

## The Family Health and Rural Improvement Program in Tari

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### SUMMARY

**The Family Health and Rural Improvement Program (FHRIP) grew out of 25 years of research activity in Tari. Between 1995 and 2000 FHRIP assisted over 300 families in 20 communities in Tari to acquire a water supply, sanitation, nutritional gardens and small livestock, and provided health education. The program demonstrated that with appropriate assistance local people could improve their health and start small projects that promise real development in their communities. The extension of this experience is occurring under Community-Based Health Care in several highlands provinces. However, FHRIP had to overcome many internal and external obstacles, and more commitment from the public sector, together with long-term assistance from aid agencies, is required if such initiatives are to grow and flourish.**

### Introduction

The need for improved family health in rural Papua New Guinea (PNG) is well demonstrated by data collected by the Tari Research Unit between 1970 and 1995. Infant mortality rates were high, compared to other countries in the Pacific and East Asian regions, and similar to many countries with lower incomes than PNG (1). Improvements in health over the past four decades owe much to the ready availability of medicine at aid posts and health centres combined with wide vaccination coverage achieved through mobile maternal and child health clinics (2). These services are now in serious decline. Although a preventive approach to health has been given a high priority in policy documents (3), in reality health extension has been seriously neglected in favour of curative and hospital-based services. Doctors and senior health workers are reluctant to serve in remote areas where services are poor and travel hazardous. The decline of the rural health system, in combination with the emergence of new diseases such as HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome) and the continuing burden of infectious diseases such as pneumonia and malaria, suggests that the

situation could worsen. Moreover, even if rural curative health services could be restored to the levels at which they operated a decade ago, there would still remain a vital need to focus attention on preventive health. Families and communities need to be encouraged and supported to look after their own health if long-term, sustainable health improvement is to be achieved in rural Papua New Guinea.

### Background

The population in Tari District in 1990 was 54,276 (4). 35,000 of these people were under surveillance by the Tari Research Unit (the Tari Branch of the Papua New Guinea Institute of Medical Research) in 1995, of whom 80% were resident in Tari District. A social and economic questionnaire carried out in 1984 showed that standards of living were low for the vast majority of Tari people (5), and despite the exploitation of mineral wealth in adjacent areas and the growing incorporation of Tari into the cash economy little has changed. Most families still live in simple thatched houses, without water supply, sanitation or lighting. They subsist on a limited range of crops, eating mainly sweet potato supplemented by the produce of a small 'kitchen' garden and a few fruit trees. Pigs are raised mainly for

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traditional exchange purposes, and few people have enough chickens to provide many eggs or meat. A small amount of cash is received from the sale of coffee and vegetables, or remittances from working relatives. Most is spent on minor food and consumption items or put aside for school fees or compensation obligations. Rising levels of education, particularly among women, are slowly permeating outlooks and parenting practices, but change is gradual and strongly counterbalanced by traditional belief systems and practices.

### **Description of the Family Health and Rural Improvement Program**

#### **Origins**

The Family Health and Rural Improvement Program (FHRIP) grew indirectly from 25 years of research activity in Tari. Evidence from health, agronomic and socioeconomic studies reported in this issue of the Journal (6,7) and elsewhere (8) indicates that environmental conditions, a lack of household amenities and a monotonous, high-bulk diet contribute to the poor health experienced by many children and adults. My personal experience of life in a rural setting in Tari suggested that simple, low-cost improvements to housing and farming systems could improve family health and welfare, if implemented in a culturally appropriate manner.

#### **Aims**

The broad aim of FHRIP was to improve health and stimulate rural development through improved preventive health measures and small-scale agricultural interventions. This was to be achieved by targeting families who would be supported by their communities. The expected positive outcomes of FHRIP were:

- 1 improvement in family health through the provision of clean water and sanitation;
- 2 better knowledge and practice of preventive health measures;
- 3 the increased production of nutritious foods from gardens through the introduction of a wider range of crops and small livestock; and

- 4 an increase in productivity through environmentally sustainable practices that would meet the needs of a rapidly growing population.

#### **Method**

In Tari the family is the best target for preventive health measures. Huli families do not live in close proximity, but rather in separate homesteads spread across terrain that is often difficult to traverse. Although intimately linked by bonds of kinship and obligation, Huli families prefer to maintain their privacy and dislike sharing ownership among neighbours.

FHRIP focussed its attention upon mothers and children in particular. The mother is the primary carer for her family: she raises the children, plants, harvests and prepares the food, and rears the pigs. Traditionally she lived with her children separately from her husband, although younger couples and their children now often cohabit in a single house (9).

The father plays a less direct role in the welfare of his children than his wife, but he is responsible for the construction of housing, preparation of new land and digging of boundary ditches. Without his active participation a program designed to improve family living standards is unlikely to achieve its goals. Hence a condition of entry to FHRIP was the participation of both husband and wife, and their provision of the local materials required for the construction of household amenities. After 1998, a small joining fee was also charged (K10 per family).

#### **Components**

FHRIP was designed as a phased scheme in which participating families first acquired a basic set of necessities for family welfare, and then progressed to acquire additional items of higher value according to their capacity and interest. Under Phase 1, each participating family was required to have a safe household water supply, an improved pit latrine and a nutritional garden. Families were assisted to obtain low-cost amenities through the provision of purchased materials and were helped with construction by community workers trained by FHRIP.

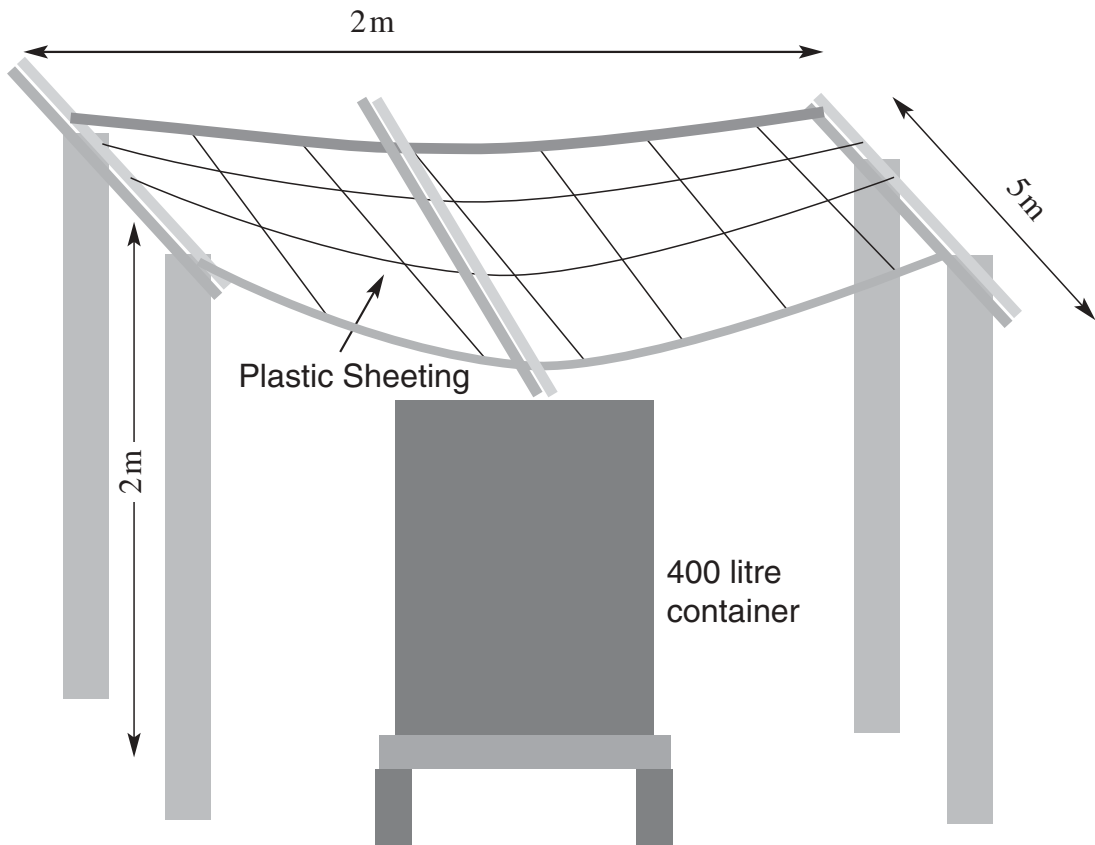


Figure 1. Water supply frame.

Note: Exact dimensions varied according to the width of the plastic sheeting, and the slope of the site. The front posts were shorter than the rear posts to ensure water drained towards the tank.

The water supply component of FHRIP aimed to provide enough clean water for drinking, washing, cleaning and cooking, at the household site, using a cheap but durable collection and storage system. It consisted of a catchment made from a sheet of blue plastic stretched across a timber frame and covering an area of approximately 12 square metres. Beneath was a tank, either a recycled plastic or iron drum of 200 litre capacity, or a reinforced plastic bag of 400 litre capacity, fitted inside a container made of woven cane grass (*Miscanthus* sp.) reinforced with wire. Each tank was covered with a screened lid and fitted with a tap (Figure 1).

Under the sanitation component a tapered concrete block, sixty centimetres square, with a central hole, was placed on top of a pit latrine built according to program specifications

(Figure 2). A bucket was supplied to keep the block clean and so that hands could be washed after use.

The main aim of the nutritional component of FHRIP was to increase the range of leguminous protein crops and greens in the kitchen garden surrounding the family house. Each family prepared six beds of approximately ten square metres each, which were planted with soya beans, peanuts, lablab beans, wing beans, pigeon peas, corn and several types of local greens (amaranthus, *awa*, *tigibi*). Some chicken manure was supplied for the initial planting. The family also dug a shallow pit which was filled with materials for use as compost when the garden was replanted (Figure 3).

After the water supply unit, toilet and the

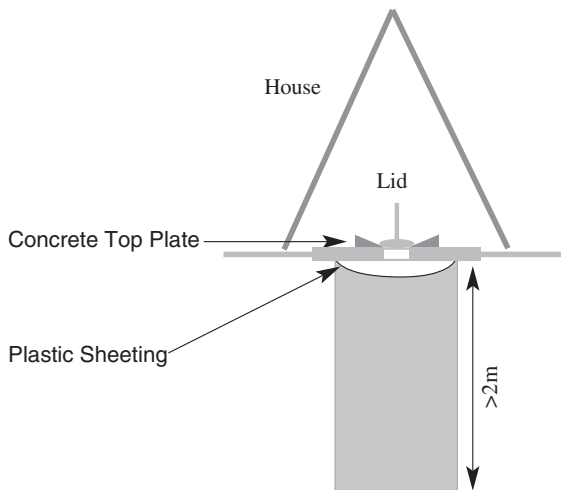


Figure 2. Pit latrine.

nutritional garden were completed, a FHRIP health worker delivered a health kit which included gauze, cotton wool, gentian violet and three buckets. Thereafter a community health worker trained by FHRIP made regular visits to check family health and provide health education. Health education was meant to achieve two goals. Firstly, health workers explained how the components of the program acted together to achieve good health. Secondly, they sought to develop relationships with individual families so they could tailor health education messages to their needs.

Under Phase 2, families who looked after their Phase 1 amenities well were able to upgrade their catchment using galvanized iron, or purchase small livestock such as Australorp chickens, rabbits, ducks, sheep and goats. Each family made a cash contribution towards these items, which were subsidized. Conditions applied to their acquisition to ensure correct utilization. Families could also join the treated bednet scheme, and acquire a range of household items including brooms and seed cupboards.

**Local workers**

FHRIP trained two types of community worker to implement its program in the field, male Local Assistants (LAs) and female Local Health Promoters (LHPs). LAs assisted families to construct water supplies, pit latrines and nutritional gardens, made visits to check project progress and helped families to maintain their amenities in good condition. LHPs, who were introduced in 1998, visited families monthly and collected information on health, checked their amenities, replenished health kits, provided health education, and organized group sessions involving the wider community. As time went on LHPs also played an increasing role in the nutritional gardening component.

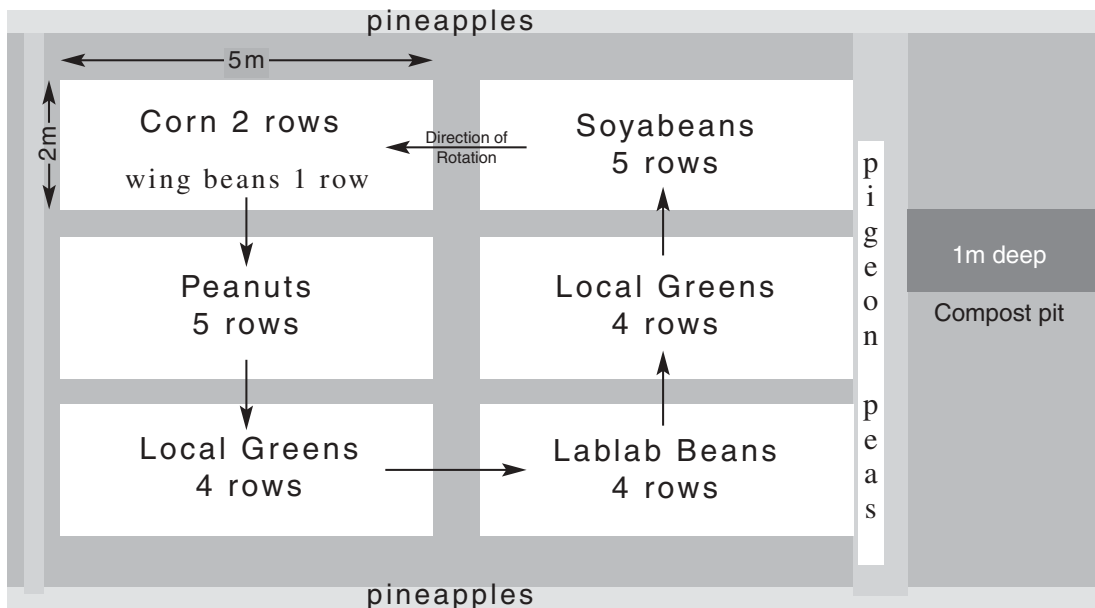


Figure 3. Nutritional garden.

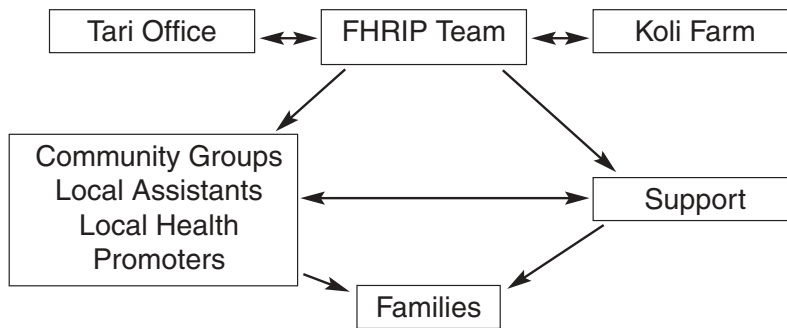


Figure 4. Structure of Family Health and Rural Improvement Program.

LAs and LHPs were assisted by the program to construct a support station in their community. Each support station consisted of a secure storage shed, usually with a galvanized iron roof, a seed propagation area, a seed storage cupboard, and an area for breeding small livestock. Support stations also provided a focal demonstration area at which workshops, field days, mosquito bednet retreatment sessions and cooking demonstrations were run by FHRIP extension workers.

Initially local workers were individuals receiving part-time payment. With the commencement of the Tebi Family Health Scheme in 1998 voluntary community groups were trained to take over this role.

### Resource stations

FHRIP was served by two major resource bases, the PNG Institute of Medical Research office in Tari and Koli farm. The Tari office was used for project management, administration, construction, distribution and storage. Koli farm was the central resource station from which seed and livestock were distributed to community programs. Demonstration days, training courses and workshops were run at Koli. The water supply unit and many other items of appropriate technology were developed and tested there, together with composting and soil conservation measures.

### FHRIP team

Initially FHRIP was run by a single manager supported by a few part-time staff. As the

program expanded, so did the number of field workers, and a core management team was assembled to supervise and administer the program. By September 2000, FHRIP staff consisted of a Program Director (who also managed Koli resource farm), two project implementation supervisors, two health program supervisors (each with formal health training), an administrative assistant, two carpenters, two livestock extension workers, a field assistant, a driver, a relief driver and two security guards.

FHRIP workers made monthly field visits to each community where they met with LAs and LHPs, visited families and reviewed progress and needs. They arranged workshops and field training sessions, and provided extension services at the request of community workers. The relationship between the different actors under FHRIP is illustrated in Figure 4.

### Information collection

A considerable amount of information was collected on families during the course of the program. For each new family, health workers completed individual health intake forms detailing chronic conditions, history of acute illness requiring admission to hospital, vaccination status (for children) and tobacco, alcohol and betelnut use (for adults). A baseline household survey was completed covering location, description of locality, GPS reading, type of housing, existing amenities, family members' education, religion, skills and experience, household environment, soil type, crops and fruits grown around the house, and the type and number of livestock tended. Between 1996 and 1999 monthly and quarterly

family health visits were made by health supervisors during which were noted any illnesses in the family over the preceding month, the condition of project amenities and the household environment. Field workers made regular implementation progress updates, from which point scores were calculated to indicate the quality of family projects.

Data from these forms were stored on computer using FoxPro, and reports produced covering health, household, implementation and maintenance details. A map of the families entering the program before 1999 was created using a GPS unit (Figure 5).

Numerous reports were compiled on FHRIP between 1995 and 2000. A comprehensive quarterly report was introduced in 1999 which summarized the activities of the program and the conditions under which it operated.

### **Program history**

FHRIP commenced in July 1995 as the Nutritional Garden and Household Improvement Scheme (NGHI), funded by Porgera Joint Venture and supported with personnel, a vehicle, equipment and office space by the Papua New Guinea Institute of Medical Research. NGHI was initially conceived as a supplement to the demographic surveillance duties of local reporters employed by the Institute of Medical Research, who collected demographic reports in over thirty census units around Tari, but the cessation of demographic work in May 1995 led to the redesign of the plan using part-time workers and fewer resources.

For this pilot scheme, 24 families listed on the demographic database with at least two young children were selected from three census units. Family projects were monitored closely and improvements made to the water supply frame and tank design. As the results were generally encouraging, a second intake of 48 families was made in 1996, from a total of eight census units including the three already in the program. At the same time, an AusAID-funded project, Kugu Rural Improvement Self-help Scheme (KRIS), commenced at Kugu, in the area surrounding Koli resource farm, and grew to include 35 families by the end of 1996.

Meanwhile, some of the families who had entered Phase 1 of NGHI in 1995 progressed to Phase 2 through the introduction of Australorp chickens.

In 1997 a further 48 families were selected for inclusion in NGHI, from existing and new census units to the west and north, but the effects of a severe drought considerably delayed the implementation of the water supply and nutritional garden components. Consequently facilities for most families were not completed until the drought had broken in early 1998.

In mid-1998 the Tebi Family Health Scheme (TFHS) commenced on the eastern side of Tari, funded by the Targeted Community Development Program. TFHS built on the experience of NGHI by using more cost-effective, community-based methods relevant to a less intensively supported program. The project commenced with a community awareness campaign at which community groups registered their interest. A number of groups were then chosen from each census unit and trained to implement the program. Over the next two years more than 100 families joined TFHS.

Formal training of LHPs commenced in mid-1998. Thereafter, regular inservice training sessions were held covering environmental health and the pathology and treatment of diseases prevalent in Tari such as pneumonia and malaria, but with a particular emphasis on preventive health issues and the proper usage of amenities supplied under the FHRIP program.

Deteriorating law and order conditions led to the departure, during August 1999, of the two Peace Corps volunteers working with the program. At the same time, the failure of supply and communications caused severe problems for program administration. In February 2000 the NGHI and TFHS programs were unified under a single banner, FHRIP. At this time conditions of participation in the program by families and groups in different areas were standardized. In July a memorandum of agreement was introduced to define mutual obligations between FHRIP and groups implementing the program. This



agreement was signed by each group wishing to continue its association with FHRIP, and set out in detail the obligations of the groups in respect of record-keeping and proper utilization of materials and equipment and the reciprocal support, supply and supervision functions of FHRIP.

### **Community-Based Health Care (CBHC) partnership**

CBHC, a division of the Nazarene Health Ministries established in 1995 in Western Highlands Province (WHP), assists communities in four highlands provinces to look after their own primary health needs and define their development objectives. As part of their program CBHC facilitates the establishment of a structure of community committees and trains volunteer health workers to dispense common medicines (excluding antibiotics) and assist with the delivery of uncomplicated births.

In late 1999 CBHC began a program in the east basin of Tari, and shortly afterwards FHRIP and CBHC began to actively cooperate and share resources. FHRIP entered into a formal partnership with CBHC in September 2000, under which CBHC provides overall management and administrative services to the joint program. FHRIP's future role is to provide assistance to communities who join the CBHC program, while continuing its support for existing communities during a transition phase to a new structure defined by CBHC's program.

## **Results**

### **Coverage**

The overall coverage rate achieved by FHRIP was about 10% of the target population of families (Table 1). Measured against the total population of the district, which is roughly double that in which FHRIP was targeted, the total impact of the program was modest. However, given its limited resources FHRIP could not be expected to meet the needs of the entire Tari District. Rather, the intention was to expose the wider community to the program's approach, ensure that the local programs were well-supported and learn from a diversity of experience, for application in wider, less intensively managed programs in the future.

### **Internal success**

Perhaps more important than coverage is determining how well FHRIP achieved its objectives of improving health and nutrition among families participating in the program. In fact, it is hard to demonstrate that family health has improved without a detailed morbidity study, which was beyond the scope of the program. Some information was available through the monthly and quarterly reports of health and field workers, which were stored on computer between mid-1997 and mid-1999. However, these reports were often imprecise and incomplete, and are not in a form that allows for analytical results to be easily extracted. Anecdotally, the suggestion

**TABLE 1**

COVERAGE ACHIEVED BY FHRIP AT 30 SEPTEMBER 2000

Area	Families*		Coverage achieved
	FHRIP	Total	
Tebi	149	1345	11%
Tagari	70	797	9%
Haepugua	42	519	8%
<b>Total</b>	<b>261</b>	<b>2661</b>	<b>10%</b>

\* Including only those families with a mother and at least one child aged under 12 years  
FHRIP=Family Health and Rural Improvement Program

was that illness tended to diminish over time among families whose projects were well kept. An examination of records for a few such families provides support for this proposition, but much more detailed analysis would be required to substantiate it.

The remainder of this section presents the results of the program in terms of the scope, quality and duration of participation, degree of involvement in project components and the training of local workers.

**Scope**

Table 2 shows the overall scope of the project as at 30 September 2000. Families at Haeapugua were the most comprehensive adopters of project components; some recently started communities in Tebi also made rapid progress.

**Quality**

Variation in quality of projects was evident between different areas, and within areas at different times. One basic measure of internal success is the attrition rate of families enrolled in the program. Very few families decided to opt out of the program, though six family projects were lost due to clan fighting in 1997. Most enrolled families remained at least nominally in the program until mid-2000 when local groups were asked to decide which

families they would continue to support under the new CBHC / FHRIP program. The groups indicated that 51 families were likely to be dropped, but the decision was not final.

Although monitoring and evaluation were carried out from the beginning of the program, quantifying the status of family projects was difficult until a point score was introduced in February 1999. Points were allotted according to the condition of water supply and tank (maximum of 4 points), toilet (2 points), garden (5 points), household and environs (5 points), chickens (3 points), rabbits (3 points), other livestock (3 points) and other amenities (2 points). Comprehensive adopters of the program, who maintained their amenities and gardens well, and introduced livestock, scored best.

A total of 195 families were assessed by FHRIP field supervisors in April and May 2000 (Table 3). Results appear to be best in the Tebi area where 89% of assessed families are in the ‘good’ or ‘very good’ categories, compared to 49% of Tagari families and 69% of Haeapugua families. This is partly because Tebi was the latest area to be included in FHRIP, and most families had participated for only a year at the time of assessment. By contrast, some families in the other two regions had been part of the program for almost five years and thus maintenance requirements were correspondingly greater.

**TABLE 2**

FAMILIES PARTICIPATING IN FHRIP AS AT 30 SEPTEMBER 2000

Area	Phase 1 complete <sup>1</sup>	Phase 1 materials issued <sup>2</sup>	Chickens <sup>3</sup>	Rabbits <sup>3</sup>	Permanent water supply	Sheep/goats <sup>3</sup>	Mosquito net <sup>3</sup>
Tebi	149	45	15	13	2	6	23
Tagari	70	10	8	3	10	-	2
Haeapugua	42	20	14	13	6	1	18
Other <sup>4</sup>	2	-	1	2	-	-	-
<b>Total</b>	<b>263</b>	<b>75</b>	<b>38</b>	<b>31</b>	<b>18</b>	<b>7</b>	<b>43</b>

<sup>1</sup> Number of families that have fully implemented the basic water supply/toilet/nutrition garden

<sup>2</sup> Number of additional sets of family materials issued to communities in the specified area

<sup>3</sup> Number of families in each area that have adopted additional components of the program

<sup>4</sup> In Tari town and at Kiam, Western Highlands Province

FHRIP = Family Health and Rural Improvement Program

**TABLE 3**  
POINT SCORES BY REGION AND CATEGORY, APRIL-MAY 2000

Area	Mean time in program (years)	Left program	Dropped	Not scored <sup>1</sup>	Poor ≤7 points	Satisfactory 8-10 points	Good 11-13 points	Very good ≥14 points	Total
Tebi	1.0	1	17	31	8	3	38	50	148
Tagari	2.6	3	21	23	12	17	22	6	104
Haeapugua	2.5	6	13	2	3	9	14	13	60
<b>Total</b>		10	51	56	23	29	74	69	312
Percent <sup>2</sup>					12%	15%	38%	35%	

<sup>1</sup> Because field staff were unable to schedule visits, or their status was uncertain

<sup>2</sup> Of the total number of scored families (195)

There was not an inevitable decline in the quality of family projects over time. In Haeapugua and Tagari, where the point score was introduced in February 1999, the average score for 34 families and 78 families, respectively, was 10.2 and 7.9; in May 2000 the score (for 39 and 57 families) was 12.2 and 10.2. Although these improvements are slightly exaggerated as some of the poorer performing families were dropped between these dates, there were a number of families that continued to expand their projects over several years. The best-sustained family projects were located in communities in which the local assistants had developed good support stations and were committed to the support of the families under their care, such as at Waralo in Haeapugua.

**Components**

FHRIP was an integrated program composed of a number of key components, but the performance of each of the components can

be evaluated separately. The condition of each component according to the point score in April-May 2000 can be seen in Table 4.

The majority of people kept their water supply, toilet and household kit in good condition. The excellent results in Tebi reflect the shorter duration of ownership of project items, and perhaps also the more inclusive, community-based mode of implementation adopted there. Gardens were less successful than other components, due to the difficulty of maintaining yields in many environments. In Tagari, where soils are poorest, less than a quarter of gardens were fully planted and a third were producing few or no nutritious crops.

Over a quarter of the families were tending a significant number of chickens in properly constructed pens and livestock houses at the end of the program. Acquisition was hampered by supply problems; in early 2000 the last producer of day-old Australorp chicks in PNG

**TABLE 4**

ASSESSMENT OF FHRIP COMPONENTS, APRIL-MAY 2000

Item	Tebi	Tagari	Haeapugua	Total
Families assessed	108	56	37	201
		% in good condition		
Water catchment	96	75	76	87
Water tank	94	91	76	90
Pit latrine	95	52	56	75
		% showing satisfactory care and maintenance		
Household and medical kit	96	75	91	89
		% fully or near fully planted		
Garden	63	22	30	45
		% with significant numbers and proper housing		
Chickens	30	21	32	28
Rabbits	4	14	27	11

FHRIP = Family Health and Rural Improvement Program

ceased production. The productivity of Australorp chickens was high compared to local chickens and they were well suited to a combination of penning and foraging recommended by the program.

Rabbits were only introduced to the program (and Tari) in 1998 and local farmers took some time to become familiar with their requirements. However, with subsidization and promotion their uptake was rapid, particularly in Haeapugua. The rabbits provided meat, manure and skins, and fitted well into small subsistence farming systems (10).

### Capacity

Training during the course of the program involved 27 Local Health Promoters and 37 Local Assistants, the majority being members of community groups from Tebi. All those trained took up a role in the program; a few left and replacements were trained to take their place.

Good progress was made in the establishment of support stations after their inception in 1998. By September 2000 most groups had constructed a secure shed and started livestock extension of some sort, and some had set up plant nurseries. However, few reached the point where they could fully support their community program. The best-developed support stations were in Haeapugua where several Local Assistants showed exceptional qualities of organization and diligence in running their community programs.

### Costs

Costs of materials (and difficulty in procurement) rose considerably during the course of the program. By 2000, it cost K118 to establish a new Phase 1 family project, of which K60 was for the water supply, K12 for the pit latrine, K10 for the garden and K36 for the household kit. These items were fully subsidized. Phase 2 items, for which a cash contribution by participating families was required, cost approximately K250 for a galvanized iron water catchment, K140 for four Australorp chickens and fencing wire, K172

for three rabbits and cage materials, and K200 for a sheep or goat and housing and fencing materials. Bednets cost K12 each. Each fully established support station cost K1150 in materials, which included galvanized iron roofing for the shed, a wheelbarrow, fencing, seed dryer, seed cupboards and garden tools.

Other costs involved in running FHRIP, excluding capital items such as buildings and vehicles, amounted to approximately K60,000 per annum. Expenditure by category was wages (58%), vehicle (17%), and administration, resource stations and training (8% each). Excluding materials, the cost of FHRIP amounted to about K200 per family supported per annum. However, a significant proportion of this cost can be attributed to program development, testing, data collection and validation. Future programs should therefore be less management-intensive and running costs correspondingly lower.

### Discussion

Two questions are of interest in respect of the Family Health and Rural Improvement Program. Firstly, was it a success in terms of the objectives it set out to achieve? Secondly, can FHRIP be used as a model for extension to other communities in rural PNG?

Before addressing these questions, it is worth pointing out that FHRIP was, in a sense, operating in a vacuum. There had been almost no attempt to foster community-based development activities for at least two decades in Tari District. So for both the families who took part and the workers who ran the program, there was much to learn and a new perspective to acquire on what health and development actually meant.

Further, especially during its first three years of operation, methods were tested on the fly and inevitably mistakes were made. In retrospect, probably the largest of these arose from cash payments made to community workers, many of whom had been Tari Research Unit reporters before demographic surveillance ceased in 1995. Although justified as a method for starting a pilot program, the provision of pay encouraged a belief that local workers were employed by an

external organization rather than working for their own communities. Families in turn became dependent upon the workers as paid 'service providers' and did not participate fully in the upkeep of their projects. The distance between local workers and families was exacerbated by the fact that local workers were not, at first, required to have their own family project (though they were encouraged to).

These problems were largely ironed out at the commencement of the Tebi Family Health Scheme, in which community groups replaced individuals, and where remuneration was almost exclusively in kind, through program items such as livestock or items of household improvement. However, viable groups were not easy to identify; they lacked a proper structure or track record, were usually more self-focussed than community-oriented, needed considerable training and nurturing, and several had difficulty maintaining internal cohesion.

Unquestionably the communities into which FHRIP was projected were under-prepared in terms of their capacity to implement and maintain an ambitious and diversified program. FHRIP sought to provide a set of health and agricultural improvements but there was no local organization able to realistically define needs, identify target families, provide trainees, take responsibility for implementation or report on progress. The development of this structure is a major task in itself, for which FHRIP was not fitted. On the other hand CBHC was precisely focussed upon this objective, but lacked the technical capacity to implement material programs. Hence FHRIP and CBHC make natural partners, though CBHC has assumed the leadership role due to its superior management capacity.

FHRIP was under-resourced in terms of both materials and staff. Funding was often uncertain and never adequate to meet structured expansion plans. There was a lack of local management capacity and only the FHRIP health team members had any formal training for the activities in which they specialized. Nor did FHRIP operate in an ideal environment. Law and order problems worsened significantly during the period, both inside Tari District and along the roads leading

to Tari. The 'civil war' between Nipa and Tari/Margarima districts in August 1999 created internal anarchy, cut off supplies and communications and almost caused the cessation of FHRIP. In one sense, FHRIP only struggled past the manifold obstacles because they made its objectives all the more relevant. In an environment in which the authorities are unwilling or unable to enforce the law or provide services, the initiative of communities must be relied upon to meet basic needs.

Given this background, what can be said about the success of FHRIP as an integrated health program? The figures presented earlier (Table 3) show that of the 312 families that joined FHRIP during the five years of operation, 84 (27%) had left the program, had been dropped or had not made satisfactory progress. Even among the 143 households classified as performing well, it is hard to show that health improved using the data produced by the program itself. The real evidence can only be indirect – a mother who has a supply of clean water for cooking, drinking and cleaning at her door is in a far better position to meet basic hygiene needs for her children than her counterpart who has to spend considerable time and energy simply to obtain enough water to drink. Similar observations may be made about the benefits of clean toilets and productive nutrition gardens. The fact that new families joined each year meant that local people clearly perceived the value of FHRIP.

While the objective of FHRIP was to achieve health improvement through an integrated program, some of its individual components also represented worthwhile achievements. In particular, the development of a low-cost, highly portable method of water catchment and storage offers scope for wider application throughout PNG. The benefits of integrated crop and livestock systems have been strongly advocated (11,12); experience on Koli farm suggested that increased diversity, higher productivity and better soil conservation could be achieved with relatively few technical or financial inputs. The growing adoption of small livestock by local families represents a first step towards a more diversified local farming system, though a far larger commitment of resources and support is required if real progress is to be made.

Some lessons were also learnt from the health education component. For the first few years FHRIP health workers visited families in all of the communities in which the program operated. Relationships were built up with these families, but the desired outcomes were not always achieved. Rather than focus on preventive health, in some instances health workers felt obliged to dispense medicines that should be (but often were not) available at aid posts. In other instances, inappropriate messages were delivered, or parents were lectured rather than engaged in a dialogue. Moreover, as the program expanded, health workers became less able to achieve adequate coverage. In 1998 Local Health Promoters, mostly young women with a Grade 10 education, were identified and formally trained by FHRIP health workers to visit families in their own communities. To supplement their activities, a more imaginative approach was introduced. Role plays were enacted at inservice courses to simulate interactions between health workers and mothers, community nutritional cooking and bednet treatment sessions were arranged, and performances portraying preventive health themes and messages were held at open theatres by community groups trained and led by FHRIP health workers. These community-level initiatives were popular and encouraged a sense of inclusiveness that balanced the family-based activities.

Perhaps the most disappointing aspect of the program was the failure to engage government health and agricultural extension personnel in the conduct of the program. Apart from the nominal involvement of one or two community health workers as participating families, interaction was minimal. This was not for want of trying on the part of FHRIP. While government agencies certainly lacked operating resources, they also seemed uninterested in working with non-government organizations and unwilling to visit rural communities except on their own terms. Beneficial relationships were established with Porgera Joint Venture, who supplied tanks, chickens and rabbits to the program, and Oil Search, who assisted with transport of materials and arranged a rabbit workshop, and with whom FHRIP exchanged sheep and goats in a joint breeding program.

## Conclusion

So does FHRIP provide a model for extension to other parts of PNG? While FHRIP is certainly not the answer to all problems in all places, it does provide a set of inputs relevant to improving health and stimulating development in many neglected rural areas that have little prospect of meeting needs through paid employment or sale of export produce. Many important lessons were learnt between 1995 and 2000, and the program is ready for implementation on a wider scale. The partnership with CBHC means that expansion is already underway, but progress is likely to be slow until adequate resources are forthcoming.

It is worth reviewing some of the factors that contribute to success:

- The program must be adapted to local cultural, economic and social conditions.
- The community must be well prepared. It must be self-organized and have a realistic definition of needs. CBHC exemplifies the steps needed to achieve this outcome.
- An awareness campaign should precede implementation to canvass ideas and create demand for preventive health measures.
- Adequate capacity needs to be developed in the form of (a) committed management, (b) motivated local groups, (c) resource stations and (d) community support stations.
- Families must participate, not just receive. Preferably each family should be part of their local implementing group.
- Local groups and program workers must lead by example. Each worker must have their own family project.
- Purchased materials may be subsidized according to the need of recipients, but a user-pay element should be incorporated for income-earning components, eg for livestock.
- Training and inservice activities for

community workers should be conducted regularly.

- Incentives and rewards for implementing groups should be in-kind and performance-based. Awards should be made at public ceremonies.
- There should be regular community-level activities, such as group health education and nutrition cooking demonstrations, to maintain a high level of awareness in the community.
- Experience should be networked with other communities.
- Long-term support by funding agencies and government departments is required.

Finally, it should be noted that community-based development offers a way forward not just for rural people but for the public service too. Government extension workers could play a valuable role in the implementation of programs like FHRIP if they were prepared to adopt new methods of operation that embrace partnerships with community organizations and villagers, rather than isolating themselves in their offices. However, if community-based programs are to grow and flourish they must overcome not only the inertia of the public service but also the intrigues and enmities of the village, and misuse by would-be politicians. If these risks can be avoided then there is the potential to improve rural health, increase productivity, and create the cohesion and sense of direction that is lacking in many rural communities.

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