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Healthy People in a Healthy Environment: Impact of an Integrated Population, Health, and Environment Program in **MADAGASCAR**



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and Environment Program in

Madagascar

Final Report
May 2005

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Final Report

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Results at a Glance: 44 Key Population, Health, and Environment Indicators

Comparison between 2001 baseline and 2004 follow-up surveys* and between integration and non-integration groups†

#	Indicator	Int. 2001	Int. 2004	✓	Non-int. 2001	Non-int. 2004	✓	Notes (increase from '01-'04, highest/lowest '04)
Smaller families: contraceptive prevalence rate								
1	Contraceptive prevalence rate: all modern methods (all women 15-49)	11.7	16.8	✓	2.4	7.6		Large increase in type 1(I)
2	Contraceptive prevalence rate: injections (all women 15-49)	5.9	9.0	✓	2.4	3.6		Lowest in type 3.b(I/NI)
3	Contraceptive prevalence rate: pills (all women 15-49)	4.8	6.4	✓	0.0	3.6		Lowest in type 3.a(NI) and type 3.b(NI)
4	Knowledge about family planning	76.9	78.9	✓	63.2	58.9		Lowest in type 3.b(I/NI)
Child health: vaccinations and vitamin A coverage								
5	Children 12-23 months fully immunized before 12 months (N=114,180)	51.2	58.7		37.4	56.2		Highest type 2(NI), lowest type 3.b(NI); SS increase NI
6	Children with a health card	79.2	82.5		73.5	77.0		Highest in type 1(I) Lowest in type 3.b(I/NI)
7	Vitamin A received during past six months	41.2	59.8	✓	44.2	48.4		Highest in type 3.b(I) Lowest in type 3.b(NI)
8	Caretaker heard about child health and nutrition	68.0	69.7	✓	58.5	56.1		Highest in type 3.a(I) Lowest in type 3.b(NI)
9	Caretaker source about child health: village motivator, health agent, group	52.9	73.6	✓	23.5	64.1		Highest in type 3.b(I) Lowest in type 2(NI)
Disease prevalence (two-week): diarrhea, fever, and acute respiratory infections								
10	Diarrhea prevalence (two-week)	14.1	23.0		16.1	25.2		Very high in type 3.b(I/NI)
11	Fever prevalence (two-week)	47.0	40.0		45.0	29.9	✓	Highest in type 3.a(I/NI)
12	ARI prevalence (two-week)		12.8			15.3		Highest in type 3.a(NI)
Disease prevention through hygiene improvement and use of mosquito nets								
13	Access to an improved drinking water source	19.1	24.6	✓	2.6	13.6		Large increase in type 2(NI)
14	Use of Sur Eau	10.1	3.7		5.5	2.3		
15	Use of an improved toilet facility	52.1	50.2	✓	36.4	34.2		Large increase type 1(I); lowest type 3.b(I/NI)
16	Soap available		67.8			66.2		Lowest availability and use rates in type 3.b (I/NI)
17	Soap used in last 24 hours		91.0			87.7		
18	Slept under a mosquito net last night		48.0 41.0	✓		29.8 22.5		Highest in type 3.a(I)
Women's health: sexually transmitted diseases (STDs), HIV/AIDS, antenatal care (ANC), assisted deliveries								
19	Women 15-49 who had heard about STDs	63.2	77.5	✓	64.0	65.5		Lowest in type 3.b(I/NI)
20	Source of STD knowledge: village motivator or village health agent		41.4	✓		28.9		Lowest in type 3.c(NI); TV most common types 1&3.a
21	Women 15-49 who know about HIV/AIDS	84.8	82.9	✓	83.4	76.4		Lowest in type 3.b(I/NI)
22	Source of HIV knowledge: village motivator or village health agent		41.8	✓		30.1		Lowest in type 3.c(NI); TV most common types 1&3.a
23	Women 15-49 who know about condoms to prevent STDs	31.6	56.4	✓	14.8	47.8		Lowest in type 3.b(I/NI)
24	Women 15-49 who know about one sexual partner to prevent STDs	46.9	66.1	✓	48.9	50.0		Lowest in type 3.b(I/NI)
25	Women 15-49 who know about abstinence to prevent STDs	3.2	7.4		3.7	7.8		Highest in type 3.a(I) Lowest in type 1(I)
26	Women 15-49 with a health card	76.4	83.7	✓	72.9	73.6		Lowest in type 3.b(I/NI)
27	Women 15-49 with one birth having at least four or more ANC visits	30.9	48.3	✓	28.7	32.0		Lowest in type 3.b(I/NI)
28	Women 15-49 received at least 2 tetanus vaccinations during last pregnancy	45.0	46.5		37.1	42.5		Lowest in type 3.b(I/NI)
29	Last delivery by trained personnel	51.7	61.0	✓	46.8	46.8		Lowest in type 3.b(I/NI)

Results at a Glance: 44 Key Population, Health, and Environment Indicators (cont.)

Comparison between 2001 baseline and 2004 follow-up surveys* and between integration and non-integration groups†

#	Indicator	Int. 2001	Int. 2004	✓	Non-int. 2001	Non-int. 2004	✓	Notes (increase from '01-'04, highest/lowest '04)
Children's nutritional status: stunting, underweight, wasting								
30	Prevalence of moderate and severe stunting (z < 2SD)	52.4	46.9	✓	46.3	51.9		Lowest in type 3.b(I/Ni)
31	Prevalence of moderate and severe underweight (z < 2SD)	46.2	40.2		37.6	40.5		Lowest in type 3.b(I/Ni)
32	Prevalence of moderate and severe wasting (z < 2SD)	10.4	10.4		6.0	10.4		
Year-round food security: agricultural production								
33	Food security for an entire year	15.5	21.9		14.9	27.5		SS increase 01-04 for I&NI; Highest 2(I/Ni) Lowest 3b(I)
Improved natural resources management: use of fire in agriculture, reforestation								
34	Slash-and-burn agriculture admitted	51.8	22.5		65.1	24.2		Highest in type 2(I/Ni)
35	Household head knows soil degradation as effect of slash and burn	61.8	68.3	✓	46.4	57.6		Lowest in type 3.b(I/Ni)
36	Household head knows loss of biodiversity as effect of slash-and-burn	17.8	15.4	✓	18.2	9.5		Highest in type 3.a(I) Lowest in type 3.b(Ni)
37	Household head knows fire block as preventive measure against fire	65.5	69.6	✓	67.8	47.0		Lowest in type 3.b(I/Ni)
38	Household head knows DINA as preventiv measure against fire	9.8	17.1		6.5	29.8	✓	Highest in type 3.b(Ni) Lowest in type 3.b(I)
39	Household head knows law about forest use	63.6	63.0	✓	54.0	51.0		Lowest in type 3.b(I/Ni)
40	Eucalyptus tree planting practiced	58.4	70.2	✓	41.7	57.7		Highest in type 1(I) Lowest in type 2(I/Ni)
41	Participation in agricultural training	26.7	37.0	✓	24.2	32.3		SS increase in (I) between 2001 and 2004
42	Visit by agricultural extension agent	22.4	31.1	✓	21.2	24.2		Highest in type 3.b(I) Lowest in type 3.b(Ni)
Community participation: gender								
43	Women's membership in community groups	29.5	33.2	✓	31.0	25.8		Largest drop in type 2 (I/Ni)
	Most frequent groups joined:							
	- Women's group		31.7			28.2		Highest type 2(I/Ni), 3.b(I)
	- Village development association		29.4			25.4		Highest in type 2(I)
	- Farmers group (Kolo Harena)		21.6			26.8		Highest in type 3.a(I/Ni)
	Frequency of group meetings weekly or monthly		56.2			53.5		Highest in type 3.b(I) Lowest in type 1(I)
	Attended last meeting:							
	during past month		42.4			49.2		Past quarter includes past month attendance
	during past quarter		59.9			64.7		
44	Women were members of groups and participated in community mobilization		36.2	✓		25.4		Highest in type 3.a(I) Lowest in type 3.b(Ni)
	Most frequent type of mobilization:							
	- Environmental campaign		32.8			22.2		Highest in type 3.a(I)
	- Health campaign		21.1			38.9		Highest in type 3.a(I/Ni)
	- Festival		17.1			11.1		Highest in type 2(I)
Household livelihoods								
	Wealth index							
	(% households in each tercile)	Lowest tercile	30.0	30.0		39.0	39.0	Highest proportion and increase in assets in type 1(I); lowest in type 3.b(I/Ni)
		Middle tercile	31.0	31.0		37.0	39.0	
		Highest tercile	39.0	39.0		24.0	23.0	

* Surveys done by DDSS/INSTAT under contract with EHP and Voahary Salama Association

† Int. = PHE Integration Group (I). Non-int. = Non-PHE integration Group (NI). SS = Statistically significant.

✓ 2004 results favoring integration or non-integration communities at p ≤ 0.05 level of significance and power = 0.8

✓ 2004 results favoring integration or non-integration communities at p ≤ 0.10 level of significance and power = 0.8

Where not indicated, statistical tests did not allow a distinction.

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The Michigan Population and Environment (PE) Fellows Program had been promoting and studying the population and environment nexus in Madagascar years before Voahary Salama came into existence, and for the last four years, PE fellow Jennifer Talbot worked hand in hand with NGOs and communities to make the links a reality. Her valuable insights are incorporated here. We are grateful to VS staff who contributed to this report, especially evaluation specialist Clément Randriantelomanana. The report also would not have been possible without Patrick Kelly, who performed all the analyses of the baseline and follow-up household surveys.

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Finally, the integration of PHE interventions could not have happened without the steadfast support from USAID/Madagascar. The vision, encouragement, and funding provided over the years by the Mission has been crucial to the successes presented here.

| Acronyms

ADRA	Adventist Development & Relief Agency International
AGERAS	Appui à la Gestion Environnementale Régionalisée et à l'Approche Spatiale
ANAE	Association Nationale d'Actions Environnementales
ANGAP	Association Nationale pour la Gestion des Aires Protégées
ARI	Acute respiratory infections
ASOS	Action Santé Organisation Secours
CBD	Community-based distribution
CCC	Community Conservation Coalition
CI	Conservation International
CPR	Contraceptive prevalence rate
DDSS	Direction des Statistiques Sociales
DHS	Demographic and Health Survey
ECHO	Environmental Change and Health Outcomes
EHP	Environmental Health Project
FAFAFI	Fanentanana Fambolena Fiompiana
HH	Household
HIV/AIDS	Human immunodeficiency virus/acquired immune deficiency syndrome
IEC	Information, education, and communication
INSTAT	National Institute of Statistics
IR	Intermediate result
JSI	Jereo Salama Isika/John Snow, Inc.
JSI/R&T	John Snow, Inc./Research and Training
LDI	Landscape Development Interventions
M&E	Monitoring and evaluation
MATEZA	Malagasy Teknisiana Mivondrona ho aro sy Tezan'ny Zahamena ary ny Ala atsinanana
MCDI	Medical Care Development International
MGHCP	Madagascar Green Healthy Communities Project
MICET	Madagascar Institut pour la Conservation des Environnements Tropicaux
NGO	Nongovernmental organization
ONE	Office Nationale pour l'Environnement
ONP	Office Nationale pour la Population

PAI	Population Action International
PE	Michigan Population and Environment Fellows Program
PHE	Population, health, and environment
PRB	Population Reference Bureau
PVO	Private voluntary organization
RCT	Randomized controlled trial
SAF/FJKM	Sampan'Asa momba ny Fampanandrosoana/Fiangonan'i Jesoa Kristy eto Madagasikara (Development Office of the Church of Jesus Christ in Madagascar)
SAGE	Service d'Appui à la Gestion de l'Environnement (Fampanandrosoana Maharitra)
SECALINE	Nutrition project in Madagascar supported by the World Bank
STD	Sexually transmitted disease
USAID	U.S. Agency for International Development
VS	Voahary Salama Association
WHO	World Health Organization
WWF	World Wildlife Fund

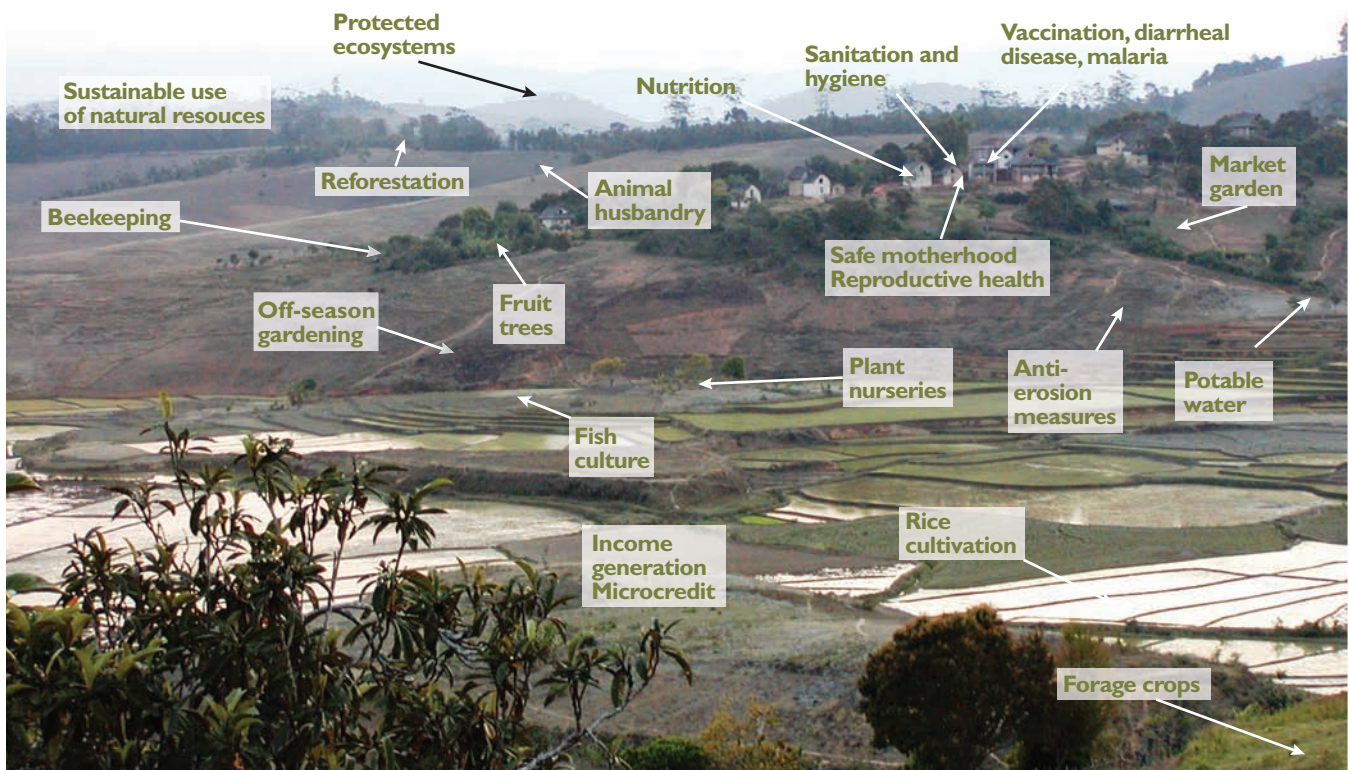
Executive Summary

This report summarizes a five-year program in the integration of population, health, and environment (PHE) in three environmental corridors and other threatened ecosystems in Madagascar. On behalf of the U.S. Agency for International Development (USAID), the Environmental Health Project (EHP) implemented the activity, the purpose of which was *to determine if activities implemented in an integrated manner achieved better results than if the activities were implemented separately*. Integrated PHE activities target sector-specific projects to foster greater collaboration and increase the integration of the respective activities in such a way as to increase the efficiency of each. This synergy is produced through a better understanding of how the interaction between human health and the environment affects communities located near regions that depend heavily on natural resource use and through the design and implementation of activities that address this interaction. In this concept, the environment is broadly defined to encompass the use of natural resources and natural processes, which include agriculture, forestry, and biodiversity conservation. Unsustainable population growth is one important threat to ecosystems; offering reproductive choices as a critical program element not only reduces this threat but also improves women's and children's health.

The "Household Food Security and Livelihood Concept" served as a roadmap for guiding the design and program implementation of PHE integration and provided the analytic framework for the baseline and impact surveys (see chapter 4) and program monitoring. This concept implies that people's choices and actions related to PHE are based on economic forces that can be influenced by various programmatic interventions on different levels in the framework.

The program pursued the integration of PHE through the Household Food Security and Livelihood Concept for three reasons:

- Due to high levels of poverty, food shortages, and limited knowledge, the people living in areas bordering Madagascar's forest corridors lack the incentives and skills to conserve natural resources.
- Meeting people's needs and conserving the environment can only be attained by simultaneously implementing interventions in all PHE sectors. Focusing on one sector does not ensure benefits in another, especially in communities located near endangered ecosystems.



Community-centered PHE interventions (Fianarantsoa Province) based on the Household Food Security and Livelihood Concept

- The programmatic integration of PHE results in program outcomes in multiple areas because of synergies that increase program efficiency and effectiveness, something that single-sector approaches cannot achieve.

For the purposes of this activity, PHE interventions focused on 10 themes and a few key interventions within each that lead to improved health, agricultural production, nutrition, and household income:

1. Smaller families: contraceptive prevalence rate
2. Child health: vaccination and vitamin A coverage
3. Disease prevalence (two-week): diarrhea, fever, and acute respiratory infections
4. Disease prevention through hygiene improvement and use of mosquito nets
5. Women's health: sexually transmitted diseases (STDs), HIV/AIDS, antenatal care, assisted deliveries
6. Children's nutritional status: stunting, underweight, wasting
7. Year-round food security: agricultural production
8. Improved natural resources management: reported use of fire in agricultural activities (slash-and-burn), reforestation
9. Community participation: gender
10. Household livelihoods

Three social marketing and social mobilization approaches based on an early adopter or innovator model played a central role in achieving PHE results:

- *“Champion community”* (community target setting, monitoring, celebration)
- *Child-to-community* (increasing life-skills, school enrollment, and school attendance through PHE themes)
- *Farmer-to-farmer* (model farmers teaching others improved agricultural techniques)

The very nature of the integration of PHE programs requires a partnership among a range of organizations. In order to better coordinate activities through such a partnership, EHP together with other projects supported by USAID and the Packard Foundation established the Malagasy Voahary Salama Association (VS), a partnership of organizations working in PHE in Madagascar. VS helps its nine member NGOs develop their capacity to better implement integrated activities. One of the components of this activity was the provision of funds to VS member NGOs to implement field activities.

Key Findings and Lessons Learned

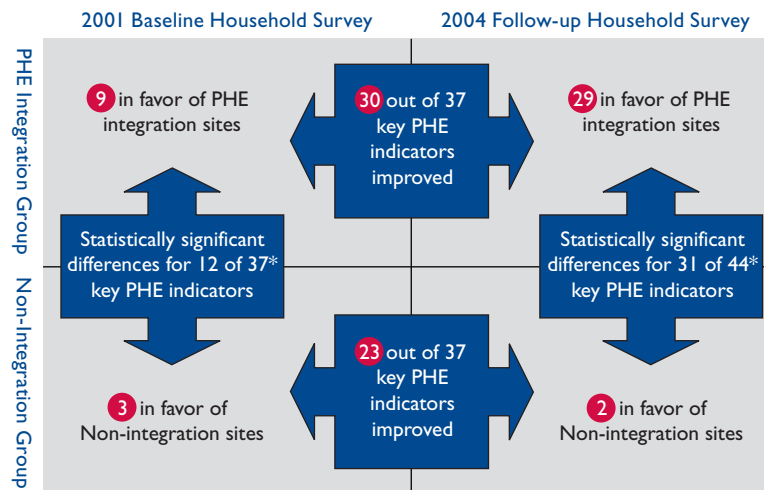
Key Lesson: The integration of health, population, and natural resource management programs can achieve good results in each sector compared with programs implemented separately because of complementarities of interventions and program synergies that occur when local NGOs work in partnership.

This report compares results from baseline and post-intervention surveys to answer the question whether integrated activities are more effective and finds that the community-centered and integrated PHE program achieved a greater impact over a three-year period. As shown in the summary table at the beginning of this document and the figure on the next page, 29 out of 44 key PHE indicators had clearly higher outcomes in integration communities¹ than in non-integration communities. Non-integration communities showed better results for only two indicators, which could have occurred by chance alone. For the remaining 13 indicators, the evaluation methodology was a limiting factor² and unable to establish whether any differences between integration and non-integration groups existed. Thirty out of 37 key indicators that were measured repeatedly showed improvements between the 2001 and 2004 surveys for the integration group. As expected in a social experiment in which interventions were also implemented with the comparison group, the non-integration sites saw improvements as well, but only for 23 out of 37 key indicators, and these lagged behind the integration sites for most indicators.

¹ The difference in outcomes was statistically significant at the 0.05 level for 24 indicators and at the 0.1 level for five indicators (all at a power of 0.8).

² The evaluation of PHE integration in Madagascar had four methodological limitations that are not uncommon in social science research and that overall may have led to underestimating the effectiveness of integration when comparing baseline and impact surveys and integration and non-integration communities. These limitations were sample size, quasi-experimental design, multipurpose survey instrument, and a short implementation period between baseline and follow-up surveys and external events.

Does PHE Integration Work? Evaluation Findings From a Social Experiment in Madagascar



*Seven new indicators were only measured in 2004.

Three results illustrate the impact of integrated PHE when comparing integration communities with non-integration communities and baseline surveys with follow-up surveys:

- The contraceptive prevalence rate reached 17 percent in integration communities in 2004 (about a five-percentage point increase from 2001), compared with 8 percent in non-integration communities.
- The prevalence of moderate and severe chronic malnutrition (stunting) dropped by almost six percentage points from 2001 and was five percentage points lower in integration communities (47 percent compared with 52 percent).
- Tree planting increased by 12 percentage points from 2001 and was practiced by 70 percent of households in integration communities, compared with 58 percent in non-integration villages.

The achievements of communities where activities were integrated compared favorably with those achieved by vertical sector programs. This is noteworthy for three reasons. First, results were achieved in multiple sectors, not just in a narrow subset of technical interventions. Second, without the integrated PHE program, the underserved populations living around forest corridors would not have benefited from essential health and agricultural services. Third, these results were achieved at relatively low costs; rapidly over a three-year period; and at scale, reaching about 125,000 people. Together, these considerations indicate that important synergies exist in an integrated approach that covers multiple sectors.

Lesson 1: At the community level, people's choices related to PHE must be seen in the context of their livelihood and food security, which are major drivers of health outcomes. Basic economic needs have to be met to maximize the impact of the interventions in PHE. As the higher diarrheal disease prevalence and unchanged high levels of child malnutrition show, factors other than program interventions seem to play a major role in health outcomes. Based on the asset index included in the household surveys and field observations, the majority of households in the program area live well below the poverty line. Three in four households do not produce enough food to last an entire year, and cash income to supplement harvests is not readily available. VS NGOs and other partners (for example, the USAID-funded ecoregional conservation and development project) have promoted cottage industry and income generation. Data from two surveys, however, indicated that these activities were still at a small scale, and few families benefited from credits or were provided equipment to improve productivity.

Lesson 2: The most cost-effective way to reach target populations at scale in ecologically sensitive areas is through local NGOs that have the interest in and capacity to reach these communities. Most ecologically sensitive areas are in remote locations, and this is the case in Madagascar. Few governments have the capacity and resources to work in remote communities, and often NGOs are the only actors willing and interested in working in these areas. The total population living along three major environmental corridors is estimated to be 500,000 people, living mostly in about 650 small communities under 1,000 inhabi-

tants each. To date, integrated PHE activities implemented by nine NGOs have reached approximately 25 percent of this population.

Lesson 3: Local NGOs offer a good return on investment.

Except for one, all the NGOs implementing integrated PHE activities were small local organizations. These NGOs had annual budgets ranging from US\$100,000 to \$200,000, counting all sources, compared with US\$1 million to \$2 million or more available to large donor-funded programs. Organizations with relatively limited funding may be more efficient than better-funded organizations, and they may serve more people per dollar and thus achieve a better investment return, as measured by key indicators. With their modest funding, the small local NGOs achieved results for some indicators, such as contraceptive prevalence, that compared favorably, in relative terms, with the results of larger donors' investments. For example, small organizations that spent \$1 to \$2 per capita to increase the contraceptive prevalence rate by two to three percentage points had a better return than larger organizations spending \$10 to \$20 per capita to increase the rate by 10 percentage points.



Lesson 4: PHE integration is effective when actors stay focused on small doable actions. Although the aim was to limit community-centered and integrated PHE interventions to a few small doable actions, the NGOs addressed a relatively broad range of issues. Where efforts were focused on a few key interventions, often driven by available funding, the NGOs showed consistently better results. For example, family planning efforts resulted in a greater number of women using contraceptives in all areas, but vaccination coverage did not improve as clearly, and in the case of sanitation the indicator did not change.

Lesson 5: Different mechanisms can successfully implement integrated PHE. From the outset, the evaluation of the integrated PHE program in Madagascar was designed as a natural experiment to compare three different implementation modes: multidisciplinary teams within one organization (the gold standard); different health and environment teams within the same organization; and field agents from different sector-specific organizations – health, agriculture, and environment working together. While the two surveys showed clear differences among the three intervention modes, they all produced positive outcomes in some areas, although not necessarily the same areas across all three. Available resources, organizational capacity, and the socioeconomic and cultural context can explain the differences in achievements.

Lesson 6: Community-centered PHE fosters participation, especially by women. Women in integration communities seemed to be more engaged in mobilization efforts and community groups, including groups that are traditionally dominated by men, such as farmers associations. Women's participation increased by four percentage points in integration communities to 33 percent, while it decreased by five percentage points in the non-integration group to 26 percent.

Lesson 7: Better government services make a difference, and NGOs depend on them. Although higher levels were achieved for most indicators in integration communities, at times the non-integration group experienced substantial increases as well. This was especially true for services provided by government institutions such as health centers, which were often supported by donor projects. Better supplies of contraceptives through public providers, for example, benefited NGOs directly, because they procured contraceptives from government facilities. In other cases, such as immunization, NGOs may help public providers increase outreach services. However, integration communities achieved substantially higher levels for two-thirds of the key PHE indicators than the non-integration group. The integration sites showed improvements between 2001 and 2004 for 30 out of 37 key indicators, compared with 23 indicators in non-integration sites.

Lesson 8: Despite limitations, the evaluation methodology was able to measure PHE synergies. The evaluation methodology has its weaknesses, but it measures “real life” synergies and is one of only a few attempts to use a social science approach to measure the impact of PHE integration. (The only other country where integrated PHE interventions are evaluated using a similar quasi-experimental design is the Philippines. The CEMOPLAF project in Ecuador did pre- and post-integration comparisons but did not include a non-integration group.) Despite the methodological limitations, important differences between integration and non-integration communities were identified. Because the comparison group included sector-specific interventions in health or environment, the greater achievements by integration sites were likely due to synergies attributable to the integration of PHE activities. Due to the methodological limitations, the true effectiveness of PHE integration was probably underestimated.

Lesson 9: The Anosy region (type 3.b) is a high-need and underserved area. For many key indicators, communities in the Anosy region (in both integration and non-integration sites) performed lower than all other sites. They also posted the lowest scores for indicators related to poverty, such as the wealth index and the availability of soap. Knowledge about basic public health issues such as STDs and access to services seem lowest here as well. This may be explained in part by the absence of major

donor-funded projects in this area, such as USAID projects that focus on such issues. However, when donors invest heavily, such as in the World Bank's SECALINE nutrition project, which has targeted malnutrition since 1994, they seem to be effective, which could explain why malnutrition rates were lowest in this region. Given the poor socioeconomic situation in Anosy, such a finding would otherwise be unexpected.

Lesson 10: Successful integration at scale depends on establishing effective mechanisms on which a range of partners can collaborate. The very nature of the integration of health, population, and environment programs requires a partnership among a range of organizations. Funds for integrated activities may come from those organizations interested only in protecting the environment or from those whose primary concern is protecting human health.

Implementing organizations might specialize in either environment or health and population. In addition, many of the activities in communities are small-scale in nature, and, in some countries, only small NGOs work in those communities. In Madagascar, the principal role of VS is to build the capacity of its member NGOs by acting as an umbrella organization that provides training and technical and financial assistance to member NGOs; coordinates efforts among its members; plays a monitoring and evaluation role; and disseminates information and lessons learned.

The experience of the integrated PHE program in Madagascar has shown that NGOs can play a significant role in improving family planning and maternal and child health services and in making improvements in agriculture and natural resource management for inaccessible and underserved populations. NGO support by donors and their projects in the form of direct funding and technical capacity building has been critical to the success of integrated PHE. As a result of being part of VS, these NGOs have increased their capacity to implement integrated activities and now see themselves as part of a larger effort. Future programs in the health and environment sector should consider expanding the roles of NGOs as a cost-effective way to rapidly extend the coverage of interventions that promise to have a health impact and protect natural resources and remaining ecosystems in the longer run to difficult-to-reach populations in vast geographic areas. Bringing together all partners in a collaborative effort is the only way that an impact at scale is possible.

Recommendations

Recommendation 1: Enhance the technical aspects of PHE integration. The technical competency of VS has been driven by its funding, which was mostly family planning and health-related. To better support member NGOs in the full range of PHE activities, the environmental component of VS needs to be strengthened. VS should have a small core staff to cover the critical technical PHE areas and management functions and a network of consultants known for the quality of their work. Once the range of PHE-related competencies exists within VS, the staff can form a truly multidisciplinary team that provides comprehensive services to NGOs by linking health with environmental concerns as a package.

Much of the success of community-centered and integrated PHE depends on effective community mobilization and behavior change. Approaches such as the “champion community” and “champion commune” have been used effectively but often just for health-related targets and with substantial outside support. VS is in a unique position to demonstrate how environmental targets and improved health outcomes can be achieved at scale.

Because different sectors use different coordination and competency-based learning approaches, successful PHE integration needs to be able to achieve an interface (between, for example, the champion commune and ecoregional approaches). VS can facilitate the dialog and communication between actors to link programs that address the environment, health, economic growth, education, local governance, and the recently developed “nature, wealth, and power” framework.

Recommendation 2: Strengthen organizational capacity. VS has developed within a short time from an informal partnership into a Malagasy association with all the necessary administrative systems to receive and manage donor funding. However, an association under Malagasy law faces constraints of how it and its members can be funded. NGO status would allow greater flexibility and strengthen the institutionalization of VS. Pursuing NGO status successfully depends on clarifying organizational roles and ensuring appropriate staffing. Functioning as an umbrella NGO, VS's niche has always been that of a service organization to its member NGOs working in PHE integration. For its long-term survival and growth potential, VS needs to reinforce its technical and organizational identity and communicate it clearly to potential clients seeking a unique set of experiences and skills. This is crucial for scaling up PHE integration further to reach the goal of serving most of the population around Madagascar's



forest corridors. To raise funds successfully in the PHE niche, VS needs to build partnerships with other organizations for responding to requests with high-quality proposals. By allowing sufficient time, setting a clear time line and milestones, and providing support, VS has good potential for becoming such an effective organization.

Recommendation 3: Increase the evidence that sustainable development and conservation of biodiversity are compatible.

One important reason for increasing agricultural production, raising income through sustainable natural resource use, and reducing family size is their potential positive impact on natural resource and biodiversity conservation. However, this relationship remains largely a hypothesis. Linking survey data to spatial datasets about vegetation coverage and land use (available from environmental conservation organizations) may further expand the evidence that supports this hypothesis. Another more resource-intensive step may involve the design and implementation of special studies of the postulated linkages. Such studies may become necessary to gather data (on, for example, household income or participation in civil society organizations and local governance) otherwise not available.

Thanks to USAID's support, EHP and VS were able to evaluate the success of PHE integration more thoroughly than would normally be possible. For mainstreaming PHE integration, the evidence base needs to be solidified by adding experiences from other countries and programs. This would be greatly facilitated by developing and testing the validity of simpler monitoring and evaluation approaches that provide reliable data for a broad range of PHE interventions. Developing, testing, and disseminating new indicators and measurement methods should be done in partnership with organizations that have such a mandate but with a sector-specific focus, such as the MEASURE Evaluation Project and Foundations of Success.

1 | Introduction

1.1 Overview

This report summarizes a five-year program in the integration of population, health, and environment (PHE) around three environmental corridors in Madagascar. The purpose of the program was to determine if integrated activities achieved better results than activities implemented separately. The report compares the results from baseline and post-intervention surveys to answer the question whether integrated activities are more effective. In order to better coordinate activities among a range of organizations, the Environmental Health Project (EHP) successfully established Voahary Salama (VS), a partnership of organizations working on health, population, and environment in Madagascar. VS also provides assistance to its nine member nongovernmental organizations (NGOs) to develop their capacity to better implement integrated activities. One of the components of the program was the provision of funds to VS member NGOs to implement field activities.

This report describes the various activities, summarizes the results, provides lessons learned, and suggest next steps.

1.2 Background

EHP's involvement with PHE integration in Madagascar stems directly from interest expressed initially during the EHP I contract (1994-1999) to address the interaction between human health and "green" environmental issues such as biodiversity conservation and sustainable use of natural resources. In EHP II (1999-2004), the U.S. Agency for International Development (USAID) included a task in the contract called Environmental Change and Health Outcomes (ECHO). One of the components of ECHO was to focus on integrated PHE programs to address this interaction. Specifically, the EHP II scope of work called for EHP to demonstrate "in several rural settings the effectiveness of linking community-based natural resource management with interventions to improve health, including the potential for scale-up involving both nongovernmental and governmental organizations."

Integrated PHE activities target sector-specific projects to foster greater collaboration and increase the integration of their respective activities in such a way as to increase the efficiency of each. This synergy is produced through a better understanding of how the interaction between human health and the environment affects communities located near regions that are heavily dependent on natural resource use and through the design and implementation of activities that address these interactions. In this concept, the environment is broadly defined to encompass the use of natural resources and natural processes, which include agriculture, forestry, and biodiversity conservation.

In early 1999, USAID was looking for a USAID-assisted country that would be interested in a PHE activity. Because USAID/Madagascar had ongoing population and health programs as well as natural resource management programs, Madagascar was an ideal setting for conducting this activity. A USAID team visited Madagascar in 1999 to confirm this interest. At the time, USAID had a large bilateral child survival project – Jereo Salama Isika (JSI) – and a large natural resource management project –

Figure 1: Regions With PHE Integration Under Voahary Salama



Landscape Development Interventions (LDI) – both of which were working near the three environmental corridors in Madagascar that are the subject of international preservation efforts. In addition, Tany Meva, a Malagasy environmental foundation, had funding from the Summit Foundation to provide financial and technical support to local nongovernmental organizations (NGOs) that are implementing integrated approaches. Both JSI and LDI fund the activities of, respectively, health and environment NGOs, thus providing a source of funds for implementation. USAID/Madagascar had already recruited a fellow from the University of Michigan Population and Environment Program to work alongside its health and environment projects in order to identify areas of integration. In short, the conditions in Madagascar were excellent for implementing a PHE activity.

Once EHP II was under way, a joint EHP/USAID team conducted a field visit to Madagascar in March 2000 to begin the development of the activity. The team determined that there was significant interest in the activity and in developing and implementing integrated approaches. During this visit, the USAID Mission requested that EHP work in two regions: Fianarantsoa and Moramanga (see map in figure 1). The EHP Senior Technical Director returned to Madagascar in July 2000 to finalize the design of the activity and develop a detailed work plan for the first year of the activity. During this visit, a planning workshop was conducted, whereby all partners agreed on a common vision, mission, and objectives for the integrated program. EHP determined that the activity had to be seen as a four-year effort; anything shorter would not allow adequate time to test the synergies that arise from integrated programming.

At this workshop, the partners agreed to establish Voahary Salama (VS), which means “human health along with all that is natural” in Malagasy. VS was originally established as a consortium of funding, technical support, and implementing partners. VS would eventually bring together 24 partners, including donors, USAID-funded projects, NGOs, and Malagasy government agencies. In addition to providing a forum for discussing and coordinating programmatic approaches, VS has gone on to serve as an arena for consortium partners to share challenges and successes as the programs have advanced. This report will describe VS in more detail, as it has become an established mechanism for coordinating the efforts of multiple partners.

The VS partners defined the following vision and mission:

- VS/PHE Vision
 - A healthy population living in a healthy environment based on sustainable development and on a rational management of natural resources on the community level
- VS/PHE Mission
 - To ensure an approach of sustainable integration
 - To strengthen community structures through an integrated approach that increases their capacity to manage the population’s health status and food security by using practices that protect the environment

EHP determined that it could play three principal roles in support of VS/PHE:

1. *Monitoring and evaluation.* EHP’s role was specifically in quantitative approaches using questionnaires and household surveys to measure the impact of PHE activities.
2. *Support to NGOs.* EHP could provide both financial and technical support to local NGOs to strengthen their capacity to implement integrated approaches.
3. *Coordination.* EHP could play a valuable role in ensuring timely communication among the VS partners. EHP decided to hire a national-level coordinator to take on this role. This role eventually expanded to include support for a local staff and office of five people – in effect, the full-time staff of VS.

The activity has been jointly funded by the USAID Office of Health, Infectious Diseases and Nutrition; the USAID Office of Population and Reproductive Health; and USAID/Madagascar. The overall budget was \$1.4 million for five years.

1.3 Integration of Health, Population, and Environment in Madagascar

The central hypothesis of the community-centered and integrated PHE is that by integrating health, family planning, and natural resource conservation activities in community-based projects, communities will be able to take advantage of synergies that make these interventions more effective and more sustainable than if the interventions were pursued in a vertical sector-specific fashion. Synergies would result from a better understanding of how interactions between human health and the environment impact communities located near regions that are heavily dependent on natural resource use. The purpose of this activity was to test this hypothesis to determine if such synergistic benefits occur when health and environment activities are integrated.

The main reason for linking programs such as natural resource management with health and population is that the health of families and individuals depends on a healthy community environment. EHP's role was in the area where environmental factors and health consequences overlap and where poor environmental quality adversely affects people's ability to lead productive lives. Moreover, existing population and health programs in communities provide an entry point for protecting the environment and vice versa. Integrated PHE activities help communities to protect environmental resources while maintaining the community's health.

Although the rationale for linking environmental and health interventions is plausible, benefits remain largely a hypothesis. Evidence to support claims of greater effectiveness and sustainability is limited. Evaluations of integrated programs have been more qualitative than quantitative and have produced equivocal results, sometimes showing that vertical programs are more effective. It appears that neither organizations dealing specifically with natural resource management nor those implementing health and population programs have taken a leadership role in addressing this knowledge gap.

For the purposes of this activity, PHE interventions focused on 10 themes:

1. Smaller families: contraceptive prevalence rate
2. Child health: vaccination and vitamin A coverage
3. Disease prevalence (two-week): diarrhea, fever, and acute respiratory infections
4. Disease prevention through hygiene improvement and use of mosquito nets
5. Women's health: sexually transmitted diseases, HIV/AIDS, antenatal care, assisted deliveries
6. Children's nutritional status: stunting, underweight, wasting
7. Year-round food security: agricultural production
8. Improved natural resources management: reported use of fire in agricultural activities (slash-and-burn), reforestation
9. Community participation: gender
10. Household livelihoods

1.4 EHP Scope of Work

ECHO/PHE activities contributed to the following USAID/Madagascar strategic objectives and related intermediate results (IRs):

- Strategic Objective 2: Smaller, Healthier Families
 - IR 2.1: Family Level: Increased use of services and healthy behaviors
 - IR 2.2: Community Level: Increased community participation leading to improved health and food security
 - IR 2.4: Institutional Level: Increased capacity to plan and manage programs
- Strategic Objective 3: Biologically Diverse Ecosystems Conserved in Priority Conservation Zones
 - IR 3.1: Improved management of critical biodiversity habitats
 - IR 3.2: Sustainable use of natural resources in broader landscapes

In early 2000, in line with contributing to both of these strategic objectives, EHP developed an implementation framework that included an operations research agenda to address the integration of PHE interventions. Pertinent questions and issues were identified – What are the types of synergies and interventions that are best integrated to maximize synergies? How are effective integrated interventions designed? How can community participation in the implementation process be ensured? The EHP framework also provided guidelines for developing and building consensus around a core set of indicators and tools for measurement of both single-sector and integrated approaches. In addition, the EHP framework included activities for promoting systematic monitoring and evaluation of integrated programs among international and local partners. Finally, the framework included a dissemination component to address national and international scale-up of an integrated approach.

EHP identified four implementation objectives over the life of the project:

1. *Management and coordination.* Strengthen the capacity of VS partner NGOs to plan, implement, monitor, and evaluate integrated approaches.
2. *Model approaches.* Develop and test model approaches for integrating specific activities in health, family planning, food security, and natural resource management.
3. *Monitoring and evaluation.* Evaluate the effectiveness and synergies created by different implementation modes of these integrated approaches.
4. *Dissemination.* Disseminate lessons learned and generalize the integrated approach in the intervention areas of VS and promote their use by new partner organizations on national and international levels.

I.5 Organization of Report

This report has six chapters, including this introduction. Chapter 2 defines the overall conceptual framework behind the Madagascar PHE activity. Chapter 3 describes the four main activities, including the accomplishments to date. Chapter 4 describes the results of the post interventions survey in detail. Finally, chapter 5 provides lessons learned, and chapter 6 provides recommendations for the future.

2 | Conceptual Framework

2.1 Health, Population, and Environment in the International Context

The 1992 Rio Declaration on Environment and Development identified the nexus between population and environment as a crucial element for achieving sustainable development – a linkage that was reinforced at the International Conference on Population and Development in Cairo in 1994. Both Rio and Cairo unequivocally voiced the need for integrated environment and development programs that take into account demographic trends. They were also equally persistent in calling for both strengthened research and the development of information about interactions between and among population, environment, and sustainable development.

Success in implementing these goals on international, national, and local levels, however, has been modest. While nations at the 2002 World Summit on Sustainable Development in Johannesburg reaffirmed their commitment to the Rio Declaration and the global program entitled Agenda 21, the Summit's agenda and discussions remained all but silent about the role of population and reproductive health in addressing unsustainable patterns of consumption and conserving the environment. More than a decade after Rio, organizations are still struggling to make truly integrated population, health, and environment (PHE) programs effective. In a world where population growth in many developing countries is still unsustainable, poverty is on the rise, and ecosystems are under constant threat, it has become more important than ever to demonstrate the enhanced value of integrated PHE programs, especially given that several foundations have had to cut back funding for this type of program.

Linking sustainable development with environmental conservation has always been controversial. A recent article summed up the issue by stating, "Sustainable development has become an environmental mantra across the Third World. But critics increasingly ask if people and wildlife belong together at all." (Steinglass, "No Man's Lands," Boston Globe, March 28, 2004) One important argument for linking sustainable development with environmental conservation is that poorer countries cannot simply declare natural resources off limits to people. The sustainable use of natural resources through improved agricultural practices and the protection of wildlife through ecotourism have been promoted by development agencies such as the U.S. Agency for International Development (USAID) and the World Bank as well as organizations in the countries concerned, including indigenous peoples' movements.

Over the past five years, the Environmental Health Project (EHP) has assisted USAID in Madagascar in PHE integration. The community-centered and integrated PHE program in Madagascar is predicated on the assumptions that

- The competing interests of sustainable development and conservation of biodiversity can be met without sacrificing one for the other.
- Likewise, the related objectives of the involved interest groups (among them, indigenous peoples asserting their cultural heritage and right to livelihood, development agencies trying to alleviate poverty, developing-country governments seeking to grow their economies, and environmental conservationists pursuing the protection of biodiversity) can also be met.

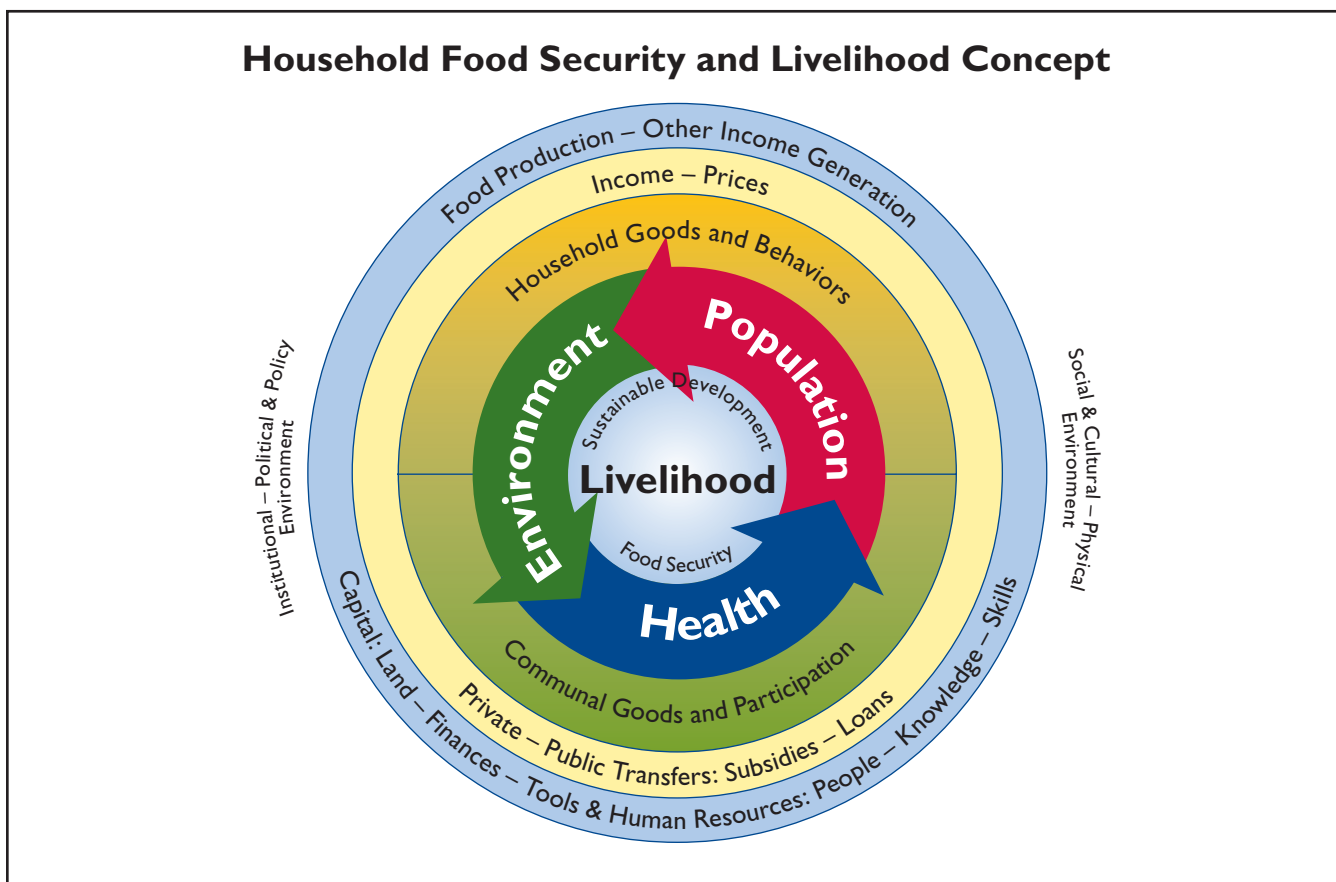
USAID supported the Voahary Salama Association (VS), an NGO umbrella organization that supports its members in implementing the integrated PHE program along three major forest corridors and in other threatened ecosystems in Madagascar. The goal was to demonstrate that linking natural resource management with health and population will increase the effectiveness and sustainability of these activities compared with their implementation through separate sector programs.

2.2 Household Food Security and Livelihood Concept

The Agenda 21 program provides a general policy context for integrating PHE interventions. For Madagascar, this broad vision was transformed into a programmatic concept to guide the design and implementation of specific activities. EHP's adaptation of the "Household Food Security and Livelihood Concept"¹ provided the analytic framework for the baseline and impact surveys

¹ The Household Food Security and Livelihood Concept is based on food security and livelihood models developed by the International Food Policy Research Institute, the Food and Nutrition Technical Assistance Project's Food Security Conceptual Framework, and CARE's Household Livelihood Security Framework.

Figure 2: Conceptual Framework



(see chapter 4) and program monitoring and served as a roadmap for the design of program interventions. Achieving food security is especially important for countries like Madagascar where malnutrition in the form of stunting affects nearly 50 percent of all children less than 5 years old in remote rural communities (Voahary Salama 2001). Lack of food to meet basic caloric and micronutrient needs is closely linked to high levels of poverty, which reaches 80 percent in rural areas (UNDP 2001).

The Household Food Security and Livelihood Concept implies that people’s choices and actions related to PHE are based on economic forces that can be influenced by various programmatic interventions on different levels in the framework. By putting the PHE link into the social and economic context, it shows the determinants of what families can do to improve their nutritional and health status, how to slow demographic trends, how to conserve natural resources, and to what extent they can be engaged in community activities. How much health or conservation households can “afford” is largely determined by income generated through production factors of capital and labor and market prices. Prices and household preferences are influenced by external factors such as transfer payments; public and private sector institutions; the political situation; regulatory policies, practices, and enforcement; and other environmental factors, which are shown in the periphery of the conceptual framework. The conceptual framework can be broken down into nine components:

1. Links between health, population, and environment
2. Direct program outcomes: food security, health status, demographic trends, natural resource management
3. Impact on sustainable development, livelihood, and conservation of biodiversity
4. Household goods and practices affecting food security, health, and natural resources
5. Communal goods and actions affecting food security, health, and natural resources (role of civil society)
6. Household income and market prices
7. Working capital and human resources

8. Institutional environment: public and private sector institutions and organizations affecting food security, health, and natural resources
9. Social and cultural; political and policy; and physical environment

Links among health, population, and environment are at the center of the Household Food Security and Livelihood Concept, based on three assumptions that seem plausible according to evidence gathered to date:

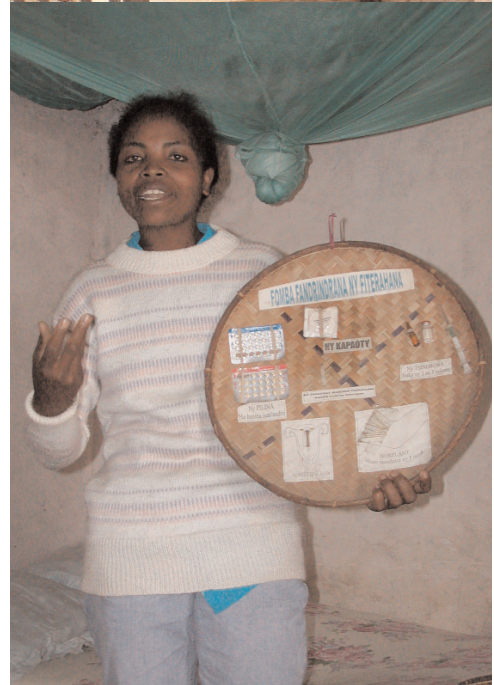
- A cause-effect relationship exists between changes in one programmatic area of PHE and outcomes in another.
- The programmatic integration of PHE interventions is synergistic, which means that results in multiple programmatic areas of PHE can be achieved while keeping costs low compared with single-sector programs.
- A holistic approach to PHE issues corresponds better to people’s needs and contributes to achieving sustainable development together with environmental conservation.

The usually high fertility in many poor countries and the rapid population growth in communities close to endangered ecosystems threaten natural resources and biodiversity. The scarcity of land and forest resources encourages households to migrate and cultivate land needed to protect animal and plant species. Reducing population pressure is one goal of family planning, but smaller and healthier families are also essential to support household livelihood and economic well-being, which rely on the ability to plan family size and to protect children from preventable diseases.

The link between poor land use practices and the environment and health is obvious. In Madagascar, deleterious agriculture practices, such as slash-and-burn, lead to deforestation and environmental problems such as soil erosion. Sustainable agriculture and use of natural resources are important to protect watersheds to maintain the quantity and quality of water resources. When safe water sources such as springs are depleted because of erosion, households turn to less safe alternatives such as streams or unprotected shallow wells. The type of water households use for drinking and handwashing is related to the risk of diarrheal diseases. Environmental management techniques such as modified or improved irrigation schemes in rice fields can reduce diseases transmitted by mosquitoes and other vectors. The loss of biodiversity has direct impact on health in areas where forests serve as a source for medicinal plants used by traditional healers. Families may also depend on renewable natural resources such as wild fruits and honey that improve nutritional status and household income. Conservation efforts have become increasingly important in attracting ecotourism, which can generate income and improve health and livelihood.

In addition to conceptual links between health, population, and environment, there are synergies that can make integrated programs more efficient and effective. Communal efforts to build water supply systems and manage water resources may be linked to messages about hygiene. Baseline and follow-up survey data presented in chapter 4 suggest that early adopters of improved agricultural methods may also be more open to practicing family planning. Health interventions may provide an entry point for environmental education and vice versa. NGOs and other organizations working together can share scarce resources and increase program outputs.

**Some elements of integrated PHE:
Community standpipe – a public safe water source; family planning volunteer; schoolchildren learning to grow vegetables**

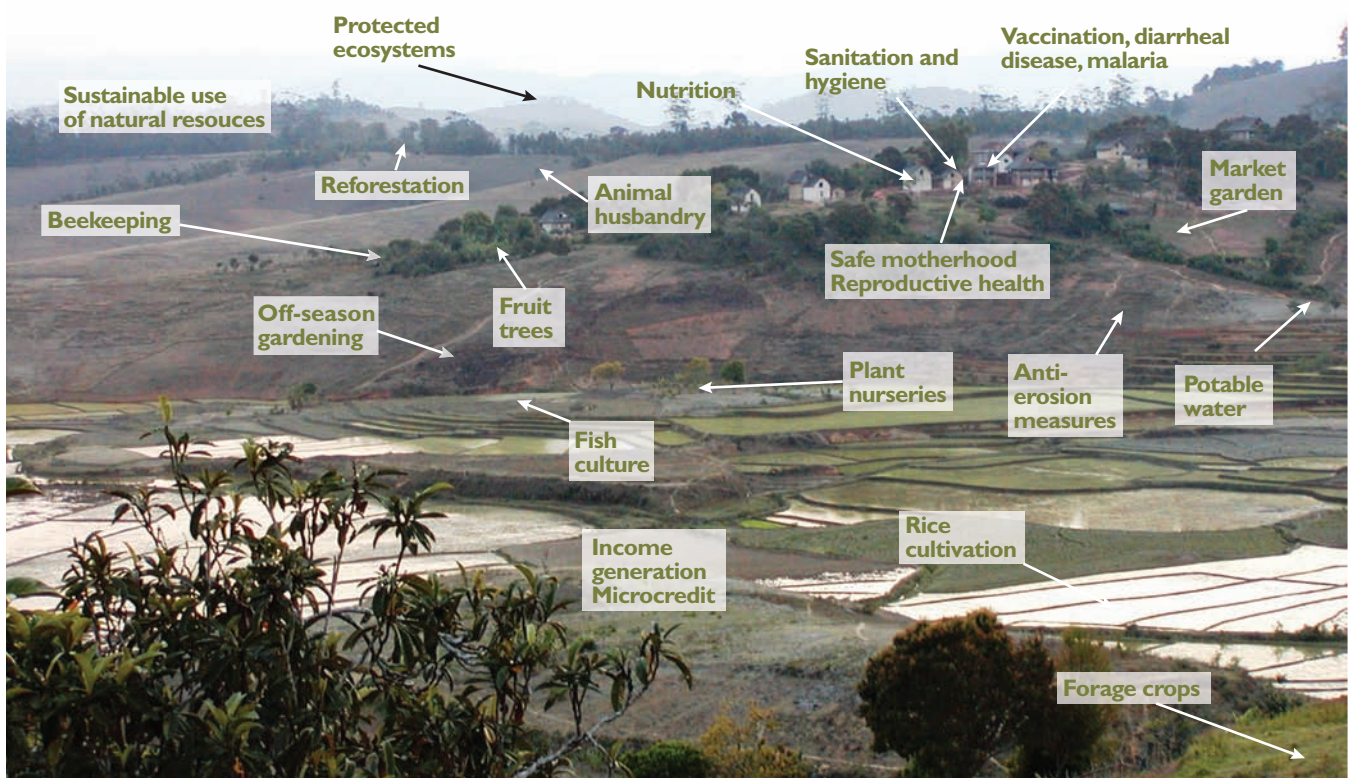


2.3 Voahary Salama: An Operational Model for Integrating PHE Interventions

Having highlighted attention to PHE in the international context and having shown how they are linked on a conceptual level, the rationale for integrating PHE on a programmatic and operational level needs to be established. The argument for integration can be made for two reasons:

- *Due to high levels of poverty, food shortages, and limited knowledge, the people living in areas bordering Madagascar's forest corridors lack the incentives and skills to conserve natural resources.* Poor people depend heavily on natural resources for their basic needs, such as food, energy, water, and housing. Although their livelihood is closely tied to the well-being of their resource base, poor people degrade the natural resources they depend on for their livelihood. The simple explanation is that people use every resource available to them to survive, especially when alternative mechanisms for survival do not exist. Where people are hungry and destitute, conservation of natural resources is less important to them. Poor people often lack sufficient incomes or access to credit to purchase appropriate tools, materials, technologies, and skills to practice environmentally sustainable agriculture, protect natural resources against degradation, or rehabilitate degraded resources. Where large-scale government or commercial interests convert productive land into other uses such as mining, dams, or parks, the poor may be forced to migrate to marginal lands. They may move higher up hillsides or cut down forests for agricultural land and firewood. Poverty does not necessarily lead to environmental degradation. Poverty, combined with rapid population growth, scarcity of productive land, and lack of improved agricultural technology, is likely to result in environmental degradation.
- *Meeting people's needs and conserving the environment can only be attained by simultaneously implementing interventions in the PHE sectors.* Focusing on one sector does not ensure benefits in another, especially in those communities located near endangered ecosystems. For example, curbing demographic trends, improving health, and increasing household income and food security do not mean that people will conserve natural resources. Historically, often the opposite has occurred with the accumulation of wealth going hand in hand with a degradation of the environment. A focus on agricultural improvements and environmental protection does not automatically lead to lower fertility and population growth, at least not immediately and in parallel with declines in mortality rates (a phenomenon called the demographic transition), unless appropriate family planning services are provided and the use of contraceptives is widely accepted.
- *The programmatic integration of PHE leads to program outcomes in multiple areas because of synergies that increase program efficiency and effectiveness, something that single-sector approaches cannot achieve.* This rationale takes advantage of the fact

Figure 3: Community-Centered PHE Interventions (Western Corridor, Fianarantsoa Province)



that while different development organizations often work through the same community structures in the same geographic areas, their efforts are usually not coordinated. Integration leads to interventions that mutually reinforce one another rather than compete with one another and increases the possibility of sharing scarce organizational resources. Moreover, a program started in one sector can serve as an entry point for interventions in other sectors.

Integrated PHE interventions are conducted at all levels of the Household Food Security and Livelihood Concept, but to a varying degree they depend on the local context, resources, and institutional capacity. Figure 3 illustrates the different PHE interventions that may happen in a community. The types of activities shown represent the full spectrum of PHE interventions, although such a multitude is usually not found in a single community. To be practical, a more limited set of interventions, commensurate with community and NGO capacity, is implemented. Therefore, VS identified 10 themes that lead to improved health, agricultural production, nutrition, and household income and that should receive priority in the programmatic integration of PHE:

1. Smaller families: contraceptive prevalence rate
2. Child health: vaccination and vitamin A coverage
3. Disease prevalence (two-week): diarrhea, fever, and acute respiratory infections
4. Disease prevention through hygiene improvement and use of mosquito nets
5. Women's health: sexually transmitted disease, HIV/AIDS, antenatal care, assisted deliveries
6. Children's nutritional status: stunting, underweight, wasting
7. Year-round food security: agricultural production
8. Improved natural resources management: reported use of fire in agricultural activities (slash-and-burn), reforestation
9. Community participation: gender
10. Household livelihoods

Three social marketing and social mobilization approaches played a central role in each of these technical areas listed above:

- “*Champion community*” (community target setting, monitoring, and celebration)
- *Child-to-community* (increasing life skills, school enrollment, and attendance through PHE themes)
- *Farmer-to-farmer* (model farmers teaching others improved agricultural techniques)

These three approaches are based on an early adopter or innovator model that has proven its value for changing people's attitudes and practices related to many behaviors in the PHE context. A partnership approach with NGOs and supporting organizations created the enabling environment for implementing community-centered and integrated PHE activities, which resulted in the formation of VS.

3 | Activities and Accomplishments

3.1 Objectives and Expected Results

The Madagascar PHE program had four objectives:

1. Strengthen the capacity of partner NGOs to plan, implement, monitor, and evaluate integrated approaches
2. Develop and test model approaches for integrating specific activities in health, family planning, food security, and natural resource management
3. Evaluate the effectiveness and synergies created by different implementation modes of these integrated approaches
4. Disseminate lessons learned and generalize the integrated approach in the intervention areas and promote their use by new partner organizations on national and international levels

At the end of the activity, two overall results were anticipated:

- *Synergies*: Synergies created by the integrated approach will result in greater effectiveness of interventions. Synergies manifest themselves in an improved capacity at program and organizational levels and in communities' progress toward self-determined and sustainable development.
- *Efficiency*: The integrated approach will achieve relatively better outcomes for low incremental costs compared with single-sector (vertical) approaches.

The role of EHP's U.S. office was to provide general technical and administrative support to the field activity in Madagascar, focusing on the following activities, the first two of which created the rationale and conceptual basis for the program in Madagascar:

- Development of the Household Food Security and Livelihood Concept (described in chapter 2) as the basis for designing an integrated PHE program
- Development of indicators and an evaluation approach based on the Household Food Security and Livelihood Concept (results described in chapter 4)
- Engagement with international partners interested in integrated PHE and dissemination of the EHP experience in Madagascar

3.2 Structure of Voahary Salama

In July 2000, 20 organizations working in Madagascar in PHE agreed to form Voahary Salama (VS), a consortium of technical support, funding, and implementation partners working on integrating PHE activities. Several of these partners were projects with a limited duration in Madagascar (such as USAID-funded projects funded for five years), while others have a long-term presence in the country (such as Adventist Development & Relief Agency International) or are Malagasy institutions. Figure 4 shows the geographic focus and organizational responsibilities of some of the original key partners.

The VS consortium serves as a forum for its partners to coordinate activities, develop common approaches, and promote the concept of PHE integration. It currently consists of 29 partners who meet annually in a general assembly and elect a president, vice-president, and secretary. VS has committees for monitoring and evaluation; community development; information and communication; and finance and logistics. Table 1 provides a list of the partners between 2000 and 2004 and their roles. Some of these organizations joined during this phase and were not members from the beginning. USAID/Madagascar plays an active role in VS and has provided funding, as have USAID's Bureau for Global Health and the Packard and Summit Foundations.

Figure 4: Geographic Focus and Organizational Responsibilities

	Fianarantsoa MICET	ADRA Moramanga SAF/FJKM	Fenerive Est MATEZA-CI	Fort Dauphin ASOS/FAFAFI/WWF	Grants	Management Design	Implement	Evaluate	Disseminate
EHP/ECHO	✓	✓	✓	✓	✓	✓	✓	✓	✓
University of Michigan	✓	✓	✓	✓	✓	✓	✓	✓	✓
Michigan Fellow	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tany Meva Foundation	✓	✓	✓	✓	✓	✓	✓	✓	✓
JSI Project	✓	✓			✓	✓	✓		
LDI Project	✓	✓			✓	✓	✓		
Pact	✓	✓	✓	✓		✓	✓	✓	✓
Linkages	✓							✓	
MEASURE Communications									✓
Intermedias	✓	✓	✓	✓					✓
AGERAS	✓	✓	✓	✓		✓			✓
ONP	✓	✓	✓	✓		✓			✓

3.3 EHP Local Office

Given the modest funding for the activity and the fact that other organizations are active in PHE activities, EHP identified three valuable roles in furthering PHE integration.

Monitoring and evaluation. Since no other organization active in PHE in Madagascar was focused on monitoring and evaluation (M&E), EHP determined that it could play a valuable role in this area. M&E support consisted of a quantitative baseline using questionnaires and household surveys, operations research, and the development of systems for reporting progress on an ongoing basis.

Strengthening integrated activities at the grassroots level. Over the course of the program, EHP provided modest support for implementing integrated activities to five NGOs:

- Madagascar Institut pour la Conservation des Environnements Tropicaux (MICET)
- Sampan'Asa momba ny Fampandrosoana/ Fiangonan'i Jesoa Kristy eto Madagasikara (SAF/FJKM)

Table 1:Voahary Salama Partners and Roles (end date in parentheses)

Financial Assistance	Financial and Technical Assistance	Technical Assistance	NGOs	
Summit Foundation (03)	Tany Meva Foundation	University of Michigan	MICET	ASOS
Packard Foundation (05)	Pact	Fellows Program	Ainga	Ny Tanintsika
USAID/Madagascar	JSI/R&T	Intermedias	Koloharena	Mitsinjo
USAID/Washington	LDI (04)	Linkages	FAFAFI	WWF
	EHP (04)	PRB	SAF/FJKM	ADRA
		ONE/SAGE	CI	MATEZA
		MCDI (PVO)	ANAE	ANGAP

- Ny Tanintsika
- Ainga
- Action Santé Organisation Secours (ASOS)

Coordination among VS partners. EHP supported the VS executive bureau. The executive director manages the day-to-day activities of Voahary Salama, maintains the flow of information among the partners, and provides technical leadership for VS at the national level.

To carry out these roles, EHP supported VS by providing resources for five full-time Malagasy staff; office rent and associated costs; the development of technical approaches; and training and technical assistance. The five full-time staff were the VS executive director; an M&E specialist; an information, education, and communication (IEC) specialist; a family planning coordinator; and a program assistant. In addition, the Madagascar Green Healthy Communities Project (MGHCP) has provided the administrator for VS since July 2003.

3.4 Overview of Specific Activities

Each of the four objectives corresponds to a specific subactivity. Under the EHP management system, an overall activity was divided into subactivities, and each subactivity had its own budget and scope of work. The focus in the first three years (until June 2003) was on the first three subactivities, which run concurrently. During year 4, the focus began to turn to the dissemination of results and the sustainability of the activity in Madagascar. In year 5, a fifth subactivity, specifically focused on family planning, was added using Flexible Fund resources. Below is an overview of each subactivity.

3.4.1 Management and coordination

This subactivity was for the management and coordination of the activity for both the EHP home and local offices.

Description

- Each year, VS developed an annual work plan for the partnership as a whole.
- VS provided ongoing coordination among the various partners through regular meetings with the coordinating committee and various technical committees and an annual meeting of the general assembly each July. This coordination included regular communication with all partners.
- EHP supported the implementation of integrated activities through subcontracts with three NGOs – SAF, Ny Tanintsika, and MICET. In addition, these NGOs, as well as ASOS and Ainga, received subcontracts under the Flexible Fund activity in year 5 for family planning. Through VS, EHP supported the development of work plans and budgets with the NGOs, as well as their capacity development by assisting in the implementation of work plans and training. EHP's funding complemented other resources and was specifically targeted at PHE integration. The NGOs used these funds to hire staff, such as an M&E specialist or a community mobilization specialist, as well as to carry out community-level activities.
- Although it had only a small staff, VS developed a management system that included procedures for personnel, financial management, consultant hiring, roles and responsibilities, and reporting.
- The local office produced regular quarterly reports as well as trip reports associated with specific field visits.
- EHP/Washington provided regular backstopping of the local office.
- With support from the Packard Foundation, MGHCP provided the VS administrator and office equipment that were critical to the association's organizational capacity.
- Pact was instrumental from the beginning of VS, providing office space during the first couple of years and assisting in organizational development.

Accomplishments

The project achieved the following:

- Institutionalized VS as a legal association in August 2002

- Fully established the local VS office, including four full-time staff members, and established its role as the coordinator of VS/PHE
- Developed a management system and a procedures manual documenting the system; established a financial management system and indirect cost rates in July 2004 in order to be able to receive and manage funds independently
- Developed the capacity of NGOs to develop grant proposals and work plans, establish monitoring and evaluation systems, and implement integrated activities. including a social marketing approach

3.4.2 Development and testing of model approaches

This subactivity was for the development and testing of model approaches. SAF, MICET, and Ny Tanintsika implemented much of the work under this subactivity.

SAF was created in 1974 and is the development department of the FJKM church. Its mission is to undertake community development activities that meet the worldly and spiritual needs of the population. SAF's development activities target rural communities. Since 1987, SAF has been engaged in the health sector by rehabilitating health facilities and initiating community pharmacies in remote rural areas. Prevention and health education were added in 1997. Since 1989, SAF has implemented community-based natural resource management programs that include reforestation, sustainable agriculture and forestry, animal husbandry, income generation, and environmental education. SAF has received financing from the Summit Foundation through Tany Meva.

MICET was created in 1997 as an NGO with a mission focusing primarily on the conservation of biodiversity using community development activities such as health services, environmental education, and research about animal and plant species. MICET played a specific role in the Ranomafana National Park project under the government's Environmental Plans 1 and 2 (1997 to 1998). MICET received grants under the USAID family planning project APPROPOP/PF to test the feasibility of integrating family planning services in Madagascar into environmental conservation in the precursor Integrated Conservation and Development Project of the 1980s and '90s. MICET received a grant through the USAID-funded JSI project and the Summit Foundation through Tany Meva to implement reproductive health and child survival activities in communities and schools along the Ranomafana-Andringitra environmental corridor from December 1999 through June 2002.

Ny Tanintsika is an association for health and development. Its activities have focused on the improvement of maternal and child health through the training of traditional birth attendants and community development. Integrated environmental activities in the zones along the environmental corridors were introduced through VS. Ny Tanintsika is the first NGO that has worked in Ambolomadinika commune. Ny Tanintsika also received funds from Feedback Madagascar, an NGO supported from Scotland.

Ainga is an association with a strong environmental focus. Ainga has received funding from the Association Nationale d'Actions Environnementales (ANAE) in the Fianarantsoa region. Ainga's participation began in 2003 with the increased emphasis on family planning through the Flexible Fund.

ASOS was created in the early 1990s during the famine in southern Madagascar. ASOS was among the NGO pioneers who initiated activities that integrated development with family planning and health. ASOS has received funds from the Summit Foundation through Tany Meva and JSI for integrated health and environment activities.

Description

- VS worked closely with the local NGOs that received funds from EHP to identify specific actions that could be carried out as part of an integrated approach. The actions served as the basis for a work plan for each NGO and a budget that could serve as the basis for subcontracts with EHP. The subcontracts averaged approximately \$25,000 per NGO for years 2 to 5 of the program.
- This subactivity also called for the development and implementation of integrated approaches that the NGOs and others can use. These included the champion community approach, the farmer-to-farmer approach, and the child-to-community education approach in schools.
- IEC for integrated approaches to PHE (such as the "champion communities" and child-to-community approaches) was an important aspect of this activity. VS worked with JSI and others to develop an IEC approach and related materials.

Accomplishments

- SAF and Ny Tanintsika implemented integrated PHE activities in their target communities.
- EHP developed environmental and integrated elements of the child-to-community education approach to complement the already existing health components and then launched the approach in 2003 with the development of a methodology and a training guide to train teachers. In 2004, the approach was implemented in 10 schools in Moramanga by SAF; in eight schools in Fianarantsoa by Ainga; in 11 schools in Fianarantsoa by Ny Tanintsika; and in 10 schools in Betioky by Medical Care Development International (MCDI), with its own USAID child survival grant funding. VS worked closely with the Ministry of Education and Scientific Research in developing the approach, carried out regular monitoring, and evaluated the approach.
- Five VS *gazety*¹ covering tree nurseries, improved rice culture, vegetable gardens, water management, and household cleanliness were published, as were two posters on vegetable gardens and reforestation. These *gazety* complemented existing *gazety* covering health topics developed by JSI.
- In collaboration with JSI, VS initiated the IEC program. An IEC tool was developed for community animators, and community development agents were trained in its use.
- Integration of PHE with EHP support took place in 160 (of 258 planned) intervention villages in 35 communes.

3.4.3 Monitoring and evaluation (M&E)

One of EHP's primary roles in the VS partnership was to monitor and evaluate the effectiveness of integrated approaches in rural communities. While other partners were actively engaged in the actual implementation of field activities and provided financial assistance, EHP's special contribution to the partnership was M&E. The two key research questions that this M&E component attempted to answer were:

- Is an integrated approach synergistic and more effective than a single-sector approach (health or environment activities implemented by the government, with or without donor support)?
- What is the most effective model to integrate multisector programs that include population, health, and the environment (agriculture and natural resource management)?

Description

- The initial M&E activity was to conduct a quantitative baseline survey in intervention and control communities. The design of the survey was based on key indicators to measure the impact of integrated PHE interventions over time and compare integration with results from non-integration communities. This baseline survey was carried out in three regions – Moramanga, Fianarantsoa, and Fort Dauphin – in March and April 2001. All household surveys were implemented, under contract with EHP and VS, by the Direction des Statistiques Sociales of the National Institute of Statistics (INSTAT), the government institution that does Madagascar's Demographic and Health Survey (DHS). EHP/VS sub-contracted with INSTAT to do a follow-up household survey in 2004 to determine the impact of the interventions. The survey design and results are described in greater detail in chapter 4.
- EHP also coordinated with the University of Michigan Population and Environment Fellows Program. Michigan's program focused on qualitative research into the design of community participation in development activities; the degree of interaction between communities and organizations; and better correlation between community needs and development actions. Michigan trained six NGO partners in the use of qualitative research methods. These NGOs in turn carried out qualitative assessments in 34 villages in 2001 and again in 2004 in order to use participatory planning techniques to develop or adapt integrated programs. Appendix 1 shows in which villages the quantitative and qualitative assessments were carried out.
- VS was also responsible for developing a community-based monitoring system at the regional level for the NGO partners to use. The objective was to involve the communities in monitoring and evaluating their own integrated activities. Participatory monitoring was mainly used in the champion community context to determine whether a community had reached champion status.

¹ *Gazety* are four- to eight-page educational publications in newsletter format.

- EHP also carefully coordinated plans and approaches for ongoing M&E with VS partners. VS developed a guide for monitoring integrated activities and training materials for using the guide.

Accomplishments

- EHP contracted with INSTAT to design and carry out the baseline survey, which was successfully implemented in March and April 2001. An EHP consultant assisted INSTAT in the design and preparation of the survey. After the survey was implemented, INSTAT analyzed the data and drafted the report. The report was finalized, and the local EHP office shared the results with partners.
- In 2004, INSTAT carried out a post-intervention survey using the same survey instrument as in 2001, with some additional questions and refinements (ensuring, however, comparability between the two surveys). INSTAT performed a preliminary data analysis but was not able to produce either an analysis comparing the two surveys' results or a final report. This did not affect the data analysis but delayed it. The comparative analysis and final report were funded under the MEASURE Evaluation project.
- EHP developed an M&E manual as the basis for the regional community-based system. The manual includes basic definitions; tools for planning and monitoring; roles and responsibilities of different actors; and system specifications. The manual was pretested in two villages in the Moramanga region, and the system was established in three regions (Moramanga, Fianarantsoa, and Fort Dauphin) for a second round of large-scale testing over a three-month period (December 2001-February 2002). VS partner NGOs used the manual with varying degrees of success.

3.4.4 Dissemination

This subactivity was for the dissemination of key lessons learned. Because of the nature and size of the VS partnership, the dissemination process within Madagascar began early in the program. On the international level, the pace of dissemination activities picked up in 2003 as lessons learned became clear and the results of the integrated PHE program became known.

Description

- The EHP senior technical director participated and presented in regular meetings in Washington, D.C., with other organizations interested in the integration of PHE activities. EHP was an active member of the Community Conservation Coalition (CCC), which includes Population Action International (PAI), Conservation International (CI), the Nature Conservancy, World Wildlife Fund (WWF), and the Population Reference Bureau (PRB). The CCC is supported by USAID and the University of Michigan Population and Environment Fellows Program. Its mission is to contribute to the conservation of biological diversity by fostering communication, collaboration, and institutional change within member organizations and their partners concerning the connections among conservation, human population dynamics, health, education, and economic livelihood.
- The VS executive director presented the Madagascar activity at several important international meetings. In 2002, she presented at the Healthy Ecosystems/Healthy People conference organized by Johns Hopkins University, the United Nations Environment Programme, the World Health Organization (WHO), and the Wildlife Trust. In 2003, VS gave three presentations² at the International Forum on Ecosystem Approaches to Human Health in Montreal organized by the International Development Research Centre and at the annual Global Health Council conference. The VS executive director participated also in the end-of-project presentation at the Global Health Council conference in 2004.
- EHP facilitated and provided the technical lead for monitoring and evaluation at the 2002 Planting Seeds/Meeting Needs meeting organized by PAI in Washington, D.C.
- EHP developed and widely disseminated a midterm progress report.

Accomplishments

- VS has become a forum for ongoing dissemination in Madagascar.
- EHP and VS presented to various audiences, including USAID/Washington, USAID/Madagascar, the CCC, the Summit Foundation, the Global Health Council, and the American Public Health Association (every year from 2000 to 2004).

² The presentations were on social marketing (Dr. Tina Andrianarisaina, VS IEC specialist), SAF field activities (Dr. Bary Rakototiana, SAF executive director), and the importance of collaboration in integrating family planning and environment activities (Dr. Odile Randriamananjara, VS executive director).

- The Sierra Club recognized the VS executive director as its 2001 Woman of the Year for her innovation and leadership.
- EHP and VS in Madagascar were recognized in November 2002 by Population Action International, the National Wildlife Federation, and the Izaak Walton League of America for “visionary leadership, bold efforts, and steadfast support in forging the link between reproductive health care services and conservation and natural resource management activities in order to ensure healthy people and healthy ecosystems in communities around the world.”
- With support from JSI and the MGHCP (funded by the Packard Foundation), Colby Gottert Productions made a documentary in 2003 about the champion community approach used by NGOs to mobilize communities for integrating PHE activities.
- In 2004, Population Action International produced the documentary *Finding Balance*, directed by Daniele Anastasion, that shows how Malagasy women value activities that provide them with easier access to contraceptives and give them a greater role in managing natural resources.

3.4.5 Flexible Fund

In the fifth year of the program, the USAID Office of Population and Reproductive Health gave \$200,000 to EHP to enable VS to provide increased support to family planning activities. The Flexible Fund allowed VS to increase the number of intervention villages supported by VS NGO members. One of the challenges was to ensure that the additional funds for family planning did not create an imbalance in integrated activities. VS worked carefully with the NGOs as they developed their work plans to ensure that the focus on integrated PHE was not lost.

Description

- EHP awarded five subcontracts to VS member NGOs: SAF/FJKM in Moramanga; Ainga, Ny Tanintsika, and MICET in Fianarantsoa; and ASOS in Fort Dauphin. This support was used to develop two new approaches: basic literacy using family planning messages and the use of satellite clinics to improve access to injectable contraceptive products.
- VS hired a full-time family planning coordinator to oversee the NGO activities in this area and to coordinate VS headquarters activities.
- VS organized training workshops, developed IEC materials for family planning, and developed a guide for the supervision of community health agents.

Accomplishments

- The five NGOs implemented community-level family planning activities. These included training community health agents and literacy agents; organizing family planning awareness sessions in communities; and supplying family planning products for satellite clinics. Note that the evaluation presented in chapter 4 of this report does not cover results from activities supported by the Flexible Fund.
- VS improved the capacity of NGO staff to supervise community health agents and community animators.
- VS improved its capacity to provide support to its NGO members in family planning.

Table 2 summarizes the subactivities and achievements to date, grouping them by the four program objectives and the 10 themes described in chapter 2. Most subactivities and achievements cut across the 10 themes, which was expected because of the integrated nature of the program. Several, however, are related to specific themes, reflecting a greater emphasis.

Table 2: Summary of Activities and Achievements

Objectives/Themes	Activities and Achievements
Cross-Cutting Achievements Affecting All 10 Themes	
Management and Coordination	<ul style="list-style-type: none"> • Planned and supported the creation and operation of Voahary Salama (VS), a Malagasy consortium of nine NGOs and 20 supporting organizations • Collaborated closely with USAID-funded (both Mission and Bureau for Global Health) projects in Madagascar • Collaborated closely with population and conservation organizations in the United States, including Population Action International, the International Center for Research on Women, Conservation International, the World Wildlife Fund, the Nature Conservancy, and the International Resources Group • Organized annual review and planning meetings of VS general assembly • Conducted monthly coordination meetings with NGOs • Subcontracted with three NGOs (not including Flexible Fund) • Helped nine NGO partners develop grant proposals and work plans • Conducted organizational development training for these NGOs in collaboration with JSI/R&T • Conducted Finance and Administration Working Group technical meetings • Helped prepare a grant proposal to the Packard Foundation • Prepared funding proposals for the European Union and the Global Fund to Fight AIDS, Tuberculosis and Malaria
Model Approaches: Social marketing, Capacity Building, Field Implementation	<ul style="list-style-type: none"> • Developed a conceptual and operational framework for PHE integration • Developed child-to-community social marketing tool; trained 137 teachers • Developed a farmer-to-farmer social marketing tool • Developed champion community social marketing tool • Evaluated cross training • Trained the following: <ul style="list-style-type: none"> 502 community health agents 360 community family planning animators 66 traditional birth attendants 59 literacy agents 551 people in literacy training 10 villages in participatory planning and evaluation • Established three satellite clinics • Established 979 village groups

Objectives/Themes	Activities and Achievements
Monitoring and Evaluation	<ul style="list-style-type: none"> • Designed, implemented, and analyzed an integrated PHE household survey to serve as a baseline • Designed, implemented, and analyzed a post-intervention survey to measure results • Designed a community monitoring system to observe processes and progress of integration; all NGOs trained • Developed integrated supervision instrument; 13 intervention villages supervised (SAF, MICET); very detailed reports received • Developed participatory assessment and planning tool (collaboration with University of Michigan, which had the technical lead) • Trained NGOs in participatory assessment planning and evaluation (collaboration with University of Michigan); applied tool in all intervention villages • Held monthly M&E working group meeting and two technical meetings • Established GPS measurements in collaboration with PACT to develop the basis for a PHE geographic information system
Dissemination	<ul style="list-style-type: none"> • Developed presentations and progress reports • Presented at USAID, American Public Health Association, Global Health Council, Community Conservation Coalition, Summit Foundation, and the Center for Research and International Development in Canada • EHP country director presented the Madagascar experience to staff of U.S. senators in collaboration with conservation organizations • Collaborated with MEASURE Communications/PRB to organize and cofacilitate workshops on population and environment targeted to journalists and policymakers during 2004
Achievements Related to Specific PHE Themes	
Food Security	<ul style="list-style-type: none"> • Developed market garden education tool (<i>gazety</i> and posters) • Started 39 school model gardens – Moramanga/SAF, Fianarantsoa /Ainga, Ny /Tanintsika, Betioky /MCDI
Income Generation	<ul style="list-style-type: none"> • <i>Same as above</i>
Environmental Conservation	<ul style="list-style-type: none"> • Developed tree nursery and reforestation education tool (<i>gazety</i>) covering water management, improved cooking stoves, tree nursery, and planting • Started 39 school tree nurseries – Moramanga/SAF, Fianarantsoa/Ainga, Ny Tanintsika, Betioky/MCDI • Started reforestation activities in 39 villages – Moramanga/SAF, Fianarantsoa/Ainga, Ny Tanintsika, Betioky/MCDI • Started training of trainers in solar oven/improved wood-burning stoves – Fort Dauphin/ASOS • Conducted forest management project with WWF, ANGAP, Centre Ecologique Libanona, Projet Radio, FAFAFI – Fort Dauphin/ASOS
Family Planning	<ul style="list-style-type: none"> • Trained 360 community animators in family planning and chloroquine distribution • Organized workshops with the Ministry of Health to determine the minimum package of activities in maternal and child health in the context of mobile health teams. • <i>Others covered under cross-cutting</i>

Objectives/Themes	Activities and Achievements
Children's and Women's Nutrition	<ul style="list-style-type: none"> • Trained 93 community animators in nutrition (SAF) • <i>Others covered under cross-cutting</i>
Immunization	<ul style="list-style-type: none"> • <i>Covered under cross-cutting</i>
Diarrhea and Malaria Prevention	<ul style="list-style-type: none"> • <i>See below and also cross-cutting</i>
Safe Water, Sanitation, and Hygiene	<ul style="list-style-type: none"> • Helped villages improve water supply • Constructed 212 latrines with community participation • Established two water users committees – Fort Dauphin/ASOS • Trained 137 teachers in sanitation and hygiene • Carried out feasibility studies for community water supply in four villages – Fianarantsoa/MICET • Produced a newsletter on sanitation and hygiene

4 | Results

4.1 Methodology

The evaluation of community-centered and integrated PHE interventions followed a quasi-experimental design with a baseline survey prior to the start of activities and a follow-up survey after about three years of program implementation. During each survey, a group of integration communities (the integration group) were compared with non-integration communities (the comparison group, which also had health or environment interventions but without integration of the two). The NGOs received funding for dedicated health or environment activities concurrently with funds specifically intended to pay for the integration of PHE. In integration communities, NGOs associated with VS conducted integrated PHE activities regardless of the funding source.

Non-integration communities either had no support from VS partner organizations or had only single-sector PHE interventions. Although other organizations unrelated to VS may have worked in non-integration and integration communities, they did not provide integrated PHE interventions. The Department of Demography and Social Statistics/INSTAT in Antananarivo conducted the baseline survey in March and April 2001 and the follow-up survey in March and April 2004, with the main funding provided by EHP with support from the Tany Meva Foundation (in 2001).

The integration group consisted of 56 communities, and the non-integration group consisted of 29 communities. Although three non-integration communities became integrated communities before the follow-up survey, they remained in the non-integration group for the analysis because they experienced less than three years of integrated program interventions compared with the rest of the integration group. Communities in each group were self-selected and remained the same during both surveys and were supported by the same NGOs throughout the integration period. However, new NGOs joined VS, and between 2001 and 2004 the program expanded to cover 134 integration communities. These new communities were not included in the follow-up survey. NGO integration areas do not overlap and correspond to different integration types described below.

This evaluation was designed to test the following working operations research questions:

- Is an integrated approach synergistic and more effective than a single-sector approach (health or environment alone or no known program other than government services)?
- What is the most effective model to integrate multisector programs that include population, health, and the environment (agriculture and natural resource management)?

To address the second question, the integration group was divided into three types of operational approaches:

- **Type 1 – Multidisciplinary teams (integration within an organization).** Includes field agents from several sectors in one team. Geographic area: Mangoro region, five communes (excludes Beforona), and Moramanga. Type 1 served as the gold-standard for integrating PHE interventions for two reasons. First, the multidisciplinary team approach and strong field presence were deemed ideal for achieving change. Second, the much greater resources available to the NGO compared with the other integration types represented a scenario where a maximum impact of PHE integration was expected.
- **Type 2 – Different sector-specific teams within the same organization (integration within an organization).** Two or more teams that have separate management structures and resources but coordinate their activities. Geographic area: Matsiatra region and Fianarantsoa.
- **Type 3 – Collaboration of field agents from different sector-specific organizations (integration between organizations).** Each organization has field agents working in the same commune or community. They plan and implement together with the community and coordinate on an organizational level. Geographic area: Mangoro region (Beforona commune, Moramanga) and Anosy region (Fort Dauphin). These two regions were combined during the baseline survey, but due to substantial differences for key indicators at the outset of the program, along with cultural and organizational disparities, type 3 was separated into types 3a (Mangoro) and 3b (Anosy) during the follow-up survey, effectively doubling the sample size for type 3.

Two other integration zones, Zahamena with MATEZA as the implementing organization and support from Conservation International, and Betsioky with MCDI as implementer, were not included in the surveys due to financial constraints.

Data were collected using five survey questionnaires for village, household, head of household, caretaker of a child under 5, and child under 5. Most of the questions used for the baseline survey were retained and unchanged for the follow-up survey to ensure maximum comparability. A few questions were modified and some were added where an information gap was identified at baseline. Where indicators are different between baseline and follow-up or where new ones were added is indicated in the section describing the findings. The questionnaires were developed in Malagasy and pretested for the baseline and again for the follow-up survey. Indicators and survey questions were drawn from numerous sources. For family planning, maternal and child health, and nutrition, standard sources such as the Evaluation Project’s Family Planning Indicators Handbook, the DHS Model Questionnaire, and PVO knowledge, practice, and coverage surveys were used as references. For food security, the Food and Nutrition Technical Assistance Project and surveys used to evaluate Title II programs provided useful references. Finally, survey instruments and technical documents from the International Food Policy Research Institute and Cornell University were the sources for agriculture and natural resources management-related indicators and survey questions.

4.1.1 Sample size and sampling design

Each operational type was represented in the survey by an equal sample size (about 256 households each) and coincided with a single geographic area for types 1 and 2 and two geographic areas for type 3. Communities for the non-integration group came from all regions with a total sample size of 256 households. Figure 5 shows the overall survey design and sample size for the baseline and follow-up surveys, while table 3 provides details for each type by integration and non-integration group.

The non-integration group for types 1 through 3 was treated as one sample during baseline and follow-up surveys and was drawn from all three regions using sampling proportional to village size. All organizational types had non-integration communities from the same communes, except for type 1, where all communities had PHE integration. Type 3a non-integration communities served also as a comparison for type 1 because they are from the same region and similar in culture but possibly have a slightly worse socioeconomic status according to the wealth index analysis. “Non-integration” status was defined by the absence of integrated PHE interventions promoted through VS, although most had either a health or agricultural program. Government services were available to all communities but might not have been equally accessible. Lastly, other organizations may have supported these communities for a variety of development activities, such as water supply systems or adult literacy. The advantage of having such a heterogeneous comparison group is that it reflects the actual context in which the synergies of PHE integration are

Figure 5: Overall Survey Design and Sample Size (planned at baseline/follow-up)

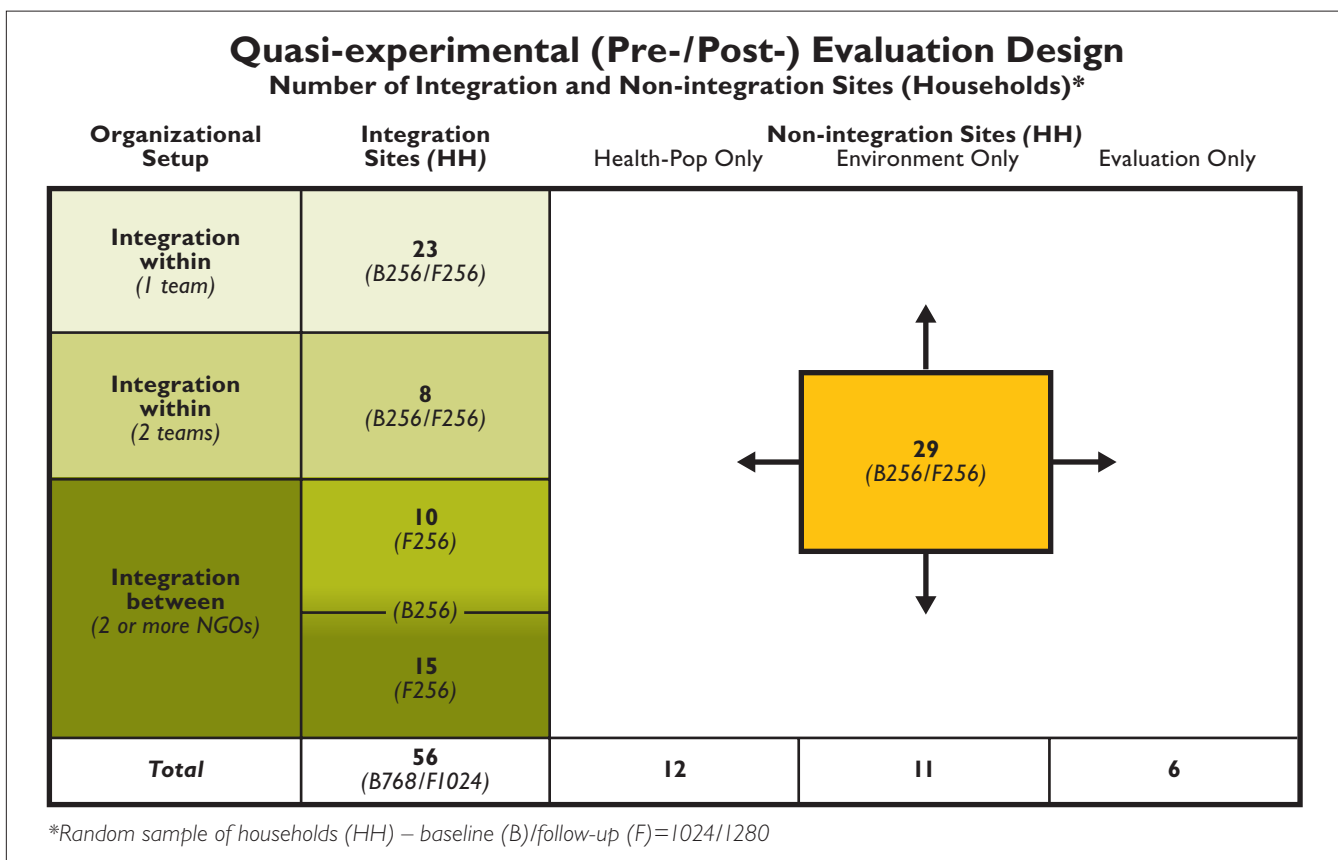


Table 3: Sample Size of Baseline and Follow-up Surveys

Organizational Type	Baseline 2001*					Follow-up 2004*				
	Villages	Households (HH)	Heads of HH	Women 15-49	Children < 5	Villages	Households (HH)	Heads of HH	Women 15-49	Children < 5
Type 1-Integration	23	257	256	283	227	23	256	256	235	186
Type 2-Integration	8	256	250	232	238	8	255	255	324	294
Type 2-Non-integration	12	74	74	73	80	12	78	78	94	114
Type 3a-Integration	10	91	91	94	66	10	255	248	277	214
Type 3a-Non-integration	8	82	77	59	59	8	80	79	85	84
Type 3b-Integration	15	165	162	173	190	15	256	255	249	270
Type 3b-Non-integration	9	100	100	89	92	9	98	98	96	99
Type 3 total-Integration	25	256	253	267	256	25	511	503	526	484
Type 3 total-Non-integration	17	182	177	148	151	17	17	178	177	181
Integration total	56	769	759	782	721	56	1022	1014	1085	964
Non-integration total	29	256	251	221	231	29	256	255	275	297
Total	85	1025	1010	1003	952	85	1278	1269	1360	1261

*Baseline 2001 – type 3-integration was treated as a single sample; follow-up 2004 – type 3 was stratified into separate samples 3a and 3b, each representing a region.

measured, where all communities, though without integration, benefit from some type of program to differing degrees, instead of a controlled setting where communities are artificially separated into homogenous groups.

The sample size was determined to allow a comparison between each integration type and with the non-integration group and changes between baseline and follow-up surveys of 5 percent for some key indicators using a 0.05 level of statistical significance and 0.8 power. Based on the estimated total sample size per group, the sample size per community was calculated proportional to the population size of the community. Population size estimates were based on the 1993 national census. The sampling design was a single-stage simple random process using lists of households established by the survey teams. The 85 integration and non-integration communities made up the universe of the program at baseline. Eligible households had to have at least one child under 5 and a female caretaker aged 15 to 49 years present at the time of the survey. Households included in the sampling frame were only those located within the community (village). While most households in rural farming communities set up temporary housing close to their fields, these were not considered in the survey. Temporary absenteeism for farming purposes was not a problem during either survey, as evidenced in table 4 by the small number of eligible heads of household and caretakers where an interview could not be conducted.

4.1.2 Data analysis

Teams of five interviewers and one supervisor spent approximately one month in the field to collect the data for each survey. There were six teams for the baseline and seven teams for the follow-up survey. Data were entered into Epi-Info V.6, using vali-

Table 4: Response Rates for Baseline and Follow-up Surveys

Organizational Type	Baseline 2001				Follow-up 2004			
	Heads of HH	Response rate (%)	Women 15-49	Response rate (%)	Heads of HH	Response rate (%)	Women 15-49	Response rate (%)
Type 1-Integration	256	98.8	283	94.6	256	100	235	99.2
Type 2-Integration	250	95.6	232	77.6	255	100	324	98.5
Type 3 total-Integration	253	97.2	267	85.0	503	98.4	526	95.3
Non-integration total	251	97.6	221	78.9	255	99.6	275	95.8
Total	1010	97.3	1003	84.1	1269	99.3	1360	96.8

ation procedures such as ranges for numeric data, invalid entry checks, and double data entry to ensure data quality. Test of data coherence were performed prior to the analysis to detect data errors. Two types of data analysis are reported here. Frequency distributions were done for all variables showing proportions by integration type and for the corresponding non-integration group comparing baseline with follow-up survey data. Tests of statistical significance of the difference between two binomial proportions were performed for approximately 60 indicators, of which 44 are reported as key PHE variables. Because an equal sample size was selected from all four areas and operational types and from the non-integration group, a weighted data analysis had to be performed. Different weights were calculated proportional to the number of households, women 15 to 49 years of age, and children under 5 in each integration type and in the non-integration group. The weights were then adjusted for the response rate in each group. The weights are shown in table 5 and varied only slightly per group.

Table 5:Weights Used in Data Analysis

Organizational Type	Baseline 2001				Follow-up 2004			
	Households (HH)	Heads of HH	Women 15-49	Children < 5	Households (HH)	Heads of HH	Women 15-49	Children < 5
Type 1-Integration	0.941	0.927	0.835	0.884	1.165	1.157	1.159	1.145
Type 2-Integration	0.385	0.392	0.416	0.407	0.560	0.556	0.561	0.550
Type 3-Integration (a and b)	1.509	1.510	1.490	1.490				
Type 3a-Integration					0.691	0.705	0.711	0.685
Type 3b-Integration					0.920	0.917	0.958	0.911
Non-integration total (T1-3)	1.160	1.156	1.233	1.181	1.662	1.657	1.711	1.662

4.1.3 Methodological limitations

The evaluation design has several methodological limitations that influence its ability to detect changes over time and differences between integration and non-integration groups:

- Sample size
- Quasi-experimental design
- Multipurpose survey instrument
- Short implementation period between baseline and follow-up surveys and external events

These limitations are not uncommon in social science research and were mainly determined by the resources available for this evaluation of program impact and the nature of PHE integration as a social experiment. The following describes the methodological limitations in detail.

Sample size

The overall sample size for baseline and follow-up surveys was about one-quarter of the size of large household surveys such as the DHS in Madagascar. This means that only relatively large changes of approximately 5 percent or greater between baseline and follow-up surveys will be statistically significant for the integration group. The integration group as a whole was larger than the non-integration group by a factor of three at baseline and four at follow-up, which means that even a larger difference of 7 percent or more is needed between these two groups to be statistically significant. Because the sample size for specific integration types 1 to 3 and their similar non-integration groups is even smaller, only differences greater than 10 percent will be statistically significant. Finally, the heterogeneous composition of the non-integration group, which consisted of a mix of communities with single-sector interventions (health and natural resource management) or no program, would influence the magnitude of differences for certain indicators. A larger comparison group, separated by type of integration, would have been preferable but was not feasible because of costs. For these reasons, statistically significant results are only expected for differences of greater than 5 percent between baseline and follow-up surveys and 10 percent between integration and non-integration groups. In studies of this type, it is therefore equally important to look for patterns of differences across all integration types and across indicators in addition to statistical significance for a specific indicator. A small sample size may lead to underestimating the effectiveness of integrating PHE.

Quasi-experimental design

The best design for evaluating whether an intervention is beneficial or not is a randomized controlled trial (RCT). However, RCTs are difficult to apply to social experiments where units are often self-selected and not assigned randomly to integration or non-integration groups. Moreover, it is usually known to study participants and researcher whether they belong to the integration or non-integration group, which precludes a double-blind design used for a RCT. Self-selection limits the generalizability of research findings and may introduce biases that can result in under- or overestimating the impact of interventions. The exact magnitude of a bias is not known in this case, but the direction of a bias can be anticipated. For example, a self-selected intervention group is often more motivated to pursue a social agenda than a non-intervention group, which may affect livelihoods and positive behaviors in general and may not be the result of an intervention alone. Measures to reduce biases in this study included some degree of matching integration and non-integration communities by selecting the latter from the same geographic area with similar cultural and socioeconomic conditions. Non-integration communities were given the option to start integrated PHE activities after the follow-up survey in 2004.

The quasi-experimental design is often accompanied by an effect called contamination or crossover, which can lead to underestimating program impact. Some services provided in integrated communities are available to everybody including non-integration communities. For example, community-based distributors provide contraceptives to women from all communities, but training of farmer's groups may only be available to specific villages. This crossover between integration and non-integration communities works both ways, but it can be expected to be more from the former to the latter because of the broader range of services available in the integrated context.

Multipurpose survey instrument

The baseline and follow-up surveys covered a broad range of health, reproductive health, agriculture, and natural resource management issues. To keep the time for administering the surveys to an acceptable limit, no single issue was covered in great depth. Most survey questions relied on interviewee recall, which has known reliability issues. More reliable observations and direct measurements were only used in a few instances, such as assessing vaccination status from a health card or taking anthropometric measurements. Some unexplainable findings may indicate that health and reproductive health information was collected with greater reliability than questions concerning agriculture and natural resources management. Almost all knowledge questions about improved agricultural practices scored consistently, by approximately 20 percent or more lower in 2004 than in 2001. Such a uniform pattern was not expected because households were taught specific farming methods throughout this period. One possible cause might be that the survey teams were all experienced in health and reproductive health surveys, but not in other areas. Such a systematic measurement error would seriously underestimate the effectiveness of integrated PHE.

Short implementation period between baseline and follow-up surveys and external events

NGO partners implemented integrated PHE activities for approximately three years. Over such a time period, changes in some key indicators such as child health coverage and contraceptive prevalence rates, which were the program emphasis, can be expected. However, other indicators such as nutritional status or disease prevalence will change more slowly or will require much more intensive interventions in order to produce measurable change, and (with the exception of the NGO support in type 1 communities) the NGOs did not have the necessary level of funding for such interventions. Other indicators, such as diarrheal disease prevalence, are substantially influenced by external events like natural disasters (cyclones occurred in 2004 immediately before the survey) and political crises (in 2002). Diarrheal disease prevalence experiences an impact from interventions that were not a major focus of integrated PHE such as the construction of water supply systems. A short implementation period and external events would lead to underestimating the effectiveness of PHE integration.

4.2 Summary of Findings

Perhaps the best way to evaluate the quality of the study is to refer selected results to the DHS of 1997 for Madagascar (MACRO International, 1998). Table 6 summarizes these comparisons.

That the results of the three surveys are very similar provides evidence for the validity and reliability of the data as far as general household characteristics and health are concerned. The consistency between health-related variables within the baseline and follow-up surveys is an additional indication of data quality. Systematically lower response rates for some natural resource management-related questions may indicate less reliable information for nonhealth-related survey content (see also sections 4.1.3 above and 4.2.8 below).

Table 6: Rural Household Demographic Characteristics

Organizational Type	Baseline 2001	Follow-up 2004	DHS 1997
Number of households	1,010	1,278	5,407
Average household size	5.7	5.1	4.7
Male/female ratio	1.00	0.97	0.995
Age groups (%)			
< 5 years	18.1	19.6	18.9
< 15 years	48.6	50.4	48.0
15-64 years	47.8	46.8	48.4
Eligible persons per household			
Children < 5 years	0.93	1.00	0.88
Women 15-49 years	0.98	1.08	0.98

The selection of indicators was based on the Household Food Security and Livelihood Concept described in chapter 2. Key findings from the baseline and follow-up surveys for a select number of indicators are presented in a summary table at the beginning of this report and in greater detail in the following sections for the 10 priority themes of VS, which were:

1. Smaller families: contraceptive prevalence rate
2. Child health: vaccination and vitamin A coverage
3. Disease prevalence (two-week): diarrhea, fever, and acute respiratory infections
4. Disease prevention through hygiene improvement and use of mosquito nets
5. Women's health: sexually transmitted diseases, HIV/AIDS, antenatal care, assisted deliveries
6. Children's nutritional status: stunting, underweight, wasting
7. Year-round food security: agricultural production
8. Improved natural resources management: reported use of fire in agricultural activities (slash-and-burn); reforestation
9. Community participation: gender
10. Household livelihoods

The following sections describe the findings for the three operational types of integration, which correspond to four geographic areas served by different NGOs. Tables and most figures show changes between the 2001 baseline and the 2004 follow-up surveys comparing integration with non-integration groups. A + symbol indicates that differences between the baseline and follow-up surveys are statistically significant at the 0.05 level. A * symbol indicates that differences between the integration and non-integration groups are statistically significant at the 0.05 level. Percentages in tables and charts represent the value for the specific indicator. Percentages cited in the narrative accompanying tables and charts refer either to the relative increase between 2001 and 2004 or to the value of the specific indicator.

4.2.1 Smaller families: Contraceptive prevalence rate

Table 7 and figure 6 show that the contraceptive prevalence rate (CPR) for modern methods increased by about 44 percent in the integration and non-integration groups; however, the rates in integration communities are consistently higher, except for type 2. The CPR for all integration sites of 17 percent in 2004 approached the national average for rural areas measured by the 2004 DHS. Injectable and oral contraceptives were by far the most used methods, exceeding 90 percent of all modern methods used in most cases. Traditional methods accounted for less than 10 percent of all methods used.

Various integration sites contributed very differently to the average improvement. Type 1 clearly outperformed all other sites with a 70 percent increase, which is not surprising because the program run by a large international NGO has considerably more resources than the small local NGOs who operate in the other sites. Increases of CPR in the other integration types were nevertheless important, ranging from 11 to 38 percent for type 3 and 52 percent for type 2. Non-integration communities also achieved a substantial increase in CPR, ranging from an almost twofold increase in type 3a to an eightfold increase for type 2. By far, the lowest use of family planning occurred in the non-integration communities of type 3b in the southeast section of Madagascar. As will be seen later for other indicators, type 3b communities in general scored lower for many indicators, which suggests a much greater need for development efforts than in other parts of the country.

Table 7: Percent of Women 15 to 49 Years Old Using Any Modern Contraceptive¹

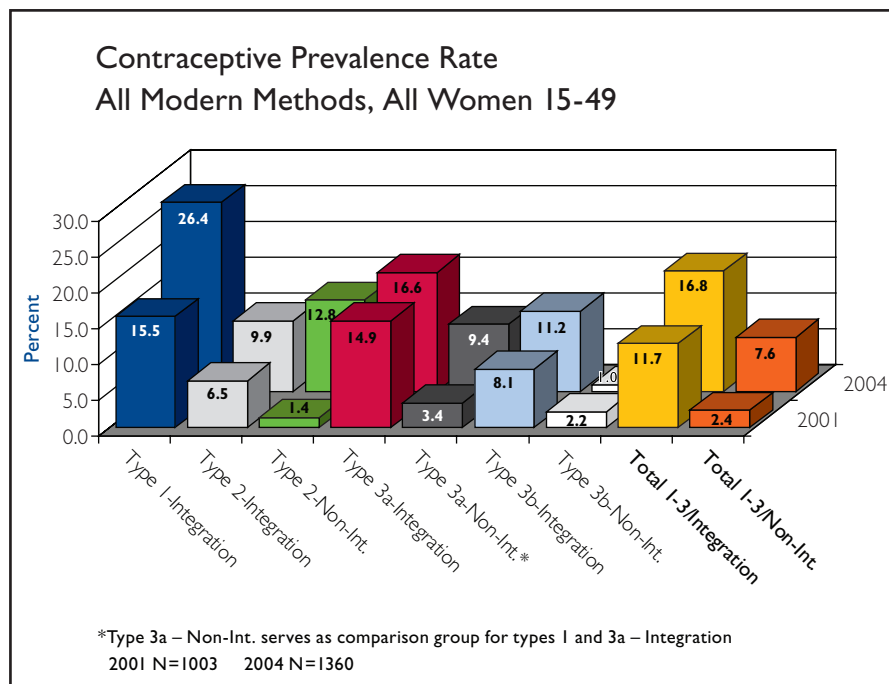
Organizational Type	Baseline 2001		Follow-up 2004	
		N = 1003		N = 1360
Type 1-Integration	+	15.5	⊗	26.4
Type 2-Integration		6.5		9.9
Type 2-Non-integration	+	1.4		12.8
Type 3a-Integration		14.9	⊗	16.6
Type 3a-Non-integration*		3.4		9.4
Type 3b-Integration		8.1	⊗	11.2
Type 3b-Non-integration		2.2		1.0
Type 3 total-Integration		10.5	⊗	13.7
Type 3 total-Non-integration		2.8		5.0
Integration total	(+)	11.7		16.8
Non-integration total	+	2.4		7.6
Total (Integration & Non-Int.)	+	8.9		13.6

⊕ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

⊗ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller (Borderline levels of statistical significance > 0.05 but ≤ 0.10 in parentheses)

* Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

Figure 6



The increase of CPR in both integration and non-integration groups does not come unexpectedly. Government services have improved service delivery through many parts of the country over the past several years and have worked hand-in-hand with NGOs to improve the knowledge about family planning in Madagascar. Table 8 supports this claim by showing substantially different rates of increase for methods delivered only by medical staff such as injections and for methods such as oral contraceptives delivered by community-based distribution (CBD) as well as by formal family planning providers. The overall increase of CPR in type 1 resulted mostly from injectable contraceptives, which were delivered by trained providers from NGO and government services. In contrast, increases of CPR in the type 3a integration group were largely due to successful CBD. Improved service delivery (injections) by government health services accounted for most of the increase of CPR in the type 3a non-integration communities. In types 2 and 3b integration communities, the modest increase was due to both CBD and health facility-based delivery. The larger increase in type 2 non-integration was the result of CBD supported by government providers and NGOs

¹ Modern contraceptives include condoms, injections, pills, Norplant, sterilization, vasectomy, IUD, spermicide, vaginal condom, and barrier methods; all other methods are considered traditional and include date method, temperature method, withdrawal, abstinence, and folkloric methods.

with funding from USAID and the Packard Foundation. Lack of access to any form of family planning was a serious issue in type 3b non-integration communities.

Table 8: Percent of Women 15 to 49 Years Old Using Injectable or Oral Contraceptives

Organizational Type	2001 Injections		2004 Injections		2001 Pills		2004 Pills	
	N = 1003		N = 1360		N = 1003		N = 1360	
Type 1-Integration	6.0		15.3	(*)	7.8	(*)	8.9	(*)
Type 2-Integration	3.9		5.2		1.7		3.7	
Type 2-Non-integration	1.4		4.3		0.0		8.5	
Type 3a-Integration	12.8		10.5		1.1		5.1	
Type 3a-Non-integration*	3.4		7.1		0.0		1.2	
Type 3b-Integration	2.9		3.6		5.2		6.8	(*)
Type 3b-Non-integration	2.2		0.0		0.0		1.0	
Type 3 total-Integration	6.4		6.7		3.7		6.0	(*)
Type 3 total-Non-integration	2.8		3.3		0.0		1.1	
Integration total	5.9		9.0	(*)	4.8	(*)	6.4	(*)
Non-integration total	2.4		3.6		0.0		3.6	
Total (Integration & Non-Int.) (+)	4.9		7.2		3.4		5.5	

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

(*) Differences between integration and non-integration groups statistically significant at 0.05 level or smaller

(Borderline levels of statistical significance > 0.05 but ≤ 0.10 in parentheses)

* Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

Figure 7

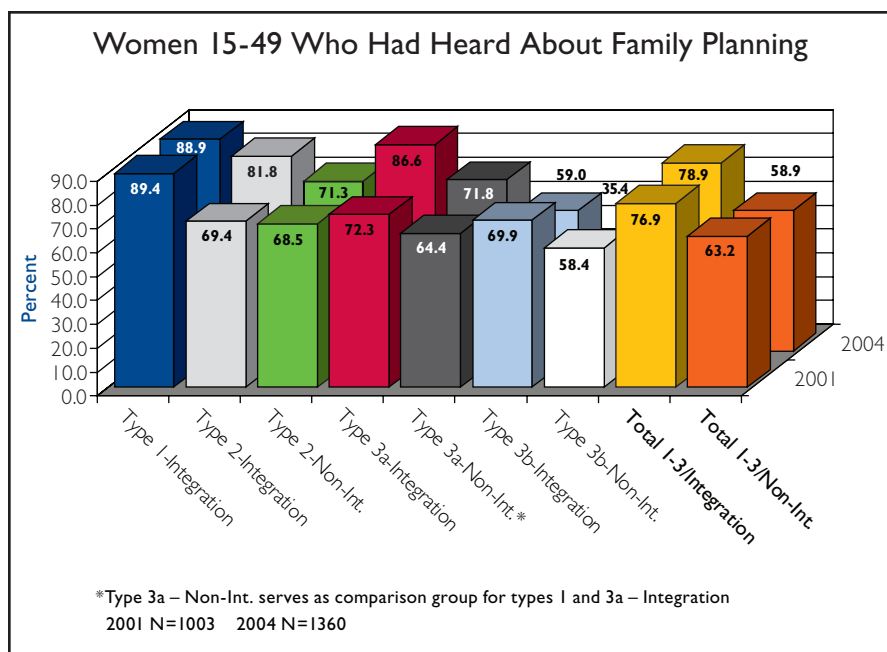


Figure 7 explains some of the differences in CPR between integration and non-integration groups for different types. Integration communities overall maintained a considerably higher knowledge (20 percent) about family planning between the two surveys than non-integration communities. Women from type 3b scored lowest compared with the other types and experienced a drop (considerably greater in non-integration communities) between 2001 and 2004. Women’s knowledge of trained providers – health centers, family planning centers, and pharmacies – as the source of contraceptives in type 3b was between 21 and 42 percent and less than half of any other type. CBD through community health agents, stores, bars, and friends and family as sources of contraceptives increased from 7 percent in 2001 to 20 percent in 2004 in integration communities, compared with an increase from 13 to 15 percent in the non-integration group. Three-quarters of the women who mentioned CBD as a source in 2004 cited community health agents in integration communities, compared with half in non-integration communities.

Table 9: Percent of Children 12 to 23 Months Old Completely Vaccinated Before 12 Months of Age (based on health card)

Organizational Type	Baseline 2001		Follow-up 2004	
	N = 114		N = 180	
Type 1-Integration		69.4		70.6
Type 2-Integration		61.5		51.1
Type 2-Non-integration		85.7		81.8
Type 3a-Integration		76.5		47.2
Type 3a-Non-integration*		0.0		50.0
Type 3b-Integration	+	3.8		53.3
Type 3b-Non-integration		28.6		22.2
Type 3 total-Integration		33.4		50.6
Type 3 total-Non-integration		15.4		35.6
Integration total	(+)	51.2		58.7
Non-integration total	+	37.4		56.2
Total (Integration & Non-Int.)	+	48.5		58.1

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

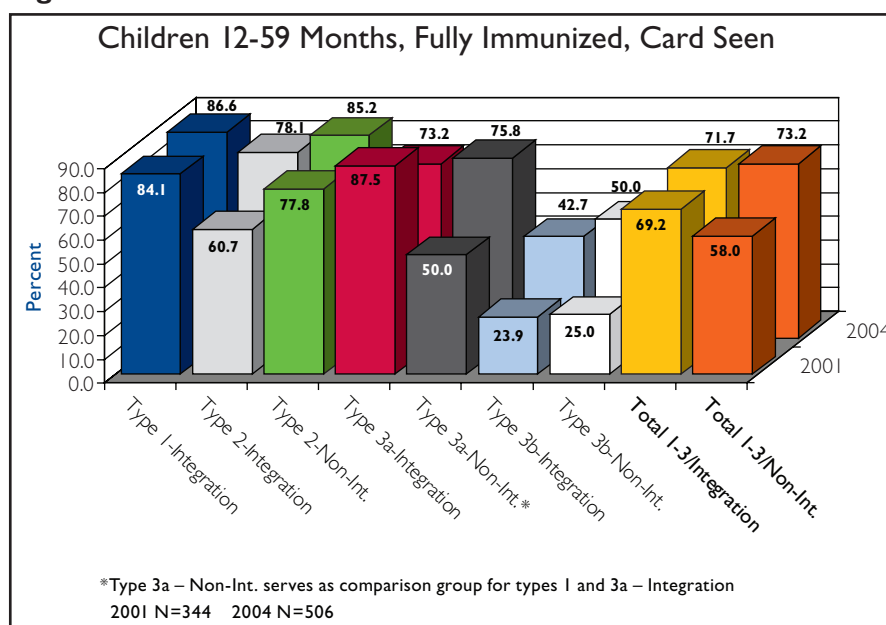
⊕ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller (Borderline levels of statistical significance > 0.05 but ≤ 0.10 in parentheses)

*Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

4.2.2 Child health: Vaccination and vitamin A coverage

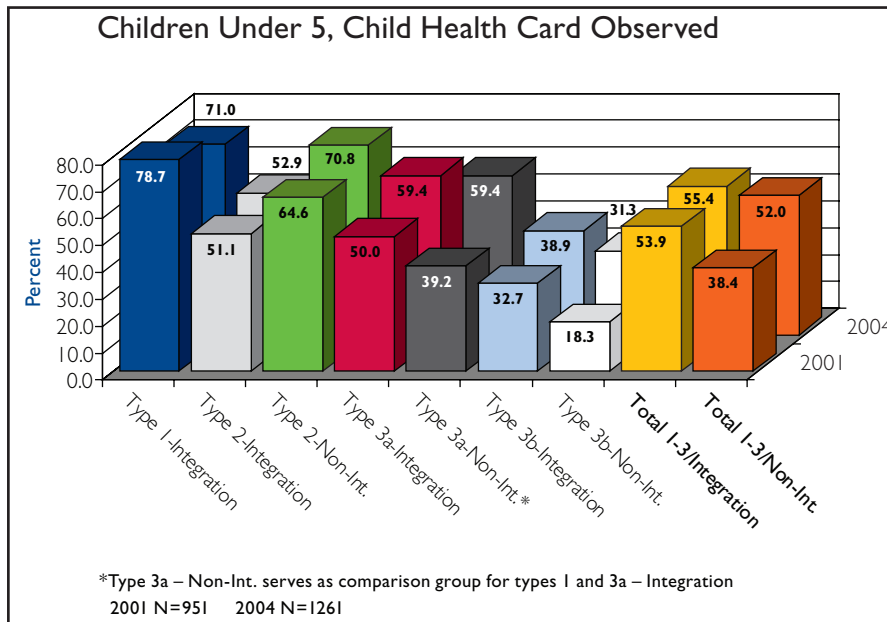
Table 9 shows that vaccination coverage increased overall and more markedly in the non-integration group, which evens out the differences at baseline compared with the integration groups. This finding is consistent with an overall increase in government efforts to improve basic public health services, which is the sole provider of vaccines, but in collaboration with NGOs for outreach activities. Although changes seem to vary considerably by type, the number of children in the appropriate age range of 12 to 23 months with a health card is very small, which leads to large variations that do not imply true differences between groups. The only dramatic increases that were also of statistical significance occurred in type 3a non-integration and type 3b integration communities. Similar patterns, although with greater uniformity among types 1, 2 and 3a, were seen for children 12 to 59 months who were fully vaccinated at any age, which is shown in figure 8. However, type 3b scored clearly below all other types.

Figure 8



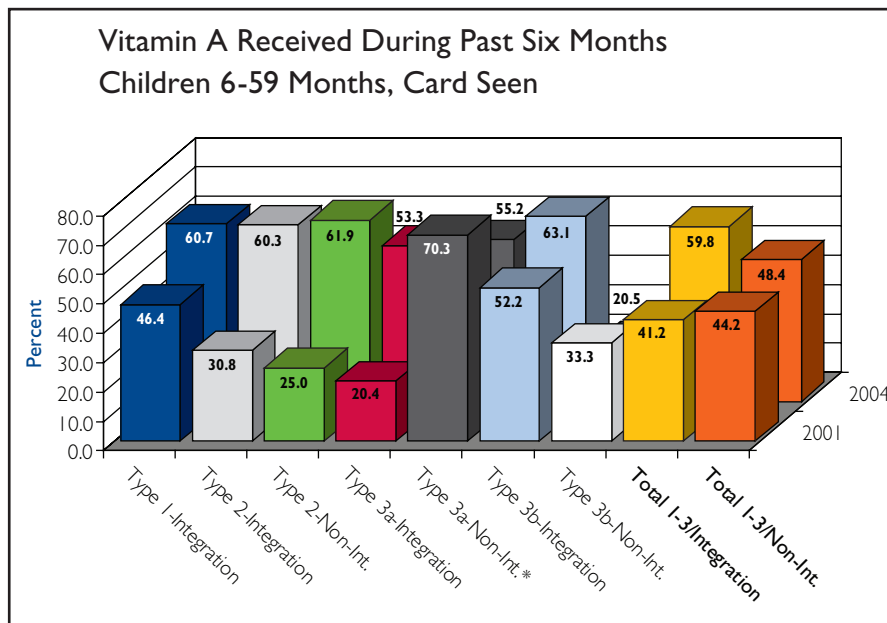
The success of improving government immunization services in integration and non-integration areas is also apparent from the availability of health cards at the time of the survey (figure 9), with the largest increases in type 1 integration and type 2 non-integration communities. Access to services seems lowest in type 3b in general, falling almost 20 percent below the average for integration and non-integration groups.

Figure 9



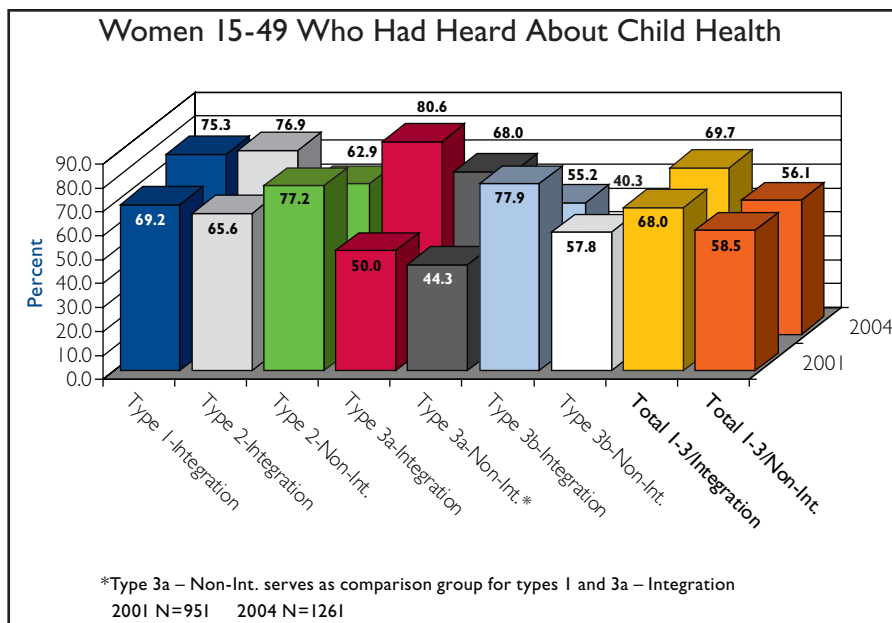
Vitamin A distribution is another basic child health integration provided by the public health service, and, as shown in figure 10, it improved more markedly than vaccination coverage in all groups, except in the type 3b non-integration group, which lagged behind by almost 40 percent compared with all integration sites. Most of type 3b integration communities and some non-integration communities benefited from the World Bank-supported SECALINE nutrition program.

Figure 10



Women's knowledge about child health increased in all integration sites, except for type 3b, which experienced a sharp drop overall. Non-integration sites showed a consistently lower level of knowledge (figure 11).

Figure 11



4.2.3 Disease prevalence (two-week): Diarrhea, fever, and acute respiratory infections

Overall diarrhea prevalence increased sharply by about 10 percent (table 10), with comparable levels in integration and non-integration communities. However, a closer look reveals that types 3b contributed the most cases by far; and type 2 sites recorded a sharp relative increase in 2004 compared with 2001. To answer the question as to why the diarrheal disease burden remained lower in type 1 and type 3a communities would require further research because of the multicausality of diarrhea and the limited range of interventions that may have an impact on diarrhea prevalence in the context of an integrated PHE program. It should be noted, though, that the availability and use of soap and household water treatment were also markedly lower in type 3b (see findings in section 4.2.4).

Table 10: Percent of Children Under 5 Years of Age With Diarrhea²

Organizational Type	Baseline 2001		Follow-up 2004	
		N = 951		N = 1261
Type 1-Integration		12.4		15.1
Type 2-Integration	(+)	8.9		21.5
Type 2-Non-integration		8.9		17.3
Type 3a-Integration		15.2		13.3
Type 3a-Non-integration*		16.7		16.5
Type 3b-Integration	+	17.3		37.0
Type 3b-Non-integration	+	20.4		38.5
Type 3 total-Integration	+	16.6		28.5
Type 3 total-Non-integration	(+)	18.9		28.2
Integration total	(+)	14.1		23.0
Non-integration total	+	16.1		25.2
Total (Integration & Non-Int.)	+	14.7		23.7

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

⊗ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller

(Borderline levels of statistical significance > 0.05 but ≤ 0.10 in parentheses)

*Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

² Diarrhea is defined as three or more watery stools during any 24-hour period during the two weeks before the survey

Table 11: Percent of Children Under 5 Years of Age With Fever³

Organizational Type		Baseline 2001	Follow-up 2004
		N = 951	N = 1261
Type 1-Integration	+	48.0	33.8
Type 2-Integration		36.3	41.3
Type 2-Non-integration		22.8	16.3
Type 3a-Integration	+	56.0	37.0
Type 3a-Non-integration*	+	62.9	35.9
Type 3b-Integration		45.1	47.3
Type 3b-Non-integration		45.9	34.3
Type 3 total-Integration		49.1	43.7
Type 3 total-Non-integration	+	53.7	35.0
Integration total	(+)	47.0	40.0
Non-integration total	+	45.0	29.9
Total (Integration & Non-Int.)	+	46.4	37.0

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

⊕ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller (Borderline levels of statistical significance > 0.05 but ≤ 0.10 in parentheses)

* Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

The prevalence of fever was high overall, reaching almost 40 percent (table 11), with the highest rates in type 2 and type 3b integration communities. Type 1, and more so type 3a, experienced a sharp drop in fever prevalence. Coincidentally, households in these groups reported the highest rates concerning children and women sleeping under mosquito nets in 2004 (of any type, most not treated with insecticides), which is presented in section 4.2.4. Again, the exact reasons for these patterns cannot be determined due to the limitations of this study and the interventions available.

Figure 12

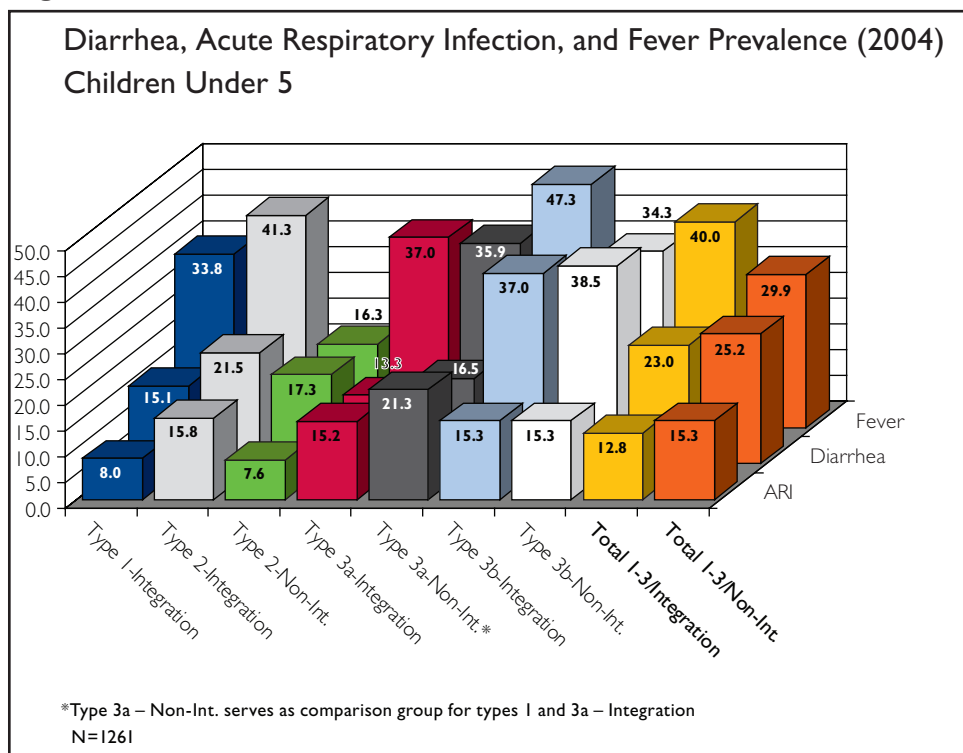


Figure 12 shows the prevalence of acute respiratory infection (ARI), as well as diarrhea and fever, in 2004. Overall, the prevalence of ARI (which was measured only in 2004) was much lower than the other two diseases, with the lowest levels in type 1 integration and type 2 non-integration communities. Considering all three disease prevalence rates, it would seem that type 3b faces the highest burden; however, as other indicators show, type 3b also has the lowest access to public health services.

³ Fever is defined as elevated body temperature during the two weeks before the survey.

4.2.4 Disease prevention through hygiene improvement⁴ and use of mosquito nets

Access to safe drinking water, use of an improved toilet facility, and handwashing with soap can substantially reduce diarrheal disease prevalence. Table 12 shows that access to an improved source for drinking water⁵ was very low overall and lowest in non-integration communities. The best access and large improvements were noticed in type 2 communities, especially the non-integration group. Except for type 3a integration communities, water supply improvements were not supported by the NGOs implementing integrated PHE activities. Instead, they were the result of large-scale water infrastructure improvement activities, such as those funded by the European Development Fund.

Table 12: Percent of Households With an Improved Water Source

Organizational Type	Baseline 2001		Follow-up 2004	
	N = 1025		N = 1277	
Type 1-Integration		18.6		16.8
Type 2-Integration	+	38.1	⊛	46.1
Type 2-Non-integration		9.4		45.2
Type 3a-Integration		35.0		37.3
Type 3a-Non-integration*		0.0		0.0
Type 3b-Integration	+	3.7		16.7
Type 3b-Non-integration		0.0		1.4
Type 3 total-Integration		14.8		24.1
Type 3 total-Non-integration		0.0		1.0
Integration total		19.1	⊛	24.6
Non-integration total	+	2.6		13.6
Total	+	14.1		21.3

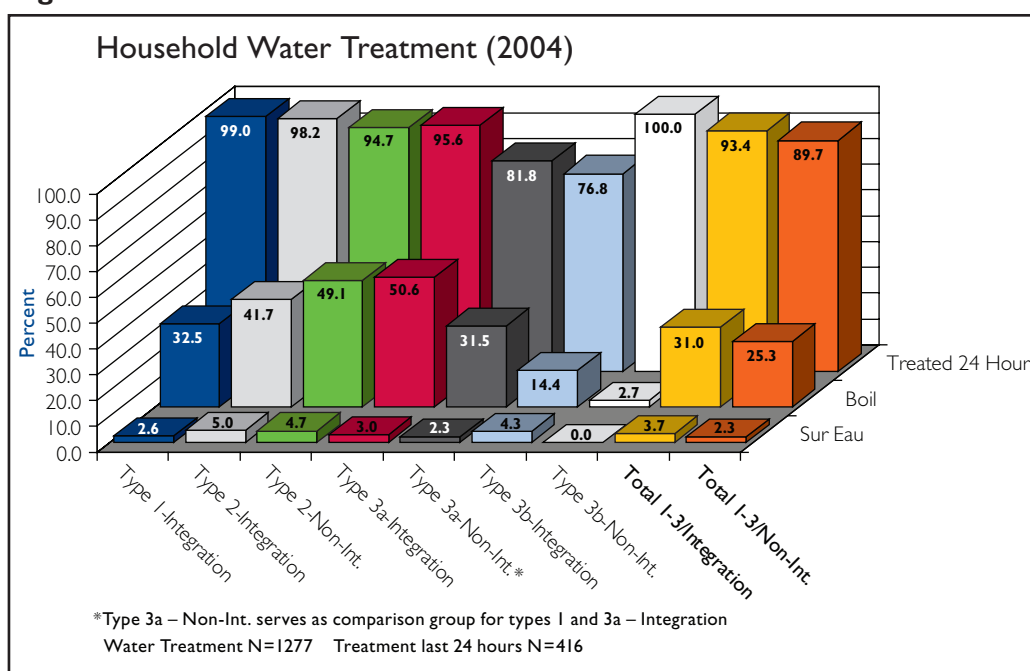
+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

⊛ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller

* Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

With so few households having access to an improved source for drinking water, water treatment by the household, also called point-of-use (POU) treatment, becomes important for rendering water safe for consumption. Figure 13 shows that less than one-third of households treated water regularly (within the last 24 hours) in 2004. Boiling, a step in preparing a traditional drink called “ranvul,” was the most frequent means of rendering water safe. Overall, integration communities fared slightly better than the non-integration group, with households in type 3b faring the worst.

Figure 13

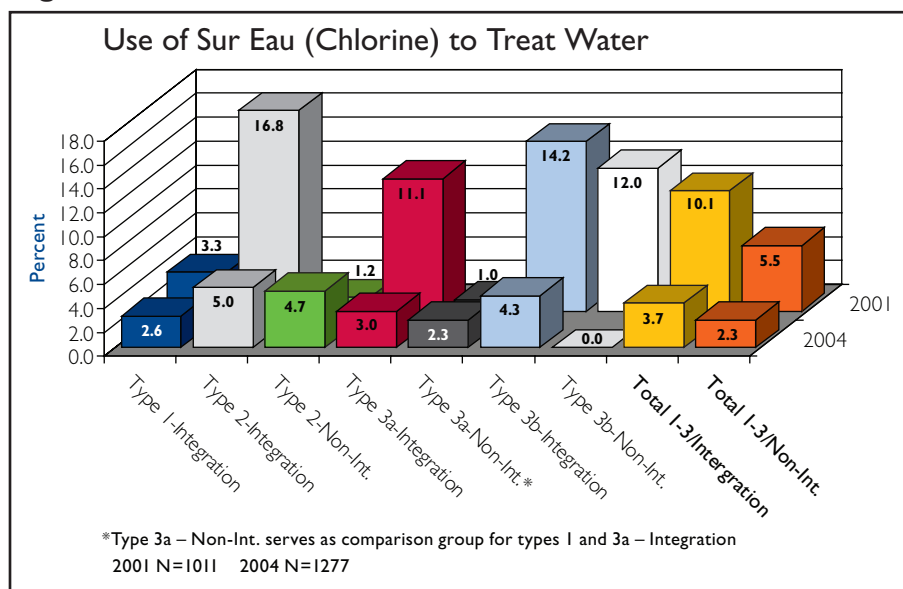


4 Hygiene improvement is the combination of improved water supply, sanitation, and hygiene.

5 Improved water sources are household connections, public standpipes, protected wells, protected springs, and rainwater collection. All other sources, including wells and springs that are not protected, are considered unimproved.

One specific method of household water treatment that is promoted in Madagascar by Population Services International is chlorination. The sodium hypochlorite solution is sold under the brand name “Sur Eau,” which means “safe water.” According to figure 14, use rates dropped between 2001 and 2004 from already low levels at baseline. The reasons for this drop are not clear because Sur Eau is available in village stores that also sell contraceptives and agricultural supplies.

Figure 14



According to table 13, about half of the households in integration communities, and only a third in non-integration communities, used an improved toilet facility.⁶ The overall difference between integration and non-integration groups was largely driven by high use rates in type 1. Most households used no latrine for defecation, especially in the type 3b group. The predominant type of unimproved latrines in the program areas were either open pits or pits covered by makeshift floors made from sticks without a smooth surface that can be cleaned. Given the remoteness of the integration areas and high levels of poverty, one would not expect many households to be able to afford the materials needed for improved toilets. Although WHO considers unimproved toilet facilities not to have an impact on diarrheal disease, these findings are nevertheless important because they show that households in all areas but type 3b have reached a substantial level of awareness about the importance of sanitation. Hopefully, this will lead to a gradual transition from unimproved to improved facilities.

Table 13: Percent of Households Using an Improved Toilet Facility

Organizational Type		Baseline 2001	Follow-up 2004
		N = 1007	N = 1272
Type 1-Integration	+	74.7	93.7
Type 2-Integration		57.3	60.5
Type 2-Non-integration		43.5	44.2
Type 3a-Integration	+	69.4	47.6
Type 3a-Non-integration*		61.9	62.8
Type 3b-Integration		17.9	4.6
Type 3b-Non-integration		10.3	2.1
Type 3 total-Integration		36.3	19.9
Type 3 total-Non-integration		33.6	30.5
Integration total		52.1	50.2
Non-integration total		36.4	34.2
Total		47.5	45.4

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

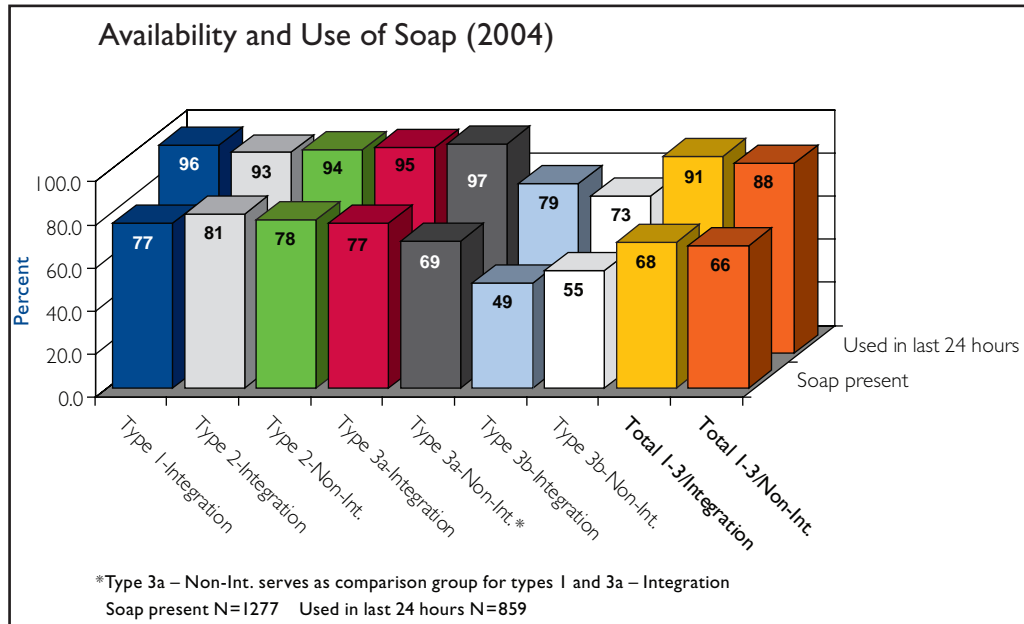
⊗ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller

* Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

6 Improved toilet facilities are flush and pour flush toilets, ventilated improved pit (VIP) latrines, and latrines with a solid slab (called latrine in these surveys). All other types, including latrines without a solid slab (called latrine traditionnelle or fosse perdue in these surveys), are considered unimproved.

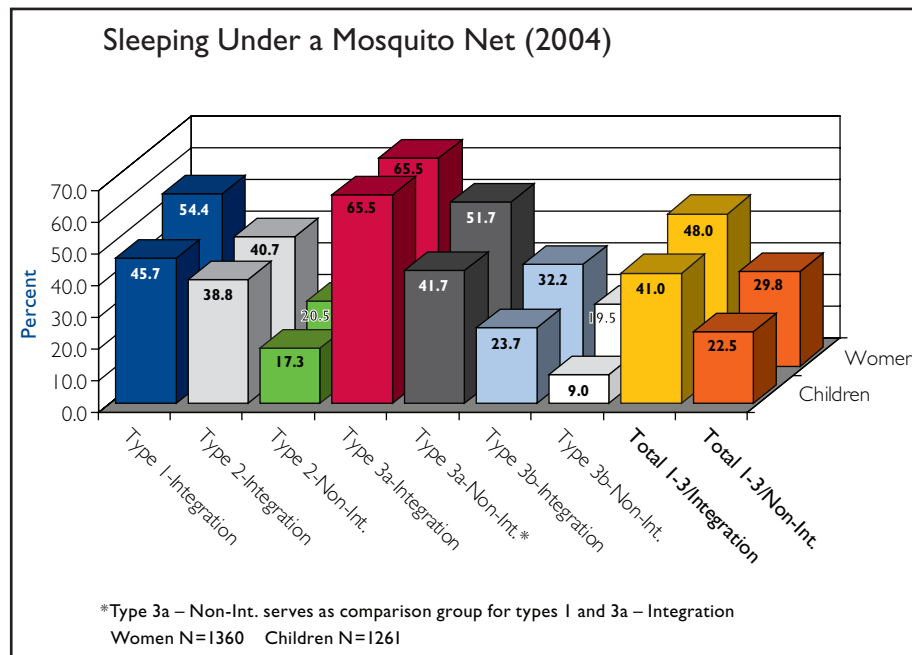
The third element of hygiene improvement, handwashing with soap, depends obviously on the availability of soap in the household. It may not be surprising that, as figure 15 shows, only two-thirds of the households had any soap in 2004 (no assessment was done in 2001), because most are very poor. Soap availability was clearly lowest in type 3b communities, where only half of all households had soap. In addition, use rates were lowest there also. Soap and handwashing were not specifically promoted.

Figure 15



Finally, the 2004 survey looked at the prevention of malaria by sleeping under a mosquito net. Of particular interest was whether women and children under 5 were protected during the night prior to the survey (figure 16). A considerably higher proportion of women and children slept under a mosquito net in integration than in non-integration households. The highest rates were observed in type 3a integration communities, where insecticide-treated nets are sold at community stores. However, the effectiveness of protecting the user was not assessed, for example, by asking about treated nets. Again, type 3b had the lowest rates for this behavior along with type 2 non-integration communities. The prevention of malaria through the use of mosquito nets was promoted within the integrated PHE context.

Figure 16



4.2.5 Women’s health: Sexually transmitted diseases, HIV/AIDS, antenatal care, assisted deliveries

The ability to avoid sexually transmitted diseases (STDs) is an important element of women’s reproductive health. Knowledge about STDs increased substantially between 2001 and 2004 (figure 17), with a more marked improvement in integration communities. The only area not seeing improvement was type 3b, which also had the lowest awareness levels in 2004, with a small decline occurring in integration communities since 2001 and a large decline in non-integration communities. The most important source of knowledge about STDs in integration communities were community health agents and radio and TV, with the latter being highest in types 1 and 3a. Health centers and family and friends were more important sources in non-integration communities.

Figure 17

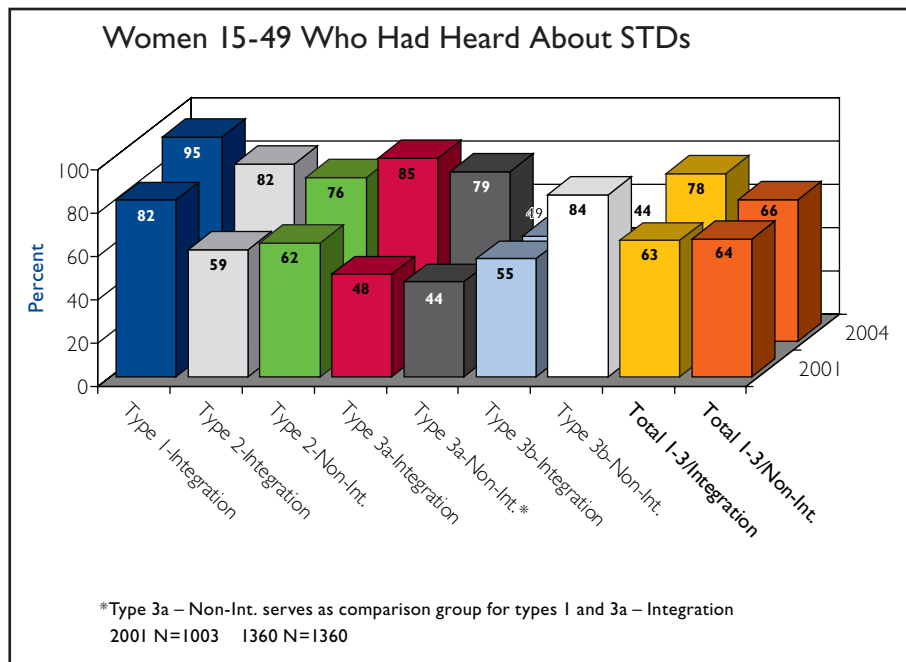
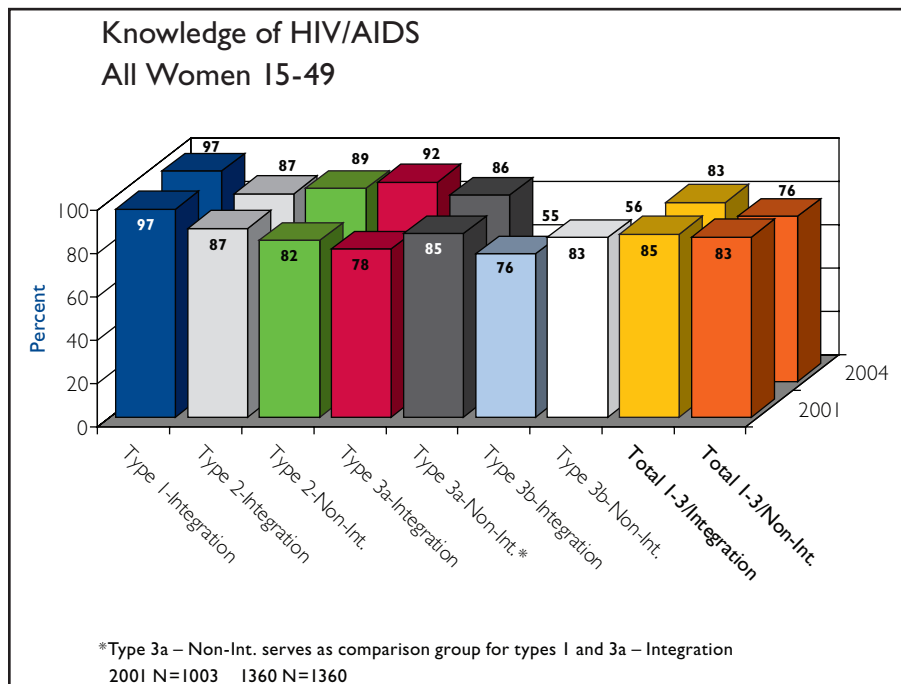


Figure 18



Although HIV prevalence is low in Madagascar, knowledge about HIV/AIDS was already very high in 2001 and remained high in 2004, perhaps favoring the integration group slightly (figure 18). However, type 3b experienced a drastic fall in knowledge overall and was markedly lower than all other sites. Among other STDs, knowledge about gonorrhea reached only about 34 percent in integration and 26 percent in non-integration communities. This did not vary greatly by site.

Knowledge about methods to prevent STDs improved considerably in 2004 compared with the baseline, as shown in figure 19 for condoms and in figure 20 for one sexual partner, with higher rates in the integration group compared with the non-integration group. The relative gains for condoms were more impressive in the non-integration group, where the proportion tripled (although they started from a much lower level than in the integration group). The greatest improvements were achieved in type

Figure 19

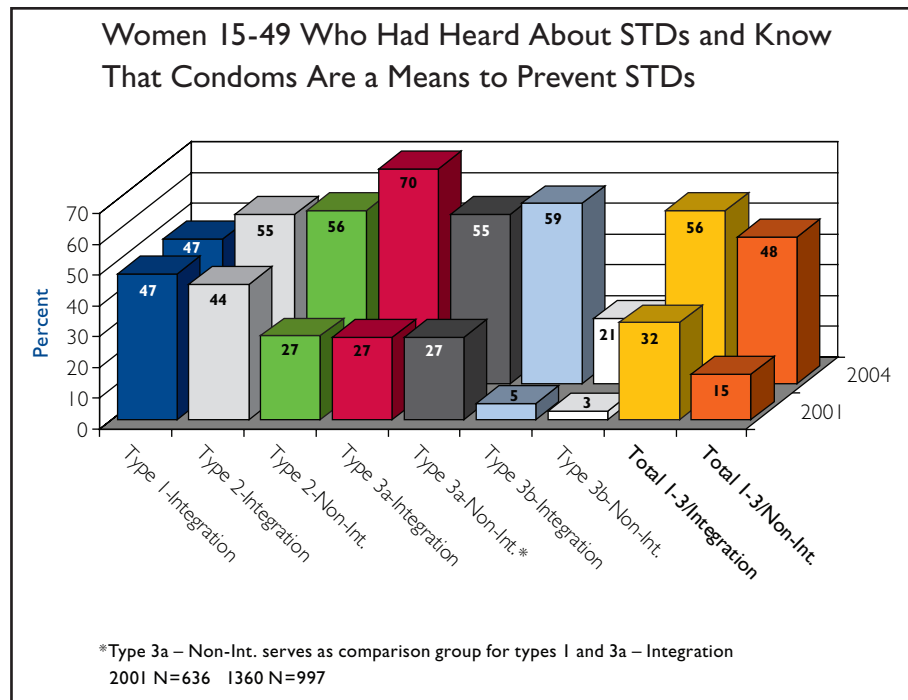
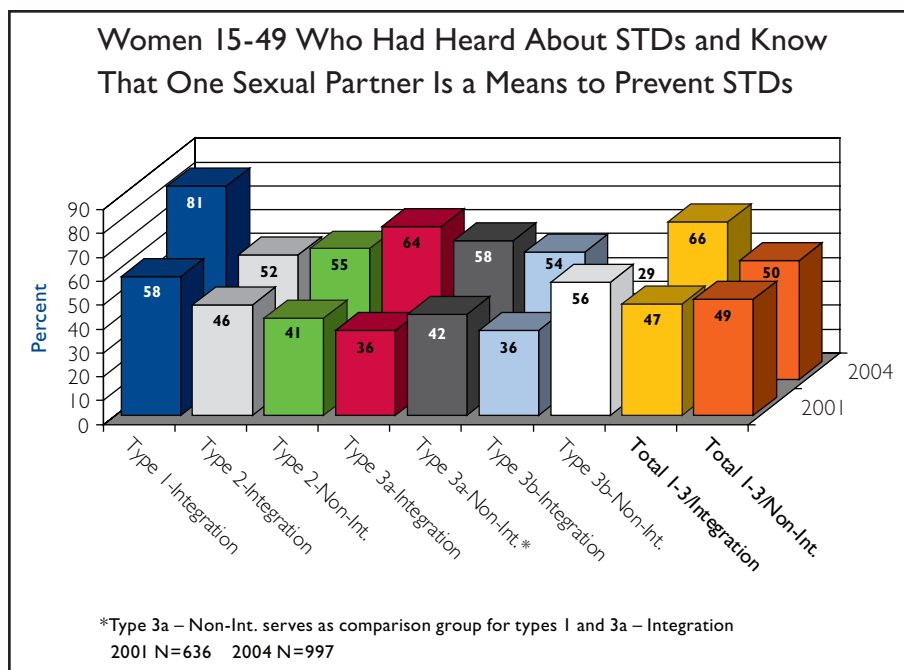


Figure 20



3b integration sites. Gains in knowledge about having only one sexual partner (highest in type 1) were more uniform, although it dropped in type 3b non-integration communities. Abstinence as a means to prevent STDs was hardly mentioned at all, about 8 percent in integration and non-integration sites in 2004 compared with 3 percent in 2001. Eighteen percent mentioned abstinence in type 3a integration communities, but only 2 percent in type 1.

Antenatal care visits (four or more) were much more frequent in integration than in non-integration communities (figure 21). The integration group experienced a substantial improvement, while the non-integration group remained essentially at 2001 levels. This was observed for integration communities of all types, although type 3b in general and type 2 non-integration communities had much lower proportions than the rest. Much of this information (and the information about tetanus toxoid vaccinations) had to be based on women’s recall because only about one-third of women in both integration and non-integration communities had a maternal health card (figure 22). Type 1 and all of type 2 communities achieved the highest levels. Again, type

Figure 21

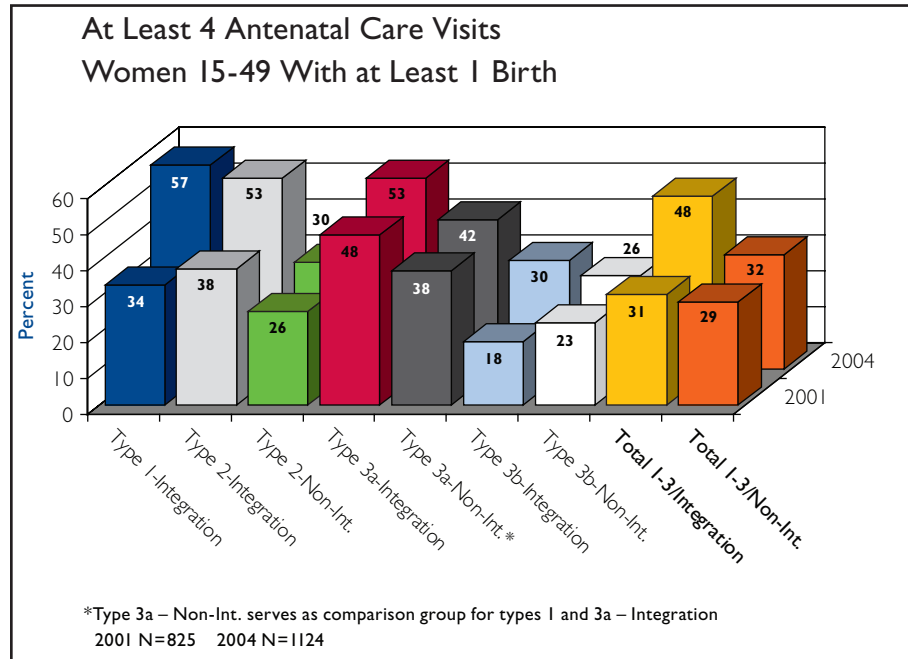
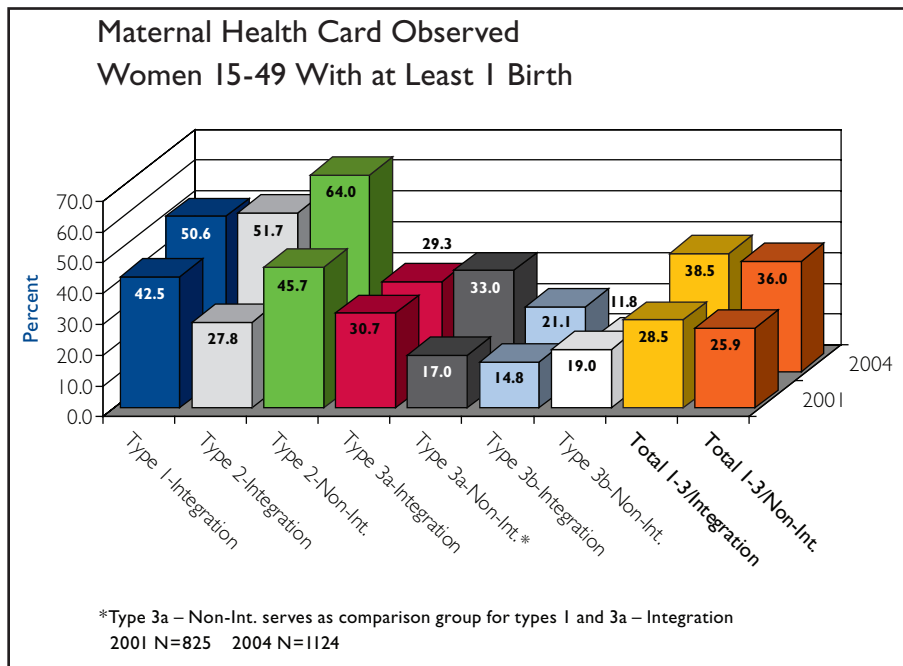


Figure 22



3b scored lowest for this indicator. Similarly, women in integration communities had a slightly higher rate of having their newborns fully protected against neonatal tetanus by receiving at least two tetanus vaccinations during the last pregnancy (figure 23). All integration sites posted gains except for type 3b, and again, type 3b had the lowest proportions overall.

Finally, women in integration sites were more likely to have their last-born child delivered by a trained provider than women in non-integration sites (figure 24). Integration communities, which were already high in 2001, either maintained proportions at levels comparable to the baseline or improved. This was also true for type 3b integration communities, although this type posted the lowest proportions overall.

Figure 23

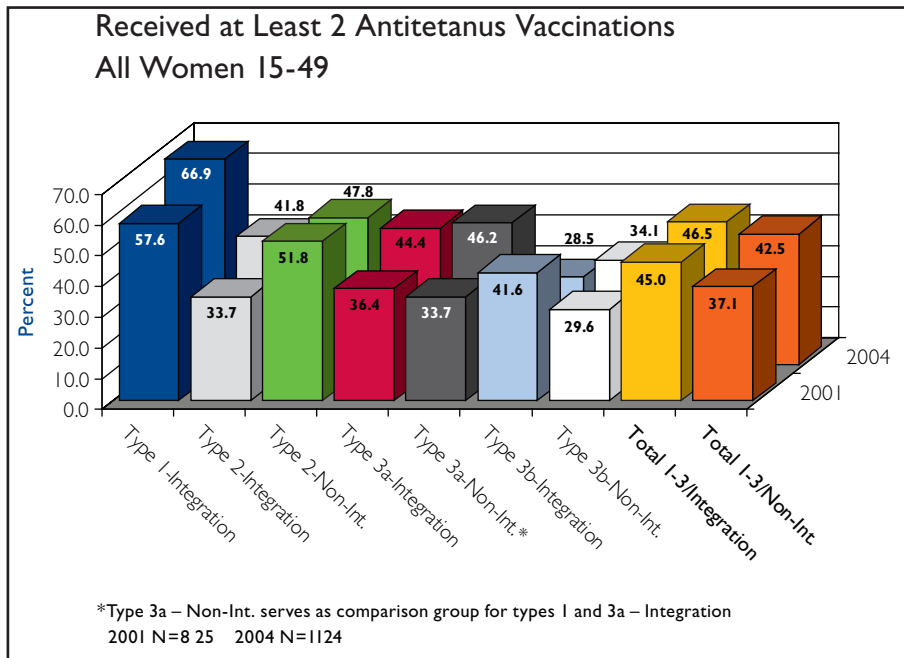
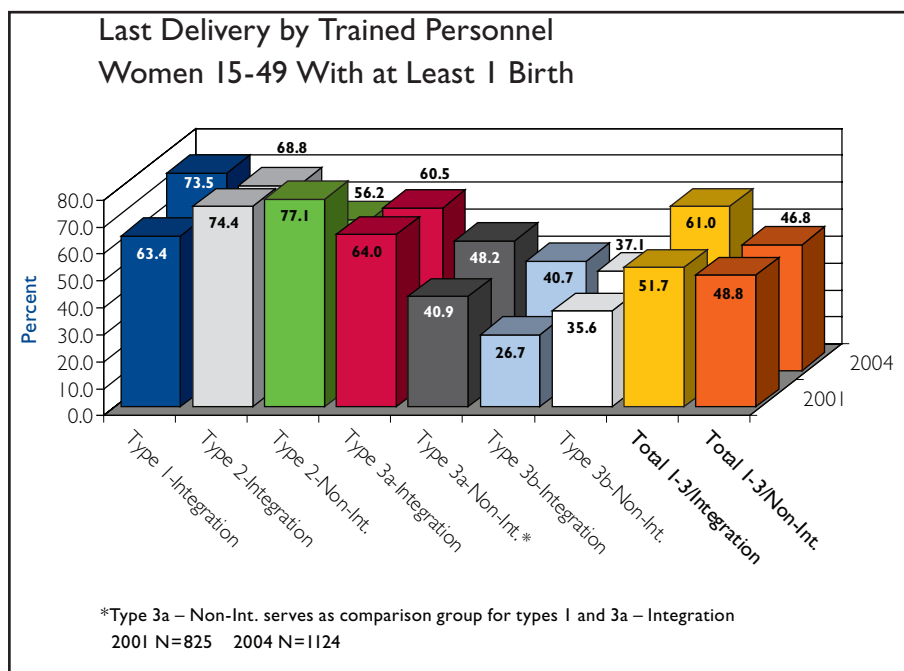


Figure 24



4.2.6 Children's nutritional status: Stunting, underweight, wasting

An interesting picture presents itself for the development of the nutritional status of children under 5. As seen in table 14, moderate and severe stunting improved in integration communities overall (not far from statistically significant levels) by 2004; these communities had started at higher levels than non-integration communities in 2001. Decreases occurred in all types, but mostly in type 3a. The gains were due to lower rates of moderate stunting. Severe stunting remained high at about 22 percent in integration communities. Because of the poorer outcomes for many indicators described earlier, stunting was lowest in type 3b, contrary to what would have been expected.

Table 14: Percent of Children Under Age 5 Moderately and Severely Stunted (z-score below two standard deviations)

Organizational Type	Baseline 2001		Follow-up 2004	
	N = 865		N = 1132	
Type 1-Integration	53.4		47.7	⊛
Type 2-Integration	51.2		54.6	
Type 2-Non-integration	46.3		53.3	
Type 3a-Integration	69.5	(+)	54.8	
Type 3a-Non-integration*	62.0		64.5	
Type 3b-Integration	42.5		38.1	
Type 3b-Non-integration	33.7		38.6	
Type 3 total-Integration	52.0		44.3	
Type 3 total-Non-integration	46.4		51.2	
Integration total	52.4	(+)	46.9	(⊛)
Non-integration total	46.3		51.9	
Total (Integration & Non-Int.)	50.6		48.4	

⊕ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

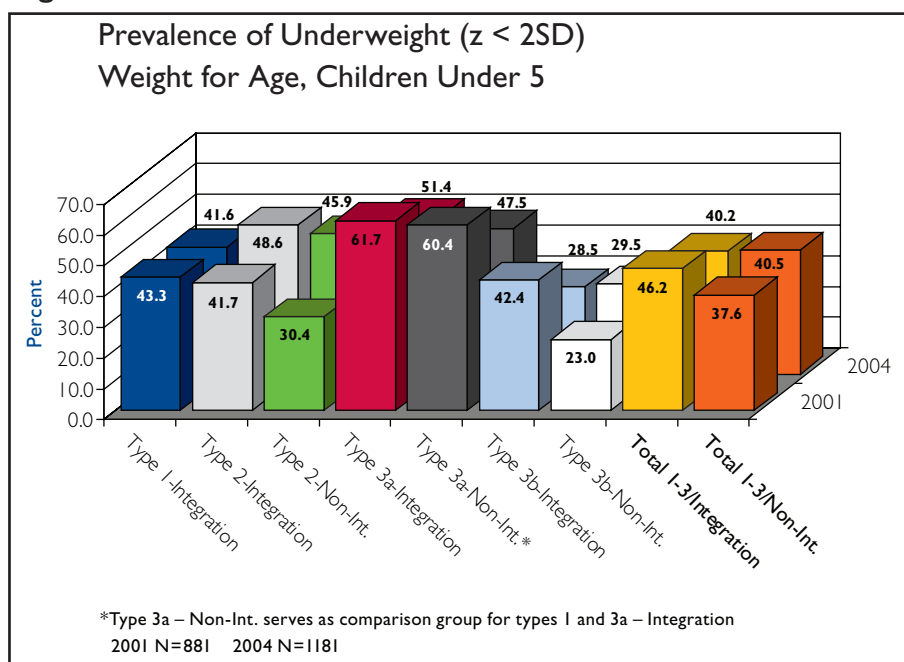
⊛ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller

(Borderline levels of statistical significance > 0.05 but < 0.10 in parentheses)

*Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

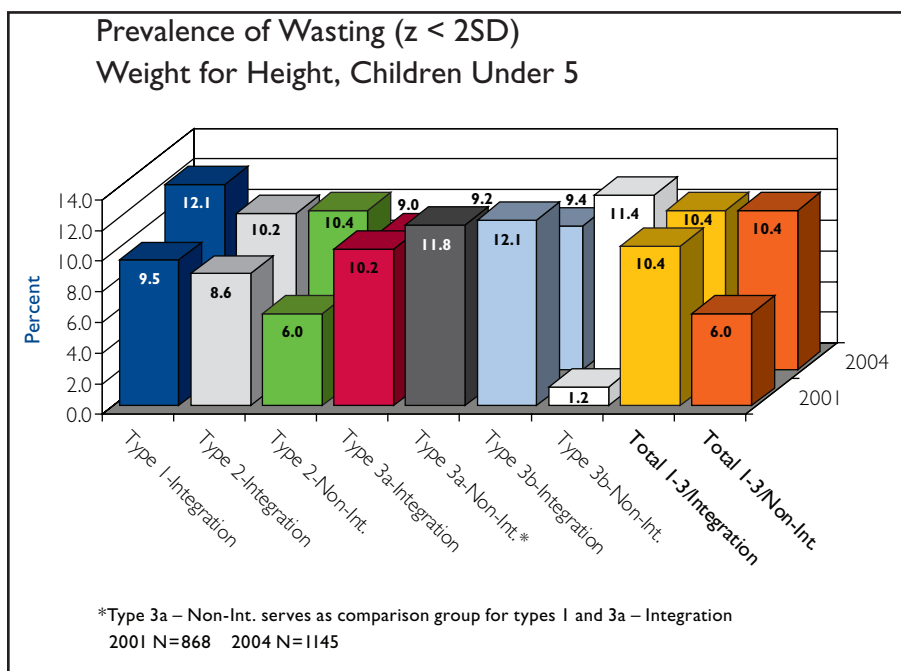
The patterns are similar for underweight children (figure 25), although the differences are not as clear as in the case of stunting. Integration communities experienced a slight drop, while rates increased in non-integration communities. Gains were due to both lower rates for the moderate and severely underweight. The most important gains occurred in type 3a, which had the highest malnutrition rates overall. They were lowest in type 3b with a marked improvement in the integration group.

Figure 25



Acute malnutrition (wasting) remained high at 10 percent in integration and non-integration communities (figure 26), with a worsening in the latter. Severe wasting doubled to 2 percent in both groups. The rates barely varied across sites in 2004; only type 3b non-integration communities seem to have worsened substantially.

Figure 26



4.2.7 Year-round food security: Agricultural production

Food security is expected to have an impact on children’s nutritional status. The surveys asked households whether they produced sufficient food to feed their families for the entire year. Food security improved in integration and non-integration communities (table 15), with a slightly higher increase in the latter, though the difference between both groups was not statistically significant. With three of four households not producing enough food in an area where almost everybody has to rely on farming, levels of food insecurity remained very high despite a small improvement. Type 2 communities achieved the highest levels.

Table 15: Percent of Households With Sufficient Food for the Entire Year

Organizational Type	Baseline 2001		Follow-up 2004	
		N = 950		N = 1148
Type 1-Integration		13.3		20.8
Type 2-Integration	+	11.0		44.2
Type 2-Non-integration	+	18.5		36.2
Type 3a-Integration		25.7	⊗	20.3
Type 3a-Non-integration*		9.7		15.8
Type 3b-Integration		14.4		15.5
Type 3b-Non-integration	+	16.2		30.7
Type 3 total-Integration		18.1		17.1
Type 3 total-Non-integration	+	13.5		23.8
Integration total	+	15.5		21.9
Non-integration total	+	14.9		27.5
Total	+	15.4		23.6

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

⊗ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller

* Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

This measure of food security relies entirely on the respondent’s recall, which is probably very subjective. Without going into much greater detail of changes in land use and productivity, which were beyond the scope of these surveys, this information is probably not very reliable. The 2004 survey contained considerably more information than the baseline; however, these data have not been analyzed yet.

4.2.8 Improved natural resources management: Reported use of fire in agricultural activities (slash-and-burn), reforestation

Environmental regulations have been in place since Queen Ranavalona II first banned slash-and-burn agriculture in 1881 and have been recently reaffirmed.⁷ One would therefore expect most people not to admit to such a practice when asked even though they may still use it, as fires in forest areas demonstrate every year. Serious underreporting needs to be considered when examining the figures presented in table 16. There was an almost 60 percent overall decline in the admitted use of fire in agriculture, which evened out the differences that existed between integration and non-integration communities at baseline. Because of the unknown degree of underreporting, it is not clear whether the higher levels reported for type 2 reflect actual practice or a different attitude of respondents in answering the survey question.

Table 16: Percent of Households That Reported Practicing Slash-and-Burn Agriculture

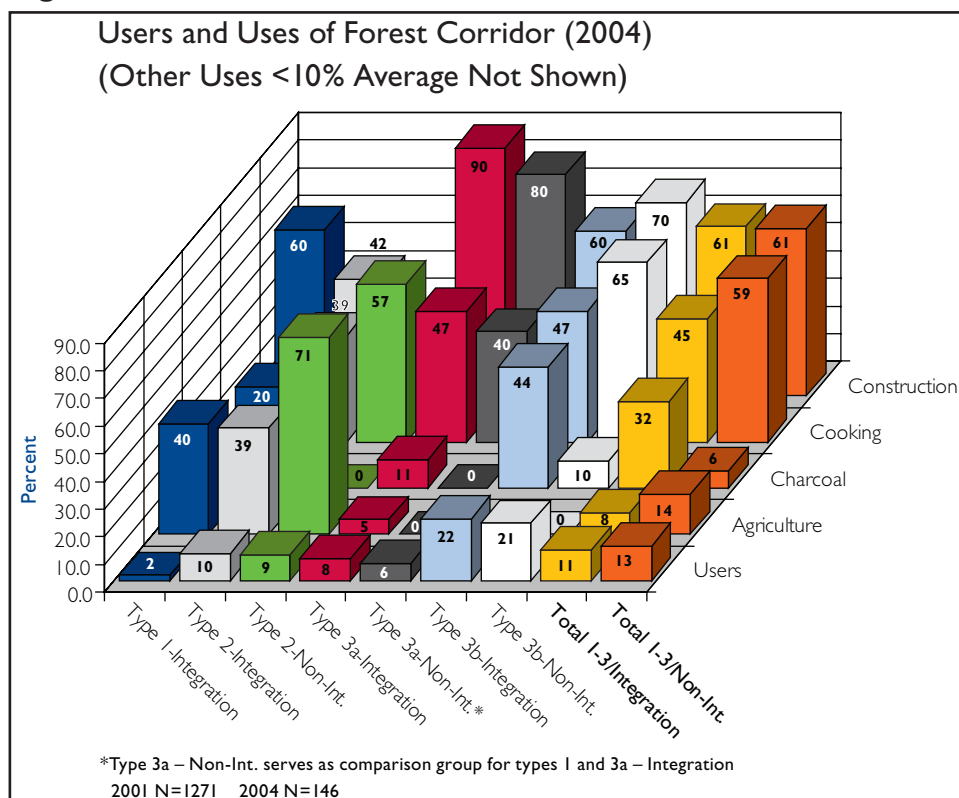
Organizational Type		Baseline 2001	Follow-up 2004
		N = 950	N = 1147
Type 1-Integration	+	51.5	15.7
Type 2-Integration		53.7	48.5
Type 2-Non-integration	+	60.5	33.3
Type 3a-Integration	+	78.1	19.7
Type 3a-Non-integration*	+	91.4	30.1
Type 3b-Integration	+	39.0	20.3
Type 3b-Non-integration	+	46.4	11.8
Type 3 total-Integration	+	51.7	20.3
Type 3 total-Non-integration	+	66.9	20.1
Integration total	+	51.8	22.5
Non-integration total	+	65.1	24.2
Total	+	55.8	23.0

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller

⊗ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller

* Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

Figure 27



⁷ Jolly, Alison. *Lords and Lemurs: Mad Scientists, Kings With Spears, and the Survival of Diversity in Madagascar*. Houghton Mifflin, Boston, 2004; <http://rainforests.mongabay.com/20madagascar.htm>

As shown in figure 27, only a small fraction of 12 percent of households responded positively in 2004 when asked whether they extract resources from the nearest forest corridor (this was not assessed in 2001). Timber was most commonly collected for construction and firewood. While activities like charcoal production were rare overall, individual households can have a much greater environmental impact through such activities because of their commercial nature, as opposed to households using forest products for their own consumption.

Table 17: Percent of Households Practicing Reforestation by Planting Eucalyptus Trees

Organizational Type	Baseline 2001	Follow-up 2004
	N = 985	N = 857
Type 1-Integration	74.3	89.1
Type 2-Integration	35.2	46.2
Type 2-Non-integration	36.1	41.8
Type 3a-Integration	73.8	65.7
Type 3a-Non-integration*	77.9	67.6
Type 3b-Integration	44.0	64.8
Type 3b-Non-integration	15.7	67.5
<i>Type 3 total-Integration</i>	53.9	65.2
<i>Type 3 total-Non-integration</i>	44.0	67.4
Integration total	58.4	70.2
Non-integration total	41.7	57.7
Total (Integration & Non-Int.)	53.4	66.7

No test of statistical significance performed

*Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

To promote the sustainable use of forest products, NGOs, donor-funded projects, and government agencies encourage villagers to plant eucalyptus and pine that can replace wood harvested from forests for the most common uses. Table 17 shows an overall increase in eucalyptus planting, but more markedly in the integration group, where it was the method most frequently promoted. This difference was due to the high level achieved in type 1 and increases in type 3b. In all other sites, the practices were more or less the same in integration and non-integration communities in 2004.

4.2.9 Community participation: Gender

One of the aims of integrated PHE programs is to increase self-governance by communities and increase the participation of household members, especially women, in the decisionmaking process. Table 18 shows that women from one-third of households were members of a community group. Integration communities experienced a slight increase, while membership dropped in the non-integration group. The most significant increases happened in the type 3a and 3b integration communities, while proportions were lower in types 1 and 2 in 2004, compared with 2001.

Table 18: Percent of Women Who Are Members of Community Groups

Organizational Type	Baseline 2001	Follow-up 2004
	N = 1001	N = 1360
Type 1-Integration	35.7	29.8
Type 2-Integration	47.4	33.0
Type 2-Non-integration	43.4	26.7
Type 3a-Integration	27.5	34.5
Type 3a-Non-integration*	18.6	24.8
Type 3b-Integration	17.2	36.0
Type 3b-Non-integration	32.5	26.2
<i>Type 3 total-Integration</i>	21.0	35.5
<i>Type 3 total-Non-integration</i>	26.0	25.4
Integration total	29.5	33.2
Non-integration total	31.0	25.8
Total (Integration & Non-Int.)	29.9	30.7

No test of statistical significance performed

*Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

Membership in women's groups, village development associations, and farmers groups ranged from 23 to 31 percent. Over 55 percent of these groups held either weekly or monthly meetings. Forty-five percent of the women attended a meeting within the last month prior to the survey, which increased to 62 percent when considering the last quarter. The type of groups, meeting frequency, and last attendance were similar in integration and non-integration communities.

Table 19: Percent of Households That Had a Visit by an Extension Worker About Agriculture, Livestock, Health, and Natural Resource Management During the 12 Months (2001) and 24 Months (2004) Prior to the Survey

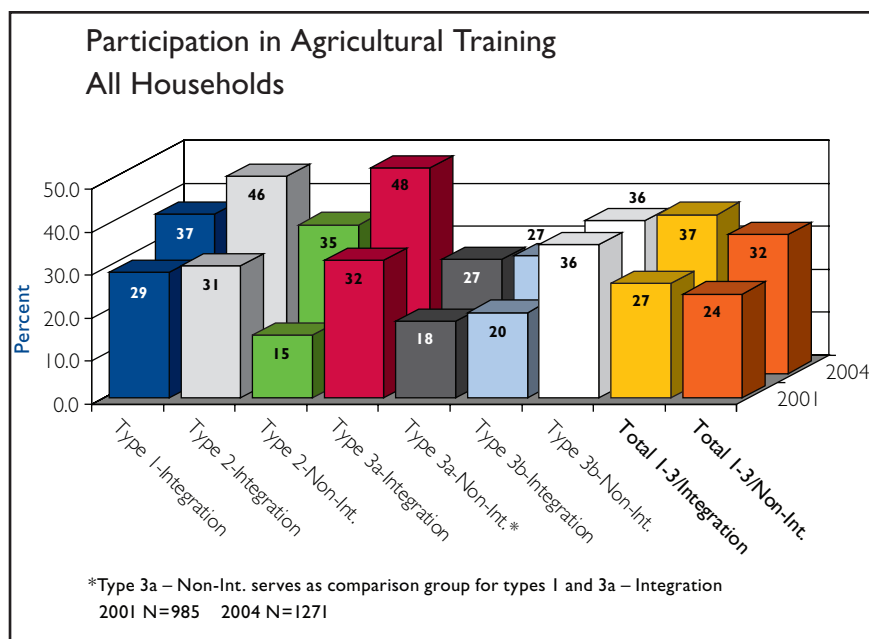
Organizational Type		Baseline 2001	Follow-up 2004	
		N = 985	N = 1271	
Type 1-Integration	(+)	21.6	30.0	
Type 2-Integration	+	16.3	33.9	
Type 2-Non-integration		28.9	29.2	
Type 3a-Integration		18.9	41.7	⊛
Type 3a-Non-integration*	+	12.5	25.0	
Type 3b-Integration		27.1	25.1	
Type 3b-Non-integration		22.6	19.3	
Type 3 total-Integration		24.2	31.0	(⊛)
Type 3 total-Non-integration	+	18.2	22.2	
Integration total	+	22.4	31.1	(⊛)
Non-integration total		21.2	24.2	
Total (Integration & Non-Int.)	+	22.0	29.0	

+ Differences between baseline and follow-up statistically significant at 0.05 level or smaller
 ⊛ Differences between integration and non-integration groups statistically significant at 0.05 level or smaller
 (Borderline levels of statistical significance > 0.05 but < 0.10 in parentheses)
 * Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

Beyond membership, one-third of women overall participated in community mobilization activities, but the rate of participation was 11 percent higher in integration than in non-integration communities. Women participated most frequently in festivals, health campaigns, and environmental campaigns. Festivals and environmental campaigns were more frequent in integration communities, and health campaigns were more common in non-integration communities.

Farmers need the know-how and skills to apply improved agricultural methods, which are taught by extension workers. Table 19 shows that there was an overall significant increase in visits and that integration households were visited more frequently than households in non-integration areas. The greatest improvements were noticed in the type 1, type 2 and type 3a integration

Figure 28



groups, which were supported through large USAID-funded projects. Visit frequency in type 3b dropped overall. These findings are consistent with households' participation in agricultural training (figure 28), for which higher levels were observed in integration than in non-integration communities. Participation increased most and was highest in type 1, type 2, and type 3a integration groups, and was lowest in type 3b in 2004.

4.2.10 Household livelihoods

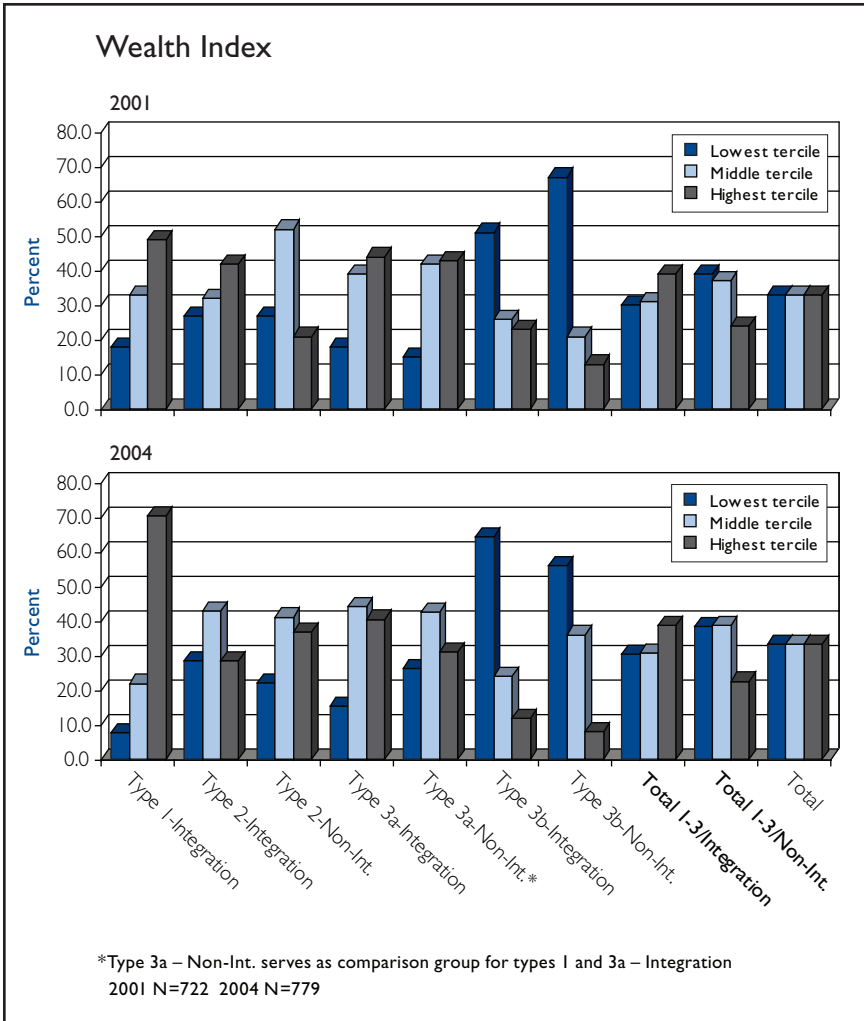
While measuring changes in household income was beyond the scope of the surveys in 2001 and 2004, the availability of a standard set of household assets allows the construction of a wealth index, as shown in table 20 and figure 29. Because of the relatively small sample size, the wealth index was constructed in terciles rather than quintiles used for the DHS. Principal component analysis generated the tercile boundaries. Overall, integration communities seem to be slightly better off than non-integration communities, although the differences are too small to draw any firm conclusions. However, two findings stand out. First, type 1 has a relatively larger proportion of households falling into the highest tercile, which equals households with the most assets, than any other site; and the proportion increased between 2001 and 2004. Second, a relatively large proportion of households in the type 3b integration and non-integration groups remained in the lowest tercile, which equals households with the least assets, compared with all other sites. This is consistent with the finding that type 3b communities fared worse for many indicators. Other surveys have similarly identified the Tulear region, which includes type 3b, as having the worst public health and economic indicators.

Table 20: Wealth Index (2001 n = 722; 2004 n = 779)

Organizational Type	Baseline 2001			Follow-up 2004		
	Lowest tercile	Middle tercile	Highest tercile	Lowest tercile	Middle tercile	Highest tercile
Type 1-Integration	18.3	32.5	49.1	7.7	21.9	70.3
Type 2-Integration	26.6	31.6	41.8	28.6	42.9	28.6
Type 2-Non-integration	27.3	52.3	20.5	22.2	41.1	36.7
Type 3a-Integration	17.7	38.7	43.5	15.3	44.1	40.5
Type 3a-Non-integration*	15.2	41.8	43.0	26.2	42.6	31.1
Type 3b-Integration	51.0	25.9	23.1	64.2	23.9	11.9
Type 3b-Non-integration	66.7	20.6	12.7	56.0	36.0	8.0
Type 3 total-Integration	41.1	29.8	29.1	44.1	32.3	23.6
Type 3 total-Non-integration	44.4	29.5	26.1	46.2	37.8	16.0
Integration total	30.2	31.1	38.7	30.4	30.8	38.8
Non-integration total	38.8	36.8	24.4	38.5	38.8	22.6
Total (Integration & Non-Int.)	33.4	33.2	33.4	33.3	33.7	33.0

*Type 3a – Non-integration serves as a comparison group for types 1 and 3a – Integration

Figure 29



5 | Lessons Learned¹

The lessons learned presented in this report draw from program experiences in two areas and will be useful for future studies, program design, and implementation of community-centered and integrated PHE. Many of the lessons learned build on the evaluation data presented in chapter 4. Other lessons draw from the organizational development and partnership experiences that were gained during the five years that VS was supported by EHP.

5.1 Key Lesson

The integration of health, population, and natural resource management programs can achieve good results in each sector compared with programs implemented separately because of complementarities of interventions and program synergies that occur when local NGOs work in partnership.

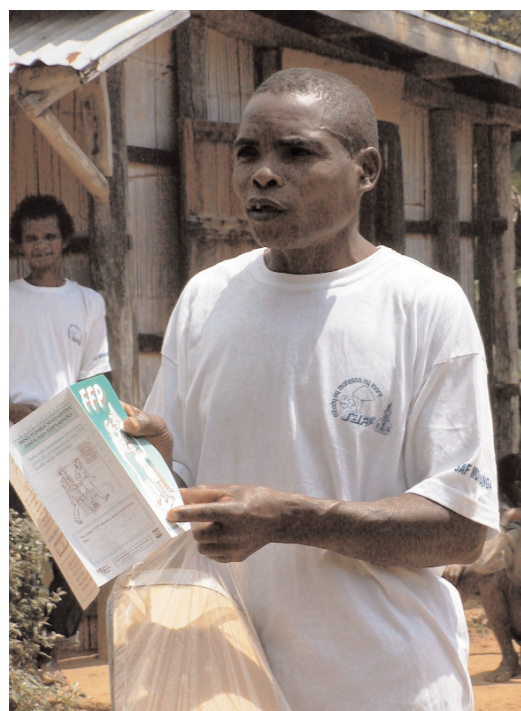
This report compares results from baseline and post-intervention surveys to answer the question whether integrated activities are more effective and finds that the community-centered and integrated PHE program achieved a greater impact over a three-year period. As shown in the summary table at the beginning of this document and the figure below, 29 out of 44 key PHE indicators had clearly higher outcomes in integration communities² than in non-integration communities. Non-integration communities showed better results for only two indicators, which could have occurred by chance alone. For the remaining 13 indicators, the evaluation methodology was a limiting factor³ and unable to establish whether any differences between integration and non-integration groups existed. Thirty out of 37 key indicators that were measured repeatedly showed improvements between the 2001 and 2004 surveys for the integration group. As expected in a social experiment in which interventions were also implemented with the comparison group, the non-integration sites saw improvements as well, but only for 23 out of 37 key indicators, and these lagged behind the integration sites for most indicators.

Three results illustrate the impact of integrated PHE when comparing integration communities with non-integration communities and baseline surveys with follow-up surveys:

- The contraceptive prevalence rate reached 17 percent in integration communities in 2004 (about a five-percentage point increase from 2001), compared with 8 percent in non-immigration communities.
- The prevalence of moderate and severe chronic malnutrition (stunting) dropped by almost six percentage points from 2001 and was five percentage points lower in integration communities (47 percent compared with 52 percent).
- Tree planting increased by 12 percentage points from 2001 and was practiced by 70 percent of households in integration communities, compared with 58 percent in non-integration villages.

The achievements of communities where activities were integrated compared favorably with those achieved by vertical sector programs. This is noteworthy for three reasons:

- Results were achieved in multiple sectors, not just in a narrow subset of technical interventions.



¹ The lessons learned presented here are based on a document prepared by EHP at the end of the project (Kleinau et al. 2004), which only included preliminary findings from the two surveys.

² The difference in outcomes was statistically significant at the 0.05 level for 24 indicators and at the 0.1 level for five indicators (all at a power of 0.8).

³ The evaluation of PHE integration in Madagascar had four methodological limitations that are not uncommon in social science research and that overall may have led to underestimating the effectiveness of integration when comparing baseline and impact surveys and integration and non-integration communities. These limitations were sample size, quasi-experimental design, multipurpose survey instrument, and a short implementation period between baseline and follow-up surveys and external events.

- Without the integrated PHE program, the underserved populations living around forest corridors would not have benefited from essential health and agricultural services.
- These results were achieved at relatively low costs; rapidly over a three-year period; and at scale, reaching about 125,000 people.

Together, these considerations indicate that important synergies exist in an integrated approach that covers multiple sectors.

5.2 Specific Lessons

Lesson 1: At the community level, people's choices related to PHE must be seen in the context of their livelihood and food security, which are major drivers of health outcomes. Basic economic needs have to be met to maximize the impact of the interventions in PHE. As the higher diarrheal disease prevalence and unchanged high levels of child malnutrition show, factors other than program interventions seem to play a major role in health outcomes. Based on the asset index included in the household surveys and field observations, the majority of households in the program area live well below the poverty line. Three in four households do not produce enough food to last an entire year, and cash income to supplement harvests is not readily available.

VS NGOs and other partners (for example, the USAID-funded ecoregional conservation and development project) have promoted cottage industry and income generation. Data from two surveys, however, indicated that these activities were still at a small scale, and few families benefited from credits or were provided equipment to improve productivity. Even if production increases in these remote rural communities, it will be difficult for villagers to sell their products unless the transportation infrastructure improves. The impact survey in 2004 shows that half of the villages are connected by only dirt tracks or footpaths, and about 40 percent of the villages are five to 15 kilometers away from the nearest market. Reduction in the high levels of poverty and food insecurity need to accompany improvements in family planning, maternal and child health, agriculture, and natural resource management to result in health impact.

Lesson 2: The most cost-effective way to reach target populations at scale in ecologically sensitive areas is through local NGOs that have the interest in and capacity to reach these communities. Most ecologically sensitive areas are in remote locations, and, this is the case in Madagascar. Few governments have the capacity and resources to work in remote communities, and often NGOs are the only actors willing and interested in working in these areas. The total population living along three major environmental corridors is estimated to be 500,000 people, living mostly in about 650 small communities under 1,000 inhabitants each. To date, integrated PHE activities implemented by nine NGOs have reached approximately 25 percent of this population. As a result of being part of VS, these NGOs have increased their capacity to implement integrated activities and now see themselves as part of a larger effort.

Lesson 3: Local NGOs offer a good return on investment. Except for one, all the NGOs implementing integrated PHE activities were small local organizations. These NGOs had annual budgets ranging from US\$100,000 to \$200,000, counting all sources, compared with US\$1 million to \$2 million or more available to large donor-funded programs. Organizations with relatively limited funding may be more efficient than better-funded organizations, and they may serve more people per dollar and thus achieve a better investment return, as measured by key indicators. With their modest funding, the small local NGOs achieved results for some indicators, such as contraceptive prevalence, that compared favorably, in relative terms, with the results of larger donors' investments. For example, small organizations that spent \$1 to \$2 per capita to increase the contraceptive prevalence rate by two to three percentage points had a better return than larger organizations spending \$10 to \$20 per capita to increase the rate by 10 percentage points.

Lesson 4: PHE integration is effective when actors stay focused on small doable actions. Although the aim was to limit community-centered and integrated PHE interventions to a few small doable actions, the NGOs addressed a relatively broad range of issues. Where efforts were focused on a few key interventions, often driven by available funding, the NGOs showed consistently better results. For example, family planning efforts resulted in a greater number of women using contraceptives in all areas, but vaccination coverage did not improve as clearly, and in the case of sanitation the indicator did not change.

Lesson 5: Different mechanisms can successfully implement integrated PHE. From the outset, the evaluation of the integrated PHE program in Madagascar was designed as a natural experiment to compare three different implementation modes:

- Multidisciplinary teams within one organization (the gold standard)
- Different health and environment teams within the same organization
- Field agents from different sector specific organizations – health, agriculture, and environment

The three organizational arrangements were compared with a comparison group that had either health or natural resource management activities, or no program support except for government services. Good performance was observed for the multidisciplinary team approach as well as for the collaboration between two or more organizations. Overall, the NGO with two teams was not able to achieve as much as the others. While the two surveys showed clear differences among the three intervention modes, they all produced positive outcomes in some areas, although not necessarily the same areas across all three. Three factors unrelated to the organizational setup can explain the differences in achievements:

- Geographic differences between the northern and southern areas, culture, access to infrastructure and services, economic opportunities, etc.
- Organizational capacity and commitment to integrated PHE
- Available resources where one organization may have more than 10 times the resources than another, but not cover a population that is larger by the same factor

Lesson 6: Community-centered PHE fosters participation, especially by women. Communities must be active participants in integrated PHE programs and can self-determine sustainable development activities when appropriate and when feasible social marketing and mobilization approaches based on an “early adopters and innovators” model are used. Women in integration communities seemed to be more engaged in mobilization efforts and community groups, including groups that are traditionally dominated by men, such as farmers associations. Women’s participation increased by four percentage points in integration communities to 33 percent, while it decreased by five percentage points in the non-integration group to 26 percent.

Three social marketing and mobilization approaches based on an early adopters and innovators model – *champion community*, *farmer-to-farmer*, and *child-to-community* – have been implemented to a varying degree by the NGOs. Where these approaches have been used, they seem to be associated with larger improvements of key indicators. Communities seem to be motivated by setting targets themselves, monitoring these targets, and celebrating their successful achievements with the help of NGOs. Where communities have not set specific targets, progress seems slower. Long-term effects of this intensive collaboration with primary schools are expected to result in significant behavior change as children grow up learning about sanitation and hygiene, nutrition, and nondestructive and improved agricultural practices.

Lesson 7: Better government services make a difference, and NGOs depend on them. Although higher levels were achieved for most indicators in integration communities, the non-integration group experienced at times substantial increases as well. This was especially true for services provided by government institutions such as health centers, which were often supported by donor projects. Better supplies of contraceptives through public providers, for example, benefited NGOs directly, because they procured contraceptives from government facilities. In other cases, such as immunization, NGOs may help public providers increase outreach services. However, integration communities achieved substantially higher levels for two-thirds of the key PHE indicators than the non-integration group. The integration sites showed improvements between 2001 and 2004 for 30 out of 37 key indicators, compared with 23 indicators in non-integration sites.

Lesson 8: Despite limitations, the evaluation methodology was able to measure PHE synergies. The evaluation methodology has its weaknesses, but it measures “real life” synergies and is one of only a few attempts to use a social science approach to measure the impact of PHE integration. (The only other country where integrated PHE interventions are evaluated using a similar quasi-experimental design is the Philippines. The CEMOPLAF project in Ecuador did pre- and post-integration comparisons but did not include a non-integration group.) Further research is needed to understand some findings. Geographic differences or abrupt changes between baseline and follow-up surveys are sometimes difficult to explain. For example, the sudden rise of diarrheal disease prevalence in type 3b may be related to the cyclones that passed over Madagascar just before the survey in 2004, but it should have affected other program areas as well. While one can speculate about the sharp drop in knowledge about family planning or STDs in some implementation types, these data are not rich enough to identify the cause.

Lesson 9: The Anosy region (type 3b) is a high-need and underserved area. For many key indicators, communities in the Anosy region (in both integration and non-integration sites) performed lower than all other sites. They also posted the lowest scores for indicators related to poverty, such as the wealth index and the availability of soap. Knowledge about basic public health issues such as STDs and access to services seem lowest here as well. This may be explained in part by the absence of major donor-funded projects in this area, such as USAID projects that focus on such issues. However, when donors invest heavily, such



as in the World Bank's SECALINE nutrition project, which has targeted malnutrition since 1994, they seem to be effective, which could explain why malnutrition rates were lowest in this region. Given the poor socioeconomic situation in Anosy, such a finding would otherwise be unexpected.

Lesson 10: Successful integration at scale depends on establishing effective mechanisms on which a range of partners can collaborate. The very nature of the integration of health, population, and environment programs requires a partnership among a range of organizations. Funds for integrated activities may come from those organizations interested only in protecting the environment or from those whose primary concern is protecting human health. Implementing organizations might specialize in either environment or health and population. In addition, many of the activities in communities

are small-scale in nature, and in some countries, only small NGOs work in those communities. In Madagascar, the principal role of VS is to build the capacity of its member NGOs by acting as an umbrella organization that provides training and technical and financial assistance to member NGOs; coordinates efforts among its members; plays a monitoring and evaluation role; and disseminates information and lessons learned.

The experience of the integrated PHE program in Madagascar has shown that NGOs can play a significant role in improving family planning and maternal and child health services and in making improvements in agriculture and natural resource management for inaccessible and underserved populations. NGO support by donors and their projects in the form of direct funding and technical capacity building has been critical to the success of integrated PHE. As a result of being part of VS, these NGOs have increased their capacity to implement integrated activities and now see themselves as part of a larger effort.

5.3 Challenges of Integrating PHE Interventions

While the effective integration of PHE poses many challenges, the following issues emerged as important for the future direction of PHE integration in Madagascar and beyond.

- *Does the integration of PHE improve health and livelihood?* Despite the improvements in intermediate program outcomes, the health status indicators did not improve. Diarrhea prevalence was 25 percent and during the second survey was almost twice as high in both intervention and control areas than during the first survey. Malnutrition, which affected one in two children under 5, remained very serious, although it seems to have declined in three integration groups. Several factors may explain why measurable changes in health outcomes (with the exception of malnutrition, which should be studied further) were not observed: (1) three years was probably too short of an intervention period; (2) two major cyclones passed through Madagascar in 2004, one right before and one during the impact survey, while similar events did not occur in 2001 at the time of the baseline survey; (3) a political crisis in 2002 following elections led to major disruptions and food shortages; and (4) four in five households in rural areas of Madagascar still live well below poverty levels. Achieving health and socioeconomic impact through integrated PHE interventions and measuring the impact should be the long-term focus of program efforts.
- *Can development activities conserve ecosystems and biodiversity?* The program in Madagascar was not designed to answer this question in the short run, but the foundation for answering this question has been laid. This will require that data from these household surveys and other qualitative assessments are linked with data on forest coverage, illegal hunting activities, and slash-and-burn practices. The environmental data are available from conservation organizations such as Conservation International and the World Wildlife Fund. A close collaboration between VS and these organizations is planned over the coming five years to carry out time series and special analyses to answer this important question.

- *Are there more reliable environmental indicators and measurement tools?* The agricultural and natural resource use indicators rely exclusively on interviewee recall. Such information is notoriously unreliable and, depending on the subject, prone to serious over- or underreporting. The use of slash-and-burn agriculture is such an example where true practices are probably grossly underestimated. These shortcomings can be addressed in two ways. First, household surveys should test whether methods other than direct questioning, such as spot observations and pocket voting, yield more reliable data. Second, environmental change can probably be more aptly demonstrated through a visual impact evaluation. A visual impact evaluation would evaluate the change of a forest landscape due to development or rehabilitation activities by comparing a series of pictures or video footage with the situation at the outset of a program. Unlike visual impact assessments, which are usually simulations of expected landscape changes, a visual impact evaluation will document actual change.

5.4 Concluding Lesson

The experience of the integrated PHE program in Madagascar has shown that NGOs can play a significant role in improving family planning and maternal and child health services and in making improvements in agriculture and natural resource management for inaccessible and underserved populations. NGO support by donors and their projects in the form of direct funding and technical capacity building has been critical to the success of integrated PHE.

Future programs in the health and environment sector should consider expanding the roles of NGOs as a cost-effective way to rapidly extend the coverage of interventions that promise to have a health impact and protect natural resources and remaining ecosystems in the longer run to difficult-to-reach populations in vast geographic areas. Bringing together all partners in a collaborative effort is the only way that an impact at scale is possible.

6 | Recommendations

The recommendations based on the experience over the past five years can be summarized in three categories: technical, organizational, and research.

Recommendation 1: Enhance the technical aspects of PHE integration

The technical competency of VS has been driven by its funding, which was mostly family planning and health-related. To better support member NGOs in the full range of PHE activities, the environmental component of VS needs to be strengthened. VS should have a small core staff to cover the critical technical PHE areas and management functions and a network of consultants known for the quality of their work. Once the range of PHE-related competencies exists within VS, the staff can form a truly multidisciplinary team that provides comprehensive services to NGOs by linking health with environmental concerns as a package.

Much of the success of community-centered and integrated PHE depends on effective community mobilization and behavior change. Approaches such as the “champion community” and “champion commune” have been used effectively but often just for health-related targets and with substantial outside support. VS is in a unique position to demonstrate how environmental targets and improved health outcomes can be achieved at scale.

Because different sectors use different coordination and competency-based learning approaches, successful PHE integration needs to be able to achieve an interface (between, for example, the champion commune and ecoregional approaches). VS can facilitate the dialog and communication between actors to link programs that address the environment, health, economic growth, education, local governance, and the recently developed “nature, wealth, and power” framework.



Recommendation 2: Strengthen organizational capacity

VS has developed within a short time from an informal partnership into a Malagasy association with all the necessary administrative systems to receive and manage donor funding. However, an association under Malagasy law faces constraints of how it and its members can be funded. NGO status would allow greater flexibility and strengthen the institutionalization of VS. Pursuing NGO status successfully depends on clarifying organizational roles and ensuring appropriate staffing. Functioning as an umbrella NGO, VS’s niche has always been that of a service organization to its member NGOs working in PHE integration. If VS were to become an implementing organization, it could enter in direct competition with its members. As a service organization, VS should have a small core staff to cover the critical technical PHE areas as well as management functions and a network of consultants who are known for the quality of their work. Being seen as competent, responsive, and cost-conscious will not only increase the ability to raise funds but also attract new NGO members. The latter is crucial for scaling up PHE integration further to reach the goal of serving most of the population around Madagascar’s forest corridors. By allowing sufficient time, setting a clear timeline and milestones, and providing support, VS has a good potential for becoming such an effective organization.

For its long-term survival and growth potential, VS needs to develop an identity that is recognized by potential clients who are seeking a unique set of experiences and skills. The foundation of this identity seems to be the ability to programmatically link PHE interventions, which should make up the core of VS’s work. There does not seem to be another organization in Madagascar that has made the integration of PHE its mandate. However, to establish and communicate this identity to clients, VS will need to be proactive and submit creative proposals to potential funding agencies. To bridge periods where business is slow, VS should

be able to accept contracts that are more sector-specific (at which it has already had its first successes), but this needs to be managed carefully so as to not lose the organization's identity. Many competitors in Madagascar already have an established record of accomplishments in either health or the environment. To raise funds successfully in its PHE niche, VS needs to build partnerships with other organizations for responding to requests and writing proposals. Establishing a network and maintaining regular contacts with these partners will be crucial for preparing quality products in a timely manner.

As a service organization, VS needs to be able to respond in a flexible manner to a variety of requests. VS has already proven that it can manage grants and subcontracts with NGOs and provide technical and managerial assistance to these NGOs. VS has less experience with documenting "lessons learned" and "best practices" of its member NGOs. This could be a valuable service and a critical element for raising new funds.



Recommendation 3: Increase the evidence that sustainable development and conservation of biodiversity are compatible

One important reason for increasing agricultural production, raising income through sustainable natural resource use, and reducing family size is their potential positive impact on natural resource and biodiversity conservation. However, this relationship remains largely a hypothesis. Linking survey data to spatial datasets about vegetation coverage and land use (available from environmental conservation organizations) may further expand the evidence that supports this hypothesis. Another more resource-intensive step may involve the design and implementation of special studies of the postulated linkages. Such studies may become necessary to gather data (on, for example, household income or participation in civil society organizations and local governance) otherwise not available.

Thanks to USAID's support, EHP and VS were able to evaluate the success of PHE integration more thoroughly than would normally be possible. For mainstreaming PHE integration, the evidence base needs to be solidified by adding experiences from other countries and programs. This would be greatly facilitated by developing and testing the validity of simpler monitoring and evaluation approaches that provide reliable data for a broad range of PHE interventions. Developing, testing, and disseminating new indicators and measurement methods should be done in partnership with organizations that have such a mandate but with a sector-specific focus, such as the MEASURE Evaluation Project and Foundations of Success.

7 | Bibliography

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8 | Appendix

List of Integration and Non-Integration Communities and Sampling Plan

ZONE	COR	CCOR	REGION	CREG	FIVONDRONANA	CFIV	TYPE	No	VILLAGE	POP	MEN	MENAE	ONG	ETHNIEDOM
1	MSE	3	MANGORO	1	ANOSIBE ANALA	2	1	1	Andranombolavo	703	117	22	ADRA	Betsimisaraka
1	MSE	3	MANGORO	1	ANOSIBE ANALA	2	1	2	Anosibekely	671	112	21	ADRA	Betsimisaraka
1	MSE	3	MANGORO	1	ANOSIBE ANALA	2	1	3	Andranotapaka	510	85	16	ADRA	Betsimisaraka
1	MSE	3	MANGORO	1	ANOSIBE ANALA	2	1	4	Ambodivona	515	85	16	ADRA	Betsimisaraka
1	MSE	3	MANGORO	1	ANOSIBE ANALA	2	1	5	Faravohitra	567	95	18	ADRA	Betsimisaraka
1	MO	2	MANGORO	1	MORAMANGA	1	1	6	Analalava	248	40	8	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	7	Ambodiakatra	370	62	12	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	8	Ambohibary	344	57	11	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	9	Mahazina	500	83	16	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	10	Antsapazana	120	20	4	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	11	Ambohimarina	123	21	4	ADRA	Bezanozano
1	ME	1	MANGORO	1	MORAMANGA	1	1	12	Tsiatzompody	75	13	2	ADRA	Bezanozano
1	ME	1	MANGORO	1	MORAMANGA	1	1	13	Antsahakabe	237	40	7	ADRA	Bezanozano
1	ME	1	MANGORO	1	MORAMANGA	1	1	14	Mahamanina	110	18	3	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	15	Befotsy	680	113	21	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	16	Ambohimarina I	102	17	3	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	17	Ambohimarina II	162	27	5	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	18	Antoby	282	47	9	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	19	Mahavoky	237	42	8	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	20	Belavabary	250	42	8	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	21	Ambonidobo	800	133	25	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	22	Ambohibahoaka	250	42	8	ADRA	Bezanozano
1	MO	2	MANGORO	1	MORAMANGA	1	1	23	Ambohimenana	240	40	8	ADRA	Bezanozano
POP ET MENAGES TOTAUX										8096	1350	256		
INTERVALLE D'ECHANT.											5.273			
2	FIE	6	HAUTE MATSIATRA	3	IKONGO	5	2	24	Ambalagoavy	267	74	35	MICET	Tanala
2	FIE	6	HAUTE MATSIATRA	3	IKONGO	5	2	25	Tolongoina	1020	201	95	MICET	Tanala
2	FIE	6	HAUTE MATSIATRA	3	IKONGO	5	2	26	Mandriandry	382	78	37	MICET	Tanala (80%)
2	FIE	6	HAUTE MATSIATRA	3	IKONGO	5	2	27	Antsatrana*	229	37	18	MICET	Tanala
2	FIE	6	HAUTE MATSIATRA	3	IKONGO	5	2	28	Ambatoharanana	194	39	18	MICET	Tanala
2	FIO	7	HAUTE MATSIATRA	3	AMBALAVAO	6	2	29	Iharondahy	241	36	17	MICET	Betsileo
2	FIO	6	HAUTE MATSIATRA	3	AMBALAVAO	5	2	30	Ambodiara dihy	620	40	19	MICET	Tanala
2	FIO	6	HAUTE MATSIATRA	3	AMBALAVAO	5	2	31	Ambodilazabe	347	35	17	MICET	Tanala
POP ET MENAGES TOTAUX										3300	540	256		
INTERVALLE D'ECHANT.											2.109			

(continued)

ZONE	COR	CCOR	REGION	CREG	FIVONDRONANA	CFIV	TYPE	No	VILLAGE	POP	MEN	MENAE	ONG	ETHNIEDOM
1	ME	1	MANGORO	1	MORAMANGA	1	3	32	Beforona*	922	245	30	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	33	Antandrokomby II	269	69	8	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	34	Vohitromby	139	28	3	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	35	Fierenana	263	53	6	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	36	Vakampotsy	105	24	3	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	37	Ambatomasina	450	102	12	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	38	Marolafa	200	40	5	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	39	Maromitety	190	47	6	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	40	Antsakarivo	317	90	11	LDI/ SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	3	41	Ambodiaviavy	247	50	6	LDI/ SAF	Betsimisaraka
1	FDE	8	ANOSY	4	TOLAGANARO	7	3	42	Fenoevo	319	66	8	ASOS/ FAFAFI	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	43	Beseva	1419	237	29	ASOS/ FAFAFI	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	44	Ankoba	218	47	6	ASOS/ FAFAFI	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	45	Etsilesy	226	49	6	ASOS/ FAFA FI/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	46	Berongo	854	142	17	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	47	Tsimelahy	650	108	13	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	48	Analamatsaka	230	38	5	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	49	Bevilany	263	62	8	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	50	Eminiminy	390	155	19	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	51	Enosiary	454	76	9	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	52	Elomaka	306	51	6	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	53	Bekiria & Besely	577	96	12	ASOS/ WWF	Antanasy
2	FDE	8	ANOSY	4	TOLAGANARO	7	3	54	Fenoaivo	996	166	20	ASOS/ WWF	Antanasy
2	FDO	9	ANOSY	4	AMBOASARY	7	3	55	Bevia	215	36	4	ASOS/ WWF	Antanasy
2	FDO	9	ANOSY	4	AMBOASARY	8	3	56	Ihazofotsy	177	30	4	ASOS/ WWF	Antanasy
POP ET MENAGES TOTAUX										10936	2107	256		
INTERVALLE D'ECHANT.											8.229			

ZONE	COR	CCOR	REGION	CREG	FIVONDRO	CFIV	TYPE	No	VILLAGE	POP	MEN	MENAE	ONG	ETHNIEDOM
1	ME	1	MANGORO	1	MORAMANGA	1	5	57	Aharana	78	17	3	LDI	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	4	58	Ankeniheny	724	176	26	SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	4	59	Ambinanisahavolo	303	69	10	SAF	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	6	60	Antanambao	363	75	11	RIEN	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	6	61	Marozevo	316	72	11	LDI	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	6	62	Ambodilazana	220	30	5	RIEN	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	5	63	Ambalavero	201	42	6	LDI	Betsimisaraka
1	ME	1	MANGORO	1	MORAMANGA	1	5	64	Ambatoharanana	421	97	15	LDI	Betsimisaraka
2	FDO	9	ANOSY	4	AMBOASARY	8	4	65	Ambakaka	401	67	10	ASOS	Antandroy
2		9	ANOSY	4	AMBOASARY	8	4	66	Anadabolava	612	102	15	ASOS	Antandroy
2		9	ANOSY	4	AMBOASARY	8	4	67	Ankilitelo	700	117	18	ASOS	Antandroy
2		9	ANOSY	4	AMBOASARY	8	4	68	Antsrika	347	58	9	ASOS	Antandroy
2		9	ANOSY	4	AMBOASARY	8	4	69	Berano	459	77	12	ASOS	Antandroy
2		9	ANOSY	4	AMBOASARY	8	4	70	Tanambao	548	91	14	ASOS	Antandroy
2		9	ANOSY	4	AMBOASARY	8	4	71	Sakafia	347	58	9	ASOS	Antandroy
2		9	ANOSY	4	AMBOASARY	8	4	72	Ambendra	238	40	6	ASOS	Antandroy
2		9	ANOSY	4	TOLAGANARO	7	6	73	Morafeno	238	40	6	RIEN	Antandroy
2		7	HAUTE MATSIATRA	3	AMBALAVAO	6	5	74	Itaolana	350	48	7	LDI	Betsileo
2		7	HAUTE MATSIATRA	3	AMBALAVAO	6	6	75	Tiakohosoa	119	19	3	RIEN	Betsileo
2		7	HAUTE MATSIATRA	3	IKONGO	6	6	76	Ambodilazabe	347	38	6	RIEN	Tanala
2		7	HAUTE MATSIATRA	3	AMBALAVAO	6	5	77	Andalandranovao*	301	80	12	LDI	Betsileo
2		7	HAUTE MATSIATRA	3	AMBALAVAO	6	5	78	Sahabe	204	36	5	LDI	Betsileo
2		7	HAUTE MATSIATRA	3	AMBALAVAO	6	5	79	Sahafy	336	57	9	LDI	Betsileo
2		7	HAUTE MATSIATRA	3	AMBALAVAO	6	5	80	Antanamarina	180	22	3	LDI	Betsileo
2		6	HAUTE MATSIATRA	3	IKONGO	5	4	81	Tsarahonenana	84	15	2	RIEN	Tanala
2		6	HAUTE MATSIATRA	3	IKONGO	5	5	82	Antekoho	135	20	3	RIEN	Tanala
2		6	HAUTE MATSIATRA	3	IKONGO	5	5	83	Tsiambahambo	349	47	7	LDI	Tanala
2		6	HAUTE MATSIATRA	3	IKONGO	5	4	84	Kianjamiakatra	149	32	5	MICET	Tanala
2		6	HAUTE MATSIATRA	3	IKONGO	5	4	85	Sahavondronana	283	60	9	MICET	Tanala
									29	9353				
POP ET MENAGES TOTAUX										18706	1700	256		
INTERVALLE D'ECHAN-TILLON-NAGE											6.642			
GRANDS TOTAUX										41038	5697	1024		

PONDERATION RELATIVE = $s/n * N/S$

s = Nombre de menage par groupe

S= Nombre de menage total

n= Nombre de population par groupe

N = Nombre de population total

(continued)

ZONE : 02 zones (Nord et Sud)

COR : 09 Sites par rapport au Corridor Forestier (ME : Moramanga Est, MO : Moramanga Ouest, MSE : Moramanga Sud Est,

FIE : Fianarantsoa Est,

FIO : Fianarantsoa Ouest, FDE : Fort Dauphin Est, FDO : Fort-Dauphin Ouest, ZE : Zahamena Est et ZO : Zahamena Ouest)

REG : 04 Regions (Mangoro : 1, Zahamena : 2, Haute Matsiatra : 3, Anosy : 4)

FIV : 08 Fivondronana (Moramanga : 1, Anosibe An'Ala : 2, Fenerive-Est : 3, Ambatondrazaka : 4, Ikongo : 5, Ambalavao : 6, Tolagnaro : 7, Amboasary : 8)

TYP : 06 Types:

1: Integration par un ONG avec une equipe pluridisciplinaire

2: Integration par un ONG avec une equipe separee

3: Integration par au moins deux ONG

4: Controle avec des activites de sante seulement

5: Controle avec des activites Environnementales seulement

6: Controle sans activites

N : Numero Village (85 villages)

POP : Population (41038 populations)

MEN : Menage (5697 menages)

MENAE : Menage a enquete (1024 menage, soit 256 par groupe)

ETHNIDOM : Ethnie Dominante

Taille moyenne de menage : 6 (Resultat EDS)

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