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# ***Agricultural Information Sharing in – the Gains Experience***

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## **INTRODUCTION**

Agricultural research and development are influenced by unimpeded flow of information among the sector's stakeholders including lecturers, researchers, students, policy makers and farmers. In the past, however, provision of agricultural information support services in Ghana remained largely uncoordinated and several useful documents were scattered in various agricultural institutions and among researchers and generally had limited distribution. Besides, useful international and local journal articles were also generally not accessible to Ghanaian lecturers and researchers. This situation was partly remedied in 1991 when the Ghana Agricultural Information Network System (GAINS), a network of 18 Ghanaian agricultural research and academic libraries, was established to revive the library and information system in the agriculture sector to support agricultural research and development.

It facilitates a question-and-answer service to address stakeholders' agricultural information needs, attempts to improve the accessibility of locally produced research, and builds the capacity of stakeholder institutions' libraries and information management professionals. It is managed by a coordinating centre based at the Institute for Scientific and Technological Information of the Council for Scientific and Industrial Research (CSIR-INSTI).

GAINS, therefore, plays a frontal coordinating role in the harnessing and sharing of agricultural information (both locally and internationally generated) in Ghana. Though GAINS has performed well over the years and has considerably increased and facilitated the flow of information among stakeholders, it faces some operational challenges not the least of which are inadequate capacity to harness and share generated agricultural information especially in digital forms to be readily accessed by potential end users. It is against this background that the Ghana AGRIS Pilot Project (GAPP) was established in 2007.

## **GEOGRAPHIC COVERAGE**

GAINS has a relatively small coordinating secretariat, but is composed of stakeholders across Ghana, including the nine agriculture-based institutes within the CSIR network, the Biotechnology and National Agricultural Research Institute (BNARI), the agriculture faculties of most of Ghana's universities, and the library of the Ministry of Food and Agriculture. Though until recently it has only focused on research institutions, it is intended to serve all stakeholders in agricultural information in Ghana.

## **PURPOSE**

GAINS' purpose is to bring together the creators and disseminators of agricultural research information in Ghana to increase information sharing and collectively address their common needs. GAINS' coordinating centre has been increasing stakeholders' collective access to scientific information, especially international journals.

## **OBJECTIVE**

The objective of GAINS is to establish a coordinated information network that seeks to collect, process, share and repackage for dissemination, agricultural information generated in Ghana or elsewhere in any format to support agricultural research and development in the country. In this capacity, it is intended to:

- i. To encourage generation and sourcing of agricultural information and knowledge;
- ii. To develop capacity in agricultural information/knowledge management to ensure effective networking;
- iii. To enhance access, sharing and dissemination of locally generated agricultural information and knowledge;
- iv. To develop repositories, including databases of experts, of locally generated agricultural information/knowledge resources;
- v. To provide tailor-made information services, including question and answer (Q & A) services, selective dissemination of information (SDI), current awareness services (CAS), radio broadcasts, etc to research scientists, policy makers, extension officers, faculty, students, farmers, etc;
- vi. To improve communication among all stakeholders in agricultural information;
- vii. To advocate for investment in agricultural information.

## **RELATION TO NATIONAL POLICY ON INFORMATION AND COMMUNICATION**

From the outset, GAINS has been funded by the Government of Ghana as the information sharing component of its World Bank Agriculture Projects under the National Agricultural Research Project (NARP). The government's recent National ICT for Accelerated Development Policy discusses the need for increased access to and exchange of research information, and the Ministry of Food and Agriculture's ICT strategy mentions strengthening GAINS as a key strategy of its plan to revitalize agricultural research and development.

The priority areas that the policy document has identified and seeks to address include:

- Developing scientific and industrial research capacity to promote the attainment of an efficient, diversified, technologically progressive, and market-driven industrial sector that is capable of sustainable economic growth; and also encouraging the transformation of the society to become more scientifically based and improve technology for increased productivity in all economic sectors.

- Modernizing agriculture and developing agro-business by encouraging rural development and promoting the establishment of a robust and diversified agricultural sector. This will ensure national food security and adequate supply of raw materials at competitive prices for industrial production.

Therefore, within the framework, the CSIR has clearly outlined its ambition to position itself to ensure that its activities fit very well into the overall policy goals of the Government of Ghana in terms of:

- Strengthening the information facilities and capacities; and
- Supporting the establishment of a sustainable national network that will provide STI using appropriate ICT tools to improve access to S & T materials to support R & D activities in the country.

## **PRODUCTS AND SERVICES**

### **Information content**

GAINS offers web-based access to agricultural research information, both from local research institutions and from international journals. Resources of specifically Ghanaian information include:

- The Ghana Agricultural Research Information (GHAGRI) database - a database of records of locally produced agricultural research
- Union List of Agricultural Serials (ULAS) - a list of journals held by stakeholder institutions
- An Experts database of Ghanaian specialists on various agricultural subjects (AGRIEX)
- Records from the Ghana Science Abstracts Bulletin (GHASAB) - The Ghana Science Abstract database is a bibliographic database of refereed journal articles in the area of science and technology.
- RESPRO - This is a database of on-going research projects in science and technology with indications of the principal researcher(s), collaborators, objectives, start and ending dates, funding, etc.
- A directory of the agricultural databases held by the various GAINS stakeholder institutions
- A directory of Ghanaian agricultural student theses and dissertations
- Institutional repositories of metadata and selected associated full-text documents in some stakeholder institutions.

AGRIEX, GHASAB, GHAGRI and the thesis database, as well as the GAINS newsletter archive, are accessible from the GAINS website. GAINS sends out lists of available materials to institutions and includes them in its newsletter, and researchers or librarians are expected to request it.

### **Content development and management**

Internationally generated information is made available from various journals through databases of abstracts and full-text articles. Generally the choice of databases and CDs is based on what is made available by donors. Locally generated information is developed by researchers at stakeholder institutions and is verified by the submitting institutions.

### **Language and medium**

The information provided by GAINS generally consists of scientific documents, which are sent to stakeholder institutions on request in hard copy or made available online. All are in English, and most of the language used is relatively complex. GAINS has recently begun supporting the repackaging of information requested by farmers and extension workers into less complex, more accessible formats such as video and radio programmes, some of which are in local languages.

### **INFORMATION SHARING MECHANISMS**

A number of mechanisms are used in Ghana to share agricultural information among the various stakeholders. These are:

#### **Question & Answer Service**

GAINS operates a CTA funded Question and Answer Service which provides information on demand mainly to researchers, lecturers and students. The service allows stakeholders in agricultural development to access information services on demand in the form of responses from researchers, bibliographic references and full text documents. The service has been enhanced through the use of radio to respond to the information needs of farmers and agricultural extension agents. Agricultural research scientists, willing to participate in the service and share their knowledge, are identified through the experts database and either respond to questions in their area of specialization or serve as guests on radio programmes.

#### **GAINS Publications**

GAINS publishes GAINSNEWS, a quarterly publication of GAINS activities and highlights of agricultural technologies. The newsletter is available and distributed in print format. In addition to the print version, the newsletter is also available in digital version on the GAINS website.

#### **GAINS website**

One of the mechanisms used to share information is the GAINS website. It is used to link people through a database of experts (research scientists and agricultural information professionals), provide links to institutional repositories and online documents, i.e. documents from GAINS activities such as project reports, annual reports, consultants' reports, workshop reports, etc.

In 2000, GAINS developed a website, with the initial support of CTA, from which GHAGRI and other databases were searchable. In 2001/2002, KIT connected GAINS to IICD, which helped the coordinating centre install a local area network (LAN), arranged improved web-hosting, and trained member institute librarians in information retrieval.

#### **Making information available to scientists**

GAINS has several different processes for making information available to scientists. Many of GAINS resources are available online to institutions that have

connectivity. These online resources are expanding to include almost everything GAINS has on CD. However, for information not available online, once or twice a year the GAINS coordinator drives around the country and updates electronic databases at each stakeholder institution. When scientists find an article or journal they want, they (or their librarian) call or email the request to GAINS and then GAINS mails it to them. This is a slow process, but is unavoidable because it would cost too much to buy full electronic copies of the journals for every research institution. In addition, due to copyright issues, most of GAINS' CD-Rom articles cannot be emailed or made available online. GAINS also sends out local journals and its own newsletter and the abstracts bulletin.

### **Repackaging information**

GAINS' pilot project with extension agents and farmers (funded by IICD) consisted of partnering with an agricultural information centre of the Ministry of Food and Agriculture to show videos describing different agricultural technologies to selected communities. Communities were then trained in a chosen technology, the training was videotaped and the tape made available at the information centre. The training was also broadcast on a local community radio station. GAINS is planning to expand this effort to other communities. Many of GAINS stakeholder institutions also disseminate and repackage information autonomously, through the RELCs or other means. Many also put their scientists on their area radio stations to discuss different agricultural issues.

GAINS already collaborate with two community-based FM radio stations – Radio Peace, Winneba and Royals Radio, Wenchi. Within this framework, GAINS will encourage member institutions, especially agricultural research institutes, to identify appropriate technologies that could be of interest to farmers and fishermen, and in collaboration with the Radio stations, produce suitable radio programmes for dissemination to farmers.

### **Face-to-Face Interactions**

Face-to-face interactions, mainly in form of meetings, workshops and conferences, are the most effective approaches for knowledge sharing. Already there are several face-to-face forums organized in the country in which organizations and individuals within GAINS participate. Among these the CSIR Research Staff Association's Annual Meeting, CRIG Research Staff Annual Review Meeting and the Ghana Library Association Annual Meeting, etc. GAINS will encourage member institutions to make use of these forums as knowledge sharing mechanisms.

### **National Conference**

To facilitate sharing of agricultural information and knowledge in the country, the GAINS Coordinating Centre initiated and coordinated in February 2010, the organization of a national biennial conference on various aspects of agricultural information and knowledge for development for a broad range of stakeholders (researchers, policy-decision makers, farmers, information professionals, farmers'

organizations, Ministry of Food and Agriculture and related ministries, etc) in the country as a face-to-face knowledge sharing forum. The conference provided GAINS member institutions, including national and international stakeholders, an opportunity to meet and share knowledge in the field of agricultural information and knowledge for socio-economic development of the country.

## **TECHNOLOGY AND SYSTEMS**

### **Information Technology (IT) system architecture**

GAINS' back office IT system includes a database-driven website that can be updated from the GAINS coordinating centre and from stakeholder institutions. Several of GAINS' resources are available online, allowing researchers to use them directly if they have connectivity. Others are housed on CDs at the coordinating centre, and abstracts of their contents are put on the computers of stakeholder institutions.

GAINS relies in large part on the IT systems of stakeholder institutions, which vary a great deal. All institutions have been given some sort of infrastructure under different donor projects, but at many institutions, investment in IT infrastructure is still not a priority. Many institutions have broken-down hardware, and at times computers containing the GAINS abstracts have broken, rendering the information inaccessible. All institutions now have connectivity, but often the connections are so slow that scientists go to cybercafés or wait until late at night to browse. For years, CSIR has been trying to set up a wide area network with all stakeholder institutions, but has not yet succeeded. Several institutions now have LANs, and one university will begin running a LAN version of TEEAL in November 2006, but none are connected to other institutions. Scientists at some institutions have now taken it upon themselves to pay for connectivity out of their own salaries.

### **Software**

GAINS' databases and website are all run on software available free online. The GHAGRI database, hosted at INSTI, runs on WebAGRIS, a multilingual web-based system<sup>1</sup>. GHAGRI is linked to GAINS' website using the interface software GenISIS<sup>2</sup>. Librarians at GAINS stakeholder institutions have been trained to develop their own institutional databases using CDS-ISIS<sup>3</sup>. WebAGRIS training was also given to stakeholder institutions, but no institutions decided to use it.

One stakeholder institution, FORIG, runs its own database using another system, Adlib, which it received from an external donor. The coordinating centre finds this problematic because it has difficulty translating the records into its ISIS format. FORIG's information is therefore not available on GHAGRI, though it is accessible worldwide through the GFIS database. Adlib is thought by some stakeholders to be more user friendly, but it is too expensive for the network to be able to pay for all member institutes to use it.

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<sup>1</sup> downloadable at [www.fao.org/agris/tools/WebAGRIS/Webagdw.htm](http://www.fao.org/agris/tools/WebAGRIS/Webagdw.htm)

<sup>2</sup> [http://portal.unesco.org/ci/en/ev.php-URL\\_ID=5331&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=5331&URL_DO=DO_TOPIC&URL_SECTION=201.html)

<sup>3</sup> [www.unesco.org/webworld/isis/](http://www.unesco.org/webworld/isis/)

## **Benefits and challenges**

The key benefits of GAINS are:

- improved capacity among stakeholder institution information management professionals
- improved stakeholder access to agricultural information
- increased accessibility of locally generated information

However, GAINS still faces many challenges, which are summarized below.

### **Scarcity of local research content**

Despite the efforts of the coordinating centre, locally generated research output is still quite difficult to access, as very few of GAINS' member institutes have functioning repositories for their research output, and even fewer effectively share their output with the rest of the network.

### **Lack of information sharing and institutional prioritization by scientists**

In many cases, scientists are either unaware that they are supposed to submit their work to the network, or are not motivated to do so. Published works are already available in international journals, and scientists do not seem to be interested in whether they are available locally. A great deal of research is also donor-funded, which has meant that scientists often feel that they and the donor, rather than the institution, own their research, and therefore they are not obligated to submit it to the library. Scientists are also reluctant to share unpublished works for fear of plagiarism. This has all resulted in severe underpopulation of the online databases of Ghanaian research. Scientists also do not frequently write institutional capacity-building elements into their research proposals.

### **Lack of capacity in libraries**

Librarians at institutions are supposed to be the key connection between researchers and GAINS. However, they generally have fewer academic qualifications than scientists, they are paid very little, and there is high turnover. Many years of under-resourcing of institution libraries has also weakened the relationship between researchers and librarians, because researchers no longer go to libraries for information, not expecting to find anything current. This has meant that librarians have not been very successful at promoting GAINS' resources, motivating researchers to submit their outputs, or taking advantage of the trainings they have been given. Many also have had hardware problems. Scientists at several institutions have discussed creating their own database of information. Some of the systems used by GAINS, such as CDS-ISIS and AGORA, also require some learning before they can be effectively used, and high turnover has meant that this has sometimes been a problem for librarians.

### **Lack of knowledge of GAINS by other users**

GAINS information is not sought out by all potential users, such as extension agents and NGOs. This seems mainly due to a lack of knowledge of GAINS on the part of many potential users outside the research community. GAINS non-online

resources cannot be accessed without coming to Accra, or visiting one of the research institutes, looking at lists of the resources available, and writing to GAINS. Most non-researchers do not seem aware of this possibility.

### **Lack of infrastructure at stakeholder institutions**

Poor or no connectivity, power outages and computer breakdowns in many cases block scientists from easily accessing GAINS resources, and have affected the capacity of many institutions to create databases of their libraries.

### **Conclusion**

GAINS is now attempting to re-position itself to face these challenges. One course of action discussed is to develop clear Memoranda of Understanding with member institutions outlining their roles and responsibilities and requiring minimum contributions of resources to the network or their libraries, and to only include those willing to accept these responsibilities to join the network. The hope is that building the capacity of several key institutions that have shown motivation, and demonstrating the benefits they gain, will inspire others to follow.

### **References cited**

1. GAINS (2010). Case study: Institution Based Systems, Ghana GAINS. Updated October 2010. Accra: GAINS, 2010. 15p.
2. GAINS (2009). Knowledge Sharing Framework. Accra: GAINS, 2010. 18p.
3. GAINS (2010). GAPP Case Study Report. Accra: GAINS, 2010. 23p.
4. Chisenga, Justin et. al. (2011). Disseminating the Outputs of Agricultural Research in Africa. ***Agricultural Information Worldwide***, 4(1), 2011. p. 40-47.

## DIGITAL SOURCES OF AGRICULTURAL INFORMATION IN GHANA

### CASE STUDY ONE

**Title** : Ghana Agricultural Research Information (GHAGRI) Database

**Description:** GHAGRI database is a bibliographic collection of information on all aspects of agriculture and rural development in Ghana. Records in the database dates back to 1900 when agricultural research started in Ghana.

**Information type:** Information in the database includes research reports, technical reports, conference papers, journal articles, books, and theses.

**Subject scope:** Mainly agricultural science and technology, rural development and related disciplines.

**Amount of digital information:** This is a bibliographic database and contains 9647 records.

**Ownership and access:** The database is owned by the participating research institutes that contribute data to it and can be accessed at the CSIR-INSTI or online at: [www.gains.org.gh](http://www.gains.org.gh).

**Information management standards:** Database was developed using the WINISIS software and indexed using AGROVOC Thesaurus. The GHAGRI database, hosted at INSTI, runs on WebAGRIS, a multilingual web-based system. GHAGRI is linked to GAINS' website using the interface software GenISIS.

## DIGITAL SOURCES OF AGRICULTURAL INFORMATION IN GHANA

### CASE STUDY TWO

**Title** : Ghana Science Abstracts (GHASAB) Database

**Description:** The GHASAB database is a bibliographic database of refereed journal articles published in Ghana or about Ghana in the area of science and technology.

**Information type:** Information in the database includes research reports, technical reports, conference papers, journal articles, books, and theses.

**Subject scope:** Contains information on science, technology and innovation.

**Amount of digital information:** This is a bibliographic database and contains? **2450** records.

**Ownership and access:** The database is owned by CSIR-INSTI and can be accessed either at CSIR-INSTI or online at: [www.gains.org.gh](http://www.gains.org.gh).

**Information management standards:** Database developed using the WINISIS software and indexed using Spine Thesaurus for Science and Technology.

## DIGITAL SOURCES OF AGRICULTURAL INFORMATION IN GHANA

### CASE STUDY THREE

**Title** : Ghana AGRIS Pilot Project (GAPP) Institutional Repository Database

**Description:** GAPP Institutional Repository is made up of metadata and associated full-text collection of information on all aspects of agriculture and rural development in Ghana.

**Information type:** Information in the database includes research reports, technical reports, conference papers, journal articles, books, and theses.

**Subject scope:** Mainly agricultural science and technology, rural development and related disciplines.

**Amount of digital information:** This is made up of metadata and associated full-text documents and contains **3505** records.

**Ownership and access:** The database is owned by the participating research institutes that contribute data to it and can be accessed either at the GAINS Coordinating centre, participating research institute or online through the respective local area networks.

**Information management standards:** Database developed using the WINISIS software and indexed using AGROVOC Thesaurus.

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