A Web-based Information Delivery System for Appropriate Technology for Reduction of Agrochemical in Northern Thailand

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Abstract

Development, evaluation, and application of appropriate technology for reduction of agrochemicals in Northern Thailand require multiple types of information and data, which can be used by different users. However, data are often lacking and underutilized with various degrees of access and quality of data sets. The Appropriate Technology for Reduction of Agrochemical in Northern Thailand (ATRACT) project is bilaterally funded by JICA and the Royal Thai Government to reduce agrochemicals usage in rose, crucifers, and tangerine has developed a web-based Information Delivery System (IDS) prototype system that provides a convenient access for documenting, archiving, and exchanging data and information on rose, crucifers, and tangerine production systems. Users can access the IDS via the Internet connection. The IDS can be applied to collect crop cultivation activities of in the model farm, which can be used to suggest current agrochemical usage and appropriate way to reduce the amount increase efficiency of the production system.

Keywords: food safety, agrochemicals, cabbage, rose, tangerine, web-based.

Introduction

The farmers in Thailand especially for northern provinces have applied large amount of agro-chemicals, where the intensive crop management for cultivating vegetables, fruits and field crops requires high rates of fertilizers and agricultural chemical applications. The ATRACT project, a JICA funded research project, is focusing on rose, crucifers, and tangerine as examples to demonstrate how appropriate agricultural and information technology can be developed and used to reduce amount of applied agrochemicals in such production systems in Northern Thailand. Residue Analysis and Diagnosis Center (RADC) will develop chemical analytical technology relevant to agrochemical usage for rose, crucifer. There is little understanding of how producers receive and utilize electronic media information. This research will provide a baseline study of the current agricultural producers use of the Internet and other electronic media to deal with farm agrochemical problems.

Although the model farms for the selected crops are currently out-of-reach to the Internet, however, we believe that the Internet Service Provider (ISP) will provide coverage in the near future. Therefore, the major problem addressed by this project is the use of the Internet protocols and electronic mediums to facilitate the content and solution of agrochemical application in rose, crucifers, and tangerine production systems. To provide an information

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delivery system for growers, consumers, and researchers community, we have
developed a web-based system for users to document and exchange production
system data sets and corresponding agrochemical usage and weather data sets.
The purpose of this paper is to present the overview of the functional design
and implementation of this IDS system with archiving agrochemical data with
adequate documentation and providing easy access to data for those who need
it.

**Overview of the IDS_ATRACT system**

**System administration**
The web-based IDS_ATRACT system is currently administered by the
Information Technology unit ([http://www.agri.cmu.ac.th/intert/atract](http://www.agri.cmu.ac.th/intert/atract)) of the
ATRACT research project, a research project with three integrated units,
namely; the RADC, the Agricultural Extension (AE) unit, and the Information
Technology unit (IT). The objective of ATRACT is to develop appropriate
technology and disseminate the information of such technology on safe and
appropriate use of agrochemicals for rose, crucifers, and tangerine production
systems.

**System components**
An Information Delivery System (IDS_ATRACT) for implementation of an
information delivery system for three crops based on residue and diagnosis
laboratory analysis was developed on a PC server with the Windows OS (Fig.
1-3). The system is composed of two servers: database server, and web server
(Fig. 1). We are planning to install a weather data management server, which
will be programmed to regularly retrieve hourly weather data from four
FieldServer weather stations (Fukatsu et al., 2004) installed at each model
farms and at the Chiang Mai University experimental farm through the
Internet. Currently, the database server manages weather, insect, fungi,
disease, and agrochemical databases by updating and providing data in the
database to the web server. The database server is interfaced with the web
server by an ASP script language interface (Fig. 2) module and then transferred
to .NET framework (Powell, 2004).

The web server also used as the program server to retrieve the hourly weather
data from FieldServer units, weather data include air temperature, relative
humidity, and solar radiation. Rainfall will be later installed with the
FieldServer unit. The output can be produced in graphic or text form on the
web browsers at the user’s requests.

**System functionalities**
The website is planned and designed (Fig. 3) to provide the following
functionalities for various users;

- **RADC services**
  - Plant and soil sample analysis
  - Agrochemical database and information
- **Model farm services**
  - Farm household information
  - Weather condition at the model farm (Fig. 4)
• Farming activities on crop production and crop yield monitoring (Fig. 5)
• Cost of inputs and price of farm products
• Cost benefit analysis module

- Information services
  - Discussion forum for the reduction of agrochemicals
  - A friendly and understanding information service
  - Computer and Internet short-term training program
  - Project administration services

The access rights to enter, modify, retrieve the farm household system(s), historical data and enter farm operation activities are granted to several types of users based on their authorization level.

**Evaluation of the IDS_ATRACT system**

The web-based IDS_ATRACT system will be evaluated by users to improve web-base services such as the ease of use, access to specific agrochemical data, user’s forum, etc. We will be using a both online and offline questionnaire survey methods and will be targeted on model farm households, extension workers, and researchers.

**Discussion**

This paper presented the overview and architecture of a service-oriented, Web-based IDS system for the provision of e-services to three model farms over a common Internet networking infrastructure. A pilot application has been developed that integrated three different units in an effort to reduce agrochemical in Northern Thailand. With the IDS_ATRACT system, farmers can gain access to a wide variety of up-to-the-minute information, which is accessible to them at all times of day or night. Farmers can stay in touch with one another such that mutual support, trade and advice can be facilitated within the community. By providing specifically designed information about agrochemicals for farmers, IDS_ATRACT allows rapid development of this new information medium. By the use of specially designed user-friendly discussion group, farmers can reduce costs and increase profits. Communication with buyers is made easily and effectively. Location of suppliers is facilitated. Farmers can receive mutual support and advice, they can simply and easily post up questions and discuss topical issues with each other. Such a forum cannot fail to improve the fortunes of all participating farmers.

By receiving up-to-the minute information on such things as chemical residue analysis results, crop market prices, new research and technologies, marketing opportunities and sources of inputs, farmers can reap the rewards of participating in IDS_ATRACT. By using the service as virtual forum for discussion of topical issues, for trade in farm inputs, machinery, parts, farmers can utilize the benefits of the Internet to the full through IDS_ATRACT. Our Project combines agricultural specialists and experts, a variety of computer software engineers, hardware engineers, information technology and network experts. No other IDS that we know of combine extensive agricultural knowledge and experience with information technology expertise. The
efficiency of production systems can be enhanced through the development of IDS_ATRACT. This means higher profits for all farmers, input suppliers, agricultural organizations and food manufacturers who participate in our IDS_ATRACT services.

References


Figures

Fig. 1 IDS_ATTRACT web-based system structure.
Fig. 2 IDS_ATRACT web-based system functionality during 2003-2006.

Fig. 3 Prototype ATRACT homepage.
Fig. 4 Monitoring of weather and rainfall condition at the model farm, an example of application system of IDS_ATRACT.

Fig. 5 Crop yield monitoring at the model farm, an example of sample application system of IDS_ATRACT.