



THE AGRICULTURAL DEVELOPMENT ASSOCIATION

PARC-GAZA

**A Project Proposal For
Producing Spirulina for Enhancing
Food Security in the Gaza Strip**

Submitted to:

AMFP/France

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PREAMBLE:

In view of the deteriorating situation impacting all life aspects in the Gaza strip, and in response to poverty, unemployment, diseases, malnutrition, Global warming, water problems; many other problems facing the Palestinians in the Gaza strip under the imposed blockade since 2007.

For decades the Palestinian people continue to face a real suffering and difficult living conditions, where the Israeli occupation is leaving a devastating impact on Palestinian's social, political and economic life in the Gaza Strip.

This situation is getting worse due to continuous Israeli invasions and the closure imposed on Gaza strip as well as the last war on the Gaza Strip 2008-2009.

In the light of the deteriorating economic situation and the increasing rates of unemployment it is worth mentioning that UNDP statistics have registered 56% of the families are living under the poverty line, the matter that is threatening the health and well-being of children, women and men.

The decrease in the per capita income forced the households to change their dietary habits and traditions which caused a real challenge.

All these factors and others have affected the food security situation in the Gaza strip targeting the different society slices.

This situation reflected negatively on the families where the FAO and the WFP reported 60% of the Gazan population is food insecure and 81% of the population depend on external food aid, the situation became more problematic and attracted attention of the main actors in the Gaza strip to find sustainable solution to this situation.

According to the recent statistics the food insecurity levels in the rural areas of Gaza strip have reached 69% while in the urban areas its 51%, although it is still high readings.

Project Compliance with the International Standards:

we in PARC as the one baggiest agricultural organization in the Gaza Strip have always sought while putting our strategic plans or implementing our interventions to comply with the international standards as the basics of any action, also to be coincide with the internationally adopted MDGs, our intervention in the field of spirulina falls directly within the framework of MDG1 "Eradicate extreme poverty and hunger".

In the same context spirulina project contributes to guarantee the environmental sustainability as it applies the multi-use scheme of the water in a complete cycle and this will contribute toward the achievement of MDG 7(Ensure environmental sustainability).

Recently; the international community has called to apply the scheme of Right Based Development Approach as the basis of any intended intervention , it's clear that through spirulina project we also try to integrate with the international efforts to attain Human Rights for the people in the Gazan community either directly or indirectly (right to food, right to life).

Project Relevance to PARC Objectives:

In line with PARC strategic plan which aims at maintaining food security and providing training and services to local community in the Gaza strip; PARC launched expanding its experience and knowledge of the community needs and to be as used the pioneer to fulfill these needs throughout it's different interventions; the idea of this project emerged to complement another significant need related to the food security that achieving healthy society.

PARC always seeks to introduce sustainable solutions that led to the development of the Palestinian community; the production of SPIRULINA as food complement In the Gaza strip for the first time will offer a cheap and sustainable solution to reduce the malnutrition rates.

The project also will enhance the women participation since SPIRULINA can be produce by women to feed their families.

PARC, since its early beginnings, took the responsibility to build the capacity of the local community in order to track the latest international development techniques, the project will provide training and capacity building activities to the implementing staff and the involved actors.

Project's justifications

Livelihoods and lives of people living in the Gaza Strip have been devastated over 5 years since the imposition of Israeli's blockade on the Gaza strip, Economy of Gaza has collapsed, Over 61% of households are now food insecure and are reliant on food assistance from foreign humanitarian agencies for their health and well-being. An additional 16.2% are considered vulnerable to food insecurity, of those food insecure, 65% are children under 18 years (FAO/WFP (2009), matter that is threatening the health and well-being of children, women and men.

For these children, long-term food insecurity is linked to rising levels of acute malnutrition and stunted growth. In addition, health conditions such as watery diarrhea and iron deficiency anemia result from the ongoing lack of access to clean water and balanced diet. In February 2009, the level of anemia in babies (9-12 months) was as high as 67.5% (MOH, 2011).

Israeli's import blockade and access restrictions continue to suffocate the agricultural sector and directly contribute into rising food insecurity, the restrictions on some agricultural input affects the availability and quality of the agriculture production, so continuously health threats are raised as a result for the preceding.

With limited access to agricultural areas, such as the Restricted Area claimed by "Buffer zone" along the northern and eastern borders of the Gaza strip arable land (29% of agricultural area),

local production has declined and farmers' livelihoods are increasingly precarious. Food prices have risen considerably since the blockade, including locally-grown produce. Palestinians are less able to afford a healthy, diverse diet that could contribute to better nutrition and health (WFP, 2010).

Moreover; the tremendous inflation in the food commodities prices internationally affected the most vulnerable families in the Gaza Strip, specifically the inflation in the prices of white and red meat which influenced the dietary needs and caused malnutrition.

Since January 2009, fishers' access to fishing grounds has been further restricted to 3 nautical miles (nm) from the shore. This has resulted in a depletion of catches and revenues.

Fishing in the Gaza Strip currently presents a threat to people's lives as well as livelihoods. Fishers find themselves frequently subjected to arrests, seizing of boats, and shootings from the Israeli navy. Fishers are under intensive scrutiny by the IDF, which uses helicopters, and gunboats to monitor fishing activity this imposes a further threatening to food security in the Gaza Strip.

Agriculture consumes over actually around 50% of water demand that forced farmers to use salty and polluted water from agricultural wells for irrigation, which presents a risk to crop production and population's health; this is due to the Israeli water confiscations.

For decades the Palestinian people was relying on the external food aid to solve the food insecurity problem, we aim through introducing spirulina to reduce the dependency and achieve self-reliance as we are able to produce it domestically.

Accordingly, all the above mentioned issues give rise to food insecurity and generate malnutrition for a very large number of the Palestinian people in the Gaza strip, therefore; the project is going to address this important issue by enhancing achieving food security to guarantee good health and nutrition to the Palestinian people in the Gaza strip specially women and children through producing and processing Spirulina.

What is spirulina?

Spirulina is a food complement with a high nutritional value. This aquatic microorganism, perfectly eatable exceedingly adaptable algae which grows in a wide variety of environments. It can be auto-produced locally by populations in warm regions like Gaza Strip.

Spirulina has extraordinary nutritional value as it is rich in minerals (Fe, Zn, Se, P, K, Ca...), which are easily digested by humans Deleted no relation. It is rich in essential amino acids,

protein, and vitamins such as beta-carotin (from which vitamin A is made), vitamin B12, gamma-linolenic acid and other essential fatty acids, lowering cholesterol and triglycerides.

It is an excellent tool to fight light and severe anemia because it gives not only iron but also the proteins necessary to fix this iron, in opposite of the medicamental iron.

A severe un nourished child with underweight and length recuperated in 6 weeks spirulina treatment, instead of 3 months with medicals nutriment.

Giving an equilibrate nutrition to children, spirulina secures and increases their cognitive capacities to study and improve their skills.

Spirulina contains also a phycoerythrin which is an antioxidant helping to inhibit cancer.

At least, Spirulina improves the immune system enough that body defenses can stop virus infections, even HIV.

Spirulina has four key assets in combating malnutrition:

1. **It is cheap:** Many other feeding matters are more costly and less sustainable.
2. **It is effective:** Five grams per day is enough to correct light malnutrition in a child in four weeks, thus in a small comparison five grams daily of spirulina in protein equal to 100 grams of meat as well as the same equivalence to two eggs.
3. Its production is a relatively **simple process** and requires a low investment.
4. **It generates income:** Spirulina cultivation is an ideal work for rural women and it can provide a sustainable source of income.

Legal Steps to Introduce Spirulina to the Palestinian Community:

Spirulina is new food complement and completely strange of the dietary culture in the Gaza Strip, Spirulina needs a process of publicity and awareness raising to present it to the local community as the ideal food for mankind, this process started by meetings with the concerned governmental bodies specifically at the Ministry of Health and the Ministry of Agriculture, Spirulina must have the acceptance and authorization of Ministry of health in order to legalize it for public usage.

The first step started by different meetings with the head of International Cooperation Department in the Ministry of Health, then it has followed by several meetings to discuss the idea of using Spirulina within the system of Ministry of health as a food complement for some intended patients; the meetings were held with the nutrition department, family health care department.

In same time, we made a meetings with Al-Azhar University to introduce spirulina to the faculty of Pharmacy and faculty Agriculture to take the role of research and scientific experiments since they have the experts and the needed technology, moreover; we agreed to implement a spirulina experimental sample on 50 malnourished children through the nutrition centers of two NGO's.

The idea of integrating the NGO's in spirulina production process is due to the fact that the NGO's have the strong linkages to the community and it is easy to reach the families and change their dietary habits through their close relations to the NGO's.

The main aim of this meeting is to create a comprehensive system which manage and organize the whole process of community sensitization, technical production, research and scientific experiments, Spirulina consumption and distribution in the local context.

Project Duration, Target area and beneficiaries:

Since the spirulina project is a pilot project and a pioneer initiative introduced by PARC in the Gaza strip, therefore; the project will be implemented in three phases "years", and will be implemented in the northern of the Gaza strip "Beit Hanoun Area" where PARC already has it's farm "Al Nakheel Farm" , the farm stands on 40,000 m² and it contains empty fields ,several green houses and fish pool with total absorptive capacity of 300 cubic meters, the farm mainly is dedicated for research and experimental purposes for the newly graduated agronomists also it is used as observation field for the farmers, more specifically there will be 2000m² dedicated for the project to manage the consecutive production steps.

The project will be co-implemented in partnership with many institutions to perform a complete process of producing, testing and post-harvest processes, the partners listed below:

- Ministry of Health.
- Al Azhar University.
- NGO's

Project Overall Goal:

To contribute in enhancing the food security and to guarantee good nutrition for people in the Gaza Strip within the frame work of the internationally adopted MDG's.

Specific Objective:

To decrease the malnutrition rates in the Gaza Strip through producing spirulina as a sustainable food complement.

Project Results:

R.1.Local capacities related to spirulina production are enhanced.

R.2.Spirulina algae are produced and distributed locally.

R.3. Community awareness rose regarding the healthy dietary habits.

Main activities:

Result # 1: Local capacities related to spirulina production are enhanced.

This result can be achieved through implementing the following activities:

Coordination:

A1.R1. forming a steering committee consisting of all involved partners to organize and coordinate the implementation among all involved partners.

A1.R2. Coordination to establish partnership between a foreign training center, Al Azhar University, and PARC, through connecting the partners with each other and exchange experiences.

Orientation and capacity building:**R1.A3. training the project staff.**

Training of a local specialized team in Gaza Strip from both technical and administrative sides in order to be able to produce and supervise spirulina production; this can be done through:

- **Study trip** aims to introduce spirulina to three experts from PARC and provide them with the theoretical knowledge related to the process of producing the algae, the duration of the sessions is 45 days and will be held in the CCFA of Hyeres - France, the other part of this activity is to implement practical internship for 45 days and it will be directly after the theoretical part; this training program is essential to have the diploma for managing spirulina farm

Result #2: Spirulina algae are produced and distributed locally.

This result can be achieved through implementing the following activities:

A1.R2 establishing production unit of spirulina

Establishing and preparing spirulina production unit according to the standards and criteria, with all the needed equipment and staff, in order to produce the desired spirulina, PARC will receive the technical consultancy from ANTENA TECHNOLOGIES FOUNDATION “<http://www.antenna.ch/en/>” which is a leading Association which has the knowledge and the experience in producing spirulina all over the world.

- **Infrastructure of spirulina production unit:**

As mentioned before the project will be carried out on 2000 m² apart from Al Nakheel farm and the project facilities will be installed in a way that integrates spirulina project with other ongoing projects in the farm.

Input required in the activities of the second result

This activity includes setting up the items listed below:

No.	Year 1	Year 2	Year3
1	Green house with total area 1000 m ²	Green house with total area 1000 m ²	three spirulina tank
2	Rain Water harvest system	two spirulina tanks	
3	Water drainage network		
4	Warehouse and processing facility		
5	one spirulina tank		

6	Processing equipment		
7	Electrical gasoline generator		

A2.R2. producing spirulina and following up the daily processes to guarantee the compatibility of this activity to the technical standards and the ideal practices in this regard.

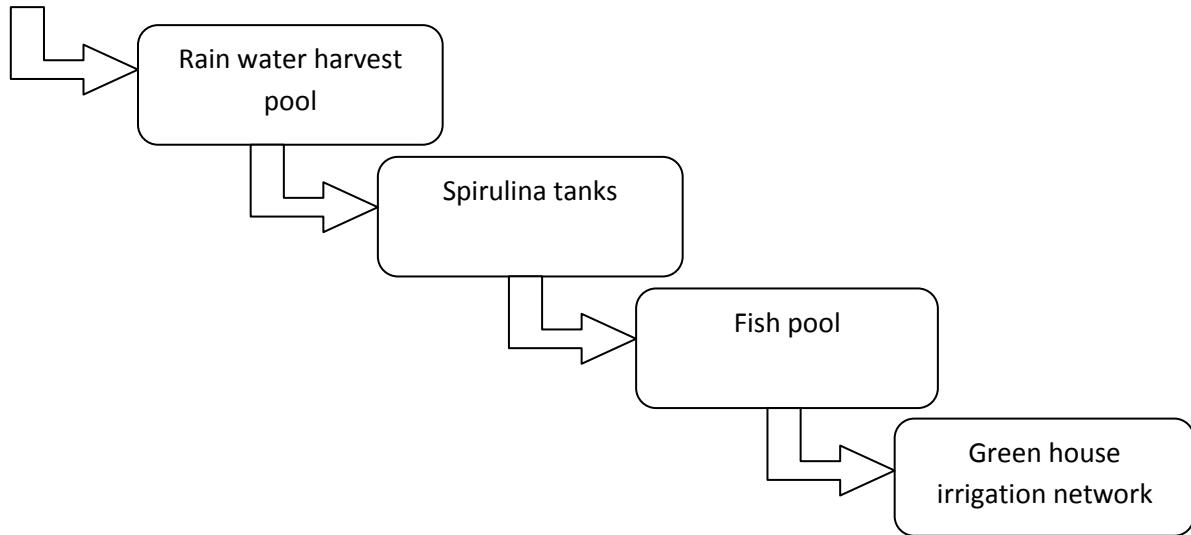
- **Technical steps in spirulina production:**

Spirulina project impressively integrates with other projects to perform a complete cycle to preserve the resources and maintain the environmental sustainability through the maximum possible investment of water under water scarcity conditions in the Gaza strip that the project will enhance the idea of “reducing underground water consumption” since the rain water harvest system will provide a clean source of fresh water to grow spirulina during winter (see Graph # 1).

Basically spirulina grows in specific tanks (4*25*0.25 m) with total absorptive capacity of 25 cubic meters and it needs a clean water and suitable lighting conditions, the PH must be between 8-11 and the ideal temperature conditions must be ranging from 30-40 degrees, in addition to that each tank must have a turbine to circulate and agitate the water to generate oxygen and spreading spirulina in the tank.

Regularly the water of spirulina needs to be renewed on monthly basis and this water will be flushed away to the fish pool, this water is very rich with organic components, on top of that it contains the remains of spirulina which is used to feed the fish, continuously and regularly the fish pool water will also be used to irrigate the green houses since the water is considered fertilized water; therefore there must be an interconnected network linking the green houses rain harvest system, spirulina tanks, fish pool and green houses irrigation network in the following manner:

Green house rain
water harvest system



Graph 1

In the first year the project will start with one tank of 25 cubic meters with a total expected productive capacity of 200 Kg as a yearly production , this quantity will be enough to feed 1600 malnourished persons, gradually the number of people fed will increase since the productive capacity will be increased in the following years (Table 1).

The production process has several steps as listed below:

- Seeding the spirulina in the water.
- Implementing the daily following up activities, this activity includes: (Feeding the spirulina, controlling the tanks parameters, cleaning)
- Harvesting the spirulina on daily basis, this activity includes: (Collecting spirulina, pressing, drying, weighting, packing and storing).
- Post-harvest processes.

Table (1):

Item	Year One	Year 2	Year 3
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Technical progress	One Tank	Three tanks	Six tanks
Expected production	200 Kg	600 Kg	1200 Kg
Service coverage	1600 person	4800 persons	9600 persons

- **Post production of the spirulina**, this stage will be according to the results of the experimental samples done by Al-Azhar University to study the options of integrating spirulina in the local food tradition.

Result #3: Community awareness rose regarding the healthy dietary habits.

Community sensitization and awareness rising.

Making extension and awareness workshops and sessions, to introduce Spirulina to the public and this can be done through implementing the following activities:

A1.R3 Conducting extension and awareness workshops

A2.R3 Publishing brochures and pamphlets concerning with spirulina, and its benefits.

A3.R3 Holding audible sessions through radio regarding this topic, besides to making posters on the benefits of spirulina, as a way to introduce this material to the public,

A4.R3. Producing a documentary film to be used as learning tool covering the nutritional and technical aspect of producing spirulina.

Project Ownership and sustainability:

Since the food insecurity is a chronic problem in the Gaza strip there was a bad need to create a sustainable solution.

Having the technical part of the project, the ownership will be achieved through providing all the necessary inputs and materials needed spirulina production, once the project is terminated PARC and its partners will proceed in producing spirulina using all equipment provided.

On the other side, the community ownership will be ensured through providing spirulina to the targeted community through either the public health sector or the NGO's.

Moreover; the project ownership will be guaranteed through the experience and knowledge disseminated to the community.

Also one of the main factors which will ensure the project sustainability is the strategic partnership with Al-Azhar University as the scientific research responsible and the NGO's as a community mobilizer.

Time Frame														
#	Activity	Year 1				Year 2				Year 3				Responsibilities
Result # 1: Local capacities related to spirulina production are enhanced.														
1	Conducting needs assessment													
2	Forming steering committee													
3	Coordination between partners													
4	Recruiting the staff													
5	Study trip and training													
Result #2: Spirulina algae are produced and distributed locally.														
6	Preparing tenders													
7	Receiving and opening tenders													
8	Constructing the production units													
9	Producing spirulina													
10	Following up and monitoring													
Result #3: Community awareness rose regarding the healthy dietary habits.														
11	Conducting Workshops													
12	Publishing brochures and pamphlets													
13	Broadcasting radio soaps													
14	Producing documentary film													

Project Budget

Activities		Item	Unit	# of units	Unit Cost \$	Contribution of Caritas in \$			Contribution of other NGOs in \$		
						Year1	year2	year3	Year1	year2	year3
1. Inputs	1.1	renting land (2 Dunums)	Year	3	500	1000	1000				1000
	1.2	Warehouse and processing facility	building	1	10000	10000					
	1.3	Green house	Green house	2	15000	15000				15000	
	1.4	Rain water harvest system	System	2	500	1000					
	1.5	Water drainage network	Network	1	4000	4000					
	1.6	Spirulina tanks	Tank	6	1500	1500		4500		3000	
	1.7	Processing equipment and tools	equipment	1	4000	4000					
	1.8	Electrical gasoline generator	Generator	1	1000	1000					
	1.9	spirulina feeds	Tank	6	2200				2200	6600	13200
	2	Workers(4)	month	36	300				14400	14400	14400
	2.1	Guard(1)	month	36	300				3600	3600	3600
2. study trip and research	2.1	study trip							10000		
3. media & information	3.1	conducting Workshops	workshop	9	200				600	600	600
	3.2	Publishing brochures and pamphlets	0	1500	0.6				300	300	300
	3.2	broadcasting radio soap	soap	3	500				500	500	500
	3.2	producing documentary film	film	1	2000				2000		
4.Salaries	4.1	Project Manager(Part time)	month	39	600				7800	7800	7800

	4.2	project coordinator(1)	month	39	950				12350	12350	12350	
	4.3	accountant(1)	month	39	700				9100	9100	9100	
	4.4	Technical(1)	month	39	750				9750	9750	9750	
5.Operational cost	5.1	Stationary	month	36	20				720	720	720	
	5.1	Transportation	month	36	150				1800	1800	1800	
	5.1	Auditing									2000	
	5.1	Evaluation									2000	
Sub Total \$									43000		239,760	
6.overhead	6.1	administrative costs							2150		11988	
Total									296,898			