

Urban agriculture in the framework of sustainable urbanism

Ana Nadal

Doctoral thesis

Supervisors: Dr. Joan Rieradevall Pons (UAB)
Dr. Alejandro Josa Garcia-Tornel (UPC)
Dra. Eva Cuerva Contreras (UPC)

Academic tutor: Dr. Joan Rieradevall Pons (UAB)

A thesis submitted in fulfilment of the requirements for the Doctoral degree in Environmental Sciences and Technology

Sostenipra research group
Institut de Ciència i Tecnologia Ambientals (ICTA)
María de Maeztu program for Units of Excellence in R&D (MDM-2015-0552)
Universitat Autònoma de Barcelona (UAB)

Bellaterra, September 2018



Appendix 1. Supporting information for Chapter 4

Appendix 1.1. Energy PNT

Fecha de emisión	Fecha de aplicación
10/01/2016	
Elaborado por	Revisado y aprobado por
Cargo: Doctorando Nombre y apellido: Ana Nadal	Cargo: Director del proyecto Nombre y apellido: Joan Hernández

II) RELACIONES

PNT y otros documentos asociados
<ul style="list-style-type: none"> - PNT para el seguimiento del cultivo - PNT flujos de agua del invernadero - PNT flujos de CO₂ del invernadero

III) INDICE

Apartado	Pág.
I) Tabla de control	
II) Relaciones	
III) Índice	
IV) Control de cambios	1
1. Introducción	1
2. Ámbito de aplicación	2
3. Definiciones	2
4. Cualificación del personal	2
5. Responsabilidades	2
6. Nivel de riesgo	3
7. Descripción del proceso	3
7.1 Observaciones generales	3
7.2 Asignación de consignas para el control del invernadero	7
7.3 Descarga de datos históricos del sistema de sensores Siemens	13
8. Residuos	

IV) CONTROL DE CAMBIOS

Control de cambios			
Núm.	Punto	Cambio	Justificación

1. INTRODUCCIÓN

El presente procedimiento normalizado de trabajo (PNT) tiene como objetivo establecer unas pautas que aseguran el buen funcionamiento de los flujos de energía de los invernaderos y la medida de los parámetros necesarios para su seguimiento.

Este documento se tendrá en cuenta conjuntamente con el resto de PNTs que hacen referencia a los diferentes flujos, utensilios y al funcionamiento general del invernadero.

2. ÁMBITO DE APLICACIÓN

Este procedimiento normalizado de trabajo se aplicará al cultivo en cubierta del invernadero SO y SE del edificio "Z" (ICTA-ICP) de la UAB. Los métodos indicados están pensados para ser aplicados en el marco del proyecto *Fertilecity* o personal vinculado/contratado con la cualificación y conocimientos necesarios.

3. DEFINICIONES

Sistema de sensores Siemens: todos aquellos sensores ubicados en el centro de los invernaderos SO y SE, en el atrio del edificio ICTA y en el exterior del edificio que con protección de radiación y son los que monitorizan las condiciones de temperatura y humedad que son considerados como válidos por el Software Siemens de control del invernadero.

Software Siemens de control del invernadero: programa que permite tener el control de la apertura y cierre de las lamas y cortinas de los invernaderos SO y SE en función de la temperatura requerida para mantener las condiciones adecuadas para el desarrollo del cultivo

Visualizador de datos: Pantalla de fondo verde en la que es posible observar por medio de una gráfica los datos históricos o en tiempo real que los sensores han recabado.

4. CUALIFICACIÓN DEL PERSONAL

Sólo queda autorizado para realizar el control y seguimiento del cultivo el personal que se haya leído este PNT o bien los expertos del área de energía del proyecto *Fertilecity*.

Es necesario que el personal:

- Conozca el funcionamiento del sistema del cultivo y los flujos principales.
- Conozca el funcionamiento de los equipos y el software que se tenga que utilizar.
- Disponga de la acreditación y permisos adecuados en caso de que sea necesario.
- Registre todas las modificaciones del control del invernadero en la bitácora de energía.
- Antes de realizar algún cambio en las consignas de apertura y cierre de los invernaderos se ha de verificar que las lamas y cortinas del invernadero estén en buen estado y libres de cualquier elemento que pueda impedir su movimiento.
- Informar a las personas responsables de los flujos de agua y mantenimiento del cultivo de las acciones realizadas, ya que estas pueden modificar las condiciones térmicas en el interior de los invernaderos.

5. RESPONSABILIDADES

- a) Es responsabilidad del usuario hacer un uso correcto de los equipos e instalaciones.*
- b) Es responsabilidad del usuario registrar todos los datos especificados en el apartado 7 para su posterior estudio.*
- c) Es responsabilidad del usuario disponer de los conocimientos necesarios especificados en el apartado 4 antes de realizar las tareas pertinentes.*

- d) *Los usuarios tendrán cuidado y custodiarán los documentos y manuales necesarios para el uso y gestión del invernadero y los proporcionarán a nuevos usuarios.*
- e) *Los usuarios tendrán cuidado y mantendrán en buen estado el material y equipos, así como la infraestructura del cultivo.*
- f) *El Director del proyecto será el responsable de la difusión del PNT entre los miembros que deban seguirlo.*

6. NIVEL DE RIESGO

Las tareas de modificación de las consignas de apertura y cierre de las lamas y cortinas de los invernaderos implican un nivel bajo de riesgo.

7. DESCRIPCIÓN DEL SISTEMA Y PROCEDIMIENTOS:

7.1. Observaciones generales.

El sistema incluye dos grupos de sensores: Siemens y Campbell. El sistema de sensores Siemens es el que se considera para el control y cierre de las lamas y cortinas de los invernaderos SO y SE, además se genera un registro de las condiciones de temperatura y humedad de ambos invernaderos. El sistema de sensores Campbell se emplea únicamente para el monitoreo y adquisición de datos históricos de la temperatura y humedad.

Ambos grupos de sensores están programados para recolectar datos cada 10 minutos.

El grupo de investigación dispone de un acceso restringido a la pantalla de control del edificio que sólo permite modificar los parámetros de los invernaderos. Este acceso se da por medio de una sola licencia, por lo que únicamente se puede tener acceso una persona a la vez.

7.2. Asignación de consignas para el control del invernadero

Acciones a llevar a cabo para la asignación de consignas para el control de los invernaderos SO y SE por medio del Software de control de Siemens:

1. Entrar en la "Conexión a Escritorio Remoto" a través del menú de inicio de Windows (Figura 1). Las credenciales para acceder son las siguientes (RESPETAR LAS MAYÚSCULAS Y MINÚSCULAS):

Equip:

Usuario:

Password:



Figura 1. Conexión al servidor Escritorio remoto

- Una vez conectados con el servidor nos aparecerá la siguiente pantalla donde nos pedirán la contraseña de acceso:

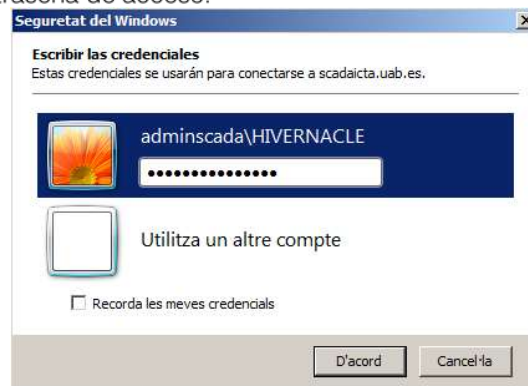


Figura 2. Pantalla de conexión al software Siemens de control de los invernaderos

Realizado este paso, es posible que no tenga acceso al servidor en caso de que todas las licencias del programa de control estén usando en ese momento. En caso que se negara el acceso al software es necesario esperar a que la licencia quede libre para acceder de nuevo.

- Aparecerá una ventana en la que hay que seleccionar la opción de HIVERNACLES

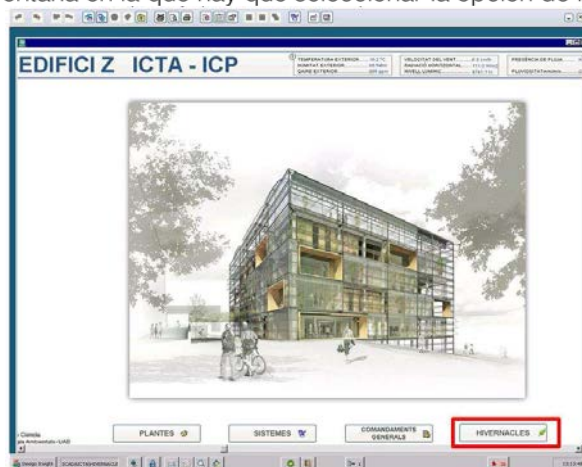


Figura 3. Ventana de inicio del software

4. A continuación aparece una ventana en la que se debe de seleccionar el invernadero de interés haciendo click dentro del área delimitada para cada invernadero.

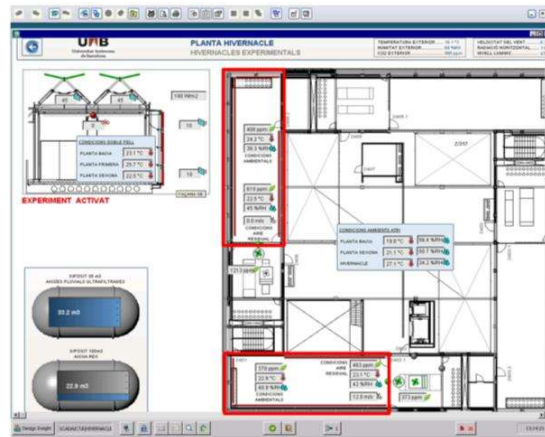


Figura 4. Ventana de selección de los invernaderos

5. Una vez que seleccionado el invernadero de interés, aparece una ventana mediante la cual podemos acceder al control de la apertura y cierre de las lamas y cortinas del invernadero. En la parte izquierda de la pantalla se encuentra el enlace referenciado con el nombre de ACCES A PARAMETRITZACIÓ, hacer click en el icono.

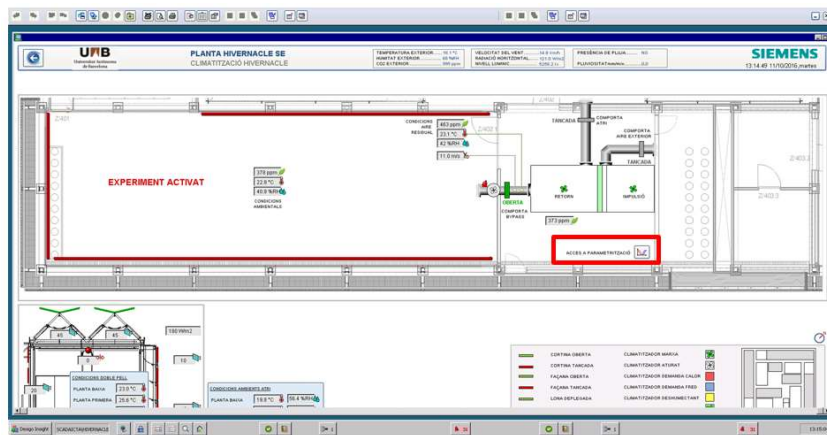


Figura 5. Acceso a la ventana de parametrización.

6. A continuación se despliega la ventana en la que es posible asignar las consignas de parametrización para el control de apertura y cierre de las lamas y las cortinas del invernadero seleccionado.

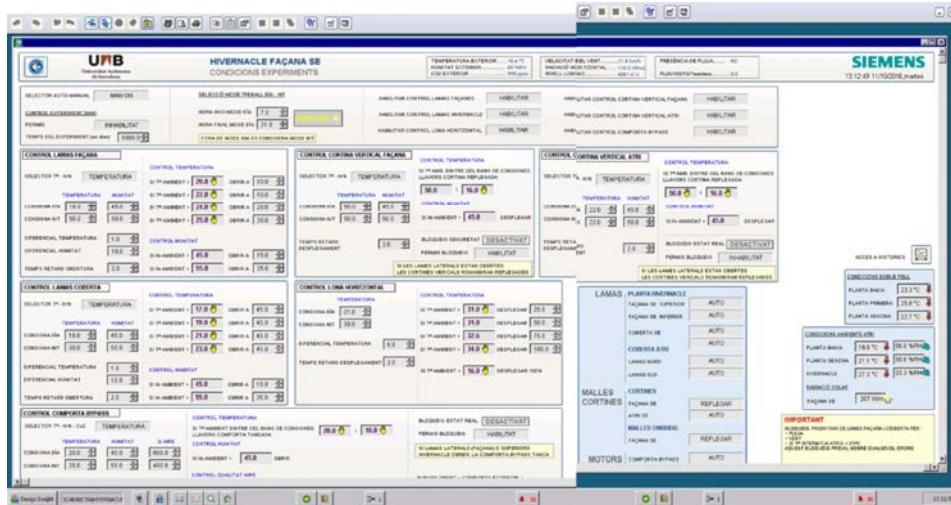
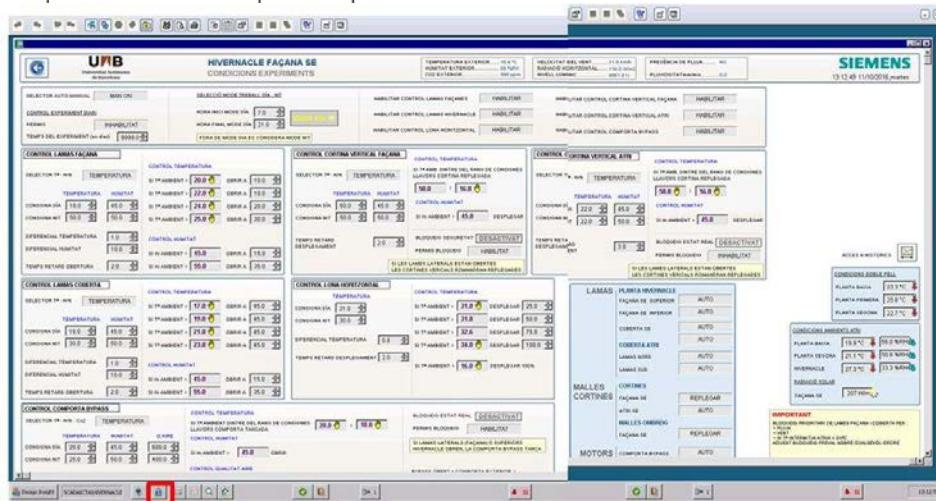


Figura 6. Ventana de control de los parámetros o consignas de control de los invernaderos

Es importante indicar en todos los parámetros o consignas de control un tiempo de retardo de 2 minutos.

- Una vez asignadas los parámetros o consignas para el control del invernadero, se ha de cerrar la sesión o licencia. Hacer clic en el icono del candado azul, ubicado en la parte inferior de la parte izquierda de la ventana.



7.3. Descarga de datos históricos del sistema de sensores Siemens

Acciones a llevar a cabo para la descarga de datos históricos del sistema de sensores Siemens de los invernaderos SO y SE:

- Entrar en la "Conexión a Escritorio Remoto" a través del menú de inicio de Windows (Figura 1). Las credenciales para acceder son las siguientes (RESPETAR LAS MAYÚSCULAS Y MINÚSCULAS):

Equip:
 Usuario:
 Password:



Figura 1. Conexión al servidor Escritorio remoto

- Una vez conectados con el servidor nos aparecerá la siguiente pantalla donde nos pedirán la contraseña de acceso:

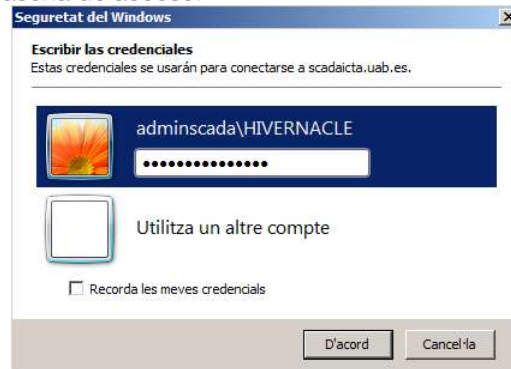


Figura 2. Pantalla de conexión al software Siemens de control de los invernaderos

Realizado este paso, es posible que no tenga acceso al servidor en caso de que todas las licencias del programa de control estén usando en ese momento. En caso que se negara el acceso al software es necesario esperar a que la licencia quede libre para acceder de nuevo.

- Aparecerá una ventana en la que hay que seleccionar la opción de HIVERNACLES



Figura 3. Ventana de inicio del software

4. A continuación aparece una ventana en la que se debe de seleccionar el invernadero de interés haciendo click dentro del área delimitada para cada invernadero.

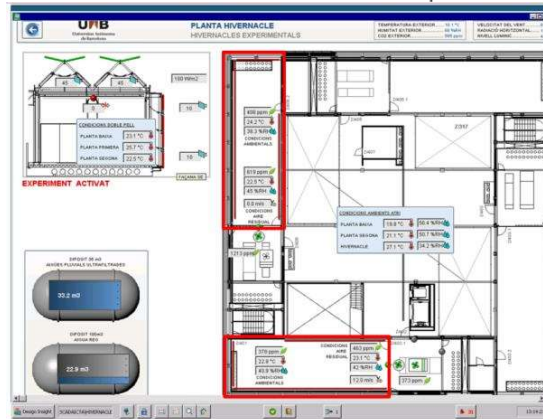


Figura 4. Ventana de selección de los invernaderos

5. Una vez que seleccionado el invernadero de interés, aparece una ventana mediante la cual podemos acceder al control de la apertura y cierre de las lamas y cortinas del invernadero. En la parte izquierda de la pantalla se encuentra el enlace referenciado con el nombre de ACCES A PARAMETRITZACIÒ, hacer click en el icono.

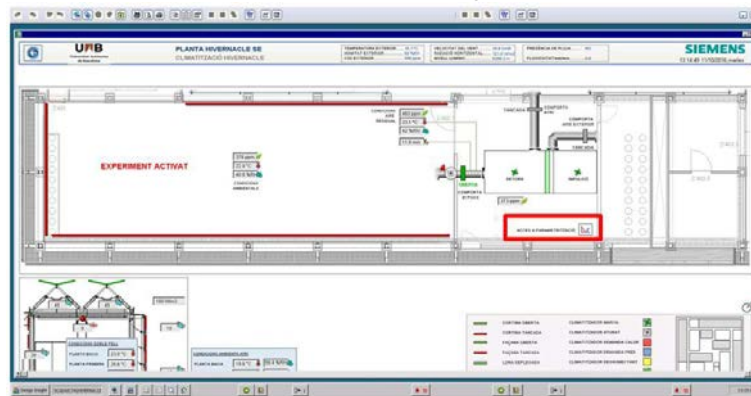


Figura 5. Acceso a la ventana de parametrización.

6. A continuación se despliega la ventana en la que es posible asignar las consignas de parametrización para el control de apertura y cierre de las lamas y las cortinas del invernadero seleccionado. En la parte media de la ventana en el lado derecho aparece el acceso ACCES A HISTORICS, hacer click en este.

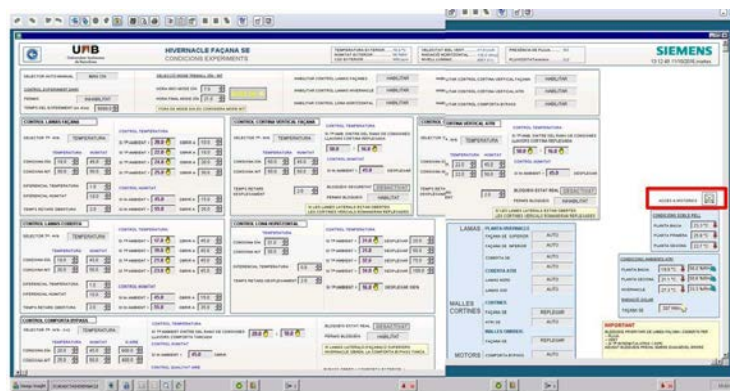


Figura 6. Ventana de acceso a los datos históricos de los invernaderos

7. A continuación se despliega una ventana en la que hay que seleccionar los datos históricos de cada invernadero que nos interese.

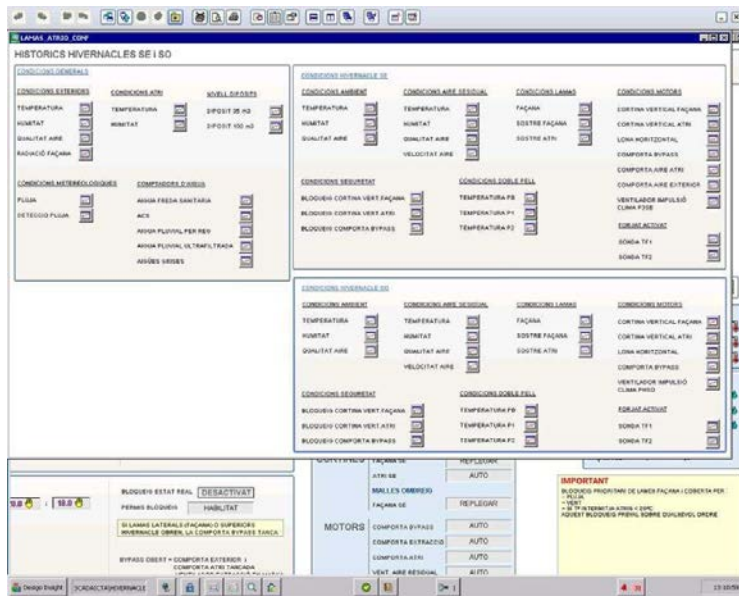


Figura 7. Ventana de datos históricos

Se pueden seleccionar diversos datos históricos de uno o varios espacios de los invernaderos y el edificio.

8. Seguidamente se despliega una ventana de visualización de datos históricos. En esta ventana se verán reflejados los datos históricos mediante gráficas. Si los datos de interés coinciden con los mostrados en la ventana se procede a hacer click sobre el fondo verde de la gráfica y selecciona la opción copiar y se abre un archivo en blanco de Excel y se pegan los datos. En el caso que los datos de interés no se visualicen en la ventana es necesario hacer clic en el icono del lado izquierdo del icono de los binoculares.

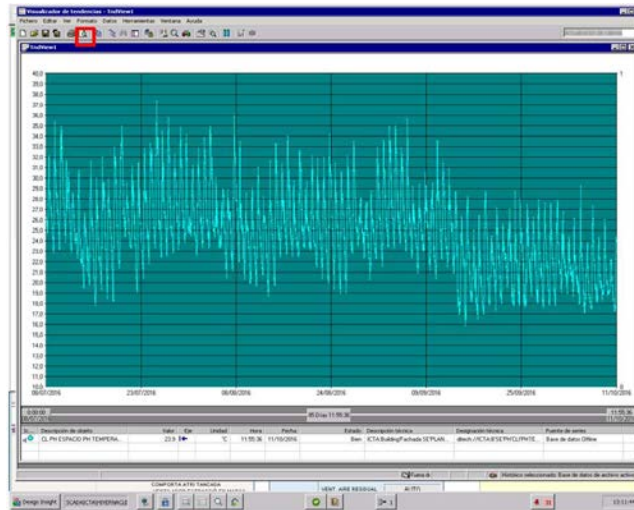


Figura 8. Ventana de visualización de datos históricos

9. Seguidamente se despliega otra ventana en la cual es necesario hacer click en la parte inferior de la pantalla en la opción de ARCHIVAR

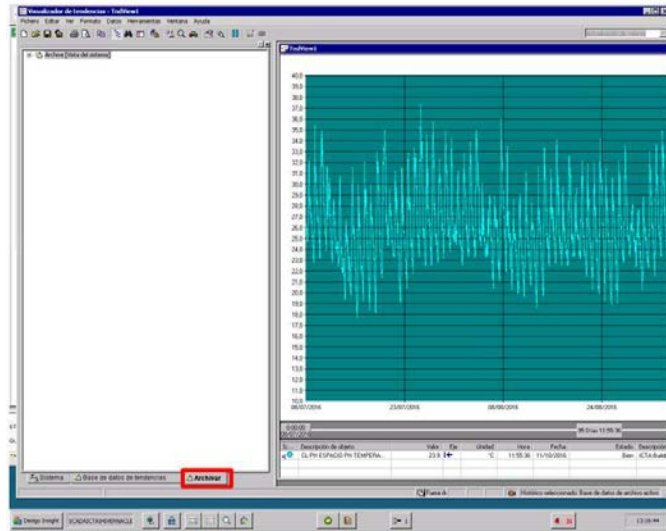


Figura 9. Ventana de selección de datos de archivo

- Después hay que hacer click en la parte de arriba a la izquierda de la ventana en la opción de FICHERO, seguidamente en la de ABRIR ARCHIVO. Seleccionar el periodo de interés de los datos históricos y dar click en ABRIR.

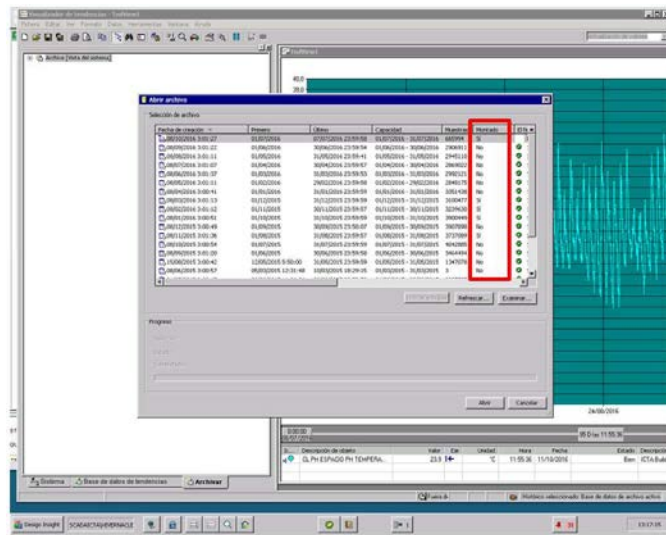


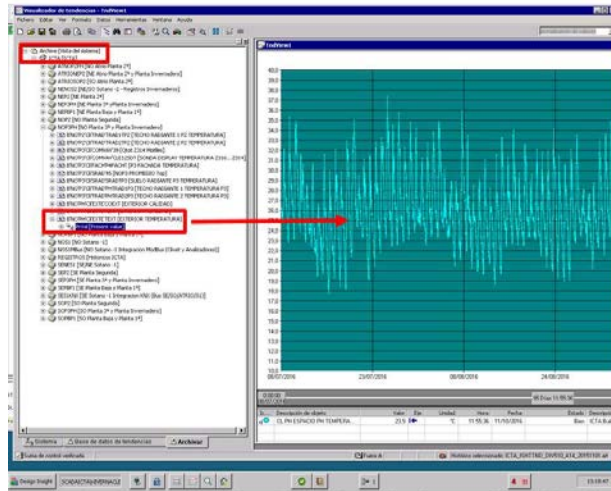
Figura 10. Ventana de selección del periodo de archivos de datos históricos Únicamente se pueden seleccionar aquellos periodos que digan SI en la columna de MONTADOS y solo se puede seleccionar un periodo de datos.

- Seguidamente en la parte izquierda de la ventana (color blanco) se puede visualizar ARCHIVE (VISTA DEL SISTEMA) dar click, luego click en ICTA (ICTA) y a continuación seleccionar el nivel del edificio PLANTA INVERNADERO y el nombre del espacio del cual se necesitan los datos históricos. Una vez que se ha seleccionado el nombre del espacio y los datos en específico se ha de mantener seleccionado y arrastrarlo a la parte derecha de la ventana con el fondo verde (visualizador) para poder visualizar los datos.

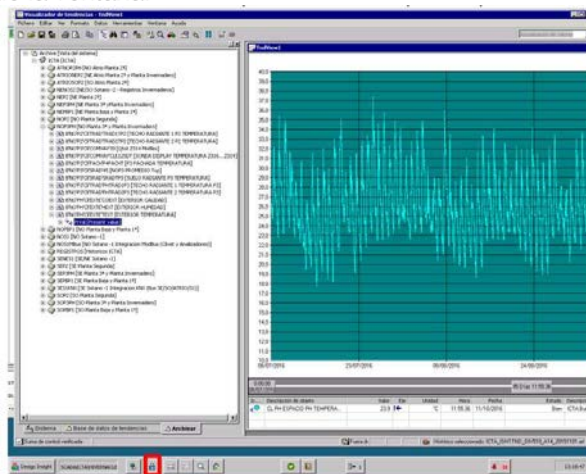
Cuando se visualicen los datos históricos de interés en la gráfica en la parte verde de la pantalla, se procede a hacer click sobre el fondo verde de la gráfica y selecciona la opción copiar y se abre un archivo en blanco de Excel y se pegan los datos. Los datos que se copian son aquellos que se visualizaron en la gráfica. Para cambiar el periodo de datos

históricos es necesario ajustar el periodo de visualización de los datos deslizando la barra que se encuentra en el visualizador de datos.

SE recomienda realizar un respaldo de los datos históricos del sistema Siemens cada 3 meses.



12. Una vez descargados los datos históricos de interés, se ha de cerrar la sesión o licencia. Hacer clic en el icono del candado azul, ubicado en la parte inferior de la parte izquierda de la ventana.



8. RESIDUOS

No se generan residuos

Appendix 5. Supporting information for Chapter 8

Appendix 5.1. Some national legislation on UPA, food security, food sovereignty and the right to food in Latin America

Country	Name	Description	Year	Sources
Antigua & Barbuda	The Constitution of the Republic of Antigua and Barbuda	Recognizes indirectly, in the context of broader rights, the right to food	1981	CELAC (2018)
Argentina	Article 75, paragraph 22. The Constitution of the Argentine Nation	Recognizes implicitly the right to food by giving the Universal Declaration of Human Rights, the American Convention on Human Rights and the International Covenant on Economic, Social and Cultural Rights a superior status to ordinary laws.	1994	CELAC (2018)
	Law N° 26631. Cooperation Agreement on Sovereignty and Food Security between the Republic of Argentina and the Bolivarian Republic of Venezuela	To establish the institutional framework to cooperate with regard to guaranteeing the food security and sovereignty of the parties.	2010	FAO (2013)
	Law of the national nutrition and food program	Creates the National Food and Nutrition Program which complies with the State's duty to guarantee the right to food for its citizens.	2003	CELAC (2018)
	Regulatory decree - decree 1018/2003	Approves the regulation of Law N° 25.724 of the National Nutrition and Food Program.	2003	CELAC (2018)
Bahamas	The Constitution of the Commonwealth of the Bahamas	Recognizes the right to food, in the third chapter of the, referring to the right to life and security of the people.	1973	CELAC (2018)
Barbados	The Constitution of Barbados	Barbados in its Constitution of 1966 implicitly recognizes, in the context of broader rights, the right to food. The Constitution's Second Chapter notes the protection of the right to life.	1966	CELAC (2018)
Belize	The Constitution of Belize	Includes an implicit acknowledgment to the Right to Food, as recognition of a context of broader rights.	1981	CELAC (2018)
Bolivia	Article 16. The Political Constitution of the State of Bolivia	The Political Constitution of the State of Bolivia of 2009 recognizes fundamental human rights, including the right to food.	2009	CELAC (2018)
	Law of agricultural community production revolution	It establishes the institutional bases, policies and technical, technological and financial mechanisms of the production, transformation and commercialization of agricultural and forestry products, of the different actors of the plural economy; prioritizing organic production in harmony and balance with the benefits of Mother Earth, for food sovereignty.	2011	CELAC (2018)
	Law of economic organizations, peasants, originating indigenous peoples -OECAS and community economic organizations -OECOM for the integration of sustainable family agriculture and food sovereignty	Its purpose is to contribute to the achievement of food sovereignty and security for the Living Well of Bolivians and Bolivians, through Sustainable Family Farming, as part of the process of the Productive Community Agricultural Revolution and the Integral Development of the plural economy, in harmony with Mother Earth; being the right to food a human right.	2013	CELAC (2018)
	Law of support for food production and restitution of forests	Its purpose is to encourage, in areas that have been subject to clearance without authorization, the production of food to guarantee the fundamental right to sovereignty and food security and the restitution of areas of affected forests.	2015	CELAC (2018)
	Law N° 144. Law of the Agricultural Productive Community Revolution	To regulate the process of the Agricultural Productive Community Revolution for food sovereignty, establishing the institutional bases, policies and technical, technological and financial mechanisms.	2011	FAO (2013)
Brazil	Article 64. The Constitution of Brazil	Constitutional Amendment No. 64 of 2010 to the Constitution of 1988 includes an explicit and direct recognition of the right to food, establishing it as a social right in Article 6.	2010	CELAC (2018)
	Law N° 11326. Family Agriculture Law	To institute guidelines for the National Family Farming Policy.	2006	FAO (2013)
				CELAC (2018)

	Law N° 11346. Organic law on food and nutritional security	Establishes the System for Food and Nutrition Security - SISAN, which is a system under construction which aims to promote, throughout the national territory, the human right to adequate food.	2006	
Chile	Article 5. The Political Constitution of Chile	The Political Constitution of 1980 gives an implicit recognition of the right to food.	1980	CELAC (2018)
	Law N° 2065	Promulgates the "United Nations Convention to Combat Desertification in Countries Affected by Severe Drought or Desertification"	1998	FAO (2013)
	Decree 17	To formalize the technical norms of Law 20089, created the National Certification System for Agricultural Organic Products	2007	FAO (2013)
	Decree 162	To create the Advisory Commission of the President of the Republic called "Chilean Agency for Food Safety	2011	FAO (2013)
	Law N° 20595	To establish "Chile Solidary" system	2012	FAO (2013)
	Law N° 20595	It creates the "family ethic income", which establishes bonds and conditional transfers for families of extreme poverty, and creates subsidies for women's employment, providing security and opportunities, promoting access to better living conditions.	2012	FAO (2013)
Colombia	Articles 43, 44 and 46. The Constitution of Colombia.	Recognizes explicitly and directly the right to food, this is recognized and applicable only to specific population categories: A balanced diet is a fundamental right of children (Article 44). During pregnancy and postpartum, women enjoy special assistance and protection from the state, and they receive a food subsidy if she is unemployed or homeless (Article 43). The State guarantees senior citizens a food subsidy in case of poverty and destitution (Article 46).	1991	CELAC (2018)
	Senate Bill 203/09. Law of Food and Nutritional Security	To generate a legal framework of the SAN that establishes the bases to develop a FNS policy. It incorporates as a principle of the Law that the State will facilitate, make effective, respect and protect the Right to Food.	2007	FAO (2013)
Costa Rica	Articles 21 and 50. The Constitution of Costa Rica.	The Republic of Costa Rica recognizes implicitly, and in the context of broader rights, the Right to Food in its Constitution of 1949, pointing out, in Article 21 of Title IV of "Individual Rights and Guarantees", which expresses "Human life is inviolable". Furthermore, Article 50 of Title V on "Rights and Social Guarantees" affirms that the State of Costa Rica "will seek the greatest welfare for the population of the country."	1949	CELAC (2018)
	Senate Bill 20.561. Law of promotion of the agrarian conscience and urban agriculture	To reform the "Cantonal Agricultural Centers", which seeks to take advantage of vacant land owned by the municipality, so that these are used, not vandalized and that in turn will generate resources for communities through production.	2017	Legislative Assembly of the Republic of Costa Rica (20017)
Cuba	Articles 43 to 52. The Constitution of Costa Rica.	The Constitution recognizes and protects economic, social and cultural rights, including the right to food, health, education, work and social security and social assistance.	1976	CELAC (2018)
	Urban Agriculture Policy of the City of Havana	To produce, without the use of chemical synthesis inputs, good quality food to improve the diet of the population, strongly impacted by the economic crisis resulting from the fall of the socialist countries, using vacant land (urban voids) and taking advantage of available resources in the city (soil, organic matter, water).	1998	UCLG/CISDP (2013)
Dominica	1 st chapter. The Constitution of Dominica	Dominica recognizes implicitly, within the framework of broader rights, the right to food in its Constitution, noting in its first chapter on "Protection of Human Rights and Fundamental Freedoms" that every person in Dominica regardless of their race, place of origin, political opinion, color or creed, has the right to life.	1978	CELAC (2018)
Dominican Republic	Article 54 and 61. The Constitution of Dominican Republic	The Dominican Republic explicitly recognizes the right to food in its Political Constitution. It notes in Article 61 the right to health, which declares that the State must ensure the health of all people, access to drinking water and "improvement to nutrition". Article 54 for Food security complements this.	2010	CELAC (2018)
Ecuador	Articles 12, 13 and 281. The Constitution of the Republic of Ecuador	Ecuador recognizes the right to food in its Constitution since 2008, as an independent right applicable to all people. Article 281, It establishes that food sovereignty is a strategic objective and the obligation of the State is to guarantee the permanent self-sufficiency of healthy and	2008	CELAC (2018)

		culturally appropriate foods to people, communities, peoples and nationalities.		
	Organic Law of the Diet of Food Sovereignty	To establish the mechanisms through which the State fulfills its obligation and strategic objectives of guaranteeing people, communities and peoples the self-sufficiency of healthy, nutritious and culturally appropriate food on a permanent basis.	2009	FAO (2013)
El Salvador	The Constitution of El Salvador	El Salvador recognizes implicitly, and within the framework of broader rights, the right to food	1983	CELAC (2018)
Grenada	1 st chapter. The Constitution of Grenada	Granada recognizes implicitly, within the framework of broader rights, the right to food.	1978	CELAC (2018)
Guatemala	The Constitution of the Republic of Guatemala	The Republic of Guatemala in its Constitution implicitly recognized, in the context of broader rights, the right to food. However, it also notes that the following rights are recognized and applicable only to certain population categories that the State guarantees, such as minors and the elderly.	1985	CELAC (2018)
	Decree 32-2005. Law of the National System of Food and Nutritional Security	This Law establishes an institutional framework that coordinates actions of governmental entities, nongovernmental organizations and international organizations, and considers as a right of all Guatemalans, access to a diet that meets their nutritional and social needs, so it is necessary to improve the conditions that allow overcome food and nutrition insecurity.	2005	CELAC (2013)
Guyana	3 rd chapter. The Constitution of the Cooperative Republic of Guyana	The Cooperative Republic of Guyana, in its Political Constitution of 1980, makes an explicit recognition of the right to food and establishing food as a fundamental right.	1980	CELAC (2018)
Haiti	The Constitution of the Republic of Haiti	The Constitution recognizes explicitly and directly the right to food as an independent law applicable to all citizens.	1987	CELAC (2018)
Honduras	The Constitution of Honduras	Honduras in its Constitution of 1982 (amended in 2005) implicitly recognized, in the context of broader rights, the right to food.	2005	ECLAC (2018)
	D. N° 25-2011. Law of Food and Nutritional Security	To establish the regulatory framework to structure, harmonize and coordinate FNS actions that contribute to the improvement of the quality of life of the population, prioritizing more vulnerable groups.	2011	CELAC (2013)
Jamaica	The Constitution of Jamaica	Jamaica's Political Constitution implicitly recognizes, in the context of broader fundamental rights, the right to food, by recognizing the right to life and human rights.	1962	CELAC (2018)
Mexico	Article 2 and 4. The Constitution of the Republic of Mexico	The United Mexican States in its Constitution recognizes the Right to Food by explicitly stating in its fourth article.	1917	CELAC (2018)
	Strategic Food Safety Program (PESA)	To contribute to the development of capacities of people and families who are in communities of high marginalization, so that they are the main actors in the appropriation of the problem, the identification of opportunities and the search for solutions to achieve their food security and the increase in entry.	2003	FAO (2013)
Nicaragua	The Constitution of Nicaragua	The Constitution of Nicaragua and its reforms, states an explicit and direct recognition to the Right to Food.	1986	CELAC (2018)
	Law N°693. Sovereignty and Nutritional Food Security Law	To guarantee the right to have sufficient, safe and nutritious food according to their vital needs, which are physically, economically, socially and culturally accessible in a timely and permanent manner.	2009	FAO (2013)
Panama	6 th chapter and article 110. The Constitution of Panama	The Republic of Panama explicitly recognizes the right to food.	1972	CELAC (2018)
Paraguay	The Constitution of the Republic of Paraguay	The Republic of Paraguay recognizes implicitly, within the framework of broader rights, the right to food in its Political Constitution.	1992	CELAC (2018)
	Law N° 2.419. Law of the National Institute for Rural and Land Development	It establishes the first legal concept of Peasant Family Farming, where it is stipulated that one of its main lines of action is to strengthen family farming through integrated and coordinated family agriculture programs.	2012	INDERT (2012)
Peru	Articles 1 and 3. The Constitution of Peru	Although there is no explicit recognition of the right to adequate food, this right is contained within the right to life stated in Articles 1 and 3 of the Constitution of Peru.		CELAC (2018)

	Law N° 29.196. Law on the Promotion of organic or ecological production	Assistance in formulating Rural Development policies, where it is expected to have biodiverse agricultural systems of global importance, managed and used sustainably by empowered local communities. The rescue and preservation of the genetic stock of the Andean species is intended.	2008	FAOLEX (2008)
Paraguay	The Constitution of the Republic of Paraguay	The Republic of Paraguay recognizes implicitly, within the framework of broader rights, the right to food in its Political Constitution, noting that the right to life is inherent to the human person.	1992	CELAC (2018)
Peru	Articles 1 and 3. The Constitution of Peru	Although there is no explicit recognition of the right to adequate food, this right is contained within the right to life stated in Articles 1 and 3 of the Constitution of Peru.	1993	CELAC (2018)
Saint Kitts & Nevis	The Constitution of Saint Kitts & Nevis	St. Kitts and Nevis in its Political Constitution implicitly recognizes the right to food, in the context of broader rights, noting that everyone in Saint Kitts and Nevis has fundamental rights and freedoms, including the right to the life.	1983	CELAC (2018)
Saint Vincent and the Grenadines	The Constitution of Saint Vincent and the Grenadines	Saint Vincent and the Grenadines recognizes implicitly, within the framework of broader rights, the right to food in its Constitution, stating that everyone has the right to life.	1979	CELAC (2018)
Saint Lucia	The Constitution of Saint Lucia	Santa Lucia in its Constitution implicitly recognizes, in the context of broader rights, the right to food, noting that everyone in Santa Lucia possesses rights and fundamental freedoms.	1978	CELAC (2018)
Suriname	The Constitution of Suriname	The Republic of Surinam in its Constitution of 1987 implicitly recognizes, in the context of broader rights, the right to food by stating that everyone has the right to life and physical, mental and moral integrity.	1987	CELAC (2018)
Trinidad & Tobago	The Constitution of the Republic of Trinidad and Tobago	The Republic of Trinidad and Tobago in its Constitution implicitly recognizes, in the context of broader rights, the right to food, to ensure the right to life and fundamental human rights.	1976	CELAC (2018)
Uruguay	The Constitution of the Republic of Uruguay	The Eastern Republic of Uruguay in its Constitution implicitly recognizes, in the context of the broader fundamental rights, the right to food, by ensuring the right to life, and making the State accountable for the legislation on hygiene and health.	1967	CELAC (2018)
	Law N° 18832. Food Unit of Montevideo. Article 2	To contemplate social objectives under the principles of public service, quality assurance and food security, as well as contributing to the consolidation of food sovereignty.	2011	FAO (2013)
Venezuela	The Constitution of The Bolivarian Republic of Venezuela	The Bolivarian Republic of Venezuela in its Political Constitution implicitly recognizes, in the context of the broader fundamental rights, the right to food, making the state the guarantor of the right to life and human rights	1999	CELAC (2018)
	Decree No. 6.701. Organic Law on Food Security and Sovereignty	To guarantee food security and sovereignty, in accordance with the constitutional and legal guidelines, principles and purposes.	2008	FAO (2013)

FNS: Food and nutrition security, in its Spanish acronym.

SISAN: National System of Food and Nutrition Security, in its Spanish acronym.

OECAS: Organizaciones Económicas Campesinas, Indígena Originarias, in its Spanish acronym.

OECOM: Organizaciones Económicas Comunitarias, in its Spanish acronym.

Sources(CELAC et al., 2018), (FAO, 2013b), (FAO, 2018b), (INDERT Paraguay, 2004), (UCLG/CISDP, 2013), (Asamblea Legislativa de la República de Costa, 2017)

Appendix 5. Supporting information for Chapter 8

Appendix 5.2.FAOs programs in LAC between 2002-2014

Country	City	Context	FAO: Achieved goals
Antigua and Barbuda	Saint John	Food production was affected in 2008 due to inflation and the impact of Hurricane Omar. Then the government created the Domestic Horticulture Program, which motivated the construction of gardens.	Currently 280 tons are produced per year, that is, 7% of the country's vegetable production. The goal is to produce 1800 tons of vegetables; for this, the program will have to be considerably expanded and based on the experience acquired to date.
Argentina	Rosario	The city has 1.35 million inhabitants and is the third city in Argentina, as well as one of the most prosperous. After the economic crisis of 2001, the municipal government initiated an urban agriculture program. Since 2004, the city celebrates the Week of Urban Agriculture annually and has been recognized internationally as an example of the good integration of agriculture in urban development.	Currently the number of citizens practicing horticulture is around 1800, of which 250 are full-time producers organized in the Huerteros and Huerteros Network. The vegetables they produce are 100% organic and the gardeners grow on high-yield compost substrates.
Bolivia	El Alto	At the beginning of 2000, 70% of the population of El Alto lived in a situation of poverty and around 40% of children under 5 years of age were malnourished due to the low consumption of animal proteins, fruits and vegetables. FAO and the municipal government of El Alto developed a project to promote the production of vegetables throughout the year in family gardens, which has had a lasting and positive impact on the poorest neighborhoods.	In one year, a typical adobe greenhouse in El Alto produces six harvests of chard and radish, and almost a ton of tomato. Gardeners save an average of \$ 60 per month in the purchase of food and have a profit of \$ 15 for the sale of surplus.
Brazil	Belo Horizonte	<p>Brazil has become the international benchmark for measuring national commitment to food security. Its Zero Hunger program, launched in 2003, made eradicating hunger and fighting poverty key objectives on the domestic agenda. The government adopted a national food security and nutrition policy that recognizes the inalienable right of all citizens to sufficient, good quality food, and implemented it with a combination of emergency measures and programs to redistribute income, boost food production and create employment.</p> <p>At last count, the Secretariat for Nutrition and Food Security's (SMASAN) program for urban and peri-urban agriculture, operational since 1998, had created 185 vegetable gardens and 48 orchards across Belo Horizonte. They include gardens in schools and early childhood centers, three fully commercial gardens, and non-commercial gardens in health and social welfare centers, nursing homes, shelters and other public facilities.</p> <p>The city's 48 community gardens average around 150sq. m and are used to grow leafy vegetables and herbs for home consumption. Cultivation practices are largely organic. One of the most effective tools for promoting urban agriculture in Belo Horizonte has been school gardens, which increased in number from 60 to 126 between 2008 and 2012. Gardens have been established in schools and kindergartens with a total of 96 000 pupils, who spend on average one hour a day caring for the plants.</p>	Belo Horizonte's food and nutrition security system handles some 45 000 tons of food consumed in the city each year. Although the contribution of urban agriculture to that total is small – around 50 tones – the program has had positive impacts. Vegetable consumption has increased among families and students directly involved in gardening, and an estimated 9 000 city residents have access to pesticide-free produce at a reasonable price.
Cuba	La Habana	The collapse of the Soviet Union in 1991. That ushered in Cuba the <i>periodo especial</i> (an extended economic crisis) which led to food rationing and rising rates of malnutrition. With agriculture affected, Havana residents began planting food crops wherever space was available. At first, yields were low, owing to lack of farming experience and inputs. But with strong government support, urban agriculture was rapidly transformed from a spontaneous response to food insecurity to a national priority. <i>Organoponics</i> is a new word added by Havana residents to the urban agriculture vocabulary and has become a pioneer in a worldwide transition to sustainable agriculture. Organoponics – the term applies to both the technology and the garden – can be applied on building sites, vacant lots and	At the end of 2013, Havana had 97 urban gardens, thanks to which 39 500 hectares (half of the city's surface) were allocated to urban agriculture. It is estimated that there are 89 thousand patios and 5100 plots dedicated to production for self-consumption. Production in 2012 included 63 000 tons of vegetables, 20 000 tons of fruit, 10 000 tons of roots and tubers, 10.5 million liters of cow, buffalo and goat milk and 1 700 tons of

		roadsides, and arranged in terraces on sloping land. Soil can be tailored, using specific mixtures, to specific crops. If the soil is affected by nematodes or fungi, the entire substrate can be replaced. If necessary, the gardens can be disassembled and relocated.	meat. some 90 000 Havana residents are engaged in some form of agriculture.
Ecuador	Quito	To the east of Quito, a community garden was created in El Chillo, because although the production of food in the year 2000 was widespread in Quito, thanks to the waves of Andean indigenous migrants, it was not contemplated by the municipal authorities, despite the fact that many of the new inhabitants of the city resorted to small-scale agriculture to feed their families. But thanks to an urban agriculture project throughout the city, Quito is now one of the greenest capitals in the region.	The municipal program provides the neighbors of 32 parishes: seeds, seedlings, supplies, materials and training for the construction of gardens. There were 140 community gardens, 800 family gardens and 128 school gardens. Currently Ecuador is a country free of transgenic corn and the government encourages the production of food.
Honduras	Tegucigalpa	Honduras is among the world's poorest countries and has one of the highest rates of urban poverty in the Latin America and Caribbean region. The capital, Tegucigalpa, is emblematic of the country's urban development challenges. In 2009 four neighborhoods were selected to carry out a project of orchards in the courtyards of the houses. The impact of this project has allowed improving nutrition in the community. Harvests of radish, lettuce, cilantro and cucumber have brought considerable savings in household food expenditures.	By the end of the project in December 2011, more than 1 200 people had been trained in gardening, food security and nutrition. They had also participated in workshops on food preparation, where they learned new ways of preparing and consuming vegetables.
Mexico	Mexico city	The Mexico City metropolitan area is one of the world's largest urban agglomerations, with a population of 9.4 million and covers just 0.1 percent of the national territory, and more than half of it is, at least on paper, protected from urbanization (conservation land). But residential land is increasingly scarce in the urban zone, and the conservation land is under constant pressure: at last count, more than 850 informal settlements had been built there. To prevent further degradation of the area, the government is promoting ecosystem-based agriculture in rural areas and food production in the city itself. Peri-urban agriculture is practiced in boroughs at middle and higher elevations of Xochimilco, Tlalpan, Milpa Alta, Magdalena Contreras, Alvaro Obregon and Cuajimalpa de Morelos, which have the lowest population densities. Plots range in size from 1 to 3 ha and are used for the production of maize, amaranth, nopal, oats, legumes, fruit and vegetables. Closer to the city center, in Xochimilco and Tláhuac, agriculture continues in lowland areas that were, until recently, peri-urban but are now "locked" into medium density suburbs. Holdings are usually of 1 ha or less on chinampas and filled-in canals.	Although 80% of the food consumed in Mexico City is important. Fully urban agriculture is still at an infant stage in Mexico City. There is no widespread tradition of producing food in built-up areas, and the high density of buildings limits the availability of space for agriculture. FAO considers that urban agriculture in the city will gradually increase its production.
Nicaragua	Managua	Among Central American countries, Nicaragua has made the firmest commitment to urban and peri-urban agriculture. The government sees UPA as fundamental to its policies for developing the family economy and for achieving national food security and food sovereignty. The success of the Managua gardening project prompted the Government of Nicaragua to include urban and peri-urban agriculture in its National Human Development Plan (NHDP) for 2012-2016, and to launch a US\$3 million "healthy backyard" program to encourage urban food production.	The Ministry reports that since the program was launched in Managua's Nueva Nicaragua neighborhood in May 2012, it has helped more than 76 000 households establish gardens of fruit trees, leafy vegetables, spices and local plants such as malanga, chayote and achote.
Peru	Lima	Agriculture is practiced in peripheral zones north, east and south of Lima, and most extensively in the districts of Carabayllo, Puente Piedra, Pachacamac, Lurín, Lurigancho Chosica and Ate Vitarte. Although farm sizes range up to 600 ha, about 60 percent of holdings are less than 1 ha and 43 percent are less than 1 000 sq m. Peri-urban farming produces a wide range of crops – mainly vegetables, fruit, ornamental plants, maize and fodder. In 2007, more than 5 000 ha of irrigated land in the Rímac, Chillón and Lurín river basins were being used to grow vegetables for sale in the capital's markets. Production systems are very dynamic, with farmers sowing simultaneously a wide range of short-cycle vegetables to take advantage of changing market demand and practicing continuous crop rotation to optimize land use.	Within the city's built-up area, food production is practiced in family plots as small as 4 sq. m and in community gardens of up to 1 000 sq. m, mainly in the southern districts of Chorrillos, Villa El Salvador and Surco. As well as growing vegetables and fruit, many residents raise guinea pigs and poultry on garden wastes and scraps from the kitchen. Urban farmers use almost no chemicals and irrigate their crops with drinking water. Production is usually for home consumption –

While no reliable data is available on the number or the socio-economic conditions of residents of Lima involved in urban and peri-urban agriculture, it is practiced in areas with generally high rates of poverty. Studies have found that farming families are more likely to have a diversified diet based on fresh, home-grown produce supplemented by purchased foods.

only a few farmers have installed hydroponic systems for the production of high-value vegetables for sale to supermarkets or at organic food fairs.

Source: (FAO, 2014a, 2014d)

Appendix 5. Supporting information for Chapter 8

Appendix 5.3. Some programs, policies, plans and strategies related to FNS in Latin America

FSN: Food and Nutrition Security		
Country	Related programs	Policies, plans and strategies related to FNS
Antigua & Barbuda	<ul style="list-style-type: none"> National school meals program National backyard garden initiative School outreach program Support for women in agriculture for increased productivity 	<ul style="list-style-type: none"> Plan of action 2013–2014 for the Zero hunger challenge The national food production plan National poverty reduction strategy 2011 - 2015 food and nutrition security policy
Argentina	<ul style="list-style-type: none"> Pro-orchard program program for inclusive rural development Food and nutrition educational program Project of integration of small producers to the wine chain Community approach program Project families and nutrition Program of rural development and family agriculture National program of reduction of food loss and waste Less salt initiative, more life Program of development of agroproductive areas in border provinces in the Plata basin. First stage. 	<ul style="list-style-type: none"> National Plan for Food Security (PNSA) Healthy argentine plan Strategic plan of continuing education: innovation and employment. Argentina 2020 National first child plan
Bahamas	<ul style="list-style-type: none"> Food assistance for families National lunch program Food assistance for older persons Food assistance for persons with disabilities 	
Barbados	<ul style="list-style-type: none"> School meals program Agricultural inputs 	<ul style="list-style-type: none"> Agreement on port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing The Barbados sustainable development policy
Belize	<ul style="list-style-type: none"> School feeding program Sugar cane replanting program Food pantry program Basic needs trust fund Building opportunities for our social transformation initiative 	<ul style="list-style-type: none"> National agriculture and food policy 2015-2030
Bolivia	<ul style="list-style-type: none"> Multi sector program of food and nutrition in the cycle of life Nutritional food education program Nutritional complement for the elderly Universal prenatal subsidy 	<ul style="list-style-type: none"> Social protection and community integral development policy Policy for development with identity of the camelli sector National policy of the quinoa Food and nutrition policy in the framework of knowledge feeding to live well Plan of economic and social development in the framework of integral development for good living 2016-2020
Brazil	<ul style="list-style-type: none"> Single system of attention to the sanitary agriculture Network of public food and nutrition equipment (popular restaurants, food banks and community kitchens) National school food program Worker food program National iron supplementation program National program of supplementation of vitamin a School health program 	<ul style="list-style-type: none"> National food and nutrition security policy Minimum price guarantee policy Strategy for fortification of children's food with powder micronutrients
Chile	<ul style="list-style-type: none"> Healthy lifestyle Adult supplementary supplement program Healthy life and obesity National program of complementary feeding Healthy schools for learning Chile grows with you School feeding program 	<ul style="list-style-type: none"> Health promotion program Subsystem of protection and social promotion National food and nutrition policy
Colombia	<ul style="list-style-type: none"> School feeding program Children's breakfast with love 	<ul style="list-style-type: none"> National food and nutritional security policy National strategy of integral attention to the first childhood

		<ul style="list-style-type: none"> • Mission for the transformation of the Colombian field
Costa Rica	<ul style="list-style-type: none"> • Food and nutrition program for school children and youths • Providing health services for "child development and nutrition" program • Program for the construction of child care and development centers – maintenance of education and nutritional centers – comprehensive centers for child nutrition • National orchards program • Campaign 5 a day for your life • Food guides for Costa Rica 	<ul style="list-style-type: none"> • National policy on food and nutrition security 2011-2021 • Public breastfeeding policy • National food and nutrition policy 2006-2010 • National policy for integrated waste management 2010 - 2021 • National plan of physical activity and health 2011-2021 • National plan for the reduction of salt / sodium consumption in the population of Costa Rica 2011-2021 • State policy for the agri-food sector and rural development for Costa Rica 2010-2021 • Agricultural sectorial plan for gender and rural youth 2011-2014
Cuba	<ul style="list-style-type: none"> • Integral mountain development program • urban and suburban agriculture program 	<ul style="list-style-type: none"> • National action plan for nutrition • Food security policy • Agreement on measures of the governing state directed to prevent, discourage and eliminate illegal, unreported and unregulated fisheries
Dominica	<ul style="list-style-type: none"> • School feeding program 	<ul style="list-style-type: none"> • Growth and social protection strategy 2014 - 2018 • Agreement on port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing
Dominican Republic	<ul style="list-style-type: none"> • School feeding program • State economic dining rooms 	<ul style="list-style-type: none"> • National STRATEGIC NUTRITION PLAN 2013-2016 • Government plan 2012-2016 • Quisqueya strategy • Sectoral strategic plan for agricultural development 2010-2020
Ecuador	<ul style="list-style-type: none"> • Comprehensive nutritional food project • Comprehensive care program for the elderly • School feeding program • Program of children's centers of good living • Program of control of the disorders for deficiency of iodine • Program growing with our children • Project for the promotion of healthy foods • Home fortification program for the decrease of nutritional anemias and malnutrition in children under 5 years old • The Participatory Urban Agriculture Project (AGRUPAR) program 	<ul style="list-style-type: none"> • Feed Ecuador • Inter-sectoral strategy for early childhood in Ecuador
El Salvador	<ul style="list-style-type: none"> • Program "Muévete" 	<ul style="list-style-type: none"> • National policy on food security and nutrition 2011-2015 • National health policy "building hope" 2009 - 2014 • National policy for protection, promotion and support for breastfeeding • Family farming and rural entrepreneurship plan for food and nutrition security • National health policy 2015-2019
Grenada	<ul style="list-style-type: none"> • School feeding program • Needy assistance program 	
Guatemala	<ul style="list-style-type: none"> • My safe cafeteria • My safe bag • Community homes program • School breakfast program • 1000-day window program • Food assistance program • My food (pilot plan) • Food and nutritional security program 	<ul style="list-style-type: none"> • National food and nutritional security policy • National integral rural development policy • Social development policy and population • Policy of conservation, protection and improvement of the environment and natural resources
Guyana	<ul style="list-style-type: none"> • Basic nutrition program 	
Haiti	<ul style="list-style-type: none"> • Panyè solidarite 	<ul style="list-style-type: none"> • National plan for food and nutrition security • National program to fight hunger and malnutrition • Triennial agricultural recovery program 2013-2016 • National agricultural investment plan 2010-2016 • National strategic plan for nutrition 2013 - 2018

		<ul style="list-style-type: none"> • Agricultural development policy 2010-2025
Honduras	<ul style="list-style-type: none"> • Solidary dining rooms • Healthy schools program • Better families program • Honduras program because 	<ul style="list-style-type: none"> • Policy for long term food and nutrition security • Public policy for comprehensive development of early childhood • State policy for the agri-food sector and rural environment of Honduras • Public policy for the exercise of the rights of persons with disabilities and their social inclusion in Honduras • National health plan 2014-2018
Jamaica	<ul style="list-style-type: none"> • Jamaica banana accompanying measures project • Praedial larceny prevention coordination program • Promoting community-based climate resilience in the fisheries sector • School feeding program • Poverty reduction program 	<ul style="list-style-type: none"> • National infant and young child feeding policy • National strategic and action plan for the prevention and control non-communicable diseases in Jamaica • National sport policy
Mexico	<ul style="list-style-type: none"> • Rural supply program • Program of social supply of milk • School breakfast program • Community dining program • Food care program for children under 5 years of age at risk, not schooled • Food assistance program for vulnerable subjects • Food assistance program for families in dismissal • National program of physical activation • Social coinversion program • Program of children's stays to support working mothers 	<ul style="list-style-type: none"> • Specific action program: food and physical activity 2013-2018 • Specific action program: promotion of health and social determinants 2013-2018 • National breastfeeding strategy 2014-2018
Nicaragua	<ul style="list-style-type: none"> • Comprehensive school nutrition program • Love program for more chiquitos and chiquitas • Food program for the people 	<ul style="list-style-type: none"> • Food and nutritional security and sovereignty policy from the agricultural and rural public sector • National human development plan • National policy for early childhood • "towards the eradication of chronic malnutrition in children in Nicaragua 2008-2015" national plan
Panama	<ul style="list-style-type: none"> • School meals • Food solidarity program • Nutritional health program • Rice fortification program • Community kitchens 	<ul style="list-style-type: none"> • National policy for agricultural transformation • National plan for combating child malnutrition 2008-2015
Paraguay	<ul style="list-style-type: none"> • Comprehensive nutritional food program • Program of control and prevention of disorders for iodine deficiency • Support project to community organization dining rooms • School feed programs 	<ul style="list-style-type: none"> • National development policy of the sustainable aquaculture of Paraguay • Iii national plan of equal opportunities between men and women • Proposal of public policy for social development 2010-2020
Panama	<ul style="list-style-type: none"> • National program cot plus • Food complementation program • National program worthy life • National integral program for family welfare 	<ul style="list-style-type: none"> • Plan of risk management and adaptation to climate change in the agrarian sector period 2012-2021
Paraguay	<ul style="list-style-type: none"> • Comprehensive nutritional food program • Program of control and prevention of disorders for iodine deficiency • Support project to community organization dining rooms 	<ul style="list-style-type: none"> • Proposal of public policy for social development 2010-2020 • National development policy of the sustainable aquaculture of Paraguay • Iii national plan of equal opportunities between men and women
Peru	<ul style="list-style-type: none"> • Food complementation program • National integral program for family welfare • National program cot plus • National program worthy life 	<ul style="list-style-type: none"> • Plan of risk management and adaptation to climate change in the agrarian sector period 2012-2021
Dominican Republic	<ul style="list-style-type: none"> • School feeding program • State economic dining rooms 	
Saint Kitts & Nevis	<ul style="list-style-type: none"> • St. Kitts school feeding program 	
Saint Vincent and the Grenadines	<ul style="list-style-type: none"> • Nutrition support program • School feeding program 	
Saint Lucia	<ul style="list-style-type: none"> • School feeding program 	<ul style="list-style-type: none"> • National food production action plan
Suriname		<ul style="list-style-type: none"> • Paris agreement

Trinidad and Tobago	<ul style="list-style-type: none"> • School nutrition program 	<ul style="list-style-type: none"> • National food production action plan 2012-2015
Uruguay	<ul style="list-style-type: none"> • School feeding program • Uruguay grows with you • Nearby program • National nutrition program 	
Venezuela	<ul style="list-style-type: none"> • Food mission • School feeding program • Nutrition for life program • Program of family and school agriculture • Project of integral and sustainable development for the arid zones of the states Nueva Esparta and Sucre • Project of integral socio-productive care with a chain approach • Strategy active and nutritive labor space • Nutri-point program 	<ul style="list-style-type: none"> • National plan of human rights 2016-2019
Source: (CELAC et al., 2018)		

Appendix 5. Supporting information for Chapter 8

Appendix 5.4. Natural hazard and / or social-political problem in LAC

County		Natural hazard and / or social-political problem	Year
Antigua Barbuda	y	<ul style="list-style-type: none"> • High food price inflation • Hurricane Omar 	2008
Argentina		<ul style="list-style-type: none"> • 60% of the population had incomes below the poverty line and 30 % were living in extreme poverty • High food price inflation 	2001
Bolivia		<ul style="list-style-type: none"> • 70 % of the population lived in poverty • 40 % of children under five years were malnourished 	2000
Brazil		<ul style="list-style-type: none"> • High rates of poverty and hunger 	1990
Cuba		<ul style="list-style-type: none"> • Extended economic crisis which led to food rationing and rising rates of malnutrition (<i>Periodo especial</i>) 	1991
Ecuador		<ul style="list-style-type: none"> • High indices of migration from rural areas to the city • High rates of food insecurity and malnutrition 	1980-2000
Honduras		<ul style="list-style-type: none"> • High indices of migration from rural areas to the city • High rates of food insecurity and malnutrition 	Since 1970
Mexico		<ul style="list-style-type: none"> • Exponential growth of the city 	1970-2000
Nicaragua		<ul style="list-style-type: none"> • High rates of food insecurity and malnutrition 	2010
Peru		<ul style="list-style-type: none"> • High indices of migration from rural areas to the city • High rates of food insecurity and malnutrition 	Since 1950
Source: (FAO, 2014a)			

Appendix 6. Supporting information for Chapter 9

Appendix 6.1. Main characteristics of Quito metropolitan district.

Characteristic	Value	Reference
Altitude range	1200-4000 mamsl	<i>EPM-METROQUITO, 2012, MDMQ, 2012</i>
Precipitation in dry season (June to September)	20,2 to 27 mm/month	(INAMHI, 2015)
Precipitation in rainy season (October to May)	126,2 to 162,2 mm/month	<i>INAMHI, 2015</i>
Climate zones	15 (Holdridge map)	<i>EPM-METROQUITO, 2012</i>
Temperature range	(-4 C to 22 °C)	<i>INAMHI, 2015</i>
Average temperature in the urban area	16 °C	<i>MDMQ, 2012</i>
Urban population	1,6 millions	<i>INEC, 2010</i>
Annual growth index	1,5%	<i>INEC, 2010</i>
Population density	92 inhabitants/ha	<i>INEC, 2010</i>
Rooftop composition	75, 32% reinforced concrete 24,68% others	<i>INEC, 2010</i>

Appendix 6. Supporting information for Chapter 9

Appendix 6.2. Socio-economic indicators of the study area

Indicator	Value	Reference
Population	8,862 inhabitants	<i>INEC, 2010; MDMQ, 2011</i>
Surface	63.29 ha	<i>INEC, 2010; MDMQ, 2011</i>
Housing built	3,490	<i>INEC, 2010; MDMQ, 2011</i>
Population density	110.5 inhabitants/ha	<i>INEC, 2010; MDMQ, 2011</i>
Population men	4,273 inhabitants	<i>INEC, 2010; MDMQ, 2011</i>
Population women	4,589 inhabitants	<i>INEC, 2010; MDMQ, 2011</i>
Population under 5 years	366 inhabitants	<i>INEC, 2010; MDMQ, 2011</i>
Economically active population	6,080 inhabitants	<i>INEC, 2010; MDMQ, 2011</i>
Unemployment rate	3.8%	<i>Larrea, 2009</i>
Chronically undernourished children	32.4% - 35.3%	<i>Larrea, 2009</i>

Appendix 7. Supporting information for Chapter 11

Appendix 7.1. Survey: urban agriculture and social housing

PERCEPCIÓN SOCIAL EN RELACION A LA VIVIENDA Y LA AGRICULTURA URBANA EN MÉRIDA, YUCATÁN

pag 1

Buenos días, tardes. Sería tan amable de ayudarnos a responder una encuesta sobre la vivienda económica y su relación con la agricultura urbana. La encuesta forma parte de la investigación realizada para una tesis doctoral de la universidad Autónoma de Barcelona y cuenta con el apoyo de la Universidad Autónoma de Yucatán y CONACYT.

Información general

1. Edad: <15 15-20 40-45 20-25 45-50 25-30 50-55 30-35 55-65 35-40 >65	3. Lugar de residencia anterior a la vivienda actual Rural Urbano	5. Situación laboral: Trabaja por cuenta propia Ocupado contrato fijo Ocupado contrato temporal Desempleado Labores del hogar Jubilado Estudiante Ns/Nc Otro:
2. Sexo: M F	4. Grado de escolaridad: Sin escolaridad Primaria Secundaria Preparatoria Carrera técnica Licenciatura Posgrado Otro:	
6. ¿Cuántos autos posee la familia? 0, 1, 2, 3, 4, +4		

Vivienda

7. N° de habitantes de la vivienda: 1, 2, 3, 4, 5, 6, >6	10. N° de espacios de la vivienda: Recamaras 1, 2, 3, 4, >4 Cocina 1, 2, 3, 4, >4 Baño 1, 2, 3, 4, >4 Sala 1, 2, 3, 4, >4 Garaje 1, 2, 3, 4, >4 Corredor trasero 1, 2, 3, 4, >4 Otro:	12. Cultivo En caso de poseer un patio trasero ¿Qué uso tiene? Jardinería ornamental Piscina Secar ropa Recreación Otro:
8. N° años de residir en la vivienda: +12 12 11 10 9 8 7 5 -5	11. M ² de construcción de la vivienda: <50 () 50-60 () 60-70 () 70-80 () 80-90 () >100 ()	13. Cultivo En caso de poseer un patio delantero ¿Qué uso tiene? Jardinería ornamental Piscina Secar ropa Recreación Guardar el automóvil Otro:
9. Régimen de tenencia de la vivienda: En propiedad Alquilada Hereditada Ns/ Nc Otra situación(cedida)		

14. En términos generales, ¿Cuál es su grado de satisfacción con la vivienda: Alto Medio Bajo Ns/Nc	19. ¿Cuáles son las razones por las que no ha modificado, ampliado o rehabilitado su vivienda? Los espacios son adecuados para el n° de personas Los espacios poseen dimensiones adecuadas Falta de medios económicos La vivienda no es propia Ns/Nc Otro:
15. ¿considera que el tamaño del lote o terreno es adecuado para sus necesidades? Sí ¿Por qué? No	20. En el futuro, ¿tiene interés en rehabilitar o modificar su vivienda? Sí (Pregunta 21) No (Pregunta 22) 20. En el futuro, ¿Cuáles serían los motivos para realizar una modificación, ampliación o rehabilitación de la vivienda? Falta de espacios en razón del número de habitantes Los espacios de la vivienda son muy pequeños Para aumentar a plusvalía de la vivienda Tendría mejores ingresos económicos y podría pagarlo Ns/Nc Otro:
16. ¿Ha modificado, ampliado o rehabilitado su vivienda? Sí (Pregunta 17 y 18) No (Pregunta 19 y 20)	21. En el futuro, ¿Cuáles serían los motivos para realizar una modificación, ampliación o rehabilitación de la vivienda? Los espacios son adecuados para el n° de personas Los espacios poseen dimensiones adecuadas Para aumentar a plusvalía de la vivienda Falta de medios económicos La vivienda no es propia Ns/Nc Otro:
17. ¿Cuáles son las razones por las que ha modificado, ampliado o rehabilitado su vivienda? Los espacios eran insuficientes Los espacios poseen dimensiones muy pequeñas Para aumentar la plusvalía de la propiedad La vivienda no tenía garaje Por seguridad Otro:	
18. Enliste en orden de construcción los espacios que ha modificado o ampliado en su vivienda: Recámara () Cocina () Baño () Sala () Garaje () Corredor trasero () Piscina () Estudio () Otro:	

Agricultura urbana (AU)

Ahora pasaremos a la parte de la encuesta que trata sobre la agricultura urbana. La agricultura urbana es el cultivo de vegetales o frutas dentro de la ciudad, ya sea para consumo o venta.

22. ¿Sabe usted como cultivar vegetales o frutas? Sí No	26. En el pasado ¿ha practicado la AU en su vivienda? Sí ¿en cuál espacio? No	30. Considera que su vivienda y terreno son adecuados para la practica de la AU? Sí No ¿Por qué?	34. ¿Qué prefiere: patio trasero para cultivar o un porche trasero de concreto? Patio trasero Porche trasero	38. ¿Cuál es el destino de su producción? Consumo Venta Donación Intercambio Otro:	39. ¿Qué forma de AU practica? Huerto tradicional (patio trasero) Huerto tradicional (patio delantero) Macetas dentro de la vivienda Macetas fuera de la vivienda Otra :
23. ¿Tiene usted milpa? Sí ¿Dónde? No	27. En la actualidad ¿practica la AU en su vivienda? Sí ¿en cuál espacio? No	31. Enliste las características físicas que usted considera debe tener la vivienda para la practica de la AU:	35. ¿Usted compraría o viviría en una vivienda que estuviera diseñada para facilitar la practica de la AU? Sí No	40. ¿Qué especies cultiva y que cantidad?	
24. ¿Qué cultiva en su milpa? Papaya Cítricos Maíz Tomate Frijol Chile Otro:	28. En el futuro le gustaría practicar la AU en su vivienda? Sí ¿en cuál espacio? No	32. Teniendo en cuenta su experiencia ¿Cuáles son los espacios de las viviendas como la suya, que considera con más potencial para la practica de la AU? *No dar las opciones, solo marcarlas Patio trasero Jardín frontal Paredes Techo Macetas interiores Macetas exteriores Ns/Nc Otro:	36. ¿Cuál es su rango de ingresos mensual? <3mil pesos 3-4 mil pesos 4-5 mil pesos 5-6 mil pesos 6-7mil pesos 7-8mil pesos 8-9mil pesos 10mil o más pesos	41. ¿Que mejoras le apoyarían en la practica de la AU? Apoyo financiero Apoyo del gobierno Plantas donadas por alguna institución Cursos Ferias de semillas Áreas de venta o intercambio de producto Otro:	
25. ¿Tiene algún familiar que practique la agricultura o que tenga una formación relacionada? Sí ¿Quien? No	29. En el caso de contar con los medios económicos ¿modificaría su vivienda para poder practicar la AU? Sí No		37. ¿Cuál es su gasto semanal en alimentos? <500 pesos 500- mil pesos 1-2 mil pesos 2-3 mil pesos Más de 3mil pesos	42. Su sistema productivo, ¿presenta problemas? No presenta Espacio Agua Acceso Problemas con vecinos Vandalismo Plagas Sol Otro:	
				43. ¿Que tecnología de riego utiliza? Riego por goteo Hidroponía Riego tradicional Aspersores Otro: 43. ¿Que tipo de fertilizante utiliza? No utilizo Orgánicos (abono, compostaje) Químicos Una mezcla de ambos 44. ¿utiliza alguna sustancia para el control de plagas? Sí No ¿Cuál?	

pag 2