

# Advocating for Horticulture

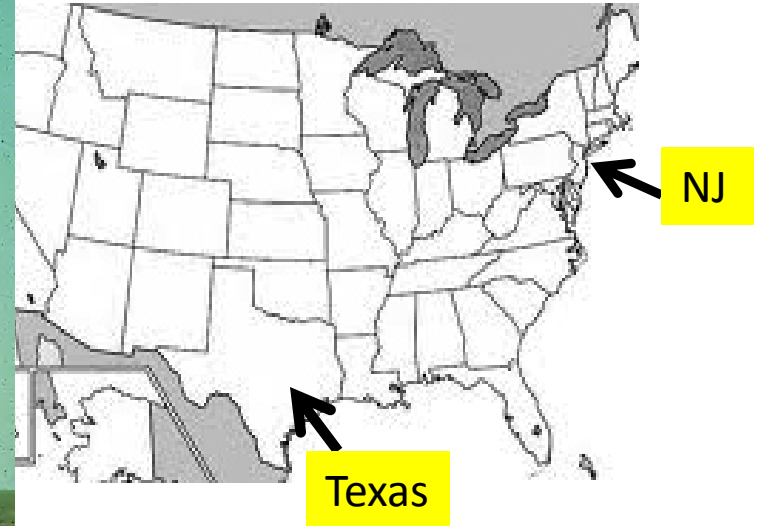
**Fred T. Davies, PhD**

**Regents Professor of Horticultural Sciences  
Texas A&M University**

**Senior Science Advisor (Jefferson Science Fellow)  
USAID, Bureau of Food Security / ARP**



**USAID**  
FROM THE AMERICAN PEOPLE



- ❑ Grew-up in Cranbury, New Jersey
- ❑ Potato production area
- ❑ Commercial Agriculture pesticide Co. -- helicopters



- ❑ Back-packed around the world for a year.
- ❑ U.S., Canada, Mexico, Central America, South America [Amazon River], Africa, India, Nepal, Southeast Asia, Japan.
- ❑ Visited banana plantations, temperate and tropical fruit and vegetable production & research centers, tea plantations, ornamental production
- ❑ International Opportunities in Horticulture for Niche Crops

# Mycorrhizal Fungi as Biofertilizers in Subsistence Potato Farming Systems in the Peruvian Altiplano



- J.S. Guggenheim Fellowship
- Fulbright Senior Fellowship
- USDA grant

# Senior Fulbright Fellow to Indonesia

Bogor Agricultural University



Udayana University



Sam Ratulangi University

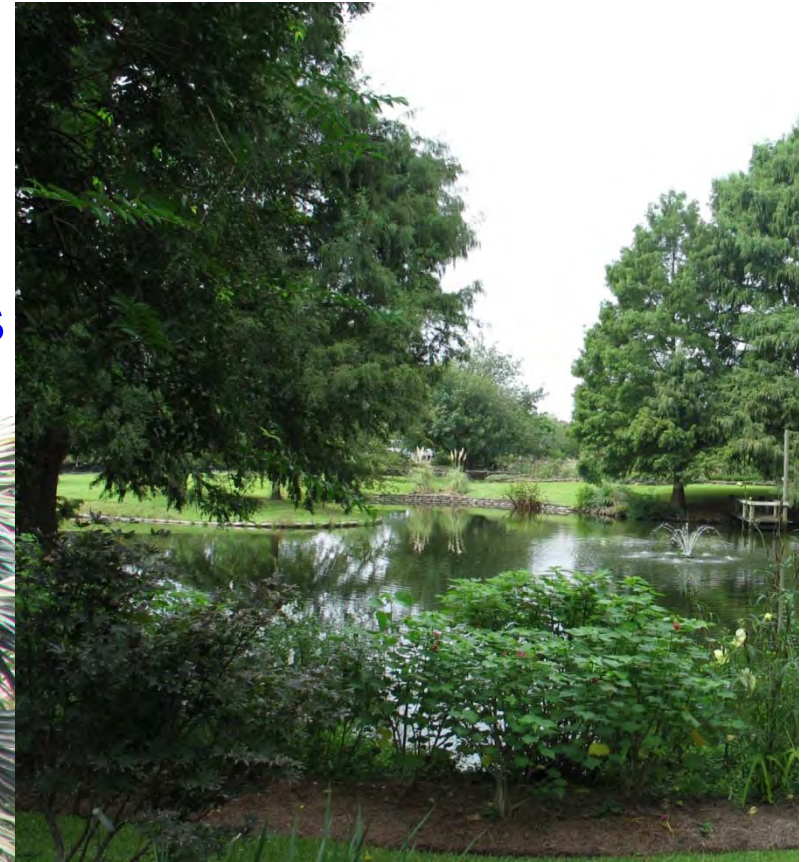
- ❑ Teaching, lecturing, workshops, collaborating, assisting with the Tropical Plant Curriculum program (TPC) - USAID

# What is Horticulture?

- ❑ Fruits, Nuts, Vegetables, Flowers, Landscape plants, Turf Grasses, Edible fungi



- ❑ Plants for Essential oils
- ❑ Nutraceutical plants for health
- ❑ Landscapes & Green Spaces
- ❑ Urban Parks & Household Gardens



- ❑ Supply vitamins, minerals (micronutrients), healthy carbohydrates (USAID goals – reduce stunting and increase human nutrition).



- ❑ 6th International Human Health Effects of Fruits & Vegetables Symposium (FAVHealth2014)

- ❑ Functional food research within fruit, vegetables and nuts.

- ❑ Foods that provide health benefits beyond basic nutrition, protection against disease, and increase in performance.



# CSU-Cancer Prevention Lab - Emphasis: Consilience



Plant Breeders

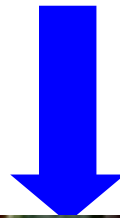
Farmers

Grocer



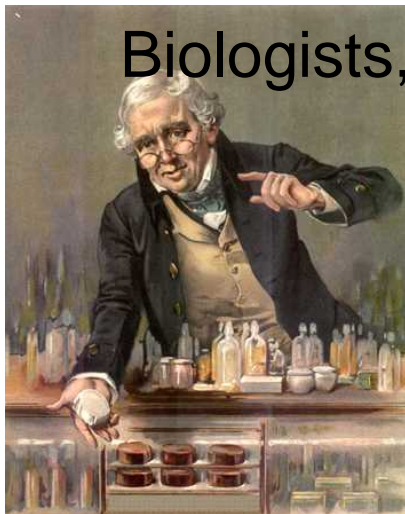
Consumer

Chronic  
Disease  
Prevention

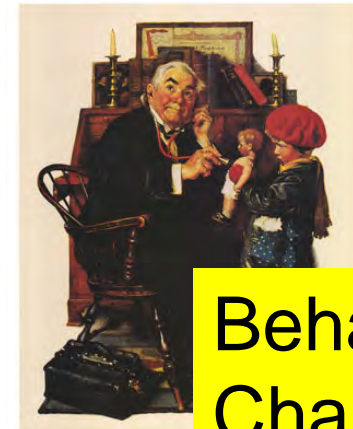


Biologists, Chemists

Health Care Practitioners



(H. Thompson, CSU)



Behavior  
Change

# Psychological Effects of Plants in Space ?



- Fresh Foods
  - Colors*
  - Texture*
  - Flavor*
- Bright Light
- Aromas
- Gardening Activity

# Economics of Horticulture

- ❑ Enables crop diversity in a world of niche markets, not just commodity crops (economy of scale)
- ❑ Value chain – producing niche markets for local, regional consumption & exportation
- ❑ High value, horticulture specialty crops can be profitable from smallholder farmers to huge commercial enterprises with large holdings of greenhouse, field crops and extensive orchards.



Cambodian  
lettuce – for  
Phnom Penh  
market

# Economics of Horticulture

- ❑ Horticulture as specialty crops are 50 % of farm gate value of all crops produced in the US.
- ❑ Unlike corn, cotton, rice, wheat and other grain crops Hort crops are not U.S. government subsidized.
- ❑ Supplies world markets through sophisticated supply chains delivering fruits, vegetables, flowers to supermarkets & hypermarkets.



- ❑ Entrepreneurship
- ❑ Favors small landholders – women
- ❑ In California, the fastest growing segment of new farmers are female, non-Anglo, intensively growing horticulture crops on small acreage.
- ❑ In Ghana, the tomato industry is dominated by the “Tomato Queens of Accra” from production to marketing.



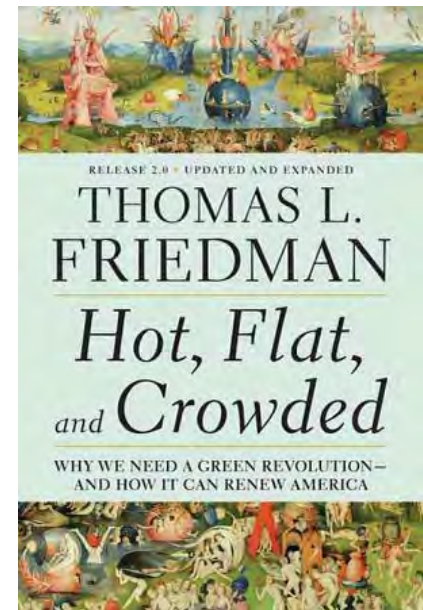
Cambodian smallholder farmer - French bean crop – local market

## Significant Challenges Affecting Horticulture / AG

- Globalization
  - Marketing
  - Labor
  - Environmental Issues
  - Urban Encroachment
  - Energy
  - Water-Usage
  - Consolidation
- 
- Viability and profit margins of horticultural industries

# How to Feed 9 Billion People?

- By the middle of the 21st century, the world population will increase from 7 billion to more than 9 billion.
- Resource limitations will constrain the global food system.
- For the first time in human history, food production will be limited on a global scale by the availability of land, water, and energy.
- Food issues could become as politically destabilizing after 2050 as energy issues are today – stressor during Arab spring.



- ❑ Where will that increased production of food come from?
  
- ❑ By the middle of the 21st century, the world population will increase 30% to more than 9 billion. It is estimated that food production will need to increase 70% to meet increased demands. The numbers do not add-up how we are going to realistically meet the increased demand for food.



## Change is a foot:

### Perfect Storm for Horticulture/ AG is also an Opportunity

- Consumers' view of quality, nutrition, production, origin and safety of foods we consume
- Peri-Urban and Urban agriculture favors horticulture.
- Food Miles, Community Supported Agriculture (CSA), Slow Food, Agriburbia, Permaculture are issues and opportunities impacting Horticulture.

- ❑ US Land-Grant System - Integrated Approach of Teaching (public education), Research and Extension (Information) delivery to producers and consumers.
- ❑ Redirection of federal agricultural research funds away from productivity-oriented research and development for the past 30 years.
- ❑ Since the early 1990s, U.S. agricultural productivity has slowed to a crawl, averaging less than 1.2% per year between 1990 and 2007.

(“For Want on a Nail: The Case for Increased Agricultural R&D Spending,” Philip Pardey and Julian Alston, 2011).

- ❑ There is increasing hunger & food security problems in the world.....
- ❑ 1 in 8 population suffers from chronic undernourishment
- ❑ 75% of the world's chronically poor are in mid-income countries, i.e. China, India, Brazil, Philippines.
- ❑ Agricultural productivity, food security, food safety, environment, health, nutrition, obesity are ALL interconnected.

## Challenges to Agro-Ecology Related to Food Security

- ❑ In Indonesia, over 200,000 ha/year of productive farmland is being lost to urban encroachment.
- ❑ Bali, Indonesia farmland is facing severe urban encroachment from high-value hotels, vacation homes and housing.

- ❑ Indonesia imports more than 50% of its food (rice, soybean, and nutritious fruits, vegetables and potatoes)
  
- ❑ Bali hotels, restaurants and supermarkets are importing fruits and vegetables for the tourist trade because of poor quality and supply issues from local Indonesian suppliers.
  
- ❑ Bali Institute for Sustainable Agriculture (BISA) to help small scale organic farmers -- Create market “value” for local, sustainable agricultural products.

Made Utama



## Lack of an Integrated Extension System

- ❑ Local governments have extension, but limited expertise for horticulture (except) for rice.
- ❑ Limited coordinated efforts – i.e., the 14-plus research centers in West Java do not conduct extension research with producers.
- ❑ No “Professors of Extension” in an integrated land-grant system approach of extension-research-teaching.

- ❑ Need for an effective agricultural extension services that provide up-to-date, practical information to farmers – especially by women for women

David Bennett (Sci Dev Net 12/31/2013)

# Communication Technology Opportunities

❑ Ubiquitous Cell phone.

❑ Some 70% of the world's seven billion people own or have inexpensive access to mobile phones.

❑ A billion people actively use Facebook; Indonesia, developing country, is the 4<sup>th</sup> highest user.



❑ Low-cost videos – Digital Green.

❑ Shamba Shape Up farm makeover reality TV Show.





# ICT - Communication Technology Opportunities

- ❑ **Changing attitudes, raise awareness:** convincing farmers to change.
- ❑ **Training:** improving competency to use new technologies.
- ❑ **Reminders, Tips:** Short reminders, i.e. what actions needed within crop cycle .
- ❑ **Diagnose Problems:** Why are my leaves turning brown?  
Combined with call center - Diagnostic tools, photos.
  
- ❑ **Time sensitive alerts, information:** weather forecast – and implications for actions given crop cycle; availability and prices of inputs; info on events, such as input delivery; harvest pick up points .
- ❑ **Feedback:** answering questions
- ❑ **Manage business processes:** connections across value chain, market price
- ❑ **Reduce transaction costs, pay faster:** mobile money  
micro crop insurance



- ❑ In the Mobile Money Revolution, Africa is Leading the World – 20% annual growth.
- ❑ **Mobile Money M-Pesa: Kenya's Mobile Banking App**
- ❑ Phones and smartphones are being used for money transfers, eCommerce payments and more advanced financial activities such as credit, savings, and insurance.



# TECHNOLOGY TRANSFORMING COCOA FARMING



## COCOALINK

IN 2011, HERSHEY INTRODUCED *COCOALINK*, A FIRST-OF-ITS-KIND PROGRAM THAT LINKS FARMERS WITH HELPFUL MESSAGES ABOUT SUSTAINABLE COCOA FARMING AND FAMILY HEALTH THROUGH TWO-WAY USE OF MOBILE PHONES AND SMS TEXT MESSAGING IN LOCAL LANGUAGES.

BY 2017, HERSHEY'S WEST AFRICAN PROGRAMS ARE EXPECTED TO BENEFIT **750,000 COCOA FARMERS** AND **2 MILLION PEOPLE** IN COCOA COMMUNITIES

MOBILE TECHNOLOGY IS WIDESPREAD IN GHANA



BASED ON THE SUCCESS OF COCOALINK'S PROGRAM IN GHANA, HERSHEY WILL EXPAND INTO THE IVORY COAST TO 300,000 MOBILE PHONE USERS



TRAINED FARMERS YIELDS ARE **15 to 40%** GREATER THAN NON-TRAINED FARMERS

MODERN FARMING METHODS AND TECHNIQUES CAN INCREASE COCOA YIELDS BY NEARLY

**50%**

INCREASED COCOA PRODUCTION IN GHANA WAS LINKED TO A

**24.6%**

IN SCHOOL ATTENDANCE

INCREASED FARMER YIELDS = **IMPROVED FAMILY LIFE IN COCOA COMMUNITIES**

□ CSR – Corporate Social Responsibility

**Low Cost Video: Digital Green is a knowledge platform to amplify development around the world.**

# digitalGREEN

Digital Green builds and applies technologies to amplify development efforts that change the world.



COMPONENTS

PARTICIPATORY LOCAL VIDEO PRODUCTION

HUMAN MEDIATED DISSEMINATION

TECHNOLOGY TO EXCHANGE DATA  
IN AREAS WITH LIMITED CONNECTIVITY

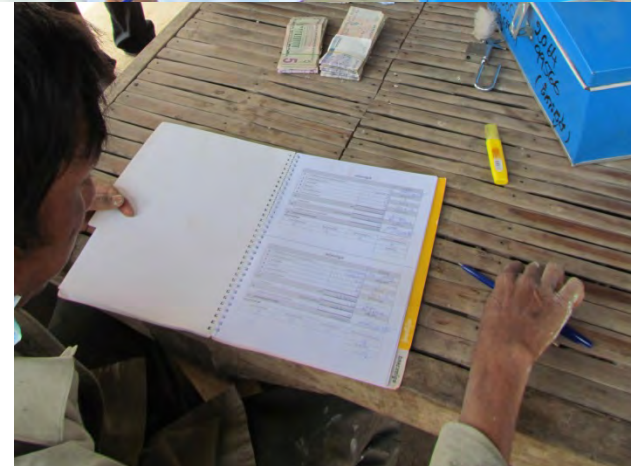
TARGETED CONTENT BASED ON  
NEEDS AND INTERESTS OF COMMUNITY

## Farmers Need “Face-Time” in adapting new technologies



# Need for bottom-up approaches

Farmer savings/lending groups; Financial Resiliency.

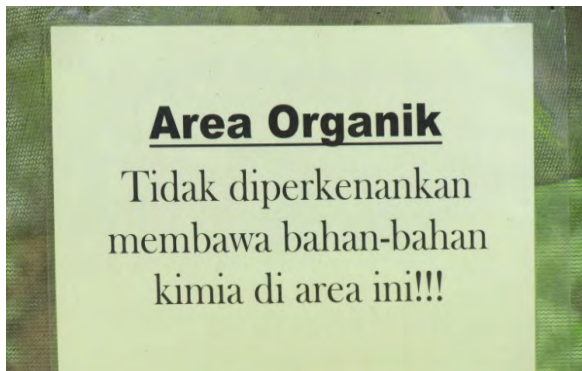




- ❑ Genetically modified food (GMOs) can lead to greener, more sustainable farming practices.
- ❑ Bangladesh commercially using BT-eggplant; eliminates pesticides.

# Branding of Horticultural Crops in Indonesia

- ⇒ Organically produced vegetables
- ⇒ Clonally propagated Chrystal Guava for exportation
- ⇒ Niche opportunities – high value, nutritious vegetables & fruits





- Farmers Greenhouse
- Drip irrigation System
- Water Tank
- Farmers Sprayer
- Gold Medal Seeds
- Nursery Set
- Organic plant inputs
- Bio organic plant protection
- Health and Safety
- Training
- Agro Support Package
- Amiran Farmers Kit Insurance

<http://www.amirankenya.com/>



Love the land and the land will love you in return!



- ❑ Focus from subsistence to commercial small-farming.
- ❑ Need to be bottom-up, value-chain driven (market-driven for economic sustainability).
- ❑ Not just producing higher yield “Hort crops” – but down–stream development of packaged, processed, refined products – “value-added”
- ❑ Targeting the consumptive, middle class to create market “pull through”, i.e. OFSP - chips, fries, bread, packaging, blending with other products.



# Opportunities for a Young Person

- ❑ “Sputnik challenge” of feeding the world -- doing it with less land, less inputs of water, fertilizer, chemicals.
- ❑ Food, Energy, Water
- ❑ Thinking out of the box – we can grow plants without soil, need to think producing vertically (growing upwards) with less arable land; CEA.

“Education is the most powerful weapon which you can use to change the world.”

— [Nelson Mandela](#)

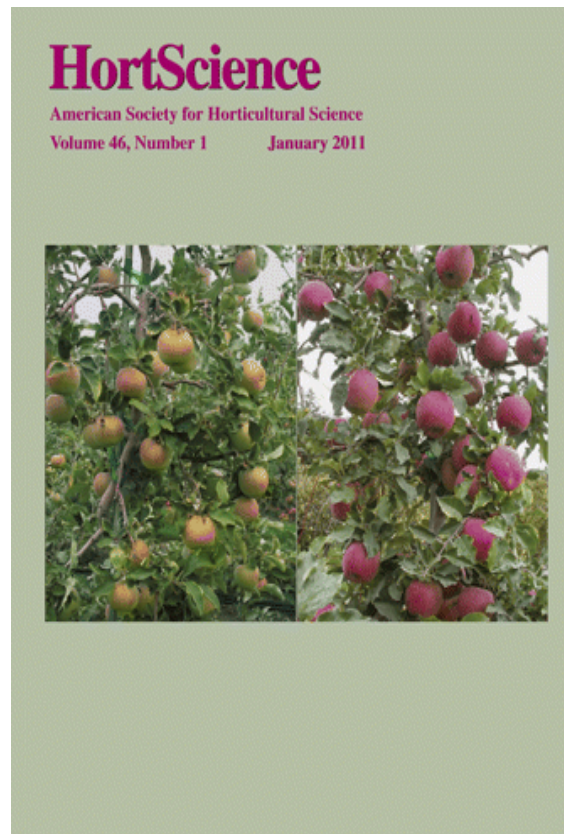
(and access to information)

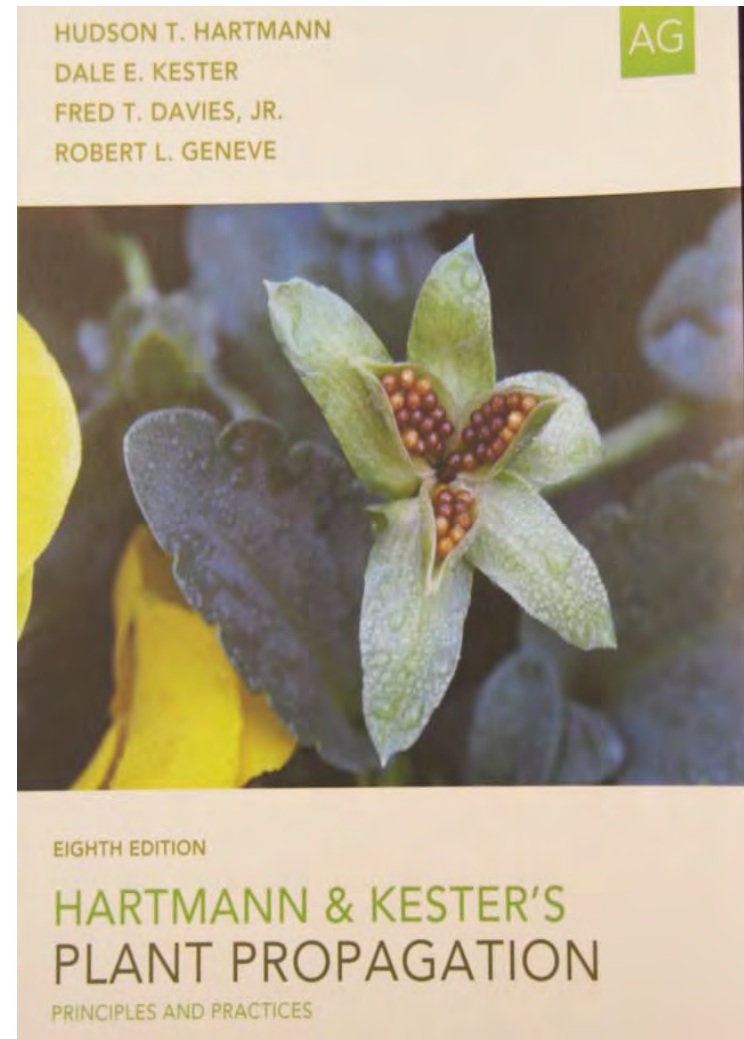
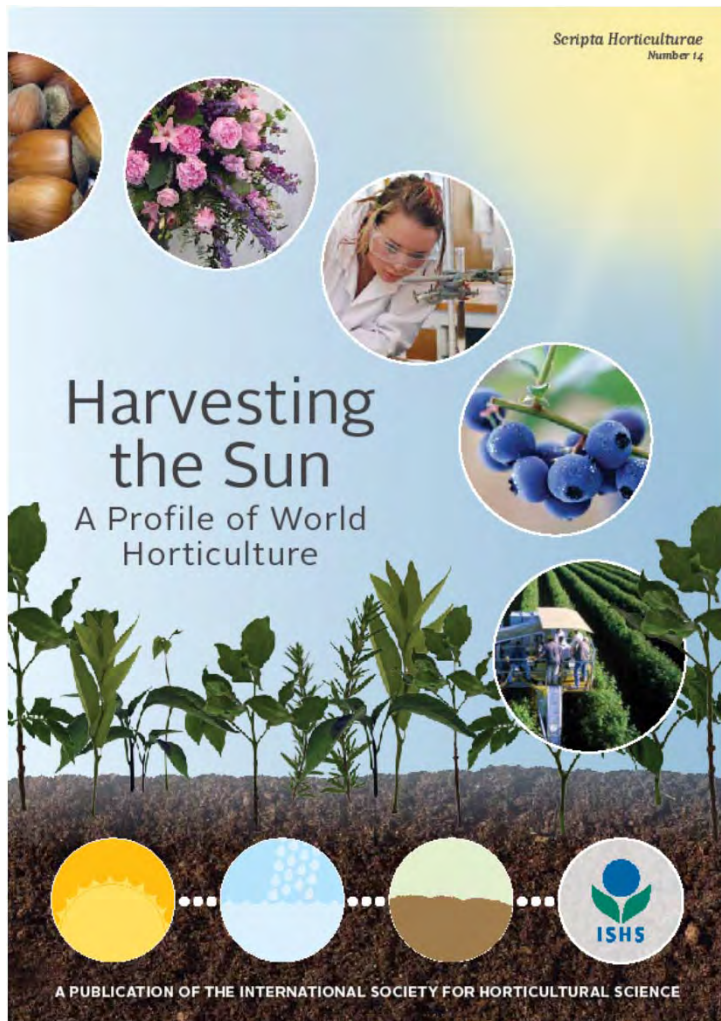
"ASHS—Science for Specialty Crops"

<http://ashs.org/>

## American Society for Horticultural Sciences

☐ 2011 & prior - Open Access – Worldwide





***Harvesting the Sun: A Profile of the World of Horticulture.* 2012.**  
International Society for Horticultural Science

A web version of this publication is available at [www.harvestingthesun.org](http://www.harvestingthesun.org)  
2012 International Society for Horticultural Science