Income (planned and actual outputs)
   B. Project Design (planned and actual accomplishments)

II. Lessons Learned from the Project.

I. THE PROJECT TO DATE

A. Production and Income

1. Baseline Information

Accurate and complete baseline information was never compiled in a coherent study for the Chama Rice Project. Baseline data is usually difficult to attain for rural areas that have not previously experienced development projects. In this case, the data that was attained was inaccurate for two possible reasons: 1) either district-wide and not project-wide data was compiled or 2) someone altered the figures in an effort to attract potential donors to the project. Whatever the case, the flat figures of baseline data that we have are not useful; statistica comparisons of expectations and actual outoomes are, however, possible using this baseline data. (Note: hereafter this baseline data will be called "empirical".)

2. Number of Farmers Involv

Based upon data compiled by the on-site Africare agricultural engineers and other reliable sources, the number of farmers involved in the Chama scheme increased significantly over the project's life. In 1981, when the project began, the number of farmers participating stood at 147 (Kapilingizya, 85; Simulemba, 45; and Chifunda, 17): an increase of 174% over the original figure. By 1985-86 and the project's completion, the scheme could count 420 farmers as members (K, 205; S, 29; C, 186), a 186% increase over the original figure. While the Simulemba scheme, during the final project year, lost farm membership/participation due to a major unforseen flooding problem, the Kapilingizya and Chifunda schemes meanwhile had experienced remarkable membership increases since

the project beginning (increases of 141% and 994% respectively). Compared to a projected entire-scheme membership increase of only 20% according to the empirical baseline data, the actual 186% increase should indeed be viewed as a success.

3. Number of Hectares Cultivated in the Project

Increases in hectarage paralleled increases in membership. At project beginning, there were only 47 hectares of land under cultivation (K, 25; S, 15; C, 7). By 1984-1985 this figure had increased to 104 (K, 42.5; S, 18.625; C, 43), and by 1985-86 to 163 (K, 84.5; S, 6.3215; C, 72.75). The projected increase of hectarage according to empirical baseline data was 80% (from 250 to 450 ha). In actual fact, hectarage increased by 121% (1981-1984/85) and by 247% (over the whole project period). Once again, Kapilingizya and Chifunda were the successful scheme areas.

4. Average Yield/Hectare

The average rice yield per hectare at project start was 17.7x80kg bags/hectare (this figure excludes Simulemba scheme because of unreliable production figures: SEE APPENDIX I). Empirical baseline figures expected a 69.5% increase in average yield over the project period. Real increases, however, amounted to 69.7%: average yield/hectare, that is, had risen from 17.7x80kg bags/ha to 30.05x80kg bags/ha. On a site by site basis yields increased from .72x80kg bags/ha (1981) to 23.9x80kg bags/ha (1985-1986) at Kapilingizya and from 34.7x80kg bags/ha to 36.2x80kg bags/ha at Chifunda (once again, Simulemba's figures for the final growing season are unreliable).

5. Average Hectarage/Farmer Under Cultivation & Cultivation of Out-of-Project Lands

If one takes into consideration certain sociological factors of African society, the figure of average hectarage/farmer is important; as a straight figure, however, it can be misleading. In the rural African setting, life is characterized by a series of social obligations and tradeoffs. Because a rural development scheme like the Chama Rice Project takes place in a zero-sum society, it begins yearly with a fair and equitable distribution of land: "One man: one lima," is an accurate approximation of an old maxim (a lima being more of a subsistence than a quantitative measurement). To repeat, hectarage is divided evenly at project start. If however a particular farmer experiences an illness in the family that temporarily draws him away from his land, for example, he might allow another farmer in the scheme to plough, plant, and harvest on his plot, expecting some sort of "gift" (like a bag of rice) from the "tenant" when the original farmer returns. Often the giver gives a "gift" that is larger than the original favor and a long-standing series of unequal reciprocities (which often constitutes the basis for friendship) results. The point is twofold: first, average hectarage/farmer can change at any time during a season--some farmers are likely to end up with more hectares than they began with, sometimes as much as 4x their original hectarage as other farmers temporarily drop out of the scheme; and second, a bag of rice is, in traditional rural African society, often seen not only as a staple food but also as a labor (or obligation) payment

Both of the above points relate to a third: namely, that hectarage cultivation labor and payment is not limited to intra-scheme activity. Rice produced on the Chama scheme either can be used for labor to cultivate original or additional-accrued hectarage within the scheme or can be used for labor payment in the cultivation of lands outside the scheme (lands on which maize, groundnuts, and sorghum might be grown). Thus, in order to understand the full sociological and unrecorded quantitative implications of the data, we must keep all of the above-mentioned factors in mind.

Average hectarage/farmer at project start was .32ha/farmer (K, .29; S, .33; C, .41). By 1984-85 the average hectarage had decreased slightly to .26ha/farmer (K, .27; S, .10; C, .70); (recall our discussion!). Still, by 1985-86 and project completion the average hectarage/farmer had reached .38 (an overall actual increase of 18.75%). But perhaps more importantly, judging by on-site reports, farmers were, throughout the whole project period, expanding hectarage cultivation of upland crops (i.e. maize, groundnuts, sorghum), were saving labor time on-scheme, and were even allowing outside farmers to plow some on-scheme and off-scheme hectarage.

Thomas Moller, the final Africare on-site agricultural specialist for Chama, noted these trends and compiled some relevant data for the final years. At Kapilingizya in 1985-86, 30 outside farmers plowed 12.5 hectares; at Chifunda in 1984-85, 57 outside farmers plowed 21 hectares and in 1985-86, 40 outside farmers plowed 32.5 hectares. Average hectarage plowed by outside farmers using this data is .62 for 1985-86 (the final project period)--63% higher than the hectarage per farmer for regular on-scheme farmers and 82% higher than the original hectarage/farmer at project beginning.

In summation, these figures and on-site observations should, in addition to outlining the actual hectarage/farmer increase recorded, also explain some of the additional, unofficial, positive implications of the Chama Rice Project for the average area-farmer.

6. The Price of Rice

The price of rice rose dramatically during the project period; much of this rise was unexpected. Prices were expected to rise from K19/80kg bag to K24/80kg bag over the project period. In fact prices rose from K19/80kg bag to K55/80kg bag from 1981-1986: a price increase of 189.5% as compared to an anticipated increase of 26.3% . We note these price figures for two reasons: 1) they are instrumental in calculating gross income/scheme and net income/farmer and 2) they are important considerations when judging the relative successes and/or failures of income increases/declines (i.e. real vs. inflated income).

7. Net Income/Grower

The net income/grower likewise increased significantly over the project period. Empirical baseline figures expected a quintipling (400% increase) in net income/grower by project termination. Actually, the net income increased by 2,762% (189.5% of which was inflationary) from K22.9/grower in 1981 to K655.5/grower in 1986 (for K and C only). At Kapilingizya, net income/grower was K1.1/grower in 1981 (due to exceptionally difficult grass interference) and rose to K541.9/grower by 1986 (a 49,164% increase); at Chifunda, net income/grower was K59/grower in 1981 and rose to K780.6/grower by 1986 (a 1,223% increase).

8. Production Level

Empirical baseline figures expected a production level of 360 tons (or 4,500x80kg bags) of rice by project completion: a 3½x (250%) increase over original figures. Disregarding Simulemba scheme, original (1981) production figures were 18x80kg bags at Kapilingizya and 243x80kg bags at Chifunda; or a total of 261x80kg bags produced. Total number of bags produced during the project's final year was 4660x80kg bags (K, 2020; C, 2640). Thus, total production had increased by 1,685% (a 11,122% increase for Kapilingizya; a 986% increase for Chifunda).

9. Marketing Level

Marketing levels, quite logically, also increased as production levels increased. In 1981, 58x80kg bags were officially sold by scheme farmers (K, 5; C, 53). By project completion 850x80kg bags were sold (K, 400; C, 450). A two-scheme project marketing increase of 1,365.5% was posted (K, 7900% increase; C, 749%). But while total rice sold increased by 1,365.5% over the project period, the percentage of rice sold out of rice produced actually declined by 211%. Were farmers consuming a greater proportion of their increasingly abundant rice yields? Unlikely. Once again, the sociological consideration that rice is, in this region, often exchanged for labor payment (and not always sold) must be taken into account. Looked at this way, the decline in percentage of rice sold out of rice produced might be interpreted positively--i.e. farmers, by their own volition, were chosing to put more earnings back into the scheme (in the form of labor payments to increase output or save time) or into the cultivation of upland crops (maize, groundnuts, sorghum, etc.). +SEE APPENDIX II

B. Project Design

1. Extension Services and Government Involvement

The original project proposal called for the construction of the following administrative apparatus: a District Rice Management Committee (DRMC) under the tutelage of the provincial agricultural officer of Eastern Province, and Farm Management Groups (FMG's) for each of the three project sites; a rice coordinator (RC) and three agricultural assistants (AA's) and three Commodity Demonstrators (CD's); and an Africare Agricultural Engineer accountable to the Africare Resident Representative in Lusaka.

The Ministry of Agriculture and the Africare staff had clearly delineated roles from the project's beginning (*Prior to extension service construction/implementation, however, it was the Provincial Agricultural Officer's (PAO) responsibility to provide data on farmers then cultivating rice in the project areas, to prepare house site plans and cost estimates, and to identify potential extension personel). The Ministry had fourteen main responsibilities:

1) Maintaining the RC, 3 AA's and 3 CD's throughout the project period, providing a DRC to supervise the 3 AA's and 3 CD's, working with the FMG's, overseeing the seed purification program, and acting as liason between the Chama District Council and other Government departments.
2) Recruiting trained tractor driver/mechanics for each of the 3 FMG's.
3) Recommending that a premium price for seed rice be established.

4) Transporting from Lusaka to Chama all equipment and spare parts necessary for the project.
5) Arranging accomodation for the Agricultural Engineer and extension staff pending construction of staff housing funded under the program.
6) Assisting FMG's to purchase replacement tractors.
7) Accruing project funds from Africare (in Kwacha) through an office designated in writing by the Ministry.
8) Providing quarterly schedules of activities indicating funds required.
9) Maintaining a separate record of project operations and of the disbursement and expenditure of funds; submitting an accounting of funds previously received when projecting future fund/work needs.
10) Establishing a DRMC in Chama to oversee FMG's and FMG funds.
11) Providing a total of 5 houses at U.S.$99,035 total cost.
12) Helping to upgrade (with assistance of Chama District Council) the Chama-Kapilingizya and Chipampa-Simulemba roads and to improve 2 feeder roads in the same area.
13) Providing a final report to Africare within 3 month's of the project's termination.
14) Providing access to all project-related reports and information upon reasonable request.

Africare had seven major responsibilities:

1) Arranging purchase and shipping to Lusaka of all necessary equipment.
2) Providing an agricultural engineer--with 5 duties:
   a) To assure the ongoing training of farmers and operators and the ongoing maintenance of tractors and other on-site equipment.
   b) To support Rural Council works supervisors in overcoming road construction problems.
   c) To design and supervise any necessary self-help water control projects in the rice fields.
   d) To generally assist the rice coordinator.
   e) To serve as a liason with other departments (mainly Health and Community Development).
3) Registering and insuring the 2 project vehicles and the 3 tractors and farm trailers; conveying titles of the 2 vehicles to GRZ, and of the tractors, trailers, and accessory equipment to the respective FMG's.
4) Insuring that funds available for the project were neither exceeded nor underspent by 25%.
5) Insuring that commodities and supplies purchased for the project were manufactured either in Zambia, other developing countries, or Western nations.
6) Providing annual reviews of project progress (with the Ministry and USAID).
7) Receiving monthly reports from the DRC and AAT.

By 1984, problems and accomplishments in the administrative system had become quite clear. Revised recommendations were then made and several new approaches were taken during the project's extension.

The Ministry, by 1984, had succeeded in providing tractor drivers and mechanics, an incipient seed improvement program (as replacement for a seed rice premium), transport of necessary equipment from Lusaka to site, accomodation for extension staff, and access to project areas and project information. The Ministry's actions were sometimes deficient

regarding: 1) extension personnel +SEE APPENDIX III, 2) acceptance of funds (the Ministry had failed to open a project account in 3 years, 3) schedules of work and disbursement of funds (no reports were sent to Africare) 4) accounting expenditures (no records were submitted to Africare), 5) the DRMC (the DRMC was ineffective, but the DRC took over and FMG's were working well), 6) housing construction (it was complete, but sometimes of poor quality), and 7) feeder road improvement (the Ministry was taking no active role in this). So the Ministry, by 1984, had succeeded in several areas of operation, had succeeded partially with others (AA's, CD's, DRC, and housing construction), and failed with the remainder.

Africare, on the other hand, had, by 1984, fulfilled its aforementioned administrative obligations yet saw fit to take the initiative in some of the floundering aspects of the project. Africare and the Ministry got together to propose a revised schedule of administrative operations in 1984:

1) Africare was to assign replacement for Project Technician Schmucker.
2) The three FMG's, it was decided, would bear all costs of operatin and maintaining their tractors.
3) Africare and the Ministry would focus on helping Kapilingizya FMG become self-supporting and would provide assistance to the other sites as merited.
4) Africare (to address the problem of inadequate training) would provide the FMG's with technical assistance, including workshops on cooperative management.
5) The Ministry would provide in-service training in rice for all extension staff assigned to the Chama program and would facilitat salary collection by the extension personnel.

Several major successes marked the project extension phase: 1) FMG's were fully staffed and tractors and tractor equipment was excellently maintained, 2) the salary collection delay problem was solved (1 day to collect instead of 15) by depositing EXST salaries in Barclay's Lundazi, and 3) project bookeepers and accountants were trained by Miss Sarah Grote, Africare Special Assistant. A new problem involving untimely distribution and collection of rice bags by the E.C.U. was identified, and ways to increase FMG meeting participation were discussed. The sites Kapilingizya and Chifunda seemed to be operating smoothly with a good potential for self-management.

In all, the extension services/government involvement aspect of the Chama Rice Scheme had a mixed history of successes and failures.

2. Improvements in Mechanized Cultivation and in Cultivation in General

In the area of mechanization and cultivation the project fulfilled, and often surpassed, original expectations; yields did in fact increase significantly and mechanized equipment was used and maintained effectively.

Of course there were a few problems, but they were relatively minor: delayed funding by AID Washington prevented tractor delivery (and thus training and farmer organization) well in advance of the first planting period; drought and erratic rains, as well as a few erosion

problems (the most notable being the flooding of Simulemba during the last project year) sometimes dampened otherwise spectacular outputs; the Japanese hand planters Africare purchased were not particularly suitable for the project lands; scheme workers did not always follow advice for better cultivation; and farmers found they could not afford tractor hire fees. Most of these problems, however, were overshadowed by remarkable successes. Considering the fact that tractor use in the dambo areas of Chama was a calculated risk, the success of the tractor aspect of the scheme is significant. Moreover, by 1986 Dr. Joan Campbell (scheme evaluator) could characterize the project tractors as being in "perfect shape," each scheme having two trained tractor drivers. And the likelihood of the tractors paying for themselves and their replacements, she prognosticated, was strong. Then too, suggestions (from a 1983 project report) to concentrate on specific intensive farming techniques (crops in lines, proper weeding, etc.) were heeded and proved valuable--a good balance between mechanized and intensive cultivation techniques was attained. The farmers at Kapilingizya and Chifunda who planted early maturing rice reaped greater returns; those who planted in rows found weeding much easier. In general, time saved by impnoved cultivation techniques resulted in (as mentioned in the statistical section of this report) increased cultivation of non-rice lands and, undoubtedly, in some degree of increased productivity on those lands. Finally, to help combat cropland erosion, Africare, in 1986, initiated the formation of a planning team from the Department of Agriculture to deal specifically with erosion problems. In summary, cultivation techniques both mechanized and intensive, were generally successful in the Chama Rice Scheme.

3. Promotion of Seed Purification and Multiplicati...

At project beginning, the Ministry of Agriculture was asked to establish a firm program for seed improvement and multiplication. By 1984, the Ministry had redirected its effors to a rice seed production/certification program with Zamseed and to a rice improvement program at Mount Makulu. Africare, however, decided to build on the original idea and: 1) instituted rice seminars for the District Rice Coordinator and the agricultural technicians, 2) planted demonstration plots to test promising shorter maturation rice varieties and to evaluate the possibility of introducting rice-transplantation on wet-cultivated plots, and 3) drilled a borehole at Kapilingizya to insure the continuation of rice-transplantation there. While some scheme farmers have already been convinced to change to shorter maturation rice varieties (thereby increasing yields), the real results of the seed development program will be seen only after one or more of the short maturing test varieties are certified within the next two or three years.

4. Provision of Improved Infrastructure

Though there were a few salient problems, the outcome of this section of the Chama Rice Scheme was, in general, positive. Original estimates called for construction of staff housing (5 units), for feeder road and general road improvement, and for (rice storage) shed construction. Though initially there were a few problems regarding construction quality, staff housing was generally completed on time. Concerning road improvements, original project objectives called for the upgrading (with culverts and drifts) of 25-30 kilometers of rural roads and for the construction of some feeder roads. Original budget projections for road

improvement (cost estimate $35,000) were soon discovered to be far short of requirements. Meanwhile, in 1982, mechanical problems with the District Council grader halted upgrading of a 7 kilometer stretch of road from Kombambo to Kapilingizya and similar arrangements for upgrading made the following year with the Provincial Roads Department, likewise fell through. As a result, fuel delivery to sites was sometimes slower than expected; nevertheless, consistent delivery of both fuel and supplies was maintained. And, in fact, some road improvement was accomplished on a self-help basis, usually organized by the local headman or ward chairman and performed by a government grader. Storage shed construction proceeded as planned at Kapilingizya; existing storage facilities were eventually upgraded at Chifunda and even at Simulemba, where reluctant citizens, after witnessing the production successes at the other two schemes, later became convinced of the need for good storage facilities. A shed at the Farmer's Training Center was completed in June 1984. Thus, while road construction faltered due to innacurate cost estimates and lack of government leadership, housing and shed construction progressed generally as planned.

But on a sustainable basis after outside input is withdrawn?

In summary, the Chama Rice Project to date accomplished its main objectives: increased rice production and increased farmer incomes. Accessory accomplishments which will bear fruit in the longer term include the introduction of mechanization and of improved cultivation and seed purification/multiplication techniques. Improved infrastructure was, to varying degrees, achieved, and an extension staff program provided valuable insights into development planning and into the effectiveness of government participation. Finally, there are a few positive project implications which will probably never be systematically recorded: 1) impetus for further regional (often commercial) development, 2) combattment of malnutrition, 3) carry-over development in non-rice production, and 4) sense of personal achievement.

II. LESSONS LEARNED FROM THE PROJECT

The most obvious lesson that should be learned from this project is the necessity of an accurate baseline study. Next, sociological considerations should be given equal weight to technical ones (it was, after all, lack of coordination and insufficient elicitation of people's (rather than just government's) input that caused most of the schemes problems). Specific suggestions for similar projects in the future include: 1) erosion monitoring and management, 2) "wet-period" cultivation to facilitate rice transplantation and to save on hand labor when such labor is necessary, 3) credit availability for scheme members, 4) insurande of adequate accounting and bookeeping, and 5) more focused concentration of efforts on schemes which show the strongest self-help tendencies which are reasonably accessible within budget constraints.

The development process implies both learning and achievement; the Chama Rice Scheme has, on balance, been successful in both aspects: it has contributed to our knowledge of agricultural scheming and has provided area farmers with more bags of rice.

APPENDIX I

Sections 4, 7, and 8 are all based on calculations from/or actual production figures. Section 9 (marketing level) is closely related to these production-related sections. Simulemba's figures must be totally excluded from these sections for the following reasons:

Production figures we have for Simulemba:

1981-82	1002 bags	
		>(-42%)
1982-83	580 bags	
		>(-8.3%)
1983-84	532 bags	
		>(-60.5%)
1984-85	210 bags	
		>(+471%)
1985-86	1200 bags	

i.e.--------average +90% production increase (1981-1986)
average -36.8% production decrease (1981-1985)
average -34.4% production decrease (1982-1985)

1) The 1985-86 production figure is wrong because...
We know that the 1985-86 year at Simulemba was bad due to land flooding. And while farmers did increase cultivation of non-scheme lands to offset the loss, there is no data available for this non-scheme cultivation. Logically, the 90% period production increase is also untenable.

2) The 1981-82 production figure is wrong because...
It would mean (using our Simulemba 1981 number of hectares figure: 15) that average yield/hectare at project start was 1002 bags/15 ha or 66.8 bags/ha. Combined with other yield/ha figures for the other schemes, this would mean an average, three-scheme yield/ha of 26.8 bags/ha. Besides the fact that reliable on-site observers quoted an three-scheme average of 16 bags/ha, a 66.8 bags/ha figure for Simulemba alone is not possible. Therefore the 1981-85 -36.8% production decrease figure cannot be used. Similar arguments can be used for sections 7, 8, and 9.

3) Finally, even the interim year figures are useless for extrapolating first year and final year figures because...
   1) A 1981 production figure extrapolated from the 1982-83 figure [i.e. assuming 1981-1982 was 34.4% more productive than 1982-83 (580 x 34.4/100 + 580 = 779.5)] of 779.5 bags is still too high a figure for it means a 1981 (779.5bags/15ha = 52bags/ha) average yield/hectare figure of 52bags/ha for Simulemba alone and an equally unrealistic 1981 22bags/ha average yield/hectare figure for the three schemes combined.
   2) Extrapolating from 1984-85 to 1985-86 would be a useless exercise knowing that, because of significant unexpected flooding, 1985-86 was not an average year.

   Thus, while 1982-85 figures may be correct in themselves, we have no accurate project beginning or end figures for Simulemba.

In conclusion, Simulemba must be entirely excluded from sections 4, 7, 8 and 9, with the added comment that a production decline was most probably experienced there and that the Simulemba scheme, in vivid contrast to the other two schemes, was a failure. Finally, while off-scheme and upland crop production at Simulemba was, judging by unofficial on-site observer reports, successful, we still have no exact figures for that site.

APPENDIX II

One other interesting project accomplishment that is related to labor savings is reflected in the following table:

Activity	Traditional Farmer (Days)	Project Participant (Days)	Labor Saver
Field Prep	14	1	tractor
Planting	4	½	hand driller
Weeding	42	21	row planting
Harvesting	60	30	scything vs. panicle picking
	80 days for 900 kg rice	52.5 for 900 kg rice	

So not only did project participants save time through increased rice production, which implies increased labor payments, but they also experienced additional labor savings resulting from the technical and agricultural suggestions and equipment provided during the project.

APPENDIX III

At Kapilingizya, both an AA and a CD were in place by mid 1981. Two new AA's ended up replacing both the original AA and the original CD; the new AA's divided their work between: 1) helping farmers with the rice scheme and 2) helping farmers with other-crop production. At Simulemba, only one AA was in place; at Chifunda, both an AA and a CD were in place. Harold Schmucker, the Africare on-site Agricultural Engineer noted two major problems with the rice extension staff: 1) extremely time-consuming salary administration (due to 8-15 days required traveling time to a bank in Lundazi), and 2) staff apathy due to a) lack of basic commodities and dependable transportation, b) lack of acceptance by the local people, c) lack of encouragement/supervision by their supervisors, and d) lack of adequate training (AA's and CD's had received only two years of general agricultural training).