

# Dark Skies Africa

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**Abstract.** The first IAU Office of Astronomy for Development Task Force 3 project on light pollution is described along with evaluations and recommendations for future projects.

**Keywords.** Light Pollution, Energy Conservation, Quality Lighting, Education Outreach

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## 1. Overview

The IAU Office of Astronomy for Development (OAD) awarded the National Optical Astronomy Observatory (NOAO) with a grant to deliver a "Dark Skies Outreach to Sub-Saharan Africa" program to institutions in 12 African countries during 2013. The program's 1st goal was to help students identify wasteful and inefficient lighting and provide ways to reduce consumption and to keep energy costs in check. The 2nd goal was to inspire students to be responsible stewards in helping their community safeguard one of Africa's natural resources - a dark night sky. The 12 countries chosen were based on 3 criteria: 1) coordinators were English-speaking and willing to train teachers, 2) coordinators, teachers, and students had to have some computer and internet access, and 3) the countries should for the most part be in sub-Saharan Africa. During the 1st half of 2013, 13 kits were designed and produced by the NOAO Education and Public Outreach group and sent to the 12 coordinators (who were located at universities, science centers, and a planetarium-type institution) and to the IAU OAD. The program's kit included complete instructional guides and supplies for 6 activities and a project on energy conservation and responsible lighting. From June through November, the 6 activities and project were taught to the coordinators and some of the teachers in a series of 6 Google+ Hangout sessions. One Google+ Hangout session included instruction on carrying out evaluations. All Google+ Hangout sessions were recorded for future viewing at any time. During the same period, the 12 coordinators trained local teachers in junior and senior high schools. From November until the following February, students from the different African countries undertook final class projects and shared them on the program's PBWorks website. Also shared on the program's website is every document connected to the program. Everyone in the program will continue to have access to the web site.

## 2. Findings from the External Evaluator

Findings from the external evaluator include: 1) Activities and supporting materials (e.g. kits and Google Hangout sessions) were implemented successfully in almost 60% of partnering countries. 2) Coordinators trained by NOAO, and the teachers they trained, were equipped with the knowledge and skills needed to provide access to quality STEM learning experiences for students, regardless of their geographical location, academic ability and socioeconomic status. Overall, members from seven countries were able to perform

key activities of the project. 3) There were substantial student outcomes, including increases in target knowledge, and engagement as a result of their participation in the project. Additionally, active students created excellent project outputs demonstrating their increased knowledge and engagements. 4) There was a spectrum of participation in the project by active partner countries. Some were incredibly active, despite barriers, and some did not engage in the project at all. Those who did participate were highly successful, and 5) There were many challenges and lessons learned through the course of the project that will be useful in future projects working with diverse and distant populations.

### **3. Recommendations for Future Projects**

Recommendations for future projects with diverse participants include: 1) Use short applications to ensure that coordinators are interested and committed to the project. 2) Be aware of issues with customs when mailing kits out to different countries so ensure efficient delivery of materials. 3) Use pre-recorded tutorial videos of activities and use Google hangout time to answer questions. 4) Provide multiple ways for coordinators to get information online, and 5) Use a variety of techniques to gather data to measure success of the project including online surveys, paper surveys, and analysis of artifacts submitted by coordinators from each country.