



DAIRY DIRECTIVE PROJECT



Final Report

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FINAL REPORT

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List of Acronyms

ARI	Acute Respiratory Infections
DIDA	Dairy Industry Development Association
DDP	Dairy Directive Project
EMPA	Egyptian Milk Producers Association
HACCP	Hazard Analysis and Critical Control Point
HEA	Health Extension Agents
MOH	Ministry of Health
ToT	Training of Trainers
USAID	United States Agency for International Development

I. Executive Summary

From May 2001 through August 2004, ACDI/VOCA implemented the Dairy Directive Project (DDP), a three-year project designed to improve the health of children and pregnant women in rural Egypt by stimulating their consumption of dairy products, thus contributing to lowered rates of infant and child malnutrition and mortality. To this end, DDP has successfully implemented a two-pronged approach: increasing the availability of safe, hygienically processed milk and dairy products throughout Egypt through technical training to commercial and smallholder dairy processors; and stimulating demand for dairy products through a pervasive public awareness campaign on the nutritional value of dairy products.

DDP's main objectives involved a) transforming the milking practices and dairy consumption patterns of 2,000 smallholder families in six target governorates in Upper Egypt—Giza, Fayoum, Bani Suif, Minya, Sohag and Assyut; b) exposing half of the Egyptian public (around 30 million individuals) to a public awareness campaign on the nutritional importance of dairy products; and c) stimulating the productive capacity of the commercial dairy industry. All of these objectives have been met over the life of the project, with the first two greatly exceeded. The DDP team has been relentless in developing innovative approaches to disseminating the project's message to a vast audience, while ensuring that this message is properly understood and translated into positive behavioral change. As a result of project activities, the levels of awareness, adoption of improved practices, and consumption of dairy products have far surpassed the expectations laid out in the DDP contract.

To achieve its ambitious targets, DDP engaged a range of stakeholders, including the Ministry of Health (MOH), smallholder farmers, public and private health care providers, the mass media, and the private sector—all of whom are represented in the six target governorates. These stakeholders formed a mutually reinforcing network of support for DDP activities, which can be credited both with DDP's success during the life of the project, as well as the prospects for sustainability of activities initiated under the project. Through these stakeholders, DDP successfully leveraged over 9,000 minutes of free national broadcast time for creative, engaging television and radio commercials which disseminated the project's message to children and adults nationwide. The approach of engaging a range of stakeholders and integrating project activities into short- and long-term public and private sector strategies not only succeeded in exposing a majority of the Egyptian public to DDP's message through appropriate media, but also built institutional support for the DDP agenda that ensured the continuation of several of these activities after completion of the project.

DDP engaged MOH support and sponsorship for the project's training of Health Education Agents (HEAs)—whose role involved conducting village-based meetings and household-level follow-up to introduce and ensure adoption of improved, hygienic milking, processing, and consumption patterns among smallholder families. As well as developing a base of thoroughly trained HEAs, DDP cycled all 247 of these HEAs through Training of Trainers courses, leaving them with the capacity to train other HEAs in the future. At project close, these core HEAs trainers had trained 1,385 other incoming HEAs. More importantly, DDP fostered the commitment of the MOH to continue supporting HEA activities as part of the ministry's own strategy.

At the village level, the HEAs' messages are reinforced by DDP-trained doctors and health-care providers who have the opportunity to advise pregnant woman and new mothers on dairy nutrition. These doctors and health-care providers utilize their clinics to display and distribute DDP educational materials, such as posters, calendars and brochures. This initiative has transformed the function of these village clinics from treatment-focused to education-oriented institutions, a function which has continued long after direct training of doctors ceased as a direct project activity. Many of these materials have been supported by sponsorship from commercial dairy companies, which received targeted technical assistance from DDP volunteer experts on quality control, product development, HACCP standards, and other pertinent issues in order to improve, modernize and enhance the production capabilities of the Egyptian dairy industry for the domestic and export markets.

More importantly, there is strong indication that DDP's achievements positively impacted child malnutrition and mortality rates in the target areas. The rates for the six target governorates decreased from an average of 45 deaths per thousand children under the age of five in 2000 to 40 in 2004, according to data collected by the Ministry of Health. In addition, consumption patterns associated with the main malnutrition-related childhood illnesses (diarrhea and Acute Respiratory Infections) improved throughout the DDP target areas, as well as among the population as a whole. The expanded scope of the project from the original design meant that DDP's impact was diffused beyond specific intervention sites, and therefore can be considered to be a factor in Egypt's success in lowering malnutrition and mortality rates among infants and children on the national scale.

Key results from the DDP activities included:

- **41,745** smallholder mothers and other primary family-care-takers participated in **1,979** village meetings conducted by HEAs. Of a sample of 12,181 participants, **all** of these families adopted **at least 10** of the 12 recommendations provided by the HEAs, while **19.6 percent** of families adopted **all 12** recommendations. This level of adoption represents **more than 20 times** DDP's target of 2,000 smallholder families adopting improved milk handling and processing practices.
- **247** Health Education Agents were trained both as practitioners and as trainers in DDP methodology throughout the project's six targeted Upper Egypt governorates, through 112 training programs. At project close, these core HEAs had trained another **1,385** individuals as HEAs.
- **24** promotional television commercials were produced and broadcast on all eight Egyptian television local channels. The in-kind value of **9,445** minutes of free air time donated to DDP by the eight channels amounts to **\$13,396,562**, representing **more than six times** the project's cost-share requirement.
- A total audience of **58.4 million** individuals viewed these television commercials. According to a survey conducted in both a DDP target governorate and a non-target governorate among a cross-section of Egyptian society (children, mothers, fathers, and grandparents), the average level of awareness of the message of the DDP campaign among viewers was **95 percent**. Applied to the overall DDP viewing audience, the total number of Egyptians aware of the DDP public awareness

campaign message is estimated at **more than 55 million**, exceeding the project target by **85 percent**.

- **58,574** children viewed **1,368** screenings of three feature-length DDP-produced videos. A random sample of these children indicated that **all** children retained at least one component of the video's message (such as the importance of milk to strong teeth) and **89 percent** were able to identify the negative consequences of not drinking milk. In terms of consumption patterns, **72 percent** increased consumption of milk and **88 percent** increased consumption of dairy products after viewing the videos. **4,900** of these videos were also produced and distributed to schools and the Ministry of Health.
- Due to increased demand generated in large part by DDP activities, retail prices of milk and dairy products increased by more than **16 percent** during the life of project, reducing the price gap between loose and packaged milk by **37 percent**.
- Average capacity utilization of commercial dairy processors rose to **58 percent** for both fresh milk and other processed dairy products, exceeding the project's target by **eight percent**.
- The percentage of the domestic supply purchased by Egyptian commercial dairy processing companies rose from 15.0 percent to 52.5 percent in 2004, a **37.5 percent** increase—exceeding the targeted increase by **17.5 percent**.

Other DDP achievements included:

- **20,000** copies of **five** educational brochures were designed, produced, and distributed by the DDP team to disseminate and reinforce the project's message of the importance of clean, safe milk.
- **15,000** copies of **five** posters (3,000 each) promoting the consumption of milk were produced and distributed by DDP. The posters were distributed during training courses and village meetings, as well as at health centers and doctors' offices.
- **3,000** copies of DDP's Milk Promotion Calendar were distributed annually for three consecutive years. The calendars were designed to promote the consumption of milk and dairy products by families in the six targeted governorates, and were distributed during the HEAs' village meetings and through the DDP follow-up visits. A significant portion of the cost of production was contributed by the major Egyptian commercial dairy companies
- **Three** radio dramas were produced and broadcast on Egypt's main radio stations. These consisted of two five-episode dramas, (*Love Always Wins* and *Dreams of Hind and Marwan*) with crucial plot elements promoting safe, sanitary dairy products; and one fifteen-episode radio comic drama (*Tales of Labanzad*), aimed at introducing nutritional information through humor and competitions. At the end of each episode, a quiz on nutritional information was presented to see how audiences retained information from the episode. Two winners were selected daily to receive a gift

consisting of dairy products contributed by the dairy companies with which DDP worked.

- 57 daily and weekly newspapers wrote and printed articles on the importance of milk for infants, children and pregnant and lactating women.

II. Project Background and Methodology

In April 2001, ACDI/VOCA was awarded the three-year Dairy Directive Project. The project began in May of 2001 and was subsequently extended for an additional four months through August 2004. DDP was designed to address the lack of dairy hygiene of smallholders, a significant cause of infant and child morbidity and mortality in Egypt. Several concerns related to hygiene involved in smallholder dairy enterprises in Upper Egypt were identified as the basis for the DDP design. Milk borne bacteria and infectious diseases such as E-coli, bacillus cereus, enterotoxigenic E-coli, hepatitis and intestinal tuberculosis were found to be prevalent in the canal water used to wash milking buckets among smallholder farmers. These diseases, in addition to significant amounts of cattle feces (traditionally used by smallholder dairy farmers to lubricate teats for milking) infected the raw, unpasteurized milk consumed regularly by smallholder farmer families, constituting a major cause of child morbidity/mortality. In addition, mothers often passed various infections on to their infants through childbirth or breast-feeding; and their malnutrition or illness commonly led to miscarriage or the birth of under-weight infants already predisposed to chronic illness or death. All of these issues were either directly or indirectly connected to the lack of clean, hygienic milk in Upper Egypt.

DDP Target Areas:

Giza, Fayoum, Bani Souef, Minya, Asyut, Sohag



Given these factors, DDP aimed to contribute to decreasing the rate of malnutrition, miscarriage and infant/child mortality by increasing both the availability of and demand for safe, hygienically processed dairy products throughout Egypt. DDP's strategy for achieving this aim engaged five categories of stakeholders—Ministry of Health (MOH) Health Extension Workers (HEAs), smallholder farmers, physicians, mass media professionals, and the private sector. All of these were engaged across six target governorates in Upper Egypt where the majority of smallholder dairy farmers reside—Giza, Fayoum, Beni Suf, Minya, Sohag and Assyut.

On the supply side, DDP's strategy targeted the dairy supply chain from smallholder dairy farmers producing small quantities of milk for household or village-level consumption to large-scale commercial dairy companies seeking to increase production capacity and market share. At the smallholder level, the pillar of the DDP design was the creation of a base of MOH extension agents providing a series of milking, handling, and dairy processing recommendations through village meetings and follow-up visits at the household level. By project completion, these HEAs had gained the capacity to continue teaching smallholder

farmers how to produce and handle clean, hygienic milk and dairy products as well as to train other HEAs in the DDP training methodology.

The second component of DDP's supply-side intervention focused on strengthening the commercial producer and processor associations—the Egyptian Milk Producers Association (EMPA) and the Dairy Industry Development Association (DIDA), respectively—and facilitating linkages between them. Originally planned activities to improve the commercial dairy industry consisted of:

- i. Assisting and subsidizing DIDA in creating and disseminating a public awareness campaign for dairy product nutrition and safety.
- ii. Delivering technical and managerial assistance to commercial dairy processors on quality control, ISO 9000 certification, and association development.
- iii. Mobilizing private dairy processors and producers through association facilitation, technical assistance, and advocacy/policy reform activities to jointly promote the dairy industry and participate in public policy creation.
- iv. Escorting Egyptian processors to the U.S. on Quality Improvement Study Tours to see new equipment, processes, technologies and management practices.

Due to a series of constraints involving internal dysfunction within the two commercial dairy associations and lack of interest in collaboration between them, this component was restructured to target several individual private dairy companies directly rather than focusing efforts on the associations themselves. DDP provided direct technical assistance to commercial dairy processors through a series of short-term assignments conducted by dairy processing experts, both American and Egyptian. These consultants and volunteers provided recommendations aimed at modernizing and enhancing the production capabilities of the Egyptian dairy industry for the domestic and export markets by improving quality standards and developing new high-value products.

On the demand side, DDP took a more integrated approach in order to achieve its substantially more ambitious target: reaching 50 percent of the Egyptian population, or approximately 30 million individuals, with the message of the nutritional importance of dairy products. The DDP team built on the role of the HEAs in the project's six target governorates, ensuring that they infused the content of their village-meetings with messages about the nutritional importance of milk and dairy products in the diets of infants, children, and pregnant and lactating women. This message was reinforced by training MOH physicians and private gynecologists and pediatricians in the importance of hygienic dairy products in the diets of vulnerable groups. The health-care providers played an important role in conveying these messages to their patients at MOH health centers and private offices and clinics.

At the national level, the DDP team created an innovative mass media public awareness campaign on dairy nutrition which far surpassed the scope and expectations of the original project design, leveraging over \$13 million in in-kind contributions from television stations alone, and exceeding the target of viewers aware of the campaign's message by 84 percent. The campaign engaged a range of media—including television, radio, newspapers, and other

print and video materials—with each segment carefully designed to target a specific demographic.

III. Project Components

A. Training Activities

1. Approach

One of DDP’s core objectives was to significantly improve the milking and dairy hygiene practices of 2,000 smallholder families in six target governorates, while stimulating their consumption of clean, safe dairy products. In order to achieve this objective, DDP proposed to create a strongly motivated core group of MOH Health Extension Agents with the skills to teach smallholder livestock farmers how to produce and handle clean, hygienic milk and dairy products, and promote the nutritional value of dairy for children and pregnant and lactating women. The DDP team envisioned that with proper training, resources, and institutional support, this group would have the capacity to continue disseminating the DDP message, as well as recruiting and training new HEAs, after the termination of the project. This would also contribute to DDP’s second core objective: to expose half of the Egyptian population to an awareness campaign on the benefits of dairy nutrition for children, pregnant women and nursing mothers.

The success of the HEAs was based largely on their existing relationships within the villages where they live and work. HEAs live side by side with smallholders in the same villages, giving them access to women smallholder farmers and a platform to discuss family planning and other family health matters. DDP’s approach was to use this connection to form a sustainable public health network within the village by providing thorough technical and communication/facilitation training to the selected HEAs, as well as developing a series of innovative, accessible training tools to help HEAs convey their message to specific target groups. This approach

provided an opportunity for trained HEAs to disseminate the knowledge gained from DDP training to their target groups through village meetings and periodic household-level follow up, which was feasible due to the HEAs’ physical proximity to their target groups. These messages were then reinforced by other authority figures such as doctors and health care providers who also received training from DDP. Occasional follow-up was also provided by HEAs’ supervisors and DDP staff.



A HEA discusses the lesson of a DDP educational poster with elementary-school children near Fayoum.

Another critical aspect of the HEA approach was the Training of Trainers component. By project completion, all 247 core HEAs selected and trained by DDP had been trained as trainers capable of recruiting and training additional HEAs. HEA trainings and additional meetings provided opportunities to discuss experiences of communicating with rural families, and to share solutions for common problems. These trainings also offered HEAs the opportunity to update their knowledge of new subjects and innovative approaches. This contributed to a widespread recognition and respect for the HEAs, and demand by the target communities both for HEA services and for opportunities to be recruited as an HEA.

2. Methodology

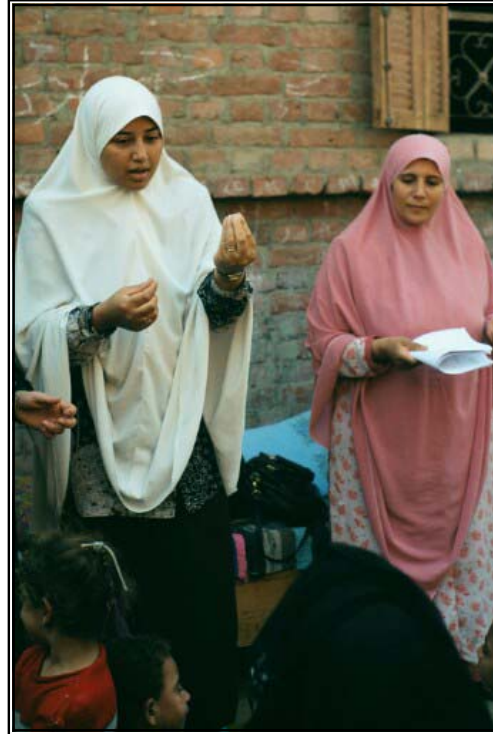
a. Direct Training

Two rounds of HEAs were selected by the DDP staff from eight villages in each of the six target governorates. An average of 20 HEAs were selected from each governorate during each of these cycles, for a total of 247 HEAs. HEAs were tasked with disseminating a series of messages and recommendations to the pregnant women and mothers in their villages, primarily through village meetings and direct household visits.

In order to prepare the HEAs for this task, the DDP team provided them with extensive training in both technical and communication/facilitation skills. The total number of trainee days reached 7,698 through the 112 direct training programs held throughout the life of the project. (This number is based on 16 two-day training programs for the first round of HEAs and 12 two-and-a-half day training programs for the second round.) The trainings sessions including the following topics:

- Dairy hygiene practices that prevent milk-borne diseases
- Adoption of non-traditional methods and practices for milking and home production of milk products
- Role of dairy products in neo-natal, infant and child nutrition
- Proper nutrition for pregnant and lactating mothers
- Facilitation techniques for group meetings
- Communication skills for information transfer

Each HEA was mandated to deliver training segments on topics ranging from technical skills for hygienic milk handling to nutrition and health information to groups of smallholder families in the target villages. HEAs disseminated the messages using a variety of



A team of HEAs explain the importance of dairy nutrition at a village meeting in Fayoum Governorate.

communication tools (discussed below) through village meetings, home visits, and direct contact with smallholders in every-day village life. In several villages, HEAs initiated the additional element of health clinic visits to reinforce their messages. Village groups were meant to average 35 smallholder women and family heads, but in reality, total attendance per village averaged 169. DDP staff conducted follow-up visits to ensure that the HEAs had delivered the recommended messages to their target smallholder communities and to measure the rates at which the improved practices were being adopted.

In addition to the HEA training, direct training was also provided to other stakeholders such as doctors (both private and MOH employed) and MOH Food Safety Agents. These were mostly conducted during the first year of the project and focused on correcting misconceptions about processed and pasteurized milk. The need for training of doctors emerged from the lack of nutrition



An HEA illustrates proper milking techniques to women at a village meeting

courses in medical school curricula which allowed doctors to graduate with major misconceptions regarding the safety of UHT milk. Even Food Safety Agents were not regularly trained on standards and specifications for judging the quality of milk products as milk had not traditionally been a major focus of quality control training. Training these additional stakeholders provided reinforcement to DDP messages from respected public and private sector dairy industry leaders.

DDP Health Extension Agents provided smallholder groups with *12 main recommendations* involving hygienic milking practices:

1. Cleaning the barn prior to milking.
2. Washing the milkers' hands prior to milking.
3. Washing and drying the udder prior to milking.
4. Cleaning and drying the milk container prior to milking.
5. Checking the first few drops of milk and not adding them to the rest of the milk.
6. Avoiding over-stretching the animal's teat during milking.
7. Using a clean light net to strain the raw milk while pouring it from the milking container to the boiling container.
8. Boiling milk for those who used to use it raw.
9. Boiling milk properly (from 7- 10 minutes) and then immersing it in cold water.
10. Giving milk regularly to the household's children.
11. Introducing milk to pregnant and nursing women as part of their diet.
12. Manufacturing dairy products from heat-treated milk.

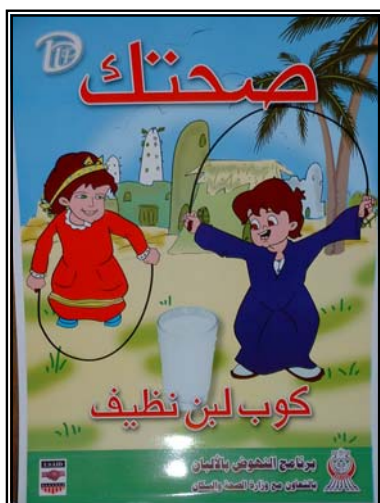
b. Tool Box Technique

Effective delivery of a message to a target group requires strong communication methods as well as a thorough grasp of the message content. DDP therefore focused on providing HEAs with **tool boxes** consisting of various communication tools, including posters, brochures, video and radio productions, etc., designed and produced by the DDP team in conjunction with professional media production companies.

A typical toolbox includes a range of complementary tools. For example, the *pregnant women tool box* includes: (1) a poster showing the importance of milk for pregnant women; (2) a record cassette of a five-part radio series; and (3) a brochure entitled *A Message to the Pregnant Woman*. HEAs were guided through the use of each of these tools and given tips for relating them to their target groups. Because all of the tools in each toolbox focus on the same topic they are mutually reinforcing, maximizing understanding and retention of the message. These toolboxes allowed HEAs to be flexible as educators and able to communicate with rural smallholders in a range of situations.

Table 1: DDP Tool Boxes

Tool Box/ Target	Contents	# Training Used
Pregnant & Lactating Women	Brochure: <i>Milk: A Message to the Pregnant Woman</i> Radio Episode: <i>Dreams of Hind and Marwan</i> Poster: <i>Pregnant Mother Drinking Milk</i>	36
Child Nutrition	2 Videos: <i>World of Milk</i> <i>Island of Milk</i> 3 Posters: <i>Child with a Glass of Milk</i> <i>Pharonic Children with Milk</i> <i>Children Jumping Rope with Milk</i> 2 Coloring Books with pictures related to milk	24
Women Farmers	Brochures: <i>Stories of Aunt Salma and her Daughter Ilham on Producing Clean Milk</i> Radio Episode: <i>Love Always Wins</i> Video: <i>Madiha, You Embarrassed Us</i>	36
Milk Safety	Brochure: <i>Milk: Food-Prevention-Remedy</i>	24

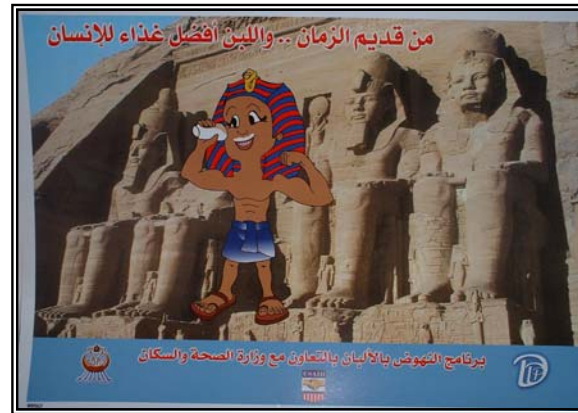


The individual tools included in the toolboxes were developed by the DDP team over the life of the project through a comprehensive design, testing and production process which ensured that the final products were effective in reaching the target group.

Posters:

DDP produced five posters focused on conveying the importance of milk to children and pregnant women. All of the posters were designed to attract the attention of the target group through eye-catching images combined with short, catchy phrases. Images emphasized the connection between milk and health, energy, and power.

The posters were used in conjunction with other communication tools produced by the DDP team to heighten awareness of target groups to the importance of milk and other dairy products and facilitate increased consumption of dairy products. These posters were extremely well received by the target groups at the village level.



Coloring Books:

6,000 copies of two DDP-produced coloring books (3,000 each) were produced and disseminated through HEA visits to nurseries and kindergartens in the targeted governorates. These coloring books were used as a tool to encourage children to remember to drink more milk and consume dairy products.

Brochures:

DDP developed a series of brochures in order to provide technical information on hygienic and safe milk products and dairy nutrition. The following brochures were produced and distributed:

- 3,000 copies of the DDP introductory brochure were distributed in DDP target areas. The purpose of the brochure was to orient the target groups and other counterparts to the goals and objectives, and proposed activities of the project.
- 4,000 copies of *Stories of Aunt Salma and her Daughter Ilham on Producing Clean Milk*, an educational brochure with drawings to show the steps of proper milking procedures, were distributed to HEAs to be passed on to smallholders during home visits.
- 5,000 copies of a brochure promoting the importance of milk to pregnant and nursing women, entitled *A Message to the Pregnant Woman* were produced and distributed by the DDP team. The brochures were distributed during training courses and village meetings, as well as at health centers and doctors' offices.
- 5,000 copies of the *Milk: Food-Prevention-Remedy* brochure were produced and distributed during training courses and village meetings, as well as at health centers and doctors' offices. This brochure focused on milk composition and its uses in combating various illnesses.

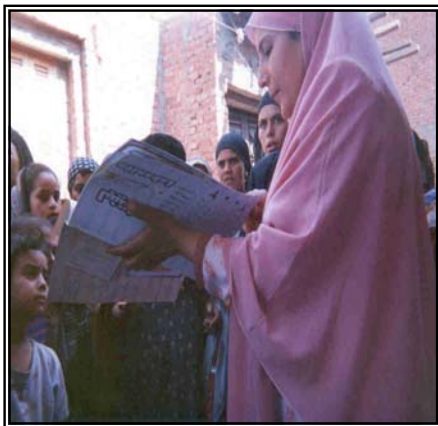




Calendars:

DDP designed and introduced attractive promotional calendars for the years 2002, 2003 and 2004 as another communication tool to promote the importance of milk among target groups. Each month of the calendars featured a recipe for a simple dish made with milk as a central ingredient, which enabled DDP to attract commercial dairy companies to sponsor months featuring their products. 90 percent of the cost of the calendars was covered by such sponsorship in the first year of the project. Each year, 3,000 copies of these calendars were printed and distributed in places frequented by pregnant women and new mothers, such as doctors' offices and health clinics.

The DDP calendar was a particularly effective tool because of the social and cultural associations between calendars and high social standing in Egyptian society. While most urban Egyptians are accustomed to receiving or at least regularly seeing annual calendars, most rural smallholders never receive and rarely see such calendars. They therefore greatly appreciated, and even coveted, the DDP calendars. HEAs reported an overwhelming number of women in the target villages preparing the dairy-based recipes from the calendars, and those who were not able to obtain one, often copied by hand or paid to photocopy the recipes from calendars in clinics or their neighbors' houses. Many HEAs themselves also began preparing these recipes in their own homes.



An HEA explains recipes from the DDP calendar

Feature-length video films:

These films were entirely created and produced by the DDP team with the aim of deepening the understanding and internalization of DDP's message among children. The DDP-trained HEAs played an important role in showing the three DDP-produced videos to children in nurseries and kindergartens in the six targeted governorates. During the life of the project, HEAs conducted a total of 1,368 video showings in the targeted governorates.



HEAs show DDP educational videos to elementary school children

Close to 60,000 children watched these shows, which were received enthusiastically by teachers and kindergarten principals, as well as by the children themselves who clapped and sang along with the videos. The HEAs played a crucial role in reinforcing the message of the videos with question and answer sessions and repeat showings.



The following videos were produced and shown:

- *The World of Milk* – 500 copies were produced in videotape format for use by the HEAs in kindergartens and nurseries. An additional 1,400 copies were produced in CD format: 400 were for use by the HEAs in kindergartens and nurseries, while the remaining 1,000 copies were given to the headquarters of the Ministry of Education to be distributed throughout the whole country.
- *Island of Milk* – This animated cartoon video aimed to encourage children to drink more milk and consume more dairy products. 2,200 copies were produced in CD format, 1,500 of which were given to the headquarters of the Ministry of Education to be distributed throughout the country. Another 200 copies of this video were produced in videotape format and distributed to kindergartens and nurseries to be shown during summer schools in the targeted governorates.
- *Madiha, You Embarrassed Us* – 200 copies were produced in videotape format for use by the HEAs in village meetings and 400 copies were produced in CD format for distribution to the Ministry of Education.

Table 2: Video Shows Presented

Governorate	Number of Showings	Number of Children *
Giza	273	11,684
Fayoum	246	10,525
Bani Suif	199	8,519
Minya	211	9,037
Assiut	223	9,549
Sohag	216	9,260
Total	1,368	58,574

* The average number of children per show is 43.

All of the tools described above formed a bridge between DDP’s two target groups—the village-based smallholder groups targeted for transformed milk handling and consumption patterns, and the 50 percent of the Egyptian public targeted for increased awareness of the nutritional value of dairy products. Many of these tools were used to reinforce the smallholder training, while also being disseminated to the broader public to deepen the message of the project’s mass media campaign, discussed below.

c. Training of Trainers

As DDP's key information disseminators, HEAs represented the prime institutional source of health and nutrition information for the rural population. The long term impact of DDP's strategy therefore depended on leaving behind not just a group of HEAs able to transfer knowledge directly to target beneficiaries, but also able to train other HEAs in the messages and methodologies developed by DDP. For this reason, DDP arranged Training of Trainers (ToT) activities for HEAs focusing on methods of facilitating village meetings and transferring technical knowledge on subjects such as:

- Dairy hygiene practices that prevent milk-borne diseases
- Adoption of non-traditional methods and practices for milking and production of milk products
- Role of dairy products in neo-natal, infant and child nutrition



A ToT course focusing on proper milk handling techniques

Over the course of the project, all 247 HEAs originally trained to conduct village-based trainings were also trained as trainers. These core HEAs then engaged in extensive recruitment and training of new HEAs. By the end of the project, they had trained an additional 1,385 HEA recruits, who are now capable of conducting village meetings to disseminate DDP's messages. This process is expected to continue with direct support from the MOH.

d. Educational Kitchen

The concept of the Educational Kitchen emerged from an observation by HEAs that many mothers lacked knowledge of how to prepare dairy products in dishes that were acceptable to their families, and that this lack of knowledge constrained consumption even when mothers understood the nutritional importance of dairy products. While this issue had been addressed with the dairy-based recipes on DDP's annual calendar, the relatively small number of recipes, lack of demonstration of preparation methods, and limited distribution meant that the calendar could not have the same impact as the HEAs themselves.

The "Educational Kitchen" was developed to provide a place where women could see and participate in demonstrations of food preparation and receive corresponding nutritional information under the supervision of health and nutrition specialists.

DDP built on existing functional kitchens established in MOH health centers, providing supplemental materials, such as pots, pans, utensils, and ingredients. Because of the location of the existing kitchens within health centers, DDP engaged health-center workers already working in those centers as trainers, giving them an added source of income conducting food

preparation trainings to pregnant women and mothers who were visiting the centers for other reasons. Additional Educational Kitchens were also established in or close to existing health centers to enhance future integration and coordination between the health care providers facilitating the kitchens and HEAs who work in the vicinity.

The Educational Kitchen training program is entitled “Home Manufacturing of Safe, Hygienic Dairy Products.” The two-day program focuses on the two main dairy products prevalent in DDP target geographical areas: yoghurt and karish cheese. These two products are generally produced by smallholders with raw, unheated milk, causing a range of health hazards. DDP developed a curriculum that includes non-traditional recipes based on yoghurt and karish cheese in order to stimulate consumption of safe forms of these dairy products among both children and adults. Examples of these recipes include yoghurt with various types of fruits, and karish cheese with ingredients such as strawberry paste, beet, chickpeas, mint, or fruits. The training sessions allowed participants to engage in the preparation, and taste the final product in order to ensure their comfort with the entire preparation process. The ToT in the Educational Kitchen program was offered to 108 nurses in all six governorates.

Table 3: Training of Educational Kitchen Trainers

Governorate	Duration	Number of Trainees
Giza	May 26 – 27, 2004	21
Bani Suif	May 15 – 11, 2004	15
Minya	May 12 – 13, 2004	12
Assiut	June 29 – 30, 2004	15
Sohag	June 27 – 28, 2004	21
Fayoum	June 6 – 7, 2004	24
Total		108

An evaluation survey of trainers showed that the overwhelming majority of them were satisfied with the program and asked for additional future training in similar training subjects.

3. Results

a. Improved Milk Handling Techniques

41,745 female family-heads received training in improved milking and dairy processing practices from DDP-trained HEAs through village meetings and additional household level technical assistance. Of a random sample of 12,181 of these participants, all were shown to have adopted ten or more of the 12 hygienic dairy practice recommendations given by HEAs. 19.6 percent were shown to be adopting all 12 recommendations. This sample alone constitutes more than six times the project’s target of 2,000 smallholder families adopting seven or more hygienic dairy practices. Applied to the entire participant base of DDP’s village meetings (41,745 mothers and pregnant women), this would total more than 20 times the original target. These numbers reflect the DDP team’s increasing aggressiveness in

ensuring that the project’s central messages were communicated to as many of the target vulnerable groups as it had the capacity to reach, mobilizing all of the project’s and staff’s resources to finding new ways of disseminating these messages as broadly as possible.

Table 4: Milking Procedures Surveyed

Number of Milking Procedures Adopted	# Women Smallholders Implementing Recommendation	% of Sample
1. Cleaning the barn prior to milking.	12,181	100
2. Washing the milkers’ hands prior to milking.	12,181	100
3. Washing and drying the udder prior to milking.	12,177	100
4. Cleaning and drying the milk container prior to milking.	12,179	100
5. Checking the first few drops of milk and not adding them to the rest of the milk.	12,164	99.9
6. Avoiding over-stretching the animal’s teat during milking.	12,097	99.3
7. Using a clean light net to strain the raw milk while pouring it from the milking container to the boiling container.	12,045	98.9
8. Boiling milk for those who used to use it raw.	12,181	100
9. Boiling milk properly (from 7- 10 minutes) and then immersing it in cold water.	12,110	99.4
10. Giving milk regularly to the children of the household.	12,053	98.9
11. Introducing milk to pregnant and nursing women as part of their diet.	12,168	99.9
12. Manufacturing dairy products from heat-treated milk.	11,896	97.7

b. Increased Consumption

Another key indicator of the success of the training component is the increased consumption of milk and dairy products as a direct result of the DDP videos described above. In order to measure the effect of the videos on nutritional behavioral change, DDP commissioned a study by Dr. Abdel Hamid Ibrahim of the Media Extension Department of the Agricultural Research Center, who surveyed 100 pre-school children aged 4-6 years old in two of the project’s target governorates (Fayoum and Assyut). The survey was designed to measure the children’s reaction towards the *World of Milk* video one week after watching it. The methodology included asking the children to draw pictures and answer questions based on their understanding of the videos, as well as their subsequent consumption of milk and other dairy products and preference for these products over other drinks and food products. The children’s responses to the behavior questions were verified by their mothers and/or kindergarten personnel before being counted.

The responses showed the video to be overwhelmingly successful in terms of the children’s understanding of the message. All of the respondents were able to express at least one main idea of the video regarding the importance of milk, and most (95 percent) were able to express more than one.

Table 5: Number of Children able to Express the Main Lessons of the Video

Response	Frequency/%
Importance of milk for keeping healthy teeth	100
Importance of milk for energy and enhanced learning	95
Importance of milk for building/maintaining strong bones	85

In addition, almost all of the children were able to recite dialogue or verses from the video with specific messages about the importance of milk. 89 percent of the respondents were able to express understanding and give examples of the negative effects of not drinking milk (11 percent said they did not know).

Table 6: Number of Children able to Recite Lines from the Video with Specific Messages

Message	Frequency/%
Importance of milk for maintaining healthy teeth and bones	85
Importance of milk for energy and learning	13
Importance of milk for body strengthening	10
Importance of milk for growth	12
Importance of milk for sustenance	6

The survey also indicated strong results in terms of impact on consumption patterns. 85 percent of mothers of the sample group indicated noticing a change in their child’s consumption behavior one week after they viewed the video. The distribution of behavior change during this week was as follows:

Table 7: Children’s Behavioral Change as Result of Video Training Activities

Behavior Change	Frequency/%
Began drinking milk for the first time	28
Increased consumption of milk	72
Began consuming dairy products for the first time	12
Increased consumption of dairy products	88

c. Sustainability

In addition to the overwhelmingly successful rate of adoption among smallholders of DDP’s recommendations, other indicators of the success of the project’s strategy include the 1:6 ratio of HEAs trainers to new recruits trained by the HEAs during the course of the project. DDP also left behind a wealth of training materials in high demand, to be reproduced and utilized by other organizations and government entities.

B. Media Campaign

1. Approach

DDP's second main objective was to expose 50 percent of the Egyptian public (approximately 30 million people at the time the proposal was written) to a pervasive public awareness campaign on the nutritional importance of milk and dairy products. This ambitious target required an innovative approach beyond the scope of traditional educational training programs.

Media has been shown to effect substantial changes in human behavior by delivering simple, tailored messages to target audiences in their own domain, which they can absorb with minimal effort. Based on the DDP team's understanding of these dynamics, the project conducted its public awareness campaign through a range of media to achieve widespread distribution of the project's messages. Each component of the media campaign underwent a thorough development process by the DDP staff and contracted production companies. Each advertisement or feature was first tested for consumer interest, then assessed and tested with a sample of the target group, and finally, if found to be effective, produced and disseminated on a wide-scale through public media outlets. The media campaign served to consolidate the messages disseminated through DDP's HEAs at the village level, as well as expanding the reach of these messages to a substantially broader spectrum of the population.

2. Methodology

In order to build on the broad potential of mass media, the DDP team developed a series of independent but mutually reinforcing media tools designed to target specific subsets of the Egyptian public. Each media message was designed to communicate at an appropriate level to maximize understanding, retention, and adoption among the specific target group.

a. Television

Increasingly in Egypt, as around the world, children spend a significant amount of time in front of television screens. These hours expose children to endless commercials encouraging consumption of a range of products, as well as exposing parents through direct viewing and messages transferred from children. Due to this existing audience among DDP's target group, the project designed a series of 24 television commercials focusing on the nutritional value of safe and hygienic milk and dairy products.

Techniques employed included animation, puppetry, and catchy jingles and songs with dairy-related themes composed specifically for these television commercials. A number of well-known child and adult actors were engaged, adding to the recognition, attention and popularity of the commercials and their messages (see below for results survey of message retention). TV commercials were broadcast throughout the year at prime viewing times, particularly during the summers to influence children's dietary behaviors during summer vacations.

These TV commercials did not target adult audiences, but focused on carrying the message directly to children by depicting the importance of milk in physical and mental growth as

well as specific sports, such as bodybuilding. Although the TV commercials did not target parents, the children’s exposure to the message often translated into requests to their parents for milk and dairy products. Parents played a major role in facilitating the improved nutrition of their children, both by educating them on proper nutritional habits and purchasing appropriate products.

The total broadcasting air-time contributed by television stations over the life of the project amounted to 9,445 minutes—valued at \$13,396,562 (more than 60 times the project’s contracted cost-share requirement).

Table 8: DDP Television Commercials

	Title of TV Commercial	Producer	Channels Aired	‡ Min Aired	Est. Audience (million)
1	<i>Message from My Loved One</i>	Gamal Shannan	1,2,7,8	164	14
2	<i>Milk and Concentration</i>	Toshka	1,2,7,8	204	17
3	<i>Milk and Osteoprosis</i>	Toshka	1,2,7,8	279	19
4	<i>Milk and Children’s Dreams</i>	Gamal Shannan	1,2,3,4,5,6,7,8	539	22
5	<i>Marathon</i>	Toni Film	4,6,7,8	194	11
6	<i>Boxing</i>	Toshka	1,2,3,4,5,6,7,8	599	20
7	<i>Milk for Lactating Mothers</i>	Voices	1,2,4,5,6,7,8	179	17
8	<i>Jumping Rope</i>	Toni Film	4,6,7,8	579	18
9	<i>The Girl and the Cow</i>	Toshka	1,2,3,4,5,6,7,8	369	21
10	<i>Milk and Bone Strength</i>	Inspiration	1,2,4,5,6,7,8	284	27
11	<i>Different Dairy Products</i>	Voices	1,2,3,4,5,6,7,8	484	27
12	<i>Drink Milk Puppet 1</i>	Essam El Foli	1,2,3,5,6,7,8	969	36
13	<i>Drink Milk Puppet 2</i>	Essam El Foli	1,2,3,4,6,7,8	809	29
14	<i>One TwoThree</i>	Inspiration	1,3,6,7,8	404	35
15	<i>Maie and the Kids</i>	Toni Film	1,2,3,7,8	364	37
16	<i>The Cow and the Ball</i>	Toshka	1,2,3,4,5,6,7,8	164	38
17	<i>Milk During Pregnancy</i>	Gamal Shannan	1,3,4,5,7,8	439	28
18	<i>Milk and Nutrition</i>	Toshka	1,2,5,6,7,8	409	22
19	<i>Types of Milk Products</i>	Inspiration	1,2,3,5,7,8	343	34
20	<i>Hygienic Kariesh Cheese 1</i>	Toshka	1,2,3,4,5,6,7,8	269	39
21	<i>Hygienic Kariesh Cheese 2</i>	Toshka	1,2,3,4,6,5,7,8	349	39
22	<i>Milk and Beauty Cartoon</i>	Inspiration	1,2,3,4,6,7,8	469	19
23	<i>Milk and Being Smart</i>	Inspiration	1,2,3,4,6,7,8	444	14
24	<i>Milk and Growing Cartoon</i>	Toshka	1,2,3,4,5,6,7,8	124	11

In addition to television commercials produced directly by the project, DDP staff actively lobbied the Upper Egypt local TV channels (Channel 7 and 8) in addition to the two main national TV channels (Channel 1 and 2, which can be seen all over Egypt) to encourage and persuade women’s special interest programs to include dairy nutrition messages at no cost to DDP. DDP succeeded in including this message in two of the most popular women-oriented programs on North Upper Egypt television: *Hawwa Wal Hayyah* (Eve and Life), and *Ili Alnis’ L’wahdum* (Only for Women). Both programs interviewed the DDP Project Director and Training Coordinator, who summarized the training program contents and highlighted the importance of hygienic milk to mothers and to women in general. These programs also

interviewed Dr. El Saied Awn, Undersecretary of the MOH, who spoke about common diseases which can be transmitted from animals to human beings. Finally, Dr. Zeinab Abdel Halim, Director of the Food Control Department of the MOH, also discussed the health implications of hygienic milk practices.

b. Radio

Despite the popularity of television, radio continues to be an important media source in Egypt, particularly for Upper Egypt. DDP therefore identified radio as a tool for targeting its rural target population and created a series of radio shows appropriate for this audience. Three radio series were developed and produced by the DDP team, incorporating dairy nutrition and hygiene themes into dramatic plots related to life in Upper Egypt. All of the series aired at peak broadcasting hours, with the air-time donated by the radio stations.

Love Always Wins, a series of seven 15-minute episodes, aired in June 2002 on Radio Cairo. The plot revolved around a love story between a young man and woman—Safaa and Khaled—whose plans to get married were hindered by financial problems. Khaled manages to gain financial stability by organizing a farmers group and helping them to produce clean milk which he collects and processes, enabling the couple to marry.

Dreams of Hind and Marwan, another series of seven 15-minute episodes, aired in the fall of 2002, also on Radio Cairo. In this love story, Marwan's father will not let him choose his own wife, causing the two men to fight. Marwan goes on his own to start a small factory producing metal machinery for dairy processing, while his mother (who works as a TV announcer promoting the importance of milk and introducing dairy recipes) tries to reconcile the family. Marwan becomes independent and marries Hind, and finally reconciles with the family.

DDP also organized two radio contests consisting of quizzes on dairy-related facts. The first was an on-air contest with call-ins to answer questions, and with winners and prizes determined immediately. The second was conducted through a comic drama called *Tales of Laban Zad*, a series of 15 episodes of five minutes each, which aired in June 2004. Both contests aired on the Youth and Sport Station and tested knowledge of hygiene and nutrition related to milk and dairy products. Prizes took the form of boxes of assorted dairy products (cheeses, flavored milk and yogurts) contributed by dairy processors at no cost to the project.

c. Newspaper Articles

DDP staff actively lobbied local and national newspapers to print articles on dairy-related issues, both from a business and public health perspective. In total, 57 different articles were published in daily and weekly publications with a combined distribution of 74 million people.

3. Results

DDP aimed by the end of the project to make 50 percent of the entire Egyptian population—about 30 million men, women and children—aware of the project's core message of the nutritional importance of dairy products. In order to assess the project's results, the team needed to determine both a) the overall viewing audience of the media commercials and b)

the rate of awareness of the message among viewers. As the television commercials were the main component of the public awareness campaign, analysis of the outreach results of the campaign were limited to this medium.

The total viewing audience of the television commercials was monitored and reported by the Ministry of Health, which serves as the government counterpart for the project, based on viewing reports from each of the participating television stations. According to the August 2004 Ministry of Health Viewing Intensity Report, the total number of viewers of the DDP television commercials reached 58.4 million individuals.

In order to assess what percentage of the viewers actually retained any level of awareness from viewing the TV commercials, the DDP team conducted an impact study in two governorates: Minya and Alexandria. In Minya, one of the project’s target governorates, experienced MOH health educators disseminated DDP messages to various target groups, supplementing information broadcast through the TV commercials. In Alexandria, located outside of the program’s geographical target area, the commercials were the only source for DDP messages. The survey reached 1,313 respondents in the two governorates combined.

The DDP survey team interviewed four categories of the target population in both governorates: elementary school students in rural areas, middle-school students in both rural and urban areas, rural households with mothers of elementary schools students, and urban households with at least one parent employed outside of the house. The reason for interviewing elementary students only in rural areas was because the responses of elementary school children with regard to behavioral change needed to be confirmed by their mothers as a basic survey tool, and reaching mothers in urban areas was found to be too difficult for the purposes of this survey.

Table 9: Media Survey Sample by Governorate

Governorate	Minya	Alexandria
Elementary School Students (Rural)	165	160
Middle School Students (Rural)	101	100
Middle School Students (Urban)	137	134
Household Members (Rural)	140	154
Household Members with Employment Outside Home (Urban)	100	122
Total	643	670

Although the main objective of the survey was to measure whether 50 percent of the population was aware of the message of the DDP campaign, the team also attempted to assess whether the commercials influenced nutritional patterns among viewers. Therefore, the survey was designed to measure rates at which respondents viewed DDP commercials, memorized the content, increased their awareness of the nutritional importance of milk, and began to consume or increased the rate of consumption of milk and dairy products.

According to the survey results summarized in Tables 10 and 11 below, an average of 96 percent of the sample of elementary school children in rural areas and an average of 97 percent of middle school students in rural and urban areas were aware of having viewed DDP commercials. 94 percent of the rural elementary school children had memorized at least one message, slogan or song from a DDP commercial, while an average of 95 percent of middle

school students were able to do the same. 87 percent of the elementary school respondents and 89 percent of middle school respondents reported enjoying or appreciating DDP commercials, which is significant in that satisfaction is generally considered to be the first step in the behavior change process.

The survey also indicates a strong impact on actual behavioral change. 76 percent of the rural elementary school respondents and 72 percent of middle school respondents indicated that the DDP commercials raised their awareness of the importance of milk on health. The DDP commercials were successful in encouraging an average of 21 percent of elementary school students and 22 percent of middle school students to drink milk for the first time. Children who had previously drunk milk and consumed dairy products were also influenced by these commercials. Among elementary school respondents 53 percent increased rates of milk consumption and 49 percent increased rates of dairy product consumption as a result of exposure to DDP commercials. Among middle school students these rates were 37 percent for milk and 42 percent for dairy products. These figures indicate that the commercials had a major impact on children’s nutritional patterns.

Table 10: Rural Elementary School Students

Result (% of Sample)	Minya	Alexandria	Average
Watched DDP Commercial	97.6	94.4	96.0
Memorized Content from Commercial (message/slogan/song)	97.6	90.0	93.8
Enjoyed Commercial	97.6	76.9	87.3
Raised Awareness of Dairy Nutrition for a Healthy Body	94.5	58.1	76.3
Began Drinking Milk for the First Time	27.3	14.4	20.9
Increased Consumption of Milk	63.6	41.9	52.8
Increased Consumption of Dairy Products	78.8	20.0	49.4

Table 11: Middle School Students

Result (% of Sample)	Minya			Alexandria			Cumulative Average
	Rural	Urban	Avg	Rural	Urban	Avg	
Watched DDP Commercial	97.1	99.0	98.1	98.5	94.0	96.3	97.1
Memorized Content from Commercial (message/slogan/song)	94.2	99.0	96.6	97.0	91.0	94.0	95.3
Enjoyed Commercial	94.2	99.0	96.6	84.3	79.0	81.7	89.1
Raised Awareness of Dairy Nutrition for a Healthy Body	92.0	72.3	82.1	63.4	62.0	62.7	72.4
Began Drinking Milk for the First Time	24.8	32.7	28.8	14.9	14.0	14.5	21.6
Increased Consumption of Milk	62.0	45.5	53.8	24.6	15.0	19.8	36.8
Increased Consumption of Dairy Products	82.5	44.6	63.6	27.6	18.0	22.8	42.2

It is clear from the survey data that while the TV commercials themselves had a significant impact on behavioral change, the additional training and technical assistance activities provided in the project's target areas greatly reinforced these messages and resulted in substantially higher rates of behavioral change.

In order to take into consideration the impact of the survey on the adult population, the survey team also collected data on 516 households in the same survey area as the data discussed above. The target group for this data included mothers of elementary school students in the rural areas and households in urban areas where at least one adult worked outside of the home. As indicated in Table 12, an average of 98 percent of the adult members of the households surveyed indicated having watched DDP commercials, and 96 percent had retained specific content from the messages.¹

Table 12: Household Viewing and Awareness

Governorate	# of Households Surveyed		% Households Watching DDP Commercials			% Memorized Content of DDP Commercials		
	Rural	Urban	Rural	Urban	Avg	Rural	Urban	Avg
Minya	140	100	100.0	100.0	100.0	100.0	100.0	100.0
Alexandria	154	122	99.4	92.6	96.0	94.8	87.7	91.3
Average					98.0			95.6

In general, DDP commercials attracted viewers' attention and increased their awareness of the benefits of milk and dairy products. The commercials also created positive behavior modification by increasing the consumption of milk and dairy products. DDP's objective was to target 50 percent of the Egyptian population for awareness of the project's messages. The category of the above data deemed most relevant to apply to this objective is that of "Memorizing Content from the Commercial", since this ensures full awareness of the message being disseminated. Taking the rates in this category for the three survey subgroups discussed above (elementary school children, middle-school children, and adult household members), the retention rate of content from the commercials averaged 95% percent.

Applied to the entire public awareness campaign viewing audience of 58.4 million individuals, it can be extrapolated that 55.4 million individuals were made aware of the central message of the campaign over the life of the project. At the time of the DDP project design, the total population was estimated as 60 million, and therefore the 50 percent target for the public awareness campaign was assumed to correlate to 30 million individuals. Based on that estimate, the target was exceeded by 84 percent. Even in relation to the 2004 estimate of the Egyptian population—67.3 million²—the 50 percent target was exceeded by 65 percent.

¹ It is possible that the perfect levels of viewing and retention in Minya (one of the DDP target areas) indicates that the sample was weighted towards individuals familiar with the project activities, although a representative sample was sought.

² http://www.capmas.gov.eg/eng_v/news/populationestimatedinandout2.htm

C. Technical Assistance Services to Commercial Dairy Industry

1. Approach

As explained at length in the DDP Unfunded Extension Request (submitted January 2004), DDP encountered resistance in its goal of establishing collaborative initiatives among the main commercial producer and processor associations—the Egyptian Milk Producers Association (EMPA) and the Dairy Industry Development Association (DIDA). The DDP team responded to the lack of commitment on the part of these associations by targeting their individual members, both as contributors to the project’s education and awareness activities (eight companies contributed annually to sponsor the dairy calendar discussed in section III. A. 2. b. above), and as beneficiaries of the project’s food safety technical assistance component.

In the past decade, food safety has become a worldwide concern as the devastating impact of outbreaks of food-borne illness on lives, businesses and international trade has become increasingly apparent. Each year, hundreds of thousands of people throughout the world fall ill as a result of food poisoning, and each year food companies pay out millions of dollars in compensation and suffer immeasurable damage to their business reputations. It is generally accepted by legislators, enforcement officers and food industry professionals that a formal, structured certification system is the most effective way of managing and controlling food safety hazards in the preparation and handling of food and food products. Hazard Analysis and Critical Control Point (HACCP) has become the accepted management system through which food safety is ensured. HACCP is the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.

DDP contributed to the Egyptian dairy industry’s capacity to meet international food safety standards by providing a series of targeted technical assistance assignments to both new and established dairy processing companies. Technical assistance provided by US volunteers and Egyptian consultants to a total of 16 companies focused on improving the hygiene and safety of milk and dairy products in order to comply with HACCP and other standards.

2. Methodology

To ensure integration of the milk chain, DDP provided technical assistance in HACCP concepts to 16 selected Egyptian processors. Recognizing that successful implementation of a HACCP plan depends on a management strongly committed to the concept and process, all recommendations were provided directly to employees with the participation of plant managers and full support of the company’s board of directors.

a. Direct Technical Assistance

DDP technical assignments consisted of two days in each dairy plant. The first day was spent on a thorough plant tour, during which the expert observed the current status of operation. The second day involved discussing key observation points of with decision makers, coming to a consensus on the necessary changes and developing an action plan to achieve these results.

During the life of DDP, five US volunteer assignments were completed, providing technical assistance to 16 dairy processors. In addition, DDP fielded two local consultants whose assignments focused on product development (new cheese and yoghurt varieties) as well as appropriate milk heating temperatures and other techniques for producing high quality new dairy products.

Summary of Expatriate Volunteer Assignments:

DDP technical assistance diagnostic questions:

- 1. Does all staff have adequate knowledge of hygiene and food safety?*
- 2. Are the premises designed appropriately and kept clean?*
- 3. Do the premises have adequate pest and pathogen control programs?*
- 4. Are raw materials safe to use and safely stored?*
- 5. Have the critical control points been identified, limits set, and managed?*
- 6. Are end products adequately sampled and tested for safety?*

- 1. Dairy Processing Consultant, Ata Baroudi (May 2002):** Dr. Baroudi conducted a seminar on HACCP standards for major dairy processing companies, which included material on packed milk, cheese, ice cream, and yogurt. Local Egyptian dairy processing experts were also invited to present material at the seminar. In addition, Dr. Baroudi spent at least one day at the plant of each of ten commercial dairy processors, where he met with the managing director, and plant and line supervisors in order to follow up on previous DDP recommendations to assess implementation rates.
- 2. Dairy Processing Specialist—Cheese, Nana Farkye (May 2002):** The purpose of Dr. Farkye’s assignment was to identify problems and introduce new technologies in six dairy processing plants by communicating effectively with owners, managers, and employees via in-plant consultations. Dr. Farkye also conducted training sessions and group seminars on the topic of dairy food safety. Clients served by this assignment were medium to large size plants, producing 10-20 metric tons per day of cheese and other processed dairy products.
- 3. Dairy Processing Specialist, Ata Baroudi (December 2002-January 2003):** On this return visit, Dr. Baroudi met with owners, managers, and key plant personnel at six dairy processing companies, spending 1-2 days at each plant. Clients were prepared with specific topics they wished to discuss, and Dr. Baroudi observed and made recommendations in other areas as needed, particularly focusing on reviewing recommendations for improvements made on previous visits. Dr. Baroudi also worked with firms on product development and conducted small seminars on processing of particular high-value cheeses such as Mozzarella, Gouda, Colby, Cheddar, and soft cheese.
- 4. Dairy Processing Specialist II, Delbert H. McDaniel (May 2003):** Mr. McDaniel met with the owners, managers, and key plant personnel of six DDP dairy processing clients, spending 1-2 days at each plant, conducting a similar assignment to the one listed above.

5. **Dairy Processing Specialist—Cheese, Nana Farkye (July 2003):** In this assignment, Dr. Farkye provided follow-up to his previous assignment through one-on-one visits with DDP clients, as well as conducting training sessions and group seminars on HACCP standards.

The total in-kind contribution of the services and materials provided by these assignments amounted to \$48,762 (\$45,194 in donated volunteer labor and a total of \$3,568 in additional donated supplies and services supplied by the volunteers).

b. US Study Tours

According to DDP's original contract, the project was meant to facilitate two study tours for members of the Egyptian commercial dairy processing industry to attend trade fairs in the U.S. These trips were intended to expose Egyptian dairy processors to new technologies, best practices, and innovative products—all with the potential to stimulate Egypt's potential for producing and marketing high quality, high-value dairy products.

Three U.S. tours were planned: the Worldwide Food Expo in Chicago, Illinois and the Pack Expo in Las Vegas, Nevada, both focusing on marketing; and the Marshall Cheese Seminar in Visalia, California, focusing on production and quality assurance. Unfortunately, due to the increasingly rigorous security and visa requirements instituted over the course of the project as a result of the incidents of September 11, 2001, implementation of these trips was not feasible.

3. Results

a. HACCP and ISO 9000 Certification

As a result of DDP's technical assistance program, five companies—Greenland, Siclam, Farm Cheese, Halayeb, and Bayti—received and maintained HACCP certification. In addition, DDP technical assistance played a major role in making another four dairy processing and/or bottling plants eligible for the HACCP system. Greenland, Halayeb and Bayti also received ISO 9000 certification, and Farm Cheese was in the process of receiving the certification at project's close.

b. Reduced Price Differential between Loose and Packaged Milk

One of the projected direct results of the project was that commercially packaged milk prices would drop to within 30 percent of the street milk price. At the outset of the project, the average price of packaged milk was LE 3.65 per liter, while the average price of loose milk was LE 1.80 per liter, a difference of 103 percent. Based on August 2004 reports by HEAs in DDP's six target governorates, retail prices of loose (unpackaged) milk have increased to an average of LE 3.95 per liter, while loose milk prices now range between LE 2.55 and 2.65 per liter, an average difference of 52 percent. The average difference between loose and packaged milk prices has therefore decreased from LE 1.85 to LE 1.35 over the life of the project, which corresponds to a difference of 37%. This trend is evidence of the increase in packaged milk consumption, which has been highly influenced by DDP's activities.

c. Capacity Utilization

Chart 1: Capacity Utilization Status of Dairy Processing Plants in Egypt

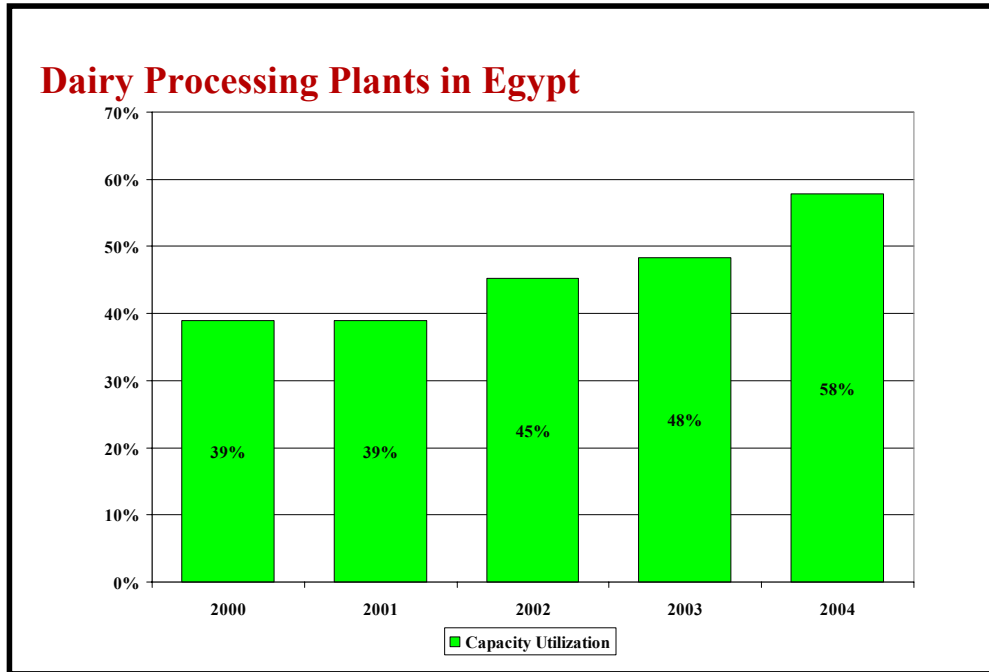
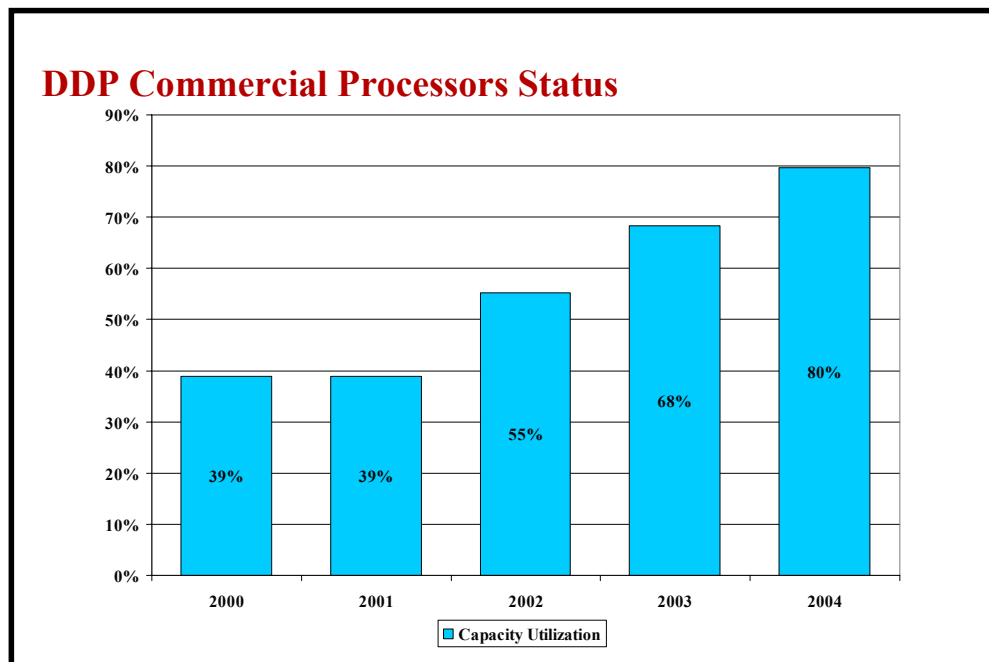
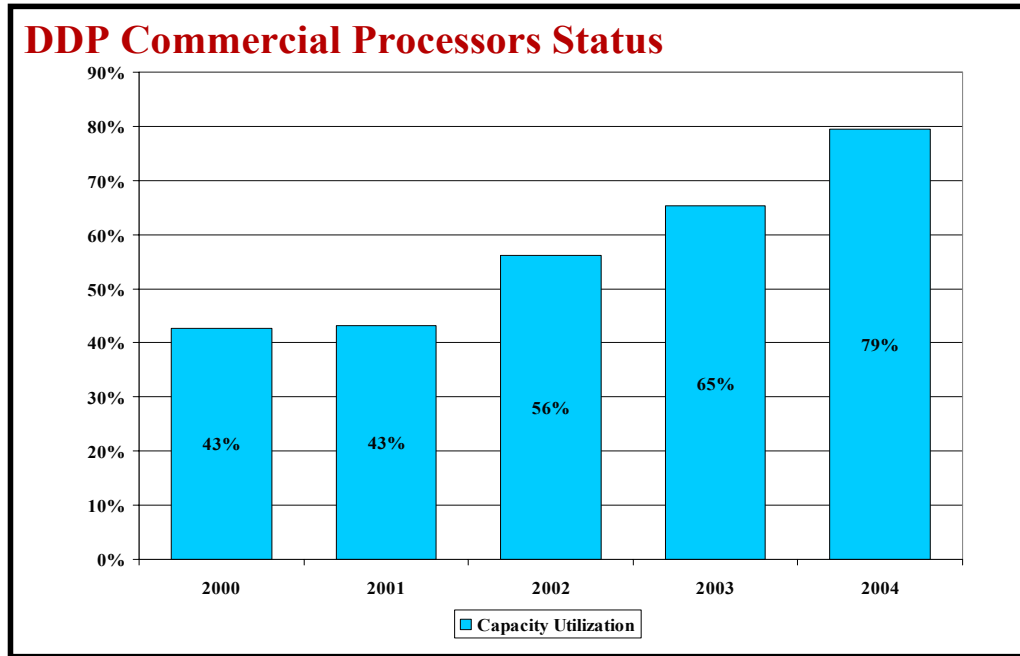


Chart 2: Capacity Utilization Status of DDP Commercial Processors-Baity



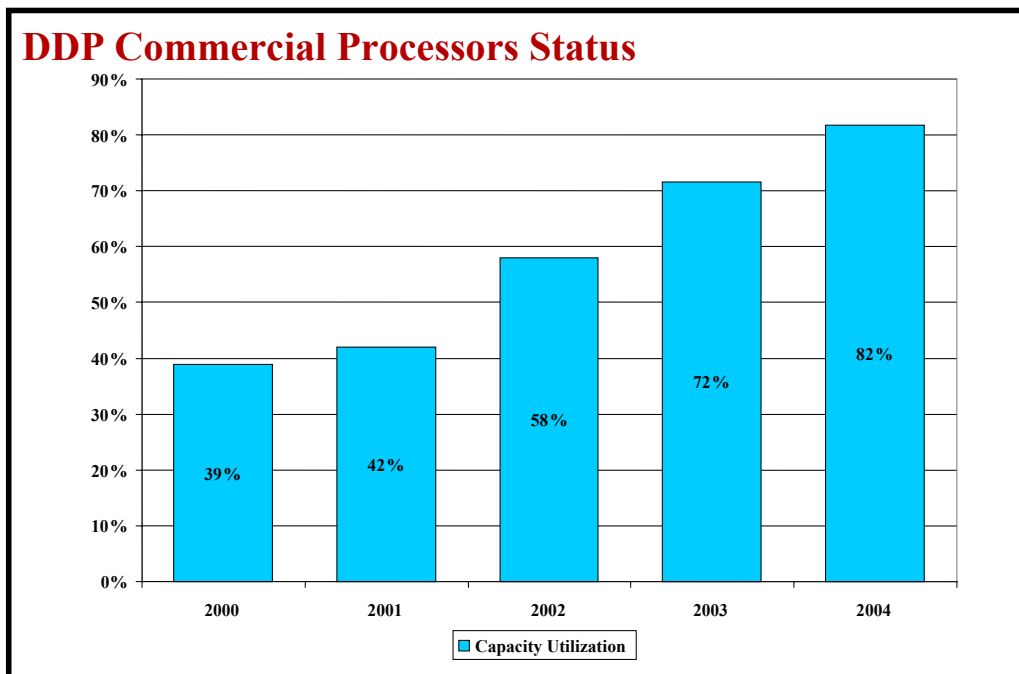
Source: Food Processing Federation Report, August 2004

Chart 3: Capacity Utilization Status of DDP Commercial Processors-Farm Cheese



Source: Food Processing Federation Report, August 2004

Chart 4: Capacity Utilization Status of DDP Commercial Processors-Green Land



Source: Food Processing Federation Report, August 2004

Average capacity utilization of commercial dairy processors rose from 39 to 58 percent for both fresh milk and other processed dairy products, exceeding the project target by 8 percent. In three cases of DDP commercial processors capacity utilization reached close to 80 percent. Additionally, during the life of DDP, the three dairy (fluid and processed) companies, Baity, Farm Cheese and Green Land were established to meet the increased demand for milk and other dairy products. The average production of these companies ranged between 15 and 25 tons/batch, with two batches produced per day. This number translates into an additional 36,000 tons being processed and consumed by Egyptians annually.³

d. Purchase of Domestic Supply

Egypt's annual production level of raw milk was 4 million metric tons as of June 2004. Of this, 2.1 million MT was purchased for pasteurization and processing into other dairy products by commercial dairy processing companies.⁴ The total commercial purchase of the domestic milk supply therefore amounted to 52.5 percent of the total domestic supply, an increase of 37.5 percent from the start of the project, when the commercial dairy industry was purchasing 15 percent of the domestic supply.⁵ This exceeds by 17.5 percent the project target of a 20 percent increase in the domestic milk supply purchased by Egyptian dairy processing companies. This increase was particularly dramatic during the final year of the project. From June 2003 statistics, commercial capacity utilization was measured at 22.4 percent, and the targeted 20 percent increase by the end of the project was seen as unlikely. Due to consumer trends and aggressive marketing by commercial dairy companies, the target was exceeded during the last year of DDP.

IV. Project Results – Reducing Child Malnutrition and Mortality

Assessment of the project's contribution to the overall goals of decreasing child malnutrition and mortality in Upper Egypt is constrained by the lack of reliable baseline data on malnutrition and mortality rates for the target areas, as discussed in the January 2004 Extension Request. However, several surveys were conducted in conjunction with substantial background research on child malnutrition and mortality rates in order to reach conclusions about the impact of the project's activities on these main goals.

A. Mortality

A survey was conducted by DDP HEAs in their target areas which was verified by DDP project staff and MOH governorate-level officials in the Information Center of the Preventative Medicine Department, as well as at the central MOH office in Cairo. According to this data, summarized below, the average number of deaths of children under age five per thousand in the DDP target governorates decreased from 45 in 1999 to 40 in 2004, for a percentage decrease of 0.5 percent. This is in line with national trends. Annual mortality

³ Food Processing Federation Report 2004

⁴ Index Mundi: Dairy; Milk; Fluid – Production, Supply, and Distribution Statistics (June 2004)
http://www.indexmundi.com/en/commodities/agriculture/dairy_milk_fluid/

⁵ The percentage of purchase of the domestic supply indicated in the original proposal was incorrectly stated as 25 percent.

rates of children less than five years old averaged 54 out of 1000 for the period from 1995-2000⁶, and for the year 2000 was estimated at 43 out of 1000.⁷ In 2002 the rate was found to be down to 41.⁸

Table 13: Mortality Rates of Children Less Than Five Years Old (Out of 1000)

Governorate	1999	May 2004
Giza	45	39
Fayoum	48	40
Bani Suif	47	42
Minya	42	39
Assiut	42	40
Sohag	46	40
Average	45	40

B. Malnutrition

Several DDP surveys indicate that project interventions had a significant impact not just on understanding of the nutritional importance of milk and dairy, but on behavioral change directly related to decreased malnutrition rates in the target population. In a survey of intervention and control sites in three of the target governorates, consumption of milk and dairy products at the end of the project were significantly higher in intervention sites than in neighboring non-intervention sites. These improved consumption patterns have been shown to be directly correlated with lowered rates of malnutrition-induced illnesses such as diarrhea and acute respiratory infections (ARIs).⁹

⁶ <http://www.measuredhs.com/pubs/pdf/FR117/10Chapter10.pdf>

⁷ <http://www.childinfo.org/cm/EGY/cmregy.html>

⁸ http://www.unicef.org/infobycountry/egypt_statistics.htm

⁹ On the general relationship between child malnutrition and diarrhea see *A Framework for Action: Child Diarrhea Prevention* (<http://www.ehproject.org/Pubs/GlobalHealth/GlobalHealthArticle.htm>). On the relationship between malnutrition and diarrhea in Egyptian children see Yassin, K. (2000) "Morbidity and Risk Factors of Diarrheal Diseases Among Under-five Children in Rural Upper Egypt." *Journal of Tropical Pediatrics* V. 46 pp. 282-287 (http://www3.oup.co.uk/tropej/hdb/Volume_46/Issue_05/pdf/460282.pdf) and Wierzba, T.F., et al, (2001) "The Interrelationship of Malnutrition and Diarrhea in a Periurban Area Outside Alexandria, Egypt" New York: *Naval Medical Research Unit No. 3 FPO*. On the relationship between malnutrition and Acute Respiratory Infections see N.M. Graham, *The Epidemiology of Acute Respiratory Infections in Children and Adults: A Global Perspective* (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2286216&dopt=Abstract)

ANNEX 1

DAIRY DIRECTIVE PROJECT SUCCESS STORY: HEALTH EXTENSION AGENT MS. ENAS KAMEL

The Dairy Directive Project (DDP) actively increases consumption of high quality dairy products among Egyptian families by improving hygienic processing standards and promoting dairy nutrition among expectant mothers and young children. In its efforts to show people the importance of dairy, DDP staff targets intermediaries who are positioned to help disseminate the message at the level of villages and households.

Health Extension Agents (HEAs) are educators working at the governorate level with Ministry of Health, and DDP works through them to disseminate its message to smallholders families throughout rural areas in six governorates. Because they are trained in community-based approaches to health care, and are often from the community themselves, HEAs offer an appropriate and effective approach to smallholder health training.

Enas Kamel, a HEA from Beni Suef, knows the importance of hygienic milk products first-hand. She has three children herself, all of whom drink milk for its nutritive value. Enas illustrates the many levels on which DDP is impacting Egyptian women's and children's understanding of the importance of dairy products for their health, and has many stories to tell about her work.



In one community, where Enas had succeeded in convincing the majority of village women drink milk on a daily basis, one village woman came and thanked her for saving her child. The woman told her that her seven-year-old daughter, who drinks milk everyday, fell one day from a table. The leg appeared to bend and then turn blue, so they immediately thought that her leg was broken. The doctor who took an X-ray and it turned out to be fine. The doctor asked them whether the child was drinking lots of milk as that was a major factor of having such strong bones because of its calcium. All of the family members who heard about this incident started drinking milk too.



Another woman was pregnant and did not drink any milk. She had a small, weak child with poor health, and Enas was afraid for the pregnancy. Enas convinced this woman of the importance of milk, and when the mother and child started drinking milk their health improved a lot, and she came to thank the Health Educator.

After participating in the Training of Trainers program offered by DDP, Enas also convinced village women to use the whey to make sweets, bread and other products. She prepared a range of products, and let the women taste them in order to encourage them to try.

Enas now uses these success stories to convince other smallholder families in medical centers and women clubs about the importance of consuming milk.

ANNEX 2

DAIRY DIRECTIVE PROJECT: A RECIPE FOR SUCCESS

The Dairy Directive Project uses a range of non-traditional methods to convey its message of increased dairy nutrition and hygiene. One of these innovative methods is DDP's educational calendar. Assessments by DDP staff of rural women and Health Educators in target areas of Upper Egypt revealed that the women are very interested in preparing tasty recipes for their families, and DDP staff saw this interest as an opportunity.

Since promoting milk and dairy products is among the project's strategic objectives, DDP decided to publish an educational calendar for the year 2002 featuring a monthly recipe in which milk is a main ingredient.

The calendar also provided an opportunity for another of DDP's target groups—commercial dairy processors. DDP invited the processors to finance the calendar by sponsoring a month of the calendar. By donating a portion of the production costs, the processors were able to promote their nutritious products through the calendar. These donations covered 90% of the production costs of the calendar.



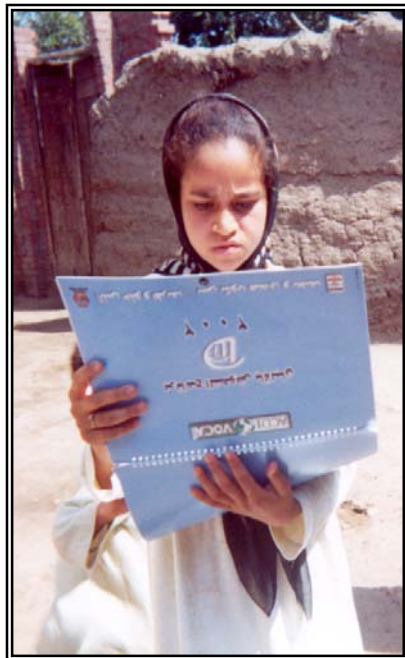
The calendar had an overwhelming impact on all levels and categories of target groups:

1. Rural Women have been extremely receptive to the calendars, which include easy and inexpensive recipes, enabling them to prepare delicious and nutritional meals for their families.

Women also appreciate DDP's dispersal of the calendars in their communities. They consider the gift of a calendar very special because such calendars are generally restricted to the walls of managers' and clerks' offices. The calendars have therefore become a symbol of status and

respect. Rural women have expressed their appreciation for DDP recognizing them in a special way by giving them a calendar. This recognition has enhanced their loyalty to the message of the program. DDP intends to distribute the calendar to all women participating in village meetings in its target areas.

Three thousand calendars have already been distributed. In the meantime, many women who have not yet received a calendar have been copying the recipes by hand or photocopy them at their own expense.



2. Health Educators—the majority of whom are women working in rural clinics. These Health Educators also appreciate the milk recipes and prepare the recipes for their own families. They have also expressed appreciation for DDP’s support of their work in rural communities by providing such a tool to promote the importance of milk and dairy products. Since the demand for this calendar has been so great, it has been impossible to immediately print an adequate number of copies, but project staff noticed that the Health Educators also photocopy or hand-copy the recipes for their own use.

DDP has tried to meet the great demand by both of Health Educators and rural women for the calendar through some other media. The project has arranged for TV and radio programs to broadcast milk recipes on a regular basis and for newspapers to print the recipes, often with donated airtime and print space. In addition, DDP has already written and produced a radio series that includes milk recipes, broadcast starting from June 25, 2002.

3. Commercial Dairy Processors, who have used the calendar to promote their dairy products and open new markets with a very reasonable financial contribution. By sponsoring a month each, the production costs were dispersed among a number of companies, making the cost-benefit ration attractive. In addition, the idea enhanced and strengthened cooperation among the dairy processing companies, contributing to another of DDP’s goals.

