

Brief No. 15, August 2015

TOWARDS AN ENABLING ENVIRONMENT FOR PAPERLESS TRADE

Electronic traceability of agricultural products in India: the case of GrapeNet

A gricultural trade is a pillar for the sustainable economic growth of many developing countries and least developed countries (LDCs) in Asia. Increased demand for fresh fruits, vegetables, cut flowers and plants in the European Union (EU), Japan and North America creates new opportunities for export. However, trade of perishable products remains a challenge, as exporters from developing countries in the region find it difficult to meet the requirements of high import standards and regulations. Many developing countries fall behind in developing and implementing food safety and traceability standards. Nevertheless, some countries have been able to make the necessary regulatory, technical and administrative investments required to meet the demands of high-income export markets.

In the agricultural trade policy framework, traceability is part of public and private procedures for monitoring the conformity to quality, environmental and other specifications related to food. Through food traceability systems, supply chain actors and regulatory authorities can track a food safety or quality issue and introduce procedures to remedy it. The benefits of traceability for consumers, governments and large businesses are well recognized. Yet for small-scale farmers, especially those producing horticultural and other fresh food products in developing countries, traceability requirements can constitute barriers to trade.



GrapeNet is an example of how electronic traceability applied to the grape sector in India has been used to enable small producers in the country to participate in international trade. The GrapeNet initiative was launched in 2006 and has ever since helped to raise European importers' confidence in fresh grape imports from India by enabling the monitoring of pesticide residue and by achieving product standardization. These measures have boosted Indian grape exports to the countries of the European Union.

This Brief introduces India's experience in implementing GrapeNet, an IT-enabled traceability system for the grape sector in India. The Brief describes how GrapeNet has emerged to address challenges of the sector in the country, approaches taken in its implementation and its major functions and services. The Brief also highlights the benefits and major success factors in the process of implementing GrapeNet and concludes by outlining the further development of similar traceability systems for other agricultural products.





The grape sector in India

According to the National Horticulture Board of India, grapes are grown across 116,000 hectares, occupying 1.7% of India's total cultivated area. India is also a major global exporter of grapes. During 2012-13, India's global export of grapes reached 1,726,000 metric tons, with a value of RS 12.5 billion¹ and accounted for 6.83% of India's total grape production. Grape is a high profit crop for growers, yet grape production is quite challenging due to the prevalence of crop diseases; the need for sustainable use of crop protection products, food safety issues related to chemical residues and the dynamics of the international market requirements of retail chains.

Traceability and the introduction of GrapeNet

Traceability² of products and ingredients is a clear legal requirement to access an increasing number of markets in developed countries. Traceability systems enable concerned stakeholders to track the movement of a product along the food chain ensuring the continuity of the product's information flows and providing verifiable record keeping and documentation.

To stay competitive, fresh fruit and vegetable growers and exporters in general need to adhere to these requirements concerning food systems, offering traceable products which are demonstrably free of contamination at or below maximum residue levels (MRLs).

In 2003, India's APEDA³ initiated an in-depth analysis of the requirements for the import of grapes from India into different EU markets. A key recommendation to facilitate grapes exports included the development of a shared Information and Communication Technology (ICT) platform functioning as a Single Window, as well as a data harmonization mechanism for exports. The greatest complexity in developing a common system was the large number of stakeholders involved in the supply chain of grapes export. These stakeholders included farmers, state horticulture departments, packaging houses, exporters, testing laboratories, phytosanitary departments and APEDA. In 2006, GrapeNet – a monitoring software with a centralized database to meet international standards for the export of grapes – was launched for Indian fresh fruit exporters. The system integrated all stakeholders, clearly communicating the Indian Government's trade procedure regulations for the grape sector; providing trainings on the fulfillment of requirements; mobilizing government and private sector inspection and testing institutions to collaborate; and producing the required documentation for importers.

APEDA then issued a *Regulation of Export of Fresh Grapes from India to the European Union through Monitoring of Pesticide Residues* which made the use of GrapeNet compulsory for Indian grape exports to the EU.

Traceability is especially important if problems arise along the supply chain and food products must be recalled. Recent EU legislation also obliges producers to disclose any potential consumer's risks deriving from their products. Many other countries are raising the standards of their own legislation on food safety. Likewise, individual growers, producers and manufacturers eager to protect their brands from the harm of being associated with tainted materials or poorly managed recalls, are boosting their own internal recall policies and methodologies.

GrapeNet's stakeholders

Exporters, packaging houses, processing plants, laboratories and state government departments are direct stakeholders of APEDA, while farmers are indirect users through state agriculture and horticulture departments. ICT is used to integrate smallholders to international supply chains. By reaching out to farmers, packaging houses, selling units, processing units and others, GrapeNet is introducing transparency in information flow, regulation and monitoring – effectively improving the overall efficiency of the supply chain.

¹ RS 1 equals US\$ 0.02. Source: http:// www.oanda.com/currency/average

² Defined as the ability to "trace the history, application or location of an entity by means of recorded identifications" (ISO8402) or "to follow the movement of a food through specified stage(s) of production, processing and distribution" (*Codex Alimentarius*).

³ Agricultural and Processed Food Products Export Development Authority (APEDA).

GrapeNet processes and services

Implementing traceability technologies for food safety and other purposes comes with a series of challenges in data collection, processes, technological solutions, business models, costs and learning. APEDA is committed to maintaining and offering an increasing number of services through its website as a virtual office available 24/7.

GrapeNet was developed in consultation with State Horticulture Department, APEDA, the National Research Centre for Grapes (NCRG), grape growers and exporters as a 'total traceability' software. The development of the system included several initial and ongoing steps:

1. Software Development: The software application was developed for registration, inspection, residue testing, consignment creation, online applications and was hosted on the web server of APEDA.

2. Expert Involvement: Experts from APEDA, NRCG and the State Horticulture Department were involved for scientific inputs in the software development. They designed a model garden for exports and uploaded sample recommendations on GrapeNet based on inspection reports.

3. Capacity Building: Knowledge updating of field staff is regularly carried out via pre-seasonal and mid-seasonal trainings at NRCG level. Trained staff carry out farm trainings for grape growers. The feedback from trainings is communicated to the experts for further improvement of the system and trainings.

4. Registration: Registration of exportable grape gardens is done yearly between October and December. Interested grape growers apply online and a 12 digit registration number is assigned to each farm.

5. Inspection: There are two mandatory inspections of grape gardens for EU export. The first is performed at the time of a new registration, with yearly renewals. The second one takes place before sampling of grapes for residue analysis, as required for export. Reports are updated online.

6. Residue Analysis: For sampling and residue analysis APEDA's accredited residues laboratories have been authorized for sampling of grapes from registered and recommended grape gardens. Upon analysis of samples, results are updated online on GrapeNet by the laboratory.

7. Agmark Certification: Following the receipt of positive laboratory test results and with the consent of the grape grower(s), the export process continues with the harvest of registered grape garden. The produce is stocked at APEDA accredited stocking houses. Exporters create consignment ID's for grading certificates and forward their applications to the Agmark authorized laboratory online. After Agmark's validation, a grading certificate is assigned to the consignment and the former is issued online through GrapeNet.

8. Phytosanitary Certification: Phytosanitary certificates are issued by State Horticulture Department officers. Agmark certified consignment applications are given to the Phytosanitary Certificate (PSC) Authority online. After physical verification of consignment and if found free from pests and disease, a phytosanitary certificate is processed online and a signed copy of the pre-printed certificate is issued to the exporter. This enables full traceability of the product shipment.

9. Public Awareness: Registration and PSC authorities organize public awareness campaigns at the district level through the press and electronic media.

10. State Level Steering Committee: This committee formed under the chairmanship of the director of APEDA involves stakeholder consultation in formulating guidelines, reviews and project updates and suggests policy changes to Government.

FLOW CHART FROM REGISTRATION TO EXPORT



GrapeNet key features

GrapeNet implements end-to-end monitoring of pesticide residues and adherence to product standards and facilitates tracing from imports to farms of the Indian growers. This covers farming, sampling, testing, certification and packing/logistics.

This software can be easily used anywhere and anytime by all authorized stakeholders. The following stakeholders have been granted access to use GrapeNet: APEDA registered exporters, packaging houses, laboratories, the State Horticulture Department, Agmark Department, Phytosanitary Department and the National Referral Laboratory.

The software has reduced duplication in data capture and enables instant reference of previous steps in the supply chain. The in-built checks and balances in the software ensure that the subsequent steps can be carried out only if all previous ones are successfully completed. No document can be issued without going through the software. Finally and most importantly, APEDA can trace details of the consignment right up to the plot level.

Technical specifications of the software

GrapeNet application was developed using Microsoft's ASP.NET platform and Microsoft SQL Server RDBMS. The application uses AJAX techniques in order to make the user experience very responsive. The CSS look and feel as been incorporated as well as JavaScript for front-end validations. Likewise, the software uses salted MD5 authentication and generates PDF files for e-mailing purposes. Logicsoft played a major role towards developing and maintaining the software.

Benefits of GrapeNet

GrapeNet has been a breakthrough initiative in India. In fact, it is the first IT platform of its kind in India to be applied – and on such a large scale – in the agriculture sector. Various ICT tools were used to create a systematic and transparent process and to ensure traceability throughout the supply chain. In this way, all the stakeholders were organized and connected under one Single Window from farmer to the trader.

Besides this, the system also promotes a culture of zero paper work and 360-degree accountability, including towards farmers who traditionally have limited access to market information. The system is available to smallholder farmers at a very competitive cost. The registration and communication are conducted in the local language.

Since its introduction, GrapeNet has succeeded in increasing the implementation of Good Agricultural Practices (GAP) among farmers and promoting value addition through exports as well as higher quality (grading) products for domestic markets. The price of Indian grapes in the international market has also considerably increased, reflecting the improved quality of the produce.

Moreover, national authorities have accredited the laboratories registered in the system, which use state of the art technologies and procedures. Standardization of quality parameters for international markets took place across both public and private laboratories.

The initiative of the Indian Government built the confidence of all stakeholders involved. In particular, the system succeeded in building the trust of EU markets thanks to the transparency and efficiency

of GrapeNet. The platform facilitates the implementation of various requirements of EU legislation for imports.

Another benefit reportedly linked to the common use of the platform and to the enhanced flow and information-sharing has been a better allocation and prioritization of resources from the different Indian government departments involved along the supply chain.

Overall, GrapeNet has been able to deploy advanced, yet user-friendly software that can be developed and replicated in other sectors.

GrapeNet funding model

The Indian Government initially funded the GrapeNet model. As of March 2015, there are more than 20,000 farmers registered in GrapeNet with an average of 3,000 containers shipped to Europe per season.

Today the model is funded broadly through the following sources:

- 1) Farmer registration as well renewal fees: RS 50/-
- 2) Phytosanitary certificate (Exporter) fees: RS 172/-
- 3) Agmark certification fees: 0.01% of FOB value.
- 4) Sample testing by farmer or exporter: RS 8,000/ sample
- 5) Software maintenance fees: approx. RS 425,000 + taxes.



Positive impact of GrapeNet

Benefits for farmers and local stakeholders

GrapeNet helps producers address some of the most common barriers experienced by Small and Medium Enterprises (SMEs) in agricultural trade such as: costs of standards and certification (GlobalGAP, HAACP, Codex Alimentarius), implementation of required traceability systems, compliance with regulatory and control requirements (SPS, quarantine, fumigation, import licenses, export licenses), compliance with food safety and health requirements (food recall systems), additional infrastructure requirements, customs clearance procedures and logistics and technical capacity.

Indian fruit and vegetable crops suffer from high levels of wastage and rejection; there is no protection against fluctuations in price and the local markets are either absent or too small to absorb such high-value and perishable produce. Thus, agriculture can be a high-risk business for smallholders. GrapeNet provides the necessary market linkages to make it a viable venture.

Famers, who have been part of the GrapeNet initiative, better understand the importance of working within a collaborative structure. The knowledge base and inputs gained from agri-officers and exporters through GrapeNet have given them larger exposure to the importance of standards and procedures and training required to upgrade their knowledge. Those who used to follow conventional farming methods are now adopting scientific cultivation approaches, new tools, irrigation systems and post-harvest techniques to get the desired quality and yield results. The farmers who have been supplying grapes for export have become local role models in their communities promoting changes in cultivation techniques and transfer of knowledge and technologies.

Small producers now better understand scientific pesticide residue management concepts like MRLs, Pre-

Farmers have realized the importance connecting directly with customers in domestic markets as well as in export markets. Similarly, the elimination of middlemen has increased their income and living standards.

As a result of the overall developments and better incomes, the children of the farmers are staying in their villages to continue the family business. Furthermore, many families are making grape production their primary source of income.

Benefits for exporters

GrapeNet provides grape exporters and importers with access to information and resources available at government level on a single integrated platform. Such resources include information from research lab experts; packaging institutions; farmers' data on their products; industry information and statistics on exports. Teams of experts and a wide range of information can be found and used by exporters without large investment.

The MRL data generated through GrapeNet provides key information for exporters. Traders can now easily monitor pesticide residues and trace consignments from the farm to the shelf. There is effective monitoring and reduction in the number of documents. The exporter now has a ready knowledge base regarding the availability of fruit and varieties in various pockets of the country throughout the year and season, with expected production volumes and harvest time, which supports the planning of exports or domestic distribution.

For perishable produce, exporters' time is the most critical factor. The identification of registered

预览已结束,完整报告链接和二维码如下:

https://www.yunbaogao.cn/report/index/report?reportId=5_4180



