Wisdom at the source of Blue Nile

Bahir Dar STEM Incubation Center

Bahir Dar University

Outreach Program for Talented Students Project

(Nov. 2011 – Sept. 2014)

Financed by: Gelfand Family Charitable Trust (GFCT)

"Inside Every Child is a Scientist" G.M.

Phase-I: Project Proposal Development to official inauguration of the program (September, 2011 - July, 2012)

1.1. Program Familiarization

Outreach Program for Talented Students was a two year project financed by Mr. Mark Gelfand, an American Philanthropist who supports such project to maximize the number of science and technology students with a motto" Inside every child there is a scientist".

The project proposal was developed by a team of three Bahir Dar University Instructors and Foka Science and Technology Center in September, 2011. The next task was introducing the program to Bahir Dar City Education offices, school directors and concerned officials and re-organizing science and technology clubs in schools. Five science and technology clubs such as Biology, Chemistry, Physics, Mathematics and Electronics and ICT clubs were re-organized in 16 schools in Bahir Dar city. The total population involved in clubs was 152 teachers and 2250 students (30 students in each club)

Two successive meetings and one day workshop were conducted with Science and Technology coordinators and unit leaders and the outreach program was fully introduced.

The 1st National Workshop on outreach program for talented students was conducted on April, 2012. Participants were drawn from Gondar University, Gondar Teachers Education College, Mekelle University, Axsum University, Amhara National Regional State Education Bureau, 16 science and technology club representatives in Bahir Dar, Ethiopia Electric Engineers Association, Foka Science Center, Afar and Benishangul Gumuz National Regional States.

1.2. Curriculum Development, and Participants Selection

17 laboratory manuals which consisted of theoretical background and practical hands on experiments were prepared and compiled for the program at the end of May, 2012.

The selection of students was carried out based on the club activity of the student, creativity of the student and average mark of the student in science and mathematics subjects. Ethics and gender was also considered for selection. The students were selected from upper elementary schools in Bahir Dar City, Secondary and Preparatory schools in different zones of Amhara Region, Benshangul Gumuz Region, and Bahir Dar city (both Governmental and Private schools). In addition to students participants, school teachers, university instructors and laboratory technicians were selected and

participated in helping students in laboratories through team teaching.

1.3. The 2nd National conference on STEM education

In July 15, 2012, the 1st outreach students and invited university and school instructors welcome guests during the National Conference on "Present and Future Direction of Science, Technology, Engineering and Mathematics (STEM) Education in Ethiopia." held in Bahir Dar University to officially open the Outreach Program for Talented Students project. The conference was chaired by Ministry of Education and high level guests. The contribution of Mr. Mark Gelfand was recognized by awarding different memorable gifts by the university. The University President, Dr. Baylie Damtie and Mr. Mark Gelfand laid a cornerstone for the construction of STEM Incubation Center at Bahir Dar.

While welcoming participants, Dr. Baylie Damtie said the University had been striving to promote STEM education within and beyond its borders in order to install scientific thinking.

The Ministry of Education Minister Demeke Mekonnen explained that the conference was meant to brief participants about STEM education, to discuss strategies that would help to scale up STEM at country level, and to find ways of how to align its activities with Mr. Mark Gelfand's project, American philanthropist supporting the growth of STEM education in Ethiopia.

In his keynote address, Mr. Mark Gelfand who was conferred with a life membership award in recognition of his distinguished contribution towards advancement of science and technology in the country pledged his support towards the area of Science, Technology, Engineering and Mathematics.

Phase 2: Summer Training to Project Advising (July 2012 – August 2014)

2.1. The Summer Training Program Structure

Students were grouped as **Group 1** (Grades 7 and 8), **Group 2** (Grades 9 and 10), and **Group 3** (Grades 11 and 12), and divided into sections with 25 students each. The training was given mainly on the school subjects Mathematics, Physics, ICT, Chemistry, and Biology. In addition, the program includes Electronics, Technical Drawing, and English Language training and all were given for 25 hours in each summer.

The training was conducted through team teaching mode, that is, one school teacher, one university instructor, and one laboratory technical assistant helped 25 students in a laboratory for three hours a day.

The training was hands on practical laboratory experiment followed by students' presentation, report writing and project works including mathematics.

So far **1340** students are participated in the program

- In 2004 E.C. 450 students
  - 50 students from 10 administrative zones in Amhara Region
  - 20 students from Benshangul Gumuz Region
  - 380 students from Bahir Dar City (Both gov'tal and private schools)
- In 2005 E.C. 550 students
  - 150 students from zones in Amhara Region
  - 150 students from Benshangul Gumuz Region
  - 200 students from Bahir Dar City (Both gov'tal and private schools)
  - 50 students from BDU community
- In 2006 E.C. 340 students
  - 104 students from zones in Amhara Region
  - 20 students from Benshangul Gumuz Region
  - 160 students from Bahir Dar City (Both gov'tal and private schools)
  - 20 students from BDU community
  - 36 students selected from the previous trainings.

Number of Teacher Participants in the last three summer trainings is:

- 74 University Instructors,
- 64 Laboratory Technicians,
- 60 upper elementary, secondary and preparatory school teachers.

• In 2014, school teachers were not invited to participate.

2.2. Extracurricular Activities

In addition to the above schemes of training, there were weekly travels in the form of educational tour or as recreation or visit based on their groups to different recreational areas around Bahir Dar. The main travel areas were **Blue Nile Water Fall** and **Koga Agricultural Irrigation Dam**.

2.3. Follow-up of some selected students

During the training time, **top six to eight** talented students were identified by their respective instructors' team and after the completion of the summer programs, there were **Aptitude Tests** for each group on **Mathematics**. Hence based on the above two mechanisms, 10% of the participant students were selected each year for further additional advanced training and project works during the whole academic year.

- So far 45 + 52 = 97 students were selected in the years 2012 to 2013
- 30 + 35 = 65 students were actively participating in projects and trainings.

2.4. Bahir Dar Science, Technology, Engineering and Mathematics (STEM) Incubation Center

STEM is an acronym for Science, Technology, Engineering, and Mathematics and usually refers to education in one or more of those disciplines. STEM initiatives started as a way to promote education in these related areas so that students would be prepared to study STEM fields in college and pursue STEM-related careers.

Vision

- To be internationally competent STEM center

Mission

- To provide competent students with high learning experience, that mainly focuses on hands on activity in science, mathematics and engineering laboratories.
- To be assessment and standardization center for school education.

- To establish school based Technology park.
- To establish School-University-Industry linkage.

Bahir Dar STEM Incubation Center Objectives

- Training and project advising for talented students.
- Organizing and supporting a variety of school clubs.
- Provision of laboratory based education for school students.
- Provision of short term training for school teachers.
- School based technology park establishment.
- Assessment and standardization of school education.
- Incubating school students' project work and creativity.
- Administration of various extracurricular activities to students such as science fairs or Olympiads, aptitude tests and other competitions.
- Summer Outreach program training.
- Provision of media based education to community.

The Bahir Dar STEM Center has the following facilities

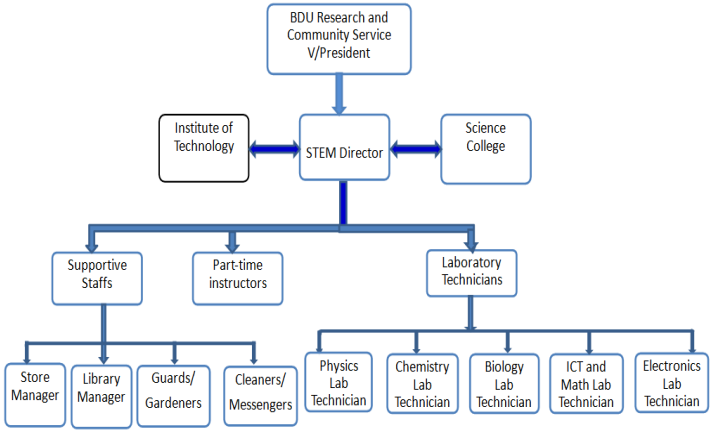
- 11 Laboratory Rooms (Physics , Optics, Space Science, Chemistry, Biology, Biochemistry, Electronics, Mathematics, ICT (Two Rooms), Workshop)
- Mini Library
- Meeting Hall
- 3 Offices (Manager Room, Store Room, Staff Room)
- 4 Toilets(Staff (Female/Male), Students (Male/Female))

2.5. Expenditure

- Training Related Expenses in three years: **2,003,770.08**
- Construction and Lab equipment Purchase: **12,500,000.00** (12.5 Million Birr)
- Total Expenses: **14,503,770.08 ETB**

Phase 3: STEM Incubation Center Future Plan

3.1. STEM Administration Structure



3.2. STEM Future Plan

- **Supporting Schools and school students**
  - ✓ Supporting Science and Technology clubs;
  - ✓ Providing teaching and learning resources, like audio and video files, books, laboratory manuals, learning/teaching softwares and standardized exam items;
  - ✓ Providing Library, Internet and Laboratory Services to students including primary school students.
- **Functioning the STEM Incubation Center fully** for the whole academic year so that students either individually or in group or with their school teachers can conduct laboratory works.
- **Supporting Innovation**
  - ✓ The STEM Center will be a Technology park
- **Searching and supporting more talented students to involve in projects.**

3.3. Collaborations

- Mr. Mark Gelfand and Family Charitable Trust
- MOE
- Amhara Educational Bureau
- Benshangul Gumuz Educational Bureau
- Bahir Dar City Educational Offices
- ✓ Funding the Outreach Program and STEM CENTER
- ✓ Selection of Students
- ✓ Covering Transport costs of students.