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LABORATORY OF INTERNATIONAL COOPERATION

POST GRADUATE PROGRAMME

# COOPERA(C)TION KNOWLEDGE AND SKILLS FOR SUSTAINABLE CITIES IN THE GLOBAL SOUTH



## INTEGRATED MANAGEMENT OF ADAPTIVE WATER RESOURCES FOR THE DEVELOPMENT OF AGRICULTURAL AREAS IN TATUN VILLAGE.

### Egypt

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# I. INTRODUCTION AND TOPIC OF THE PROJECT PROPOSAL



a) **Localization of Tatun and Fayoum oasis. Source: Satellite photo from Google Earth.**

The project proposal includes the promotion of integrated interventions for sustainable management of water resources aimed at enhancing the agricultural in semi-rural areas of Tatun<sup>1</sup>, a village of 80,000 inhabitants in the governorate of Fayyum, Egypt.

A proper water management is getting the best availability both in terms of productivity, water accessibility and sustainability of local rural system. Through an adaptive<sup>2</sup> and integrated<sup>3</sup> management of the resource, solutions will be sought to bring together local practices with the research for technological innovation in water sector.

Dealing with water management only from a technical point of view to meet the demand, it is no longer sufficient for the ecosystems sustainability. The Water Governance is the international strategy that seeks to integrate different systems (social, political, economic), involved in water management at different levels. Essentially the knowledge on water management to be effective, should be produced by a network of multiple actors that reflects the complexity and the interrelationship between the systems of governance of water and soil. The IWRM process has a potential value in the proposed principles, such as cross-sectoral planning, the involvement of stakeholders and the freedom that comes from being able to explore rather than optimizing<sup>4</sup>.

A water management and integrated development approach for one of the most fertile oases of Egypt, it is an important strategy for the environment; while agriculture is 13% of the GDP and involve about a third of employment, it is perhaps the most neglected in the chaotic post-revolutionary conditions. Fayyum needs to improve the efficiency of water use by the introduction of innovative and affordable technologies for so long; a bottom-up process that implies local practices to improve water management, seems to be one of the priorities for the development of agricultural vocation of this territory.

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1 This village had been the subject of my master's thesis in Urban Planning. With prior knowledge of some problems, some local actors and insights acquired with the examples illustrated during Cooperation (especially those of Proff. Magoni and Minucci), I suggested a proposal focused on semi-rural areas in Tatun.

2 The Adaptive Management is "*an approach that addresses uncertainty and complexity by increasing and sustaining the capacity to learn while managing*" (Mysiak et al., 2010). Source: slideshow by lecturer Minucci 'Agriculture and water management in an arid territory: Draa Valley'.

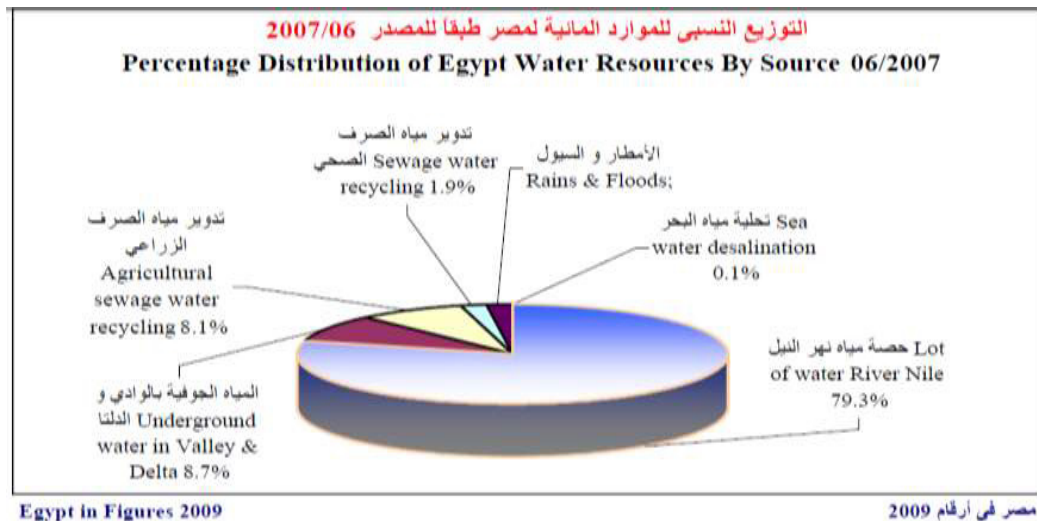
3 The Integrated Water Resource Management [IWRM] is defined as the process that promotes the development and coordinated management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (Global Water Partnership, 2000).

4 W. Medema, B. S. McIntosh, P. J. Jeffrey, "*From Premise to Practice: a Critical Assessment of Integrated Water Resources Management and Adaptive Management Approaches in the Water Sector*", paper in Ecology and Society 13(2): 29, 2008.

## II. THE PROBLEMATIC NATURE OF THE EGYPTIAN CONTEXT

In Egypt, the significant increase of the population (currently about 89 million inhab.) plus the urban and industrial expansion and the increase in agricultural reclamation occurred in recent decades, are excessive pressures on agricultural resources.

The continuous decrease in the per-capita availability of water, up to the shortest threshold, has already been reached since 1998 and it is expected that by 2025 the level of availability will be only 500 cubic meters per-capita per year. It is estimated that approximately 86% of water is employed in agricultural activities and that a huge volume of this irrigation water (about 40%) is lost due to evaporation or improper uses (FAO, 2004).



b) Egypt's water resources (billion cubic meters / year). Source: paper by M.Shendy

Fayyum has an area of about 6,000 square kilometres and 2,882,000 inhabitants (2012). Located in the Upper Egypt, it is a vast oasis to south of Cairo, very fertile and lush green palms. The agricultural sector is the main source of employment, while there are almost no industries (only few related to agriculture, such as sugar refineries): overall the region's economy is stagnant. The amount of water for irrigation is approximately 2.5 billion cubic meters per year.

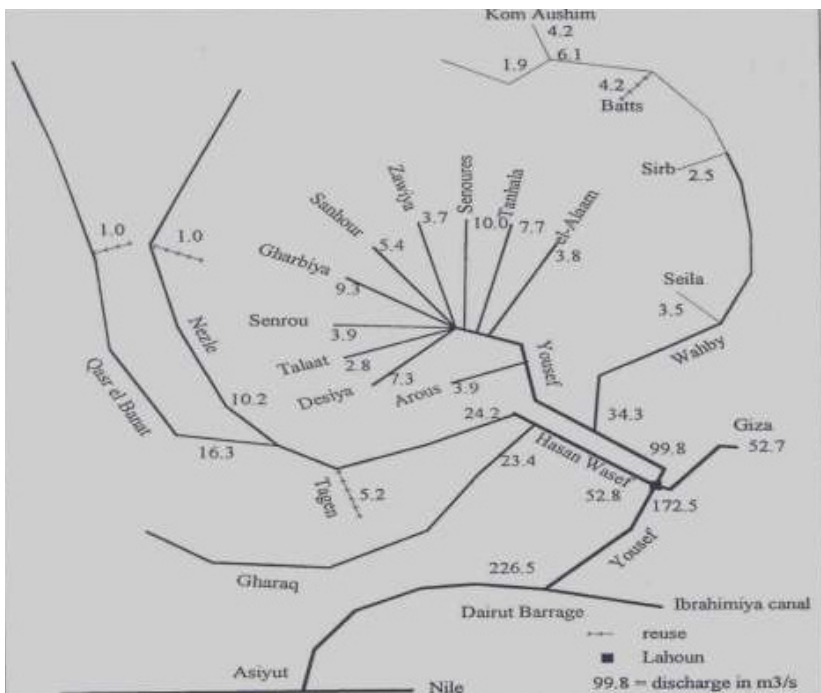
The area is irrigated by the Bahr Yussuf canal, where the waters of the Nile are drawn to the barrier at Asyut. From the enclosures located at el-Lahun and Hauwaret el Maqta, at the entrance of the oasis, the waters are distributed through a network of channels. From the Bahr Yussuf canal and the waters are distributed through an extensive network that consists of three main natural systems (El-Batts in the east, El-Wadi to the west and lower central channels), considered the main source of water drainage for agricultural land of the Governorate (UNDP, 2003). The waters of El-Batts and El-Wadi are conveyed to Lake Birket Qarun by gravity, exploiting the digging topography toward the lake; the waters of Wadi El-Rayan (about 30%) are conveyed through a tunnel in two artificial lakes made in the early 1970s in the Wadi Rayan South-West Depression of the oasis.

The Birket Qarun, once a freshwater and now a brackish one, is a closed system (it has no natural outlet) used for recreation and fishing, and has an area of 55,000 feddans (about 231 million square meters); the lake level continues to rise by 0.1 m / year for the surfacing of the lake bottom and its salinity rising by 0.5 g / l annually. The Wadi Al Rayan lakes have an area of 35,000 feddans (about 147 million square meters). Throughout the region, regimation takes place through a series of masonry overflow channel of standardized dimensions.





c) Topographic map of Fayoum. Source: paper by N. Donia.



d) Schematic structure of the Fayoum Governorate irrigation system. Source: paper by M. Shendy.

By focusing on Tatun, emerge some problems that are common to the entire drainage basin of Fayyum:

### 1. Inefficiency of the water system

Tatun has an irrigation system by gravity that slopes steeply from south to north towards the Lake Qarun with an average gradient of 2 m/km<sup>5</sup>. Therefore, most of the soils are irrigated directly through waterfalls with continuous irrigation 24/7. The water is distributed to farmers with a rotation system shared among them through irrigation ditches (*mesqas*) letting in water in each agricultural field. This results in a loss of large water volumes during transport because of infiltration, evaporation, massive collection of herbs on the canal banks and constant irrigation without considering the real needs (fig. e).



e) **A Fayoum channel.** Source: paper by M. Shendy.

## 2. **Environmental degradation and low quality of water**

Water in irrigation canals does not meet the quality standards laid down in Egyptian legislation and therefore constitutes a source of danger for the health of the inhabitants.



f) **Waste collection in Tatun.** Source: ph by F. Giangrande.



g) **Discharges of uncontrolled garbage along the streets in Tatun. Source: ph by F. Giangrande.**

Waste collection is done twice a week with a bulldozer that goes only along the main street of Tatun, whereas heaps of garbage are piled up everywhere and litter the dense network of canals that irrigate the surrounding countryside, muddy and contaminated by parasites that cause bilharzia and dysentery to the inhabitants in contact with water, causing a huge environmental and health damage. The shortage of sanitation facilities in many Tatunian homes also affects the precarious condition of the water quality (fig. f ed g).

### 3. **Uncontrolled urban expansion**

In Tatun<sup>6</sup> the phenomena of environmental degradation are amplified by a significant return migration from Italy which generated a socio-spatial impact in terms of rapid urban growth due to the remittances<sup>7</sup>. The housing boom is the most visible outcome of migrants returning and investing the money for the exclusive benefit of the household and private space. Although remittances are essential for GDP growth, collective investments are limited and do not yet represent a support for local development. Many lands have been abandoned, divided and incorporated into semi-rural housing zones; a bad state of mesqas maintenance and the canal Masraf al-Bashwat crossing the urban fabric (sprawl with some illegal artifacts) involve severe water pollution problems. Moreover, in absence of urban infrastructures, the remittances fuel costs for supplies of water storage facilities for domestic use, as tanks on the roofs of houses of migrants (fig. i).

Tatun's urban expansion due to remittances (and not only) was mainly on the edge of the village along the East-West route. The connecting road between Tatun and the village of Al Gharraq is perpendicularly crossed by the Masraf al Bashwat channel (fig. j e fig. k).

### 3. **Consortia or agricultural associations**

Little is known about the presence of consortia or agricultural associations in the Tatun area and management arrangements. Most Egyptian farmers' organizations, both present in the Nile Delta and in Fayyum, do not communicate and are controlled by the state<sup>7</sup>; their efficiency and functionality are limited due to a strong political centralization and / or due to the lack of internal resources and capabilities.

However, farmers' organizations can have a big impact when they manage to unite stakeholders and obtain access to markets, financial prospects, good governance and leadership (Aitlhaj, A., 2013).

6 Tatun, 150 km south of Cairo, with its 47,000 immigrants to Italy is called the "Milano of Egypt": «The connection with Milan, which started in the 80s, has forever changed what thirty years ago was an agricultural village similar to many other in Fayyum [...] Today, from the streets still unpaved, colourful buildings that recall at times the buildings in Milan rise, as the product of remittances and investments of migrant circulating between the two poles». Source: Giangrande F., Piscitelli P., *Egipptaly. Indagine territoriale sull'immigrazione Egitto-Italia*, Master Thesis in Urban Planning and Policy Design, Politecnico di Milano, 2012/2013.

7 "The farmers have feared the government for decades," said Mahmoud al Mansy, who heads Sons of the Soil's human rights center. "The banks are controlled by the landholders and any gathering of farmers is attacked by thugs. Finally, they are beginning to organize." Tratto dall'articolo di Stephen Glain, Egyptian Farmers Make Themselves Heard, The New York Times, 2012.





h) The urban encroachment on Tatun land. Source: ph by F. Giangrande.



i) Private house tanks in Tatun. Source: ph by F. Giangrande.



j) Aerial ph of semi-rural areas around the canal Masraf Bashawt, Tatun. Source: Google map, 1:1000 scale.



k) **Photo of farm fields around the canal Masraf Bashawt, Tatun. Source: ph by F. Giangrande.**

### III. GOALS

This project foresees some strategies to empower the rural community of Tatun, through learning processes from below, enabling the local people to analyse, share and enhance knowledge of the territory and tools available to facilitate more flexible, efficient and inclusive interventions in water management aimed at enhancing agricultural.

The project will make use of some participatory methodologies in order to collect data and information to draw up solutions shared by local populations.

The project will eventually become a pilot for similar contexts through scaling-up strategies to convey learnings on problems and solutions from village to village of Fayyum.

The Cooperation lecturers have recommended that the implementation of the project was in line with the eligibility requirements of the Expo call "Feeding the Planet 2014", promoted by Lombardy Region, Milan Municipality and Cariplo Foundation. Thus, based on that format, I assumed a duration about 24 months, a funding of 150,000 euros and a list of actors/partners to make it feasible.

### IV. STRATEGIES AND ACTIONS FOR THE REHABILITATION OF RURAL AREAS IN TATUN

I made a proposal of three strategic axes consisting of 2/3 actions. The beneficiaries of these will be the farmers and the inhabitants of the village of Tatun involved in the project actions:

#### **AXIS 1. Knowledge strategy, aimed at improving the efficiency of the water system, to recover and preserve agricultural heritage**

##### **1.1. Knowledge of the state of maintenance and degradation levels of the water system for agricultural uses:**

- Survey and mapping on the maintenance status of the mesh and the viaductivity and the efficiency levels of channels and mesqas, carried out by the University of Fayyum
- Evaluation of the levels of pollution of mesqas and hydrogeological phenomena, carried out by the University of Fayyum.

##### **1.2. Knowledge of how farmers use, transfer and store the water.**

- Mapping of local producers (individual farmers, associative realities) that apply effective irrigation, transfer and storage solutions in the fields
- Focus groups organized by facilitators of the Procasur and Faoda NGOs aimed at recognizing the strengths and criticalities found in the management of the water system, with the participation of farmers
- Training of local NGO workers, conducted by the NGO Faoda, about the use of efficient irrigation techniques, transfer and storage already being used successfully in other local fayyumiti areas.



## **AXIS 2. Strategy for the dissemination and networking of knowledge gained in the first phase**

### **2.1 Promote measures of protection and preservation of the mesh farm and the water system**

- Territorial animation events by facilitators of the Procasur and Faoda NGOs, for sharing with the Tatunian inhabitants of the results of the water system surveys conducted by the University of Fayyum and the NGOs
- Accompanying and advisory activities for farmers, carried out by agricultural operators of local associations on maintenance of channels and mesqas, from the care of the riparian vegetation to reduce the infiltration, to the reclamation of the channels invaded by abusive artefacts arising from uncontrolled urbanization

### **2.2 Promoting dialogue and sharing virtuous water management practices to foster partnership and mutual learning among agricultural actors**

- Enabling “learning routes”, in Tatun addressed to individual farmers and associations, conducted by the NGO PROCASUR for the networking of knowledge and the dissemination of good practices of local water management

## **AXIS 3. Encourage investment for measures to protect and maintain the dense network of little farms and to improve the water system**

- Fundraising stands and awareness raising activities on the topic of water for agricultural use, edited by the FAODA ogn during the weekly village souq (market)
- Listening and dialogue meetings in Milan, conducted by the ShebSheb association, to raise awareness among migrants by Tatun on maintenance of the network of little farms issues mesh and water management, as strategic way to reactivate sustainable rural development
- Creating competitions with a premium mechanism for Tatunian migrant entrepreneurs, to encourage the use of remittances in the protection and maintenance of the water infrastructure for agriculture

## **V. SUBJECT AND PARTNERSHIP**

**Sheb Sheb Association:** Lead Partner

**FAODA ( Fayoum Agro Organic Development Association):** partner

**Procasur:** partner

**Faculty of Agriculture, Fayoum University:** partner for technical and scientific contributions

**Collective and local groups:** partner

### **Sheb Sheb Association**

From the Expo call, requests for contributions may only be submitted by NGOs and non-profit organizations that have their registered office and / or operational headquarters in Lombardy, in partnership with at least one Italian organization and one local counterpart in the country of intervention. Sheb Sheb is a nonprofit social promotion association, born as an Italian-Egyptian cultural association based in Milan since 2011 by some Italian teachers volunteer. His project aims to enhance the identity and memory of young Egyptians and set up an alternative to integrate in the host country. The association has in-depth knowledge of the Tatunian context as well as of the Tatunian migrant network established in Milan and works on the front of integration in Italy and local development in Egypt. Its role could be to support a migrant entrepreneur who is inclined to invest for Tatun's collective growth. The association will enhance the migrants by informing local governments of the appropriate incentive arrangements (ie through grants) and accompanying Tatunian migrants who demonstrate sensibility and willingness to invest for this project in the promotion of water and agriculture.

<https://shebshebmilano.wordpress.com/>

### **FAODA**

FAODA is an active NGO in the area since 2001 which has gained considerable training experience under the agricultural export information project. Expertise acquired in sustainable projects that have already begun makes FAODA a potential partner of the project. In co-operation, various past success experiences are reported on the

association's website (including a collaboration with Slow Food Italia). It will be possible to connect the ong with other subjects of Tatun's agricultural reality. In the FAODA project, it will be possible to strengthen the already started collaboration with the University of Fayyum for learning actions with farmers and empowering the Tatun community.

[http://www.faoda.org/aboutus\\_en.html](http://www.faoda.org/aboutus_en.html)

#### **AGRICULTURE FACULTY, FAYYUM UNIVERSITY**

The faculty is carrying out numerous studies on the issues and the improvement of the efficiency of agricultural techniques, especially on water management for agriculture, in the Fayyum area. Tatun area knowledge advancement studies could benefit from specific and localized skills of researchers. Some workshops and initiatives in the field have already been undertaken in partnership with FAODA (such as the Sustainable Water Technologies workshop), which shows a good predisposition to the collaboration between the two actors in the area. Fayyum University will collaborate with other partners to improve local scale information, with innovative tools and technologies for remote sensing of hydrologic, environmental and water features, and techniques for building infrastructure works, providing information in the evaluation phases (before, during and at the end of the project) on pollution impacts, local water management flows and mapping skills of Tatun's actors and semi-rural areas. It will also actively participate in learning routes and other bottom-up training initiatives with farmers and NGOs.

<http://www.fayoum.edu.eg/English/Agriculture/Economy/AboutBoard.aspx>

#### **Procasur Corporation**

Procasur is a global organization specializing in harvesting and scaling-up strategies for domestic production innovations. The mission of the organization is to promote the exchange of local knowledge to put an end to rural poverty. Procasur has experience of bottom-up approaches and practitioner-to-practitioner of knowledge sharing. In 2013 Procasur set up an initiative of learning routes in Egypt open to experts, researchers and anyone wishing to visit local contexts and learn sustainable water management initiatives. Given the accumulated experience in the context, replicating such an initiative in the Fayyum area, working with FAODA and Fayyum University, would make it possible to thicken a relatively weak network today and to initiate a process of learning among Tatun's agricultural subjects and between Tatun and similar realities of the same problematic region.

<http://www.procasur.org/>

#### **Collective and local groups**

A collective of Tatunian boys, since the Revolution of 2011, has already activated several private initiatives in support of the community, also thanks to the flow of remittances of emigrants in Milan. In this way, awareness-raising campaigns and micro-businesses in the village have been privately activated by groups of active volunteers. Knowing and involving these groups is a key point of the project for greater capacity from the bottom by realities that are already active and sensitive to the theme of environmental degradation and lack of agricultural enhancement.

<https://www.facebook.com/photo.php?v=143690992362213&set=vb.151186858273339&type=3&theater>

## **VI. EXPECTED OUTCOMES AND RESULTS OF THE PROJECT PROPOSAL**

Working in Tatun means try to re-establish virtuous rural relationships within increasingly urbanized places of the Fayyum countryside: it may represent a possible way so that innovative forms of care and culture will arise in rural areas.

The proposed actions aim to facilitate the empowerment of local farming community. To enhance the agricultural context of Tatun is necessary a process of analysis and learning on the local water theme, starting from the problems listed above. The surveys should include all those affected by the immobility of the government administration together with the socio-spatial impact of remittances, the lack of infrastructure and degradation resulting by anthropogenic sources of pollution.

Moreover, the project will consider jointly the question of agricultural development and of the diaspora with the

involvement of a non-profit organization in Milan, named Sheb Sheb<sup>8</sup>, aiming to encourage the creation of local partnerships between Tatum and Milan.

The Municipality of Milan intervenes in international decentralized cooperation since 1989. Since 2007, in view of the candidacy for EXPO 2015, Municipality has launched a multi-year program with specific Call for Proposal<sup>9</sup> on food security, biodiversity and co-development. Given the capacity to enable funding and create tools to support co-development initiatives, I suggested that local administration might play a pivotal role in supporting the networks of tatumesi migrants. Through the development of potential “natural twinning” between Milan and Tatum, starting from dialogue and cooperation with local associations to understand the bridges between the two realities, it will help to strengthen the existing connections.

Migrants from Tatum lack a collective vision, whereby the investments are reduced to massive housing construction. The project also aims to support and not mythologizing the migrant even try to arouse interest on management of water resources.

It will be required a stage of meetings, with awareness-raising initiatives and proposals for reward mechanisms to encourage the use of remittances for the benefit of the community and common goods.

Is expected an increase in the sustainability of local rural system; good water management will affect the long term on the quality and efficiency of agricultural processes and, as a result, the quality of the products. This could be the engine of a self-sustainable local agricultural system (Magnaghi, 1998), to be pursued through a mode of self-government based on the recognition of each other’s needs and exchanges (cf. Self-guiding society, Lindblom, 1991).

## VII. MONITORING

During the lifetime of the project, that is 24 months, monitoring will take place in this way:

Half-yearly reports (12 months, 18 months, and a 24-month final) shared between the project partners for an assessment of the performance of different activities in terms of management skills and control of factors outside the project;

Semiannual financial reporting (12 months, 18 months, 24 months) of individual project actions;

Annual checks (12 months, 24 months) of the training level of local operators and facilitators for learning routes and territorial animation initiatives through questionnaires and other evaluation tools;

Two meetings (at 6 months and 18 months) at the headquarters of a local association (to be defined) with farmers and agricultural associations, to evaluate the progress of accompanying initiatives to farmers, the fundraising and gather opinions to include in the reports;

Semi-structured interviews at the end of the project, to be included in the final report (24th month) with farmers and Tatumians inhabitants to check the ex-post efficacy of accompanying initiatives to farmers, fundraising campaigns and water awareness, of focus groups;

Meetings and talks at the close of the project in Milan with immigrant entrepreneurs to check the ex-post convenience of investments in the water management sector;

Two moments (at the end of the 24 months and in the first year after the end of the project) of ex-post evaluation of project outcomes in terms of ability to activate diasporic networks, on pollution and water scarcity issues, to increase association between the agricultural realities of the area, and other externalities.

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8 From the EXPO call, the applications may be submitted only by the non-profit NGOs and organizations that have their registered/ executive office in Lombardy, in partnership with at least an Italian organization and a local partner in the foreign country. Sheb Sheb is Egyptian-Italian cultural association based in Milan since 2011, created by some volunteers teachers of Italian language. Its project aims to enhance the identity and memory of young migrants and to set an alternative integration system in the host country. So I think might be the right lead partner.

9 In the “Feeding the planet 2014” call, Milan Municipality has had the role of lender of projects.