



CASE STUDY: BETTER BUSINESS PRACTICES BOOST INDIAN GOVERNMENT EFFORTS TO PROVIDE NUTRITIOUS FOOD TO YOUNG FAMILIES

Global Alliance For Improved Nutrition (GAIN) Invests In Andhra Pradesh Foods To Improve Nutrition Of Women And Young Children

EXECUTIVE SUMMARY

India has the highest rates of malnutrition in the world with 74.3 percent of pre-school children suffering from anemia. In the state of Andhra Pradesh, 43% of children below three years of age are stunted and 12% are underweight.¹ The International Food Policy Institute and their India State Hunger Index lists the situation in the state of Andhra Pradesh as “serious.”²

In 2008 the Global Alliance for Improved Nutrition (GAIN) in India approached the government-owned organization Andhra Pradesh (AP) Foods about working together to scale up and improve their production of fortified supplementary foods, such as ready-to-cook mixes for common meals. These fortified foods are produced in a central facility located in Hyderabad, India and distributed free of cost to mothers and young children through local community centers located throughout the state of Andhra Pradesh in order to improve their nutritional status.

The collaboration between GAIN and AP Foods that began in 2010 has led to significant improvements in the nutritional quality and packaging of the food that AP Foods produces. Additionally, GAIN's investment and expertise acted as a catalyst for substantial financial commitment from the State government to build a new, world class production facility, which will allow AP Foods to go from supplying just 222 of the community centers, to all 385 in the state.

The GAIN - AP Foods' partnership demonstrates how to use business-centered practices to achieve improved nutrition product quality and efficiency for public sector social objectives. They prioritized impacting efficiency, scale, and quality incrementally while remaining cost effective. This allowed them to effectively evaluate expert recommendations with an eye towards sustainability of the organization, as well as impact on women and children, the ultimate beneficiaries.

Key Strategic Lesson

It can be challenging to develop a high-quality nutritious product at low cost for free distribution in a public delivery system. Nutritional quality and food safety come at a cost.

Key Operational Lesson

While targeting investments that drive long-term value the organization must continue to identify opportunities for short-term improvements.

¹ ICF International, 2012. The DHS Program STATcompiler, May 2014

² Global Hunger Index. 2013. *The Challenge of Hunger: Building Resilience to Achieve Food and Nutrition Security*. International Food Policy Research Institute, Washington, October 2013.

INVESTMENT SNAPSHOT

Geographic coverage: Andhra Pradesh, India

Project start: April 2010

Stakeholders: GAIN, Andhra Pradesh Foods, State Government agencies

Nutrient Products: Fortified Foods

- Ready-to-cook products such as Kichidi mix, Halwa mix, sweet porridge mix (for children 3 to 6 years of age and pregnant and lactating women)
- Ready-to-eat products (modified therapeutic foods for children 6 to 36 months of age and snack foods for children 3 to 6 years of age)

Addressed customers: 3.23 million

Project Goals:

- Increased production
- Improve product formulation and package
- Upgrade quality management systems

Total anticipated project cost: \$7.3 million (40 crores)

GAIN contribution (% total project): \$1.3 million (25%)

State contribution: \$5.47 million (75%)



ABOUT GAIN. The Global Alliance for Improved Nutrition (GAIN) is an international organization launched at the UN Special Session on Children in 2002 to tackle the human suffering caused by malnutrition. We believe that everyone in the world should have access to an affordable, healthy and nutritious diet. We focus our efforts on children, girls and women because we know that providing these groups with sustainable, nutritious diets is crucial to ending the cycle of malnutrition. We act as a catalyst – bringing together alliances of governments, business and civil society - to find solutions and deliver results. Through this collaborative approach, we believe that malnutrition can be eliminated within our lifetime.

For Further Information

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BACKGROUND & CONTEXT

As of 2008, India still ranked worse than most sub-Saharan countries on the Global Hunger Index. The country strives to address malnutrition through 1.3 million local outreach centers that provide education, healthcare and nutrition services primarily to women and children.

In 2005, the last time a comprehensive national study was conducted, almost half of India's children under five were considered "stunted" or too short for their age, an indication that they had been undernourished for some time. Twenty percent were considered "wasted" or too thin for their height – a level at which the WHO considers this a critical health problem – and forty-three percent were generally underweight.³ Perhaps most telling is that as of 2008 India still ranked worse than most sub-Saharan countries on the Global Hunger Index, with 13 of its 17 major states (accounting for 95% of the population) falling into the categories of "alarming" or "highly alarming."⁴

In India, nutritional aid for children, pregnant women, and lactating mothers is provided primarily through the Integrated Child Development Services (ICDS). This outreach program, sponsored by federal and state governments, includes a highly decentralized network of 1.3 million Anganwadi Centers (AWCs), community education and aid centers that provide education, healthcare, and nutrition services primarily to women and children. The AWCs are also the primary means by which free supplementary food, such as ready-to-cook mixes, is distributed to women and children.

In 2004, the Supreme Court issued an order that changed the policy environment in which nutritional programs, such as ICDS, operate. This order focused primarily on excluding commercial contractors, and has been widely interpreted as a mandate against centralized production of supplementary nutritional products. As a result, decentralized self-help groups (SHGs), comprised of rural women who jointly own and operate the cooperatives, have been promoted and large-scale, centralized organizations have faced opposition and been viewed with suspicion.

Despite the push to decentralize, AP Foods, being a government-owned organization and not a commercial

³ International Institute for Population Sciences (IIPS) and Macro International. 2007. *National Family Health Survey (NFHS-3), 2005–06: India: Volume I*. Mumbai: IIPS.

⁴ Naresh Saxena, "Hunger, Under-Nutrition and Food Security in India," Working Paper 44, CPRC-IIPA 2010, p. 28: http://r4d.dfid.gov.uk/PDF/Outputs/ChronicPoverty_RC/CPRC-IIPA44.pdf

ABOUT MALNUTRITION AND FOOD FORTIFICATION

Malnutrition is a global issue that affects billions. The term malnutrition refers to both undernutrition and overnutrition. Undernutrition indicates a lack of the necessary energy, protein or micronutrients while overnutrition and obesity mean too much energy, fats or specific micronutrients.

Vitamins and minerals, also known as micronutrients, are a critical component of good nutrition. In particular, folate (vitamin B9), iodine, iron, vitamin A, zinc, and other B vitamins including thiamin (vitamin B1), riboflavin (vitamin B2), niacin (B3), cobalamin (vitamin B12) and pyridoxine (vitamin B6) are important for healthy and productive populations. Without them, children develop birth defects, blindness and an inability to learn properly, among other long-term disabilities.

Food fortification is the process of adding vitamins and minerals to staple foods, like cereal and condiments. With GAIN support, more nutritious foods and condiments such as wheat flour, maize meal, salt and vegetable oil are now available in over 28 countries.

company, continues to operate with a centralized model as it has since it was established in 1974. With initial backing from UNICEF, CARE, and the Indian Government, it started by producing a fortified snack for malnourished preschool and school-age children, pregnant women, and lactating mothers – hereafter referred to as "beneficiaries." Currently, AP Foods maintains an industrial scale production and storage facility in north-east Hyderabad, producing ready-to-cook and ready-to-eat mixes, which are distributed for free to over 3 million beneficiaries in the Andhra Pradesh region.

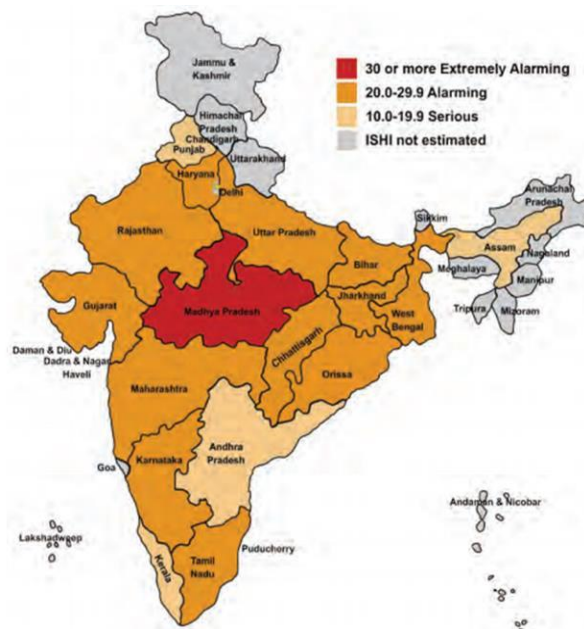


Figure 1 – map of india state hunger index, by severity (international food policy research institute)

AP Foods has many advantages over decentralized models such as the SHGs, including increased economies of scale and a consolidated organizational structure that allows for easier management. With this centralization, however, come high start-up capital requirements, a long ramp up period and a concentration of risk. Additionally, the model does not align with government policies that encourage decentralization.

Regardless, AP Foods' centralized model minimizes material and packaging costs, helping to drive profits. Additionally, by centralizing production AP foods achieves benefits in quality control and standardization. The model relies heavily on local partners to coordinate complex distribution logistics and efforts to educate beneficiaries on why and how to use its products.

OBJECTIVES AND APPROACH

GAIN Invests in Andhra Pradesh Foods

Six years after GAIN approached AP foods about working together, AP foods new facility is complete, and the investment has positively impacted operational efficiency, capacity and product quality.

GAIN's India Country Manager first approached AP foods in 2008 about working together to scale up and improve the centralized production of fortified supplementary foods. GAIN's objective for this project was to provide AP Foods with financial and technical support to enable an increase in the capacity of its production facility, improve its product formulation and product packaging, and upgrade its quality management systems. GAIN, in partnership with the State government, has co-invested in the construction of a completely new production facility, which required a total capital investment of \$7.3 million.

The GAIN-AP Foods partnership is now approximately five years old, and with the new facility almost complete with all equipment under installation, this investment has already had a considerable impact. All of AP Foods' quality assessment and quality control systems have been upgraded; packaging features (size, design and materials) have been improved to ensure longer shelf life; all trans-fats have been removed; and milk powder has been added to the blended fortified food products meant for children 6 to 36 months of age. The new, modern production plant is scheduled to be fully operational by mid-2014.

Improve Nutritional Value and Shelf Life of Products

Working with GAIN, AP Foods took a market-based approach to enhancing the quality and packaging of their products, maintaining a balance between an ideal product and practical considerations such as price, acceptability, demand and quality.

Originally, GAIN recommended that AP Foods make a few key product formulation changes to enhance the nutritional value of their fortified supplementary foods – specifically, to add milk powder and to replace hydrogenated vegetable oil (which contains trans-fats) with soya bean oil. This recommendation was also supported by the National Institute of Nutrition. These new ingredients were more expensive and more difficult to source. For example, AP Foods found that the recommended soya bean oil was too costly for their existing production budget. AP Foods leveraged its sophisticated materials procurement platform to eventually identify and source palm oil as a viable substitute that fitted within its existing budget.

In the case of milk powder, AP Foods waited to make any formulation changes until the Indian government increased the price at which they would purchase the product, giving them the financial flexibility to source, process, and incorporate milk powder.

AP Foods leverages its scale to initially screen potential vendors by quality of reputation, standards, and product. This process ensures that AP Foods purchases large quantities of input materials at favorable costs only from vendors with the proper licenses, certifications, registrations, and safety standards. As a result, AP Foods is able to purchase affordable inputs from vendors without compromising on product quality and safety.

GAIN also advised AP Foods to modify the product packaging in order to improve the shelf life; specifically, to use high-density poly ethylene (HDPE) portion-sized consumer packets instead of 20 kilogram woven sacks. However, this suggestion was costly, so AP Foods again explored less expensive, alternative solutions. As a result, AP Foods opted to switch to 10 kilogram HDPE bags. These were cheaper than consumer portion-sized packets, but still preserved the product shelf life better than the woven sacks did. Eventually, when the product budget was increased and milk powder was added to the formulation, AP Foods made the switch to 2.5kg HDPE consumer packets, each equaling a month's ration.

Increase Production Capacity and Improve Quality Assurance

A primary objective of this project was to increase the production capacity of AP Foods from supplying 222 of 385 ICDS centers in AP, to supplying all of the centers and improving the Quality Assurance processes.

In Andhra Pradesh, GAIN, AP Foods, and the government have co-invested in a new facility, rather than upgrade the existing plant. Although an upgrade of the existing plant might have been quicker, building a new plant will ultimately generate more comprehensive operational improvements. The new facility will include safer, highly automated production, and will enable

greater scale that will allow AP Foods to reach the entire state of Andhra Pradesh. Furthermore, GAIN's decision to invest acted as a catalyst for the new plant project by motivating the Andhra Pradesh government to also make an investment, which was three times the amount of GAIN's.

The new fully automated facility is expected to be operational as of October 2014 and will require less labor and include a more efficient layout than the existing production facility.

The new facility will help AP Foods achieve efficiency similarly found in private enterprises and will drive an estimated 50% increase in production capacity of fortified supplementary foods (FSFs)

AP Foods also invested in improving quality control and assurance processes while avoiding driving up long-term input costs. This is significant because it demonstrates the benefits of a large-scale production facility versus smaller, less sophisticated food production models that lack standardized quality control processes. Rigid quality control mechanisms that ensure the right nutrient mix and proper packaging are critical to achieving AP Foods' primary goal of combating malnutrition. When coupled with scale (once the new plant is complete), these processes will allow AP Foods to produce enough volume of high quality products to serve all beneficiaries in the state of Andhra Pradesh.). This focus on investing in a quality product and efficient production to reach scale while maintaining economic viability makes the project stand out from other more traditional approaches by social organizations and government, which often struggle to balance social impact with efficiency and quality.

However, given the long time frame required to build a new facility, finding short-term opportunities to reduce costs and improve production efficiency is essential. AP Foods had already made significant operational improvements to the productivity of their existing facility prior to their partnership with GAIN, and ongoing improvements have since continued. With GAIN support, AP Foods has been able to drive short-term improvements in product formulation, packaging, and food quality certification.

Additional opportunities to improve plant efficiency still exist. For example, if AP Foods were to hire a lean operations specialist to identify and execute significant, though relatively inexpensive, process improvements at the existing AP Foods facilities, production capacity could be significantly expanded long before the new plant becomes fully operational.

GAIN's involvement was vital in providing credibility to build a new plant, and its investment of 10 crores (\$1.8 million) unlocked additional local government investment of 30 crores (\$5.4 million). This model can be used to

demonstrate the benefits of centralized production to other State governments as a cost-effective and efficient strategy to produce high-quality supplementary foods at scale. Unlocking government funding is critical to launching large-scale nutritional programs, and in this project GAIN was highly successful in doing so by bringing both expertise and capital to the partnership.

CHALLENGES AND OPPORTUNITIES

Distribution and Promotion

The impact of the improved supplementary foods on the beneficiaries' nutritional status may not be fully realized without appropriate distribution of the product, as well as sufficient product promotion that address issues around improper usage, sharing amongst household members or potential acceptability issues.

While this government-sponsored approach allows the program to achieve scale relatively quickly and cost-effectively, it can be difficult to know if the products are reaching the right beneficiaries and are being used properly. In addition, the government making products available to all income groups can have a negative effect due to a limited appeal to people that don't want to be associated with lower income groups, but may still benefit from the products.

AP Foods has improved its distribution process by integrating more closely with the demand end of the supply chain through mFoods, a mobile technology and web-based supply chain management tool. This technology works by having Anganwadi Workers (AWWs) at the community centers enter product requests through mobile phones, and then a centralized system tracks those requests along with their date and time. Alerts are then sent to relevant stakeholders. In response to the requests, AP Foods can dynamically adjust its supply schedules to better meet demand. With this system, inefficiencies in the order and supply process can be tracked by the stakeholders throughout the supply chain, resulting in more timely production, less waste, proper accounting, and increased overall efficiency.

While AP Foods occasionally interacts with the AWWs, there is more opportunity to develop these relationships and reap the benefits of two-way knowledge sharing. Gaining a better understanding of beneficiaries and their behavior might inform product development and directly address their needs and preferences, resulting in greater acceptability. In turn AP Foods could use mFoods to send messages to the AWWs about the benefits of its products.

Education plays a critical role in impacting the nutrition of beneficiaries and it has proven to be a significant challenge. A "local foods model" was developed by ICDS

in recent years in which raw ingredients are supplied to the AWCs, which cook and directly serve the food to the beneficiaries. A study⁵, conducted by the state government in 2012 and supported by GAIN, NIN, and AP Foods, compared the impact of the AP Foods model to that of the local foods model and showed that awareness of health benefits is critical to generating more favorable attitudes towards supplementary nutritional products.

However, in India it is prohibited to market food for children under two years old. This handicap makes the complicated process of influencing behavioral change even more of a challenge.

Further engagement across the entire supply chain, including educating the AWWs, who are actually distributing the food, as well as raising awareness with the beneficiaries, can ensure that nutritional benefits of the supplementary foods are better understood and the product is being used correctly, ultimately leading to improvements in growth and development of the children in Andhra Pradesh.

Measuring Impact and Demonstrating Success

Though the partnership goals relate to improving the consumption rates, acceptability, and nutritional impact of AP Foods' products, the project scope and budget unfortunately initially did not allow for substantial resources to be dedicated to impact assessments.

There were three reasons that the GAIN-AP Foods project did not invest in impact assessments, at least upfront. First, AP Foods considered the measurement of beneficiary uptake, acceptance, and nutritional status outside the scope of its mission. Second, measuring the impact of nutritional programs requires a significant financial investment in order to track the many variables that can contribute to nutrient deficiencies and stunting outside of supplementary nutrition interventions (illness, infections, lack of sanitation, feeding practices, seasonality, etc.). Third, there is a lack of accurate data from the monthly AWW reports.

A small, unpublished study carried out in 2012 compared the impact of the AP Foods model to that of the local foods model,⁶ which seemed to suggest better nutritional status, better food and nutrient intake, and lower incidence of nutritional deficiency and morbidities for pre-school children using AP Foods products.

⁵ Study: "Evaluation of the acceptability and the nutrient adequacy of meals supplied by A.P. Foods to the ICDS centers for pre-school children (3-6 years) and the impact on nutritional status and comparison with the local food model" SOURCE??

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In order to fill the data gap, GAIN has decided to conduct a consumption study towards the end of the project that will look at the intake of AP Foods products by beneficiaries, identify the gap with dietary requirements, estimate the nutritional gap that AP Foods products can fill, and simulate the impact of the products. The study will also look at differences, if any, in the acceptability of the new formulation (with milk powder) versus the existing formulation.

Data on acceptability, compliance, and coverage can contribute to a better understanding of the impact of the investments in improving product composition, quality and shelf life and therefore to better measure the investment's success. Additionally, empirical data can help to advocate for the beneficial impact of models like the AP Foods-GAIN partnership.

OUTCOMES AND LOOKING AHEAD

GAIN's project in Andhra Pradesh has already demonstrated the value of applying a business mindset to a public delivery system and could well become a model for centralized food production in India.

GAIN and AP Foods have been able to drive improvements in quality and nutritional value without losing sight of cost implications. GAIN, in partnership with the regional government, made a sizeable capital investment in a new production facility that focused on maximizing the efficiency, cost, and quality of production, rather than generate additional employment or social impact, as is often the goal with development projects. The business rationale applied to this capital investment will ultimately secure an efficient, cost-effective supply of supplementary nutrition for Andhra Pradesh for many years to come.

Plant Payback Calculations:

	Amount	Unit
Capital Cost	40	Crores
Surplus per MT	1000	Rupees
Capacity (annual)	144,540	MT
Annual surplus	14.5	Crores
Payback*	2.8	Years

* Assumes 16MT/hour and 1 rupee profit per kg (per AP Foods management guidance). Capital Cost includes GAIN factory and directly related projects. Calculation does not include time value of money or financing costs which relies on accurate assessment of cost of capital

The newly completed facility will have an estimated payback period of three years.⁷ Ultimately, the investment may take longer than expected to bear fruit,

⁷ GAIN data and Tuck School of Business analysis

but there are some additional potential operational improvements along the way, such as considering lean modifications, which would make the overall approach even more successful.

Key Operational Lesson

While targeting investments that drive long-term value the organization must continue to identify opportunities for short-term improvements.

GAIN's decision to invest in a new facility rather than fixing up the old one prioritized long-term value over short-term fixes. However, the focus on long-term, comprehensive operational improvements did not come at the cost of opportunities to reduce costs, improve production efficiency and also improve quality control and assurance processes. With GAIN's support AP Foods was able to make short-term improvements in areas such as product formulation—they got rid of hydrogenated oil and added milkpowder; packaging—they substituted packaging with longer shelf life and also smaller, more affordable packets; and food quality certification. GAIN prioritized impacting efficiency, scale, and quality of the product incrementally, while remaining cost effective. This allowed the GAIN-AP Foods partnership to effectively evaluate the nutritional, packaging, quality assurance and production recommendations that were being made by experts with an eye towards sustainability of the organization as well as impact on beneficiaries. By focusing on the economically feasible and sustainable options in a variety of areas, AP Foods achieved significant incremental improvements in quality and production, while planning and preparing for major, long-term investment in the new facility.

Key Strategic Lesson

It can be challenging to develop a high-quality nutritious product at low cost for free distribution in a public delivery system. Nutritional quality and food safety come at a cost.

GAIN was able to drive improvements in AP Food's product, by eliminating trans-fat and increasing the nutritional quality, without losing sight of a sustainable cost structure. GAIN and AP Foods were able to find compromises, such as using palm oil rather than soya bean oil, to achieve nutritional improvements. Though not the ideal product composition, these compromises improved the product while acknowledging cost constraints. In addition, improvements, such as those reducing the size and enhancing the quality of the packaging, were made gradually in close consultation with government counterparts, to ensure improvements would still result in sustainable operations.

Looking Ahead

AP Foods seeks to become recognized as a leader in centralized food production in India.

When the new production facility is completed, it will begin hosting other states' leaders to observe and learn about the model advocating for adoption and replication in their respective states. Additionally, AP Foods could potentially leverage its size and production capability to supply other Indian states with nutritional products.

However, before AP Foods serves as a model, it will need to increase focus on the distribution and consumer advocacy end of the value chain. As was mentioned before, a guaranteed demand from state government meant that GAIN India focused on the product and



production end of the value chain. So, while there have been significant product and production improvements, the overall impact could be limited by improper usage, sharing or acceptability issues by beneficiaries. Further engagement across the entire supply chain, including capacity building of the Anganwadi Workers (AWWs) as well as awareness-raising with the beneficiaries can ensure that nutritional benefits of the supplementary foods are better understood, and that the product is used correctly.

The Agricultural University of Hyderabad will conduct a consumption and acceptability study before the end of the partnership term, which will provide empirical data on the impact of product improvement and will support advocacy for the model. Additionally, GAIN will work to evaluate the success of its involvement with AP Foods to develop alternative strategies that appease proponents of both centralized and decentralized food production, with the hopes of providing financial and operational support to other states throughout India that face nutritional challenges.

CONTRIBUTING ORGANIZATIONS

This article was written in collaboration with the Global Alliance for Improved Nutrition (GAIN), the Global Business School Network (GBSN), and the Tuck Global Consultancy Program at the Tuck School of Business at Dartmouth. Information is as of January 15, 2014. For more information on GAIN, please contact Marti van

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