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# Adapting Integrated Agriculture Aquaculture for HIV and AIDS-Affected Households: The case of Malawi



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The WorldFish Center in conjunction with World Vision Malawi carried out a one year project (July 2005 to June 2006) in Chingale - Zomba District with funding from the World Bank.

Through participatory approaches, the project identified constraints that limit HIV and AIDS affected households' realisation of the benefits from fish farming and adapted technologies and practices for the affected beneficiaries to boost fish production and utilization.

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## **Adapting Integrated Agriculture Aquaculture for HIV and AIDS-Affected Households: the case of Malawi**

### **Summary**

As fish caught from natural lakes and streams have traditionally been an important part of the diet in Malawi, increasing population and declining catches reduced annual per capita fish consumption from 14 kilograms in the 1970s to about 4 kilograms in 2005. Aquaculture has since been seen as an exit option to relieve pressure from dwindling capture fisheries and increase fish consumption. WorldFish Center has made remarkable contribution to improving household income and food security through the promotion of Integrated Agriculture Aquaculture (IAA) in Southern Africa and Malawi in particular. There are now over 6000 farm families that have adopted different IAA technologies up from about 300 in the 1980s. The IAA farm families have achieved a range of benefits including increased farm productivity, increased household incomes, improved adaptation and resilience to erratic climatic conditions; improved food and nutritional security through increased production and consumption of fresh fish and food crops grown around the fish ponds.

To-date however HIV and AIDS affected households have not been adequately targeted with IAA technological interventions. Yet such households need IAA benefits the most, especially for ensuring nutritional benefits for the sick. Their plight and priorities have not been investigated in order to design appropriate IAA interventions. In particular, the implications of their labour constraints and relative isolation from producer organizations and markets. In order to enable HIV and AIDS affected households to adopt IAA technologies to improve their income, food security and nutrition, the WorldFish Center in conjunction with World Vision Malawi carried out a one year project (July 2005 to June 2006) in Chingale - Zomba District with funding from the World Bank. Through participatory approaches, the project identified constraints that limit HIV and AIDS affected households' realisation of the benefits from fish farming and adapted technologies and practices for the affected beneficiaries to boost fish production and utilization.

The results have shown that developing customized technologies are a critical component in setting an all-inclusive strategy for economic growth among HIV/AIDS ravaged families in Malawi. While it is not a solution for all their problems, the results also indicate that IAA can dramatically improve the ability of families to cope with the effects of HIV/AIDS. With its innovative approach to lessen the constraints facing the families, the project doubled the income of 1,200 households and greatly increased fish and vegetable consumption by about 150% among rural communities

## **Introduction**

The WorldFish Center in conjunction with World Vision Malawi carried out a project to improve income and nutrition status of households affected by HIV and AIDS with funding from the World Bank. The project was implemented in Southern Malawi particularly in the West of Zomba District, covering 37 villages in Traditional Authority Mlumbe from July 2005 to June 2006. Specifically, the project sought (1) to identify the constraints that limit HIV and AIDS affected households to realise the benefits from fish farming and based on the constraints, (2) to adapt technologies and practices for use by the affected beneficiaries to boost fish production and utilization.

The project was necessitated by the fact that agricultural technologies and economic investments have so far not adequately and sufficiently responded to the needs and strengths of vulnerable households such as those affected or infected by HIV and AIDS. Consequently, these households become economically marginalized and increasingly dependent on relief service providers. The increased demands by agricultural technologies e.g. aquaculture, in terms of labour, capital investment, time, institutional support and planning skills often exceed the capacity and capability of the poor and affected households who not only lose their most productive members, but also spend more time, labour and other resources to care for their sick members who no longer participate in economic activities (Gillespie, 2006). As a result HIV/AIDS affected households are among the worst affected by food and nutrition insecurity and reduced income levels. For the people affected by HIV/AIDS, improved incomes and nutritional status through sale and consumption of fish are vital contributions to their livelihoods.

Research has shown that a nutritious and balanced diet is crucial, especially for people living with HIV. Good nutrition helps fortify people with HIV/ AIDS against secondary infections while increasing the effectiveness of anti-retroviral (ARV) drugs. According to the World Health Organisation (2003), people living with HIV and AIDS require increased energy intake of up to 50% higher than uninfected people especially children. It also recommends increased intakes of micronutrients over and above those for healthy non-HIV-infected individuals of the same age, sex, and level of physical activity. Fish is often the only accessible and affordable source of animal protein for poor households, especially those affected by HIV and AIDS. It offers fats (macronutrients) and micronutrients such as iron, iodine, zinc, calcium and vitamins A and B (Bene and Heck 2005) that enhance the efficacy and uptake of ARVs.

## **Aquaculture in Malawi**

The fishing sector is very important to both Malawi's economy and her overall food security, providing 300,000 – 450,000 jobs and 4% of GDP. However as a result of over fishing and poor conservation practices, the productivity of small holder and commercial fishing on major lakes and river systems in Malawi has declined more than 37% over the past 30 years (Scholz and Chimatiro, 2004). This dramatic decline, coupled with rapid population growth over the same period, has reduced the per capita consumption of fish in Malawi by more than 70%, from 14kg per person per year in the 1970s, to about 4 kg (FAO 2006). The reduction in fish consumptions brings serious nutritional implications in a country whose 70% of her protein source comes from fish. Aquaculture therefore offers the best option to increase fish supply in Malawi.

Small-scale aquaculture in Malawi has significant potential as demonstrated by the exponential increase in number of fish farmers over the past 10 years due to the intensification of extension by NGOs and adoption of participatory extension (Dey et al., 2004). There are now about 6000 farmers (from 300 in the 1980s) owning about 8000 ponds covering about 200 hectares scattered across the country. This growth is similar with the world aquacultural growth from about 4% in 1970 to 36% by 2006 (FAO 2009). However, the current aquaculture growth only accounts for about 20% of the potential area for pond aquaculture in Malawi (Brooks and Maluwa 1997). Aquaculture production (800 tons per year) and average yields (0.8-1.4 tonnes/ha/year) are also low due to insufficient use of inputs such as fertilisers and feed (Government of Malawi (GoM), 2005).

WorldFish Center has led the promotion of IAA as an efficient and environmentally sound farming practice to reduce the need for external inputs while offering diversified technologies in which conventional inputs such as labour, organic fertilizer and capital can be used more effectively to increase farm productivity. The basic principle of IAA is to grow fish in water bodies that are closely integrated into household farms, and intentionally make use of the resource flows such as animal and plant by-products from the diverse on-farm enterprises. The major aim is to convert agricultural wastes and manure into high quality fish protein; to use the nutrients generated in the pond as fertilizers for growing crops in order to reduce the need for off-farm inputs.

While many households in Malawi are participating in programs that promote aquaculture, specific constraints and priorities of HIV and AIDS affected households have not been addressed and the benefits such households can derive from aquaculture are therefore limited.

## **AIDS situation in Malawi**

Malawi is one of the sub-Saharan African countries hardest hit by the HIV/AIDS epidemic. Estimates indicate HIV prevalence of 11.8% in the 15-49 year age group (GoM 2007), with 97,000 people getting infected and 87,000 dying from AIDS related diseases annually (Ministry of Health (MoH) 2005). The primary mode of HIV transmission (90%) is unprotected heterosexual intercourse (National AIDS Commission (NAC), 2003). Although HIV prevalence is generally higher in urban than rural districts in Malawi, some rural districts have high HIV prevalence. For example, the 2004 Malawi Demographic and Health Survey (National Statistical Office (NSO), 2005) indicated a prevalence of 20.8% in the 15-49 year age group in the rural district of Mangochi that was nearly twice the national average (11.8%) and comparable to the prevalence in the urban district of Blantyre (22.3%). The country is currently implementing various behavioural change and biomedical interventions (such as syndromic Sexually Transmitted Infection –STI- management and the use of ARV drugs) which may reduce HIV transmission.

The HIV/AIDS situation especially in rural areas is exacerbated by general poor health and sanitation services, inadequate clean water supply facilities, limited education facilities and poor diets. Caught in a vicious cycle, the HIV and AIDS affected families experience long-term economic hardship through loss of productivity and income, increased costs for nutritional supplements and care, and exclusion from mainstream programs for economic growth in addition to the suffering through disease and death. In order to survive amidst the challenges, the affected households need to strengthen their resilience and coping capacity through active participation in economic activities. It is therefore imperative that appropriate technologies and practices adapted to the constraints and priorities of these families are developed. These technologies will enhance participation of the affected households in the development of cross-sectoral rural investment strategies aimed at strengthening their economic base. Fish, and in particular cultured fish (in small ponds), can play a mitigating role in the combined crisis of HIV/AIDS and food insecurity in Malawi (Bene and Heck 2005), especially through technological innovations that may account for the requirements of the affected households.

## **Implementation process**

### Participatory approaches

A series of Rapid Progressive Learning meetings were conducted with local leaders in order to build rapport, elicit support, share information and entice participation of the people in their own development activities. The meetings also aimed at improving the local leaders' understanding and conceptualization of the HIV and AIDS pandemic within the rural development framework. The meetings were augmented with 5 days of training for 30 village heads (8 women) on HIV/AIDS, gender and human rights, leadership, and group dynamics. After the trainings, the leaders sensitized their

communities and using participatory approaches, they identified a number of constraints faced by affected households in their respective communities.

### Household stratification

Village meetings were organized to stratify the households potentially affected by HIV/AIDS and those that were not. Through focus group discussions and other participatory tools (e.g. village profiling, social mapping, census mapping and wealth ranking), a list of households in each village was generated using the following proxies: households with chronically ill member, elderly-headed households, child-headed households and households keeping orphans. Based on these indicators, it was found that almost all the households in the area were affected in different ways. The proxies for HIV/AIDS affected households were thus further refined to look at HIV and AIDS related impacts on households such as:

- limited production and access to food,
- economic losses arising from the death of economically active household members and the resulting lack of purchasing power for farm inputs,
- number of distressed orphans within the household,
- orphaned girls leaving school to marry in order to support other children,
- level of child labour
- number of widows resorting to prostitution.
- amount of time allocated to caring for the sick instead of farm work,

### Household targeting

Following the profiles of the households, consultations on the targeting of households were led by Chingale Integrated Agriculture-Aquaculture Fish Farmers Association (CIAFFA)<sup>1</sup>. These consultations resulted in the identification of 1200 households from 37 villages, which were grouped in 21 farmer clubs. The farmer club approach was identified as a way of providing social support and collective action and economies of labour during pond construction. It was also an effective means for extension dissemination.

### Village farmer extensionist

Thirty young men and women (21 boys and 9 girls) of ages ranging from 16 to 25 years were recruited by village heads based on levels of literacy (ability to read and write) and good experience in fish farming practices (model farmers). The 30 youth were then trained as farmer extensionists (lead farmers) in order to equip them with the necessary abilities, skills and knowledge to provide extension services to other farmers in all the villages. The training module included: i) leadership skills, ii) group dynamics, iii) communication skills, iv) problem identification and solving, v) extension delivery skills, vi) gender and HIV/AIDS mainstreaming, and vii) report writing. The farmer extensionists facilitated the construction of small, rain-fed earthen ponds of about 20 meters by 10 meters on their land or other land allocated by the village heads. The farmers used the ponds to raise commonly cultivated fish species of *Oreochromis*

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<sup>1</sup> A farmers association vested with the responsibility of managing the affairs of all fish farmers and marketing of fish and agricultural products in Zomba West.

*shiranus* and *Tilapia rendallii*. The waste water from the pond was used to irrigate vegetables, mostly indigenous.

#### Prioritization of the project activities

The project technical team and the communities together identified and implemented practices to reduce the labour inputs needed for IAA and to extend farm productivity more evenly throughout the year. These included group construction of ponds, diverting stream water with low-cost canals, winter irrigation, community-based monitoring and evaluation. However prioritization of the activities was left to the farmers to decide which activities they wanted to implement first.

Between July and December 2005, the country experienced severe food shortages that resulted in many people doing piece work to earn money for purchasing food. According to the Malawi Integrated Nutrition and Food Security Surveillance report of October 2005 (FEWSnet 2005), Zomba District had a food stress index of over 60 and had grain reserves only enough for less than 7 days. The prevailing famine at the beginning of the project demanded prioritizing interventions that would bring immediate benefits. For instance, forty farm households with chronically ill and elderly members (18 of them headed by women) decided to grow irrigated maize crop to mitigate the looming food crisis. As such, communities worked together to align and dig canals initially to provide water for a winter cropping of maize and later to be used for fishponds. To make the most of local labour resources, the work was done in groups, largely by young energetic people who volunteered to help the elderly and the vulnerable. World Vision supported these households by providing 300 kilograms of chemical fertilizer and 25 kilograms of early maturing and open pollinated maize seed (ZM 621). This was planted communally on 1 hectare and irrigated with water from the newly dug canals. A total of 1.3 tones of maize was harvested and shared among the 40 households.

Ten farmer clubs engaged in multiplying groundnut seed through irrigation. Fifty two farming households (including 25 women headed households) from two farmer clubs embarked on indigenous vegetable and medicinal crop production to ensure their availability during the dry season. This activity was entirely communities' own initiative as was not in the original project plan. In total, the vegetables and medicinal plants covered about 0.75 hectares and were grown organically. Inclusion of indigenous vegetables was an effort to provide a balanced and nutritious diet that help to strengthen the immune system and assist the HIV affected people in wading off other opportunistic infections that render them more vulnerable to AIDS.

In partnership with the nutrition department of the Ministry of Agriculture and Food Security, 20 women facilitators were trained in food preparation and utilization suitable for people living with HIV.

### Monitoring and evaluation

In order to enhance ownership of the project and achieve agreed milestones, a community based monitoring and evaluation (CBM&E) system was developed. This CBM&E system involved monthly reporting on progress on agreed actions by communities to the Village Development Committee (VDC)<sup>2</sup> then to Area Development Committee (ADC). Under the decentralization system in Malawi, the ADC is the highest community body chaired by a Traditional Authority (TA) that reports directly to the District Assembly.

### **Results**

#### Identification of suitable farming practices for HIV and AIDS affected households:

Four farming practices were identified as beneficial for HIV and AIDS affected households because of their low labor requirements and the potential to increase food production evenly throughout the year. These included integrated aquaculture-agriculture (IAA), irrigation during winter, low cost stream diversions (water canals), group construction of ponds that cushions those with limited ability to construct a pond, and a community based monitoring and evaluation system.

#### Adoption of IAA

Project participants integrated fishponds with over 100 hectares of indigenous vegetables and maize. Five hundred existing ponds were rehabilitated and another 200 new ones were constructed, including two ponds dug by primary school children of an average size of 200 square meters each.

#### *Crop production*

With an estimated maize yield of 3 tons/hectare, 300 tones of maize grain was produced enough to feed over 1000 people<sup>3</sup> for the whole year and capable of supplementing energy food for 4500<sup>4</sup> adults during the season of food shortage (December to February) and replace grain purchase of over MK7,500,000<sup>5</sup> (USD54,000<sup>6</sup>).

#### *Fish production*

The new and rehabilitated ponds were stocked with over 134,000 fingerlings. *Tilapia rendallii* was the species of choice, as it grows to market size (100 grams) in 4-6 months on rice or maize bran as supplementary feed. *Tilapia rendallii* also feeds on relatively large amounts of vegetation which made it a good candidate in the IAA system. The yield from the ponds averaged 1500kgs/hectare that translated to a production of 21 tones of fresh fish. Because most of the fish was consumed locally, the per capita supply of fresh fish was estimated to have increased by 150% from about one kilogram of fresh fish per person, as estimated before the start of the

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<sup>2</sup> A development committee at the group village headman level under the decentralization act.

<sup>3</sup> 300kgs is enough to feed 1adult per annum.

<sup>4</sup> 1200 households with average size of 5 and an average of 50% adults

<sup>5</sup> In June 2006, maize was selling at MK25/kg

<sup>6</sup> 1USD = 140 Malawi Kwacha (MK)

project. Previously, the main source of fresh fish was from Liwonde market about 40 kilometres and was costing around MK300 per kilogram by July 2005.

### Sustainable impact

Records from the community (through CBM&E) indicated that 150 households in the project target area had sold fingerlings worth MK430, 000 (USD3071) by June 2006, which translates to an average of MK3000 (USD 21) for each household. This was almost double the annual income of these households from one fish production cycle (6 months).

A nutrition survey conducted by World Vision in the same area, on a previous aquaculture project in September 2005, found out that only 0.67 percent of global severe malnutrition using weight for height and 1.8 percent of global malnutrition and 0.44 percent of oedema in under five children was recorded. The reduction in malnutrition was all attributed to high protein dietary intake from fresh fish.

### **Discussion**

The project's success is based on the understanding by the traditional leaders of the plight of HIV and AIDS affected households. This understanding resulted in effective selection of beneficiaries and provision of necessary environment for the project especially on land allocation. Fish farming demands access to suitable land and water supplies, which some households affected by HIV/AIDS lacked. Traditional leaders allocated land suitable for IAA to the farmers' clubs. In due course, the leaders became respected by their subjects and were a source of learning for many that came for study visits to the project area. Fifteen study visits by both government and non-governmental organisations outside the project district were done to the project site during the one year duration of the project.

Young people actively participated in the project, many taking up the challenge of fulfilling leadership roles. The youth became drivers of development as trainers in pond construction, provision of labour through farmer clubs when constructing ponds, and dissemination of HIV and AIDS information to the communities.

The above innovations resulted in the adaptation of aquaculture to suit the needs of 1200 (60% women-headed) households affected by HIV and AIDS by addressing mainly land and labour constraints. The approach succeeded because it cheaply and efficiently integrated aquaculture into existing farm operations. Investment on farm inputs was minimal because farmers were encouraged to use farm wastes and crop by-products to feed their fish. The provision of additional water in the dry season expanded crop and vegetable production. Farmers have started growing valuable crops like bananas and guava on the perimeter of their ponds, taking advantage of the water that seeps into the surrounding soil to keep their plants thriving. Also, the sediment dredged from the bottom of the ponds is an effective fertilizer that can boost crop production with just a single application.

## **Limitations**

The diverse scope of the project was necessary to canvass the various interactions among nutrition, income, HIV/AIDS, livelihoods and group action. Nutrition impacts are difficult to observe within one year and according to nutritionists, the minimum period for studying nutritional impact is five years. The small sample size (only Chingale community) did not allow for comparison and analysis of the differential effects of IAA responses to HIV/AIDS affected household. Given the disproportionate impact of the epidemic on women (in terms of HIV infection and the socio-economic impacts of AIDS) and their traditional roles in family management (e.g., caring for the sick, provision of household services), a rigorous gender analysis would have greatly enhanced understanding of these interactions and this needs to be a priority in future efforts. Though further analysis is needed, some references to the impacts and benefits of this project were made: WorldFish impact study report (Dey et al 2004); Integration of Food Security and HIV-AIDS Programming in World Vision (World Vision 2004); FAO plan of action, Gender and development (FAO 2003); Mitigating the impact of HIV/ADS on food security and rural poverty (FAO 2003b); and World Vision nutrition survey report (World Vision 2005). All these have demonstrated the potential of small-scale aquaculture in improving nutrition and food security in poor communities.

## **Conclusion**

This project has demonstrated that one avenue to manage the effects of HIV/AIDS is to increase the resilience of rural households to food insecurity through actively involving them in economic activities such as IAA. The potential impact of the project might be in line with the Chinese proverb, “Give a man a fish and he will eat for a day. Teach him how to fish and he will eat for a lifetime.” When technology transfer and skills development take place in a participatory manner, many opportunities exist for answering the key needs of affected households. Aquaculture offers a particularly relevant set of benefits and has shown to effectively increase micronutrient intake and status, especially when combined with effective behavioral change and communication (Hawkes and Ruel, 2006). IAA in particular ensures steady cash income through diversified and year-round agricultural production, as well as the opportunity to raise larger sums of cash quickly from fish, and participation in market-oriented clubs of fish farmers that are spreading throughout Malawi.

Developing customized technologies are a critical component in setting an all-inclusive strategy for economic growth among HIV/AIDS ravaged families in Malawi. In scaling out such technologies, policymakers can learn from the Chingale experience. The challenge is to determine where the Chingale lessons can and cannot serve as a guide, and this challenge is partly country and location-specific. In the context of the realities of the effects of HIV/AIDS on affected families, priority action areas for enhancing the welfare of the vulnerable groups primarily requires building an all-inclusive agricultural and rural development framework which encourages:

- Development and use of innovative approaches to target vulnerable groups in the production, processing and marketing sectors
- Investing in technology development that best suit the need of vulnerable groups
- Increased participation of women, youth and orphans in the targeted approaches

An effective implementation of these priority actions may require strong institutional and organizational support and arrangements. Foremost, initiatives to generate country and location specific lessons in the Sub-Saharan African region where most of the HIV/AIDS infected and affected families live and remain predominantly resources poor are long overdue. Such lessons and knowledge will facilitate the formulation of an enabling policy framework for both institutional and technological innovations in dealing with vulnerable groups such as those infected and affected by HIV and AIDS.

## **Recommendations**

Despite the limited implementation period, the project provides the following lessons for aquaculture development projects on vulnerable groups:

- Teach IAA farmers to maximize benefits for terrestrial crops.* Fish farming can boost productivity across the farm by improving water availability and providing a new and renewable source of fertilizer in the form of pond sediment. This can upgrade a subsistence farm into one that also produces cash crops. During drought which is expected to worsen in Malawi with climate change, ponds can make participating farmers more resilient. WorldFish research has shown that farms employing IAA are nearly 20% more productive during drought than farms without fishponds (Dey et al 2004).
- Promote IAA as a system that produces nutritious food with modest labour demand and sustains farm productivity year round, even during drought.* Previous efforts to restore historically high levels of fish consumption in Malawi through aquaculture failed partly because the targeted aquaculture systems required unduly large investments. The IAA approach is succeeding because it cheaply and efficiently integrates aquaculture into existing farm operations, with farmers using kitchen scraps, crop by-products and other farm wastes to feed their fish. IAA ponds can produce 1,500 kilograms of fish per hectare annually, often providing a surplus that can be sold to pay for medical care and other household needs.
- Draw from the community and other stakeholders when formulating best practices.* Innovations are likely to be effective when developed with the active participation of beneficiaries, their communities and other stakeholders, as communities assume greater ownership of innovations that they helped formulate. The farmer extensionist approach has been proven to be very effective in inducing adoption because among other factors farmers tend to understand fellow farmers better.

- d. *Ensure the full participation of women in the project.* The success of most projects to improve agriculture depends on reaching women, whose roles in the rural economy often give them the greater need for knowledge and greater ability to put it to good use. This is doubly so for projects addressing nutrition and health, as women typically manage the homestead and are the primary caregivers to their children. The success of this project hinged on the strong participation of women. Experts working with WorldFish and World Vision taught the women how to raise process and market their fish, generating much-needed income for their families.
- e. *Use the community to monitor and evaluate their own projects.* Community-based monitoring and evaluation encourages ownership of the project activities. It enhances local capacity of project stakeholders to reflect, analyze, learn, adjust and take corrective actions to ensure that the project achieves its objectives. Community participation in all project activities was outstanding, and participants displayed a strong spirit of ownership. Communities transparently accounted for all project inputs and outputs at all levels and there was transparency from the community level up to those responsible for implementation and funding the project through monthly monitoring and evaluation meetings.
- f. *Develop partnerships with nongovernmental organizations, community-based organizations and government extension services.* Partnerships facilitated effective implementation, as each partner concentrated on the activities it knew best. Partnerships reduced the time needed to train implementation teams, ensuring that most of the project's limited resources were directed to beneficiaries. The WorldFish-World Vision partnership in particular facilitated growth by making available to farmers technological, managerial and marketing information of the highest quality. WorldFish's experience in technology development and World Vision's experience in community mobilization made the partnership effective at delivering outputs on time.

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The expansion of Integrated Aquaculture-Agriculture (IAA) in Malawi has not adequately benefited the HIV and AIDS affected households. Yet such households need IAA benefits the most, especially for ensuring nutritional benefits for the sick. Their plight and priorities have not been investigated in order to design appropriate IAA interventions. This paper aims to involve HIV and AIDS affected households in adopting IAA through adjusted practices in fish production and utilisation. In particular, the implications of their labour constraints and relative isolation from producer organizations and markets to improve household incomes, food security and nutrition. The paper demonstrates that developing customized technologies are a critical component in setting an all-inclusive strategy for economic growth among HIV/AIDS ravaged families in Malawi. While it is not a solution for all their problems, the results indicate that IAA can dramatically improve the ability of families to cope with the effects of HIV/AIDS by doubling households incomes and increasing fish and vegetable consumption by about 150% among rural communities.

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