



Swedish University of Agricultural Sciences
Faculty of Natural Resources and Agricultural Sciences
Department of Food Science

Improving peri-urban home gardens in Hyderabad, India

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Abstract

Insufficient intake of vegetables is a reason for micronutrient deficiencies and malnutrition in developing countries. With urbanization, globalization and a growing world population it is of major importance to secure sufficient food supply for the world's population. Part of the solution to increased food security among the world's poor could be the introduction of vegetable home gardens, plots for small scale vegetable production which can provide households with sufficient vegetables as well as serve as an extra income source.

The study *Improving peri-urban home gardens* aims at examining the existence of vegetable home gardens in the peri-urban areas of Hyderabad, India. The impact from these home gardens on vegetable consumption and food security for peri-urban as well as for urban population is to be determined.

In addition, the study tries to understand what driving forces occur through the value chain of peri-urban vegetable production. This will as well give knowledge about the inputs used in vegetable production systems and how the inputs affect the consumers' purchasing habits.

The study was performed in a qualitative manner through interviews with farmers, consumers and traders. For each type of respondent group a specific questionnaire was designed. The results were analyzed and interpreted after which a field visit to rural areas in the state of Jharkhand was done for comparison of rural and peri-urban home gardens.

The results showed that home gardens are rare in peri-urban areas of Hyderabad, mainly due to lack of space. Hence, the home garden produce doesn't have a significant impact on either vegetable sustenance systems in the area or vegetable consumption. Education on nutritional value of vegetables as well as on input usage in commercial vegetable production seems to be needed.

Respondents in the study are not significantly interested in vegetable production systems and the usage of chemical inputs. More concerns are put on factors such as price and freshness of vegetables. Still the study shows some indications on concerns about health and inputs to some extent.

In contrast to the peri-urban areas in Hyderabad the home gardens found in rural areas played a significant role for the poor population. They served as a major source of vegetables and in many cases even as an important source of income.

Home gardens could possibly gain more attention and interest from the population in peri-urban Hyderabad if more nutritional information was available. More research on the topic is also necessary for further home garden improvement in urban and peri-urban areas.

Sammanfattning

Brist på mikronäringsämnen och undernäring beror i utvecklingsländer ofta på otillräckligt intag av grönsaker. I tider med pågående urbanisering, globalisering och växande befolkning är det av stor vikt att säkra livsmedelsförsörjningen för världens svältande population. En del av lösningen på ökad livsmedelssäkerhet för världens fattiga kan vara att introducera *home gardens*, småskalig odling på mindre ytor som kan förse hushåll med grönsaker och dessutom fungera som en extra inkomstkälla.

Studien *Improving peri-urban home gardens* undersöker förekomsten av *home gardens* i de peri-urbana områdena runt Hyderabad, Indien. Även påverkan av dessa *home gardens* på grönsakskonsumtion och livsmedelssäkerhet bland befolkningen i peri-urbana såväl som urbana områden har studerats. *Home gardens* i peri-urbana områden har med hjälp av dessa resultat jämförts med *home gardens* på landsbygden i Jharkhand, en stat i nordöstra Indien.

Studiens mål är dessutom att förstå vilka drivkrafter som ingår i värdekedjan för peri-urban grönsakskonsumtion och konsumtion. I och med detta kommer även information om användning av insatsmedel i grönsaksproduktionen samt hur dessa påverkar konsumenternas inköpsvanor.

Improving peri-urban home gardens är en kvalitativ studie som inbegriper intervjuer med lantbrukare, konsumenter och grönsaksförsäljare. För varje typ av respondent utformades ett specifikt frågeformulär. Resultaten från dessa analyserades och tolkades varpå ett studiebesök gjordes för att jämföra *home gardens* på landsbygden med resultaten från Hyderabad.

Resultaten från intervjuerna visar att *home gardens* är sällsynta i det undersökta peri-urbana området i Hyderabad, detta huvudsakligen på grund av brist på utrymme. Grönsaker från *home gardens* tycks således spela en väldigt liten roll för grönsaksförsörjningen i området. Utbildning om grönsakers näringsmässiga fördelar samt om insatsmedel som används tros behövas för att fördelarna med *home gardens* ska klargöras.

Till skillnad från Hyderabads peri-urbana områden visade studiebesöket i Jharkhand att *home gardens* kan ha stor betydelse för den fattiga landsbygdsbefolkningen. Förutom att deras *home garden* fungerar som källa till näringsämnen kan den även tjäna som en extra inkomstkälla.

Deltagarna i studien var relativt ointresserade av hur grönsaksproduktionen fungerar och vilka insatsmedel som används. Faktorer som pris och kvalitet är betydligt mer angelägna vilket kanske beror på rådande vattenbrist vid tidpunkten då intervjuerna utfördes. Resultaten indikerar dock att en viss oro för hälsan relaterat till användning av insatsmedel förekommer hos respondenterna.

Studiens slutsats är att *home gardens* skulle kunna erhålla mer uppmärksamhet och intresse i området om mer kunskap om grönsakers näringsmässiga fördelar funnits. Avslutningsvis bör sägas att mer forskning på området är nödvändig för en generellt gällande slutsats samt fortsatt utveckling av *home gardens* i Hyderabads peri-urbana områden.

List of abbreviations

AVRDC	1971-1992: Asian Vegetable Research and Development Center. 1992-present: The World Vegetable Center
CGIAR	Consultative Group on International Agricultural Research
FAO	Food and Agriculture Organization of the United Nations
ICRISAT	International Crops Research Institute for the Semi-Arid Crops
IWMI	International Water Management Institute
MFS	Minor Field Study
PRA	Participatory Rural Appraisal
SIDA	Swedish International Development Cooperation Agency

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1 Introduction

The initial chapter of this report provides the reader with background information about the project, a presentation of the problem and lastly the aim of the project.

1.1 Background

The world's population is estimated to increase from 6.7 billion in 2007 to 9.2 billion in 2050. Most of this growth is expected to occur in the urban areas of developing countries and 70 percent of the world population will probably live in urban areas in 2050. The future world population which will grow and urbanize at the same time challenges agriculture and this concentrated food demand must be met from rural and peri-urban areas. At the same time the peri-urban agricultural production areas are threatened to be crowded out by expanding cities (FAO 2009). A peri-urban area is defined as the area at the border of a city that is in the process of converting from rural to urban area (Gerstl 2001).

In India FAO has observed an increase in the urban population of 0.8 percent annually since 1990 (FAO 2010). Rapid urbanization tends to threaten food security if it is outstretching the capacity of the cities, which is often the case in today's developing countries (FAO 2009). Food security is defined by FAO as

“a situation that exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”(FAO 2009:4).

In developing countries such as India, food security is of high importance since a large percentage of the population is poor and a high share of household expenditure is used for food purchases (FAO 2003). The poverty rate of India is estimated to 27.5 percent, and 19 percent of the population is undernourished (FAO 2010). Anthropometric indicators of nutrition in India are among the worst in the world and the improvement of these measures has not followed the high rate of economic growth in India as expected (Deaton & Dreze 2009). Although the world seems to be adequately fed by staples today, good health is impossible as long as “the hidden hunger” of malnutrition is still present, in other words the micronutrient deficiencies. Diseases related to imbalanced diets cause 2.7 million deaths worldwide every year and are one of the top mortality risk factors (AVRDC 2011).

One way of responding to future food demands as well as to the hidden hunger can be the ancient food production strategy of home gardening. This food production system has been more or less overlooked during the industrialization of agriculture and the green revolution, but has gained attention again from development agencies since the 1980s. Home gardens include the mixed cropping of fruits, vegetables, trees and condiments that serve as supplementary sources of food and income (AVRDC 1991). The home gardens vary in size and complexity from a small creeper growing on a fence to large organized cultivation plots. The distance between residence and home garden can differ from just next to the residence to kilometers away (Satish *et al* 2009). Small plots can provide food and improve the nutrition of rural families as well as increase options for income generating activities, and raise a household's status in a community (RDI 2006).



Figure 2. Home garden in a rural village in Jharkhand. Private photo.



Figure 1. Home gardeners in Jharkhand during harvesting. Private photo.

Evidence from Asian countries has shown that home gardens in combination with nutrition education can make a highly profitable contribution towards nutrition improvement among poor rural households. Figure 1 and 2 show examples of home gardens. The diversified diet can reduce malnutrition and improve health especially among children under the age of five and women in reproductive age (RAP 2006). Home gardens can also contribute to empowering women since selling of home garden produce can be one of few independent income opportunities for a woman as well as giving her status and the possibility of showing skills and capability (RDI 2006). In developing countries, women often have limited resource access and at the same time culture and society prevent them from working activities. Additionally, since women mostly determine the family's diet their knowledge about food production directly enhances the nutrition and health in the household (AVRDC1991). Home gardens can provide improved nutrition and health status as well as an additive income either through selling the produce or from the indirect savings because of reduced purchase and health care costs (RAP 2006). The Government of India stated in the five year plan of 2002-2007 the following:

“Ownership of even a small plot of land enables a family to raise its income, improve its nutritional status, have access to credit facilities and lead a more dignified life” (GOI 2002:3.2.71).

The study *Improving peri-urban home gardens* was carried out under the Minor Field Study (MFS) scholarship funded by the Swedish International Development Cooperation Agency (SIDA). The study is a joint project between AVRDC, The World Vegetable Center and IWMI, International Water Management Institute at ICRISAT campus in Hyderabad, India (Figure 3).

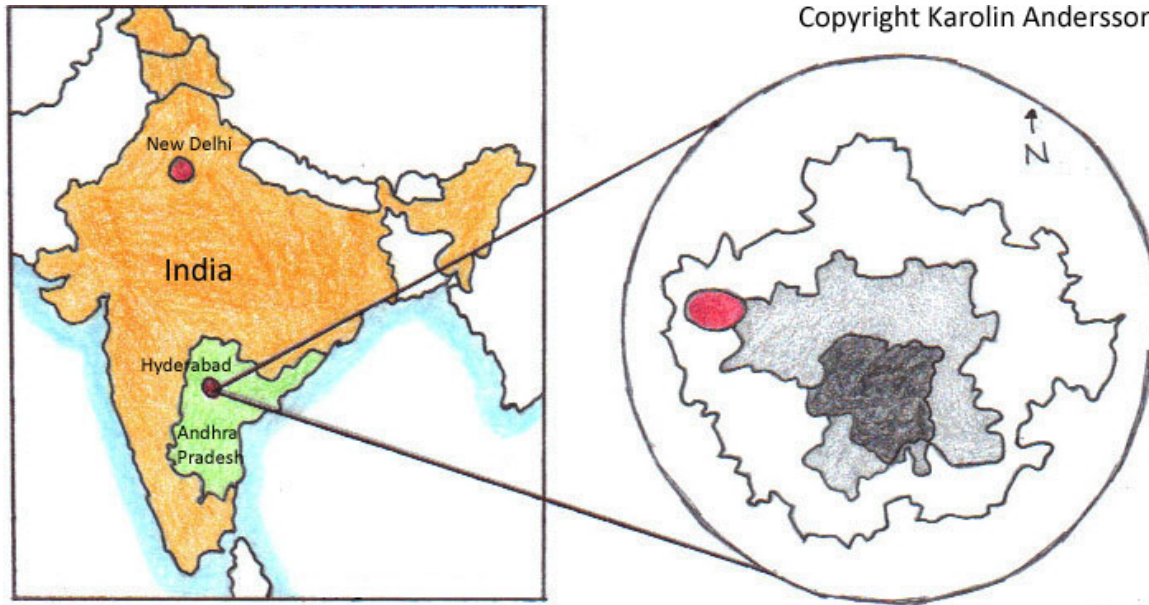


Figure 3. The location of Hyderabad in India to the left and the city of Hyderabad to the right. The white parts denote the peri-urban areas. The red dot shows where the study took place (GHP 2010, HUDA 2003).

AVRDC – The World Vegetable Center is an international research and development institution with the aim to alleviate poverty and malnutrition in the developing world through the increased production and consumption of safe vegetables. The institute is independent and non for profit founded in 1971 with an original mandate to work in tropical Asia, but expanded its work to south Asia, sub-Saharan Africa and Latin America after 1992. The headquarters are located in Taiwan and the regional offices are in Bangkok (Thailand), Hyderabad (India), Arusha (Tanzania) and Dubai (United Arab Emirates) (AVRDC 2012). Its goal is to shift parts of the focus from research on staple foods in developing countries towards a “Revolution with Greens” meaning research and development to promote vegetable production and consumption to reduce micronutrient deficiency (AVRDC 2011).

IWMI – International Water Management Institute is a non for profit organization with the primary focus on agricultural water management with the aim of improving livelihoods and poverty alleviation. The headquarters are in Sri Lanka and there are ten regional offices in Asia and Africa. IWMI conducts research on finding efficient ways to increase water productivity and water resources for food production. IWMI is part of the CGIAR, the Consultative Group on International Agricultural Research (IWMI 2012).

1.2 Problem

Population growth in combination with urbanization challenges agriculture to meet the food demand of people concentrated to specific areas, and these needs must be met by surrounding rural and peri-urban areas. Peri-urban areas often play a significant role in the food supply of cities but urbanization also threatens to crowd them out (FAO 2009). Social, political, ecological and economic issues strongly affect the development of urban and peri-urban agriculture, which continuously adapts to rapidly changing conditions. The farming systems in the areas are diverse and multi-functional – apart from food supply and income generation, they play a role in shaping urban environments, enhancing biodiversity and providing landscape management and

recreational services. This strongly motivates the development of peri-urban as well as urban agriculture in the work of long-term sustainable urban development (FAO 2007).

In India the rate of undernourished among the population is 19 percent (FAO 2010) and 48 percent of all children are stunted (FAO 2009). Improved vegetable consumption is a sustainable solution to overcome micronutrient deficiencies and provide for a diversified and balanced diet. Under circumstances when vegetables are seen as a luxury, home gardens can be a way to increase the availability of vegetables among poor people. In rural areas, home gardens have been shown to be providers of a food safety net and the question is if these home gardens can also play a part as food suppliers in peri-urban areas. Urban and peri-urban agriculture jointly have the potential to complement rural agriculture and increase the efficiency of national food systems, which could give contributions to sustainable urban development from social, economic and ecological aspects (FAO 2007).

1.3 Aim

The overall goal in the study *Improving peri-urban home gardens* was to survey the existence of vegetable production in home gardens in the peri-urban area of Hyderabad. This in an attempt to find out what role the home gardens played and how they impacted vegetable consumption and food security for the people living in both peri-urban and urban areas. The findings were compared with home gardens in the rural areas of the north east Indian state of Jharkhand where there had been a large impact of home gardens on providing diets and incomes (Satish *et al* 2009).

Knowledge about the peri-urban vegetable production and marketing systems was to be gained through interviews with farmers, consumers and traders in attempt to follow and analyze the value chain. The interviews attempted to understand the drivers of the value chain as well and the degree to which the vegetable production systems and its inputs affected the consumers' purchases. Finally the interview results were analyzed together to try to come to a conclusion about the viability of home gardens and to what extent they may contribute to the vegetable resources in the peri-urban area of Hyderabad.

2 Theory background of methods used

In this chapter, theoretical information will be described. Important parts of qualitative studies, such as sampling and ethical limitations are explained, and Participatory Rural Appraisal is shortly described.

2.1 A qualitative study

In a qualitative field study, the aim is to explore and understand contextual human issues. A holistic approach is undertaken, and the study should be flexible and adaptive to changes or deviations during the process. In contrast to a quantitative study where a predetermined hypothesis is tested through generalizable questions, a qualitative study is concentrated on humanistic questions with theory progressively refined based on the findings from the study. In addition, the questions in a qualitative study should be general, and allow for further probing, leaving room for nuances and varying perspectives of the respondents, whereas quantitative questions ought to be more closed and generalized (Marshall 1996).

2.1.1 Strategies of sampling

In quantitative studies, the sampling aims at drawing a representative group from a population to be able to generalize the results from the study back on the whole population. However, in qualitative investigations that include simple questions it is preferable with relatively small samples (Marshall 1996), which this study is considered to have.

There are three distinct strategies of sampling in qualitative studies. In *convenience sampling* the selection is based on the most accessible respondents. It takes little effort from the researcher in case of both time and money, but the results may be of poorer quality and may lack intellectual credibility. A common and more carefully prepared strategy is *judgment sample*. The sampling is based on the researcher's practical knowledge of the research area, literature about the topic and iteratively during the actual study. Respondents are actively chosen based on their productivity, and this strategy promotes a broad group of respondents. Respondents included in judgment sampling can with advantage be used in a concept called the *snowball sample approach* (Marshall 1996), which has been used in this study. In snow ball sampling, a key informant (person with particular knowledge) is asked to recommend a friend or other person who might be useful for the study. The recommended person thereafter suggests a new potential respondent and so on. This generates a growing "snow ball" of respondents (Goodman 1961). The last strategy is *theoretical sampling*, and requires that interpretative theories are made from the emerging data. New respondents are selected to elaborate on these theories. In the majority of all qualitative studies these strategies overlap to some extent, as they do in this study. During sampling, it is important to take into account not only individual but also spatial, situational and temporal characteristics (Marshall 1996).

2.1.2 Problems in qualitative fieldwork

In all qualitative studies, the researcher must keep in mind the possible problems that can arise and have an impact on the results and trustworthiness of the study. Qualitative research examines complex social and humanistic issues, and fieldwork automatically raises ethical problems and dilemmas. The fieldwork requires face-to-face contact between researcher and participants and the outcome of the results is dependent on how the relationship between the two parts develops (de Laine 2000). It is important to avoid a detached, impersonal approach

but instead adopt a behavior towards the respondents that puts the researcher in an integral part of the discussions (Marshall 1996). Through this approach the respondents can feel more comfortable and the answers are more likely to be true. However, a widespread problem in all anthropologic and social studies is the differences in ethnical origin, culture and social behavior that often occur between researcher and participants. In India, the caste system is deeply rooted in the society and it includes social functions an outsider can never understand. Additionally, the country is strongly male-dominated. This raises barriers that particularly when it comes to crossing boundaries of convention and discussing sensitive topics can prevent the researcher to get honest answers (de Laine 2000).

Problems due to the social and cultural structures can arise also when the researchers work together with a translator. In a country like India the answers from the same respondent can be totally different depending on both gender and if the translator belongs to a higher or lower caste. It should also be mentioned that the translator should only record and mediate the direct translation during an interview, without interpreting what is being said (Nabasa 1995). Another problematic situation that can occur during most studies is that actors like organizations, sponsors, supervisors and participants have varying expectations which can put pressure on the researcher and requires him or her to adapt and compromise (de Laine 2000).

2.2 Participatory Rural Appraisal

In all qualitative surveys it is vital to use a suitable attitude when performing interviews. How the questions are asked and how the conversation between interviewer and respondent develops can affect the answers and data collected and the risk of getting the wrong picture and adversely affecting the outcome of the whole study. Before interviewing it is necessary to identify and imagine the situations and personal hardships that the respondent lives in, from economic, political and social aspects. *Participatory Rural Appraisal (PRA)* is a concept which focuses on increasing involvement and participation of the researcher in qualitative questionnaire surveys, and is mainly addressed to agricultural surveys in rural areas (Nabasa 1995). In this survey specific methods of PRA have not intentionally been used, but it has served as a way to broaden the way of thinking about attitudes and approach when designing questionnaires and performing interviews for surveys in rural and peri-urban areas in developing countries.

3 Method

Chapter 3 describes the methods used in the study, starting with a figure that shows the basic steps in the research process (Figure 4). The chapter further provides an explanation of how the work was outlined and discusses limitations and possible uncertainties.

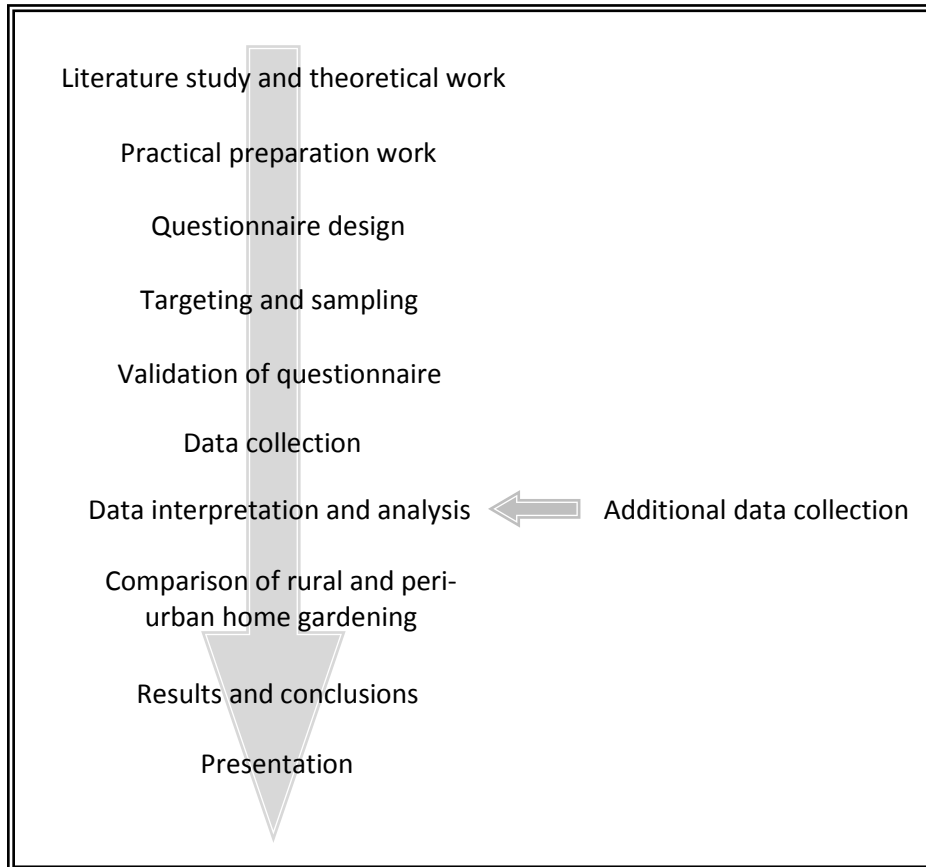


Figure 4. The research process step by step.

3.1 Literature study and preparation work

Before the outset of the survey a literature study was performed to gain general knowledge about India’s social, cultural, political and economic structure. Additionally, historical information about the agricultural development of the surrounding urban, peri-urban and rural areas of Hyderabad city was collected. Publications on previous home garden projects; urban as well as peri-urban were also reviewed to gain understanding of current debates and facts about the topic of the study. This information collection continued throughout the whole study as understanding of the field work situation deepened.

3.1.1 Market and supermarket visits

In India the dynamics of vegetable trading are complex and diverse. The number of alternatives for farmers, wholesalers as well as for consumers to sell or buy vegetables can for an untrained eye seem uncountable. In order to get deeper insights in the dynamic forces of vegetable trading and the value chain in the peri-urban areas of Hyderabad, preparatory observation visits

were made to four vegetable markets and eight supermarkets in Hyderabad, which are listed in Table 1.

Table 1. Markets and supermarkets visited.

Market	Supermarket	
Miyapur market Kukatpally Rythu Bazaar, KRB BHEL market Patancheru market	Heritage health & happiness Tarkari Inorbit mall, Hyper City More	Vijetha Spencer's daily Reliance Fresh Pure Natural

The focus during the visits was to observe the variation in sellers regarding age, gender, apparent economic status and whether they were likely to be farmers or traders, as well as the variety and amount of vegetables they were selling. The consumers and their behavior were observed in the same way. The structure of the market was also recorded in order to recognize more or less attractive marketing spots and a view of waste management and the transportation of vegetables to and from the market was obtained. The preparatory observations gave an understanding of how the vegetable markets differ in organization, size and clientele and it was possible to start the process of targeting farmers, consumers and traders for the interviews. It was also helpful in gaining knowledge about how to act when entering a market to attract as little attention as possible. The preparatory work also served as the basis for design of the questionnaires used in the study, which are described in the next section.

3.2 Questionnaire design

The questionnaires were designed in collaboration with Warwick Easdown (AVDRC) and Priyanie Amerasinghe (IWMI) and were focused on three groups of respondents; peri-urban farmers, consumers and traders in local markets. Information collected in the different questionnaires is seen in Table 2 (see Appendix I-III for the complete questionnaire).

Table 2. Questionnaires topics addressed to each of the three actors.

Farmers	Consumers	Traders
Vegetable production Water supply issues Input management Inputs and health Productions costs Home gardens	Vegetable consumption Market habits Quality and price Inputs and health Home gardens	Vegetable trading Vegetable quality Inputs and health Home gardens

The drafting started in conjunction with the literature and background studies. The design began with general and broad questions based on the objectives, and went through about five iterations before each questionnaire was narrowed down and shortened to include only the most essential and informative questions. The questionnaires were kept short to reduce the risk of the respondent getting impatient and unwilling to continue the interview. Questions were constructed in a way that aimed at making the respondent comfortable and opening up for discussion.

3.3 Targeting and sampling

In order to get as reliable results as possible, the areas of study and relevant respondents were chosen as careful as possible.

3.3.1 Study area

For the farmer interviews, 5 villages out of 27 in the area around Patancheru were chosen as the area of study. According to the objective of capturing the value chain and explore the driving forces, the area for consumer interviews was chosen as the Patancheru daily market, since this was the location where most of the farmers interviewed usually sold their produce. For the same reason the trader interviews started at the Patancheru market. However, it was desirable to find traders with diverse attitudes towards vegetable trading and production. Since the trader types appeared to differ from market to market, four different markets were visited, and an approach was undertaken throughout the process of trader interviews, where interviews continued in the same market until no new answers were received.

3.3.2 Respondents

In order to find relevant farmers for the study, the snow ball sampling approach was used as far as possible. Initially, the goal was to target farmers with home gardens separated from their commercial production. Since no such farmers were found, the goal changed to farmers who used their commercially grown vegetables for home consumption. The targeting of consumers at the Patancheru market was based on gender, age and to some extent apparent living standards, trying to capture a broad range of consumers. When targeting traders, parameters such as gender, age and quantities of vegetables traded were considered as important. In each market an attempt was made to involve traders with low, moderate and high amounts of vegetables. It was as well of interest from where the trader had obtained his or her vegetables.

3.4 Data collection and interpretation

The data was collected through 40 interviews; 10 for farmers, 10 for consumers and 20 for traders. No electronic device such as video camera or voice recorder was used. All interviews were done together with a translator, Mr. Mohammed Qadir from IWMI. Before the interviews were initiated the students together with the translator visited the officer of the Agricultural Department in Patancheru mandal, Patancheru. This was done to inform them about the purpose and line of action of the study.

Prior to the start of each questionnaire type a validation interview was done, which was held in a suitable environment and with a person who could represent the respondents in each group. The purpose was to confirm the relevance and aptness of the questions and to give a chance to modify the questionnaire. All interviews were performed only after informed consent from the respondents and presentation of the students, the study and its purpose. The respondents did not get any compensations or payment for participating.

To get a correct insight in the vegetable production systems and to avoid wrong and irrelevant questions for consumers and traders, farmer interviews were done first. The interviews were performed in Bhanoor, Ghanpur, Pate, Velimella and Yemkunta villages and in the field of the farmer, making it possible for him or her to feel comfortable, show their vegetable production and for the students to observe details. The sessions lasted approximately 40 minutes. After farmers, consumers were interviewed. The sessions were estimated to last 15-30 minutes and

were held at the Patancheru daily market. Finally 20 traders were interviewed. Since the traders were busy running their businesses at the same time as being interviewed an attempt to keep the session time to a maximum of ten minutes was set. Experience during the consumer interviews suggested that this was the maximum time that would be practical and acceptable in a busy trading environment. The interviews took place at the Patancheru weekly market, Patancheru daily market, Lingampally weekly market and Kukatpally Rythu Bazaar. The Rythu Bazaar is a farmers market and is government organized with only farmers selling their own produce. The only exceptions are middlemen selling goods which cannot be provided by the farmers for fixed prices.

Additionally, one discussion was held with a shopkeeper for the supermarket Vijetha. This did not follow the trader questionnaire but was adapted to the situation. The interview was intended to examine differences in attitudes and concerns about vegetable production compared to the findings on the markets.

The data collected served as a basis for generation of graphics and charts, used in the data interpretation and analysis described in a later section.

3.5 Comparison of rural and peri-urban home gardens

Part of the objective of the study was to compare home gardens in peri-urban areas with those in rural areas, looking at what role they play in each area and how they may be improved by using techniques and concepts from each other. This was done after the interviews were completed through a three day field visit to the rural areas of north eastern India in Ranchi, Jharkhand (Figure 5), where AVRDC runs a five-year project. The project aims at improving safe commercial vegetable production to raise incomes for farmers and to improve vegetable consumption and household nutrition through home gardening (AVRDC 2012).

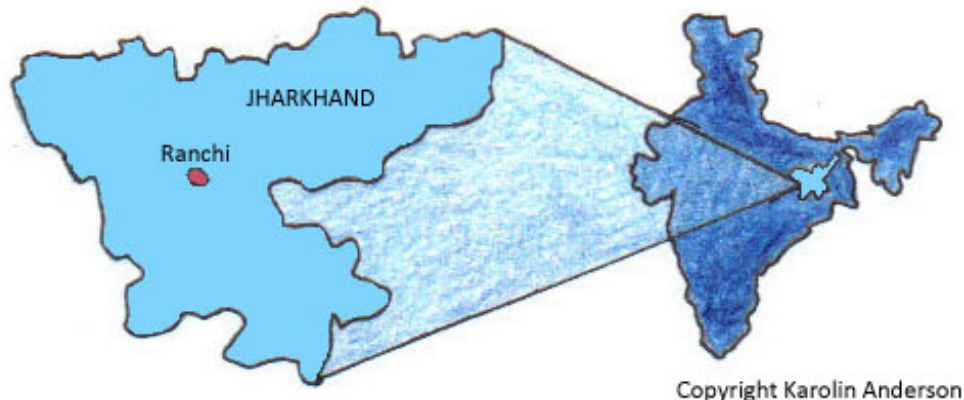


Figure 5. Location of Jharkhand and Ranchi.

Prior to arrival in Ranchi, background information about the social and agricultural situation in Jharkhand was collected. Relevant questions for the comparison were outlined, based on the objectives of the study and experiences from interviews in the peri-urban areas of Hyderabad. The questions were kept in mind during the field visit, and are seen in Figure 6.

- How common are home gardens?
- Is the space availability sometimes a problem in the case of home gardens?
- What are the alternative sources of vegetables?
- If there are surpluses, how is that utilized?
- Are seeds for home gardens hard to get?
- How much time is spent on the management of the home gardens?
- Is there a risk for water scarcity now or some other time of the year?
- Is there a problem with water scarcity?
- Do people have concerns about pesticides and alike?

Figure 6. Questions for comparison of rural and peri-urban home gardens.

During the visit urban, peri-urban and rural vegetable markets were visited. Home gardens in peri-urban and rural areas were also visited. A trip to Digri village in Khunti district, consisting of approximately 100 households, was made together with AVRDC staff Mr. Ravishankar Manickam and Mr. Nabakishore Parida. The rural vegetable situation was shown and interactions with home garden owners took place. AVRDC's research field at Birsa Agricultural University was also visited in order to see the research work and home garden model for rural households in Jharkhand, developed by AVRDC.

3.6 Limitations and uncertainties

The issues with food security and malnutrition dealt with in this study are immensely complex and due to the relatively short period of time that the study was conducted, some limitations are noted. The primary focus was on the existence of home gardens and the role they play as well as on the driving forces in the vegetable value chain. Due to time limitations the number of interviews was kept at 40, and time availability was also crucial upon deciding the area of study. It would have been impossible to cover the complete peri-urban area of Hyderabad so interviews were done in villages in the Patancheru mandal only. Due to this the results cannot be applicable in general, but they do provide a case study from which conclusions can be drawn and the reader invited to make informed comparisons with similar situations. In addition the short time of the field work made it possible to visit only one rural area for comparison of different home garden models.

The questionnaires were designed with relatively few questions. However, even though it could have been useful, questions about money were excluded. The reason for this was that participants' lack of time for interviews had to be taken into account. For the respondents and traders in particular, loss of working time is equal to loss of income. This fact was also the reason for keeping the interviews short. When examining home gardens in the peri-urban areas of Hyderabad, no distinctions were made in terms of their structure or size. Data on all types of home grown vegetables was collected and analyzed.

Some shortcomings with the study should be mentioned. In the course of interviewing in field or at a market there is a pending risk that friends of respondents or unknown persons accidentally join the discussion. This could affect the answers and thus the results. Another problem could be that the data analysis and interpretation by the researchers could cause loss of small but important details when translating data to results. It should also be mentioned that the lack of experience on qualitative field work among the researchers in this study can have an effect on the results.

4 Results

Chapter 4 explains the relevant data obtained from the interviews. Observations from the field visit in Jharkhand are also presented.

4.1 Farmer interviews

The ten respondents in the farmer interviews were living in five different villages. Nine of the respondents were male and seven were less educated which denotes less than five years in school. The age of the farmers ranged between 30 and 80 years with an average of 51.4 years. In three interviews additional persons participated. Only one of the respondents had finished 12th grade which corresponds to *Gymnasieexamen* in Sweden.

Cultivated land

The cultivated land amount varied from 1 to 4 acres with an average of 2.5 acres. One acre is equal to 4 047 m², consequently about 80% of the Swedish area unit *tunnland* of 5000 m². All of the cultivated area was not consistently used for vegetable production. The average of the respondents' farming land was less than the average farm size in India which is 3.3 acres (USDA 2009). This was thought to be because of the interviews were performed in a peri-urban area where land was expensive and scarce.

Vegetables grown

The results showed a wide diversity in types of vegetables grown by the farmers in the area. Figure 7 shows the vegetables grown in total over the three vegetable seasons which are Rabi (winter) from October to February, summer from March to May and Kharif (rainy season) from June until September. In the targeted area vegetables were mostly grown in the Rabi and summer seasons whereas paddy rice was the most common crop in the Kharif season. The most common vegetables grown were tomato followed by brinjal.

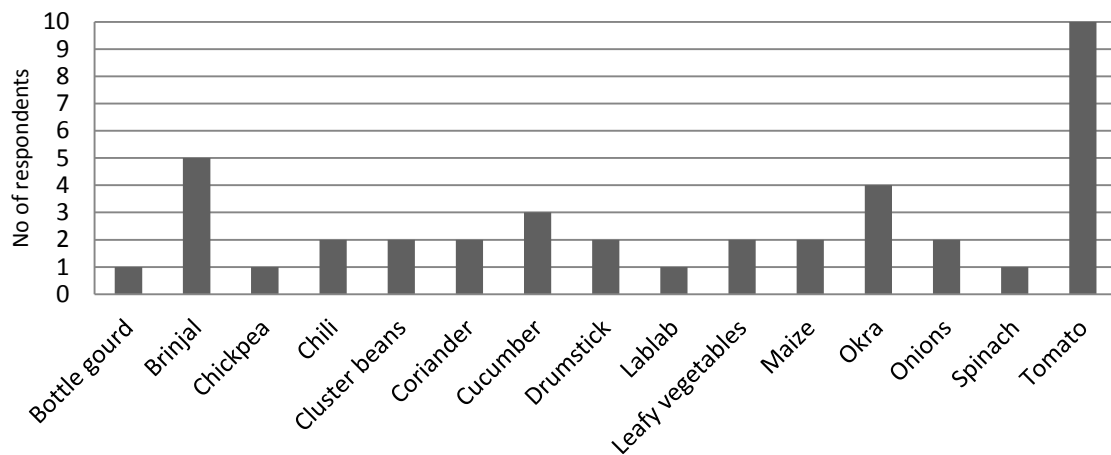


Figure 7. Vegetables grown by farmers in peri-urban areas of Hyderabad.

Vegetables in demand

Many of the respondents commented that the demand is high for all vegetables in summer because of water scarcity which cuts down the yield and leads to increased prices. Still there was a slight difference in the demand where tomatoes showed a distinctly higher demand than

other vegetables, but that was also the vegetable that all respondents grew. Tomato is a common vegetable in India used for curries and other traditional dishes.

Selection of vegetables to grow

The question of what determined the vegetables to grow gave a wide diversity of answers. The most common answer was that water availability determined the choice of crop. After water availability came market demand and high selling price, both in the same range. Easy cultivation, low investment and high selling price were also mentioned. Easy cultivation included high resistance which can decrease the need of pesticide usage. A reason for choosing a vegetable could also be because it fitted well with the production of paddy rice which was hard to grow in the summer period before planting paddy.

Vegetable market

The choice of market that farmers sold to, either through wholesalers or directly was included in the questionnaire to help select the most appropriate markets for the consumer and trader surveys. It turned out that produce from eight of ten farmers was sold at Patancheru market, either daily or weekly. The common reason for this was that it was the closest market in the area which enabled neighboring farmers to share transport. Other markets where vegetables were sold were Moosapet where five farmers went, Lingampally and R.C. purum with three farmers each and one at BDL market. Six of the farmers sold their vegetables to a wholesaler because of the time saving aspect. Three went to the markets by themselves to earn as much money as possible. One sold to a wholesaler if the quantity was big enough, otherwise the farmer sold it himself at the market.

Water

Hyderabad is in a semi-arid zone and water supply is poor during summer when there is normally little or no rain, and this had a major impact on the agriculture and vegetable cropping. All ten respondents in the interviews had bore wells which were relatively reliable sources of water. Eight of the farmers specified the depth of the bore which varied from 140 to 500 feet, corresponding to 43-152 m. The average was 248 feet (76 m). The interviews were performed in the month of April which was in the middle of the summer in the state of Andhra Pradesh. This likely affected the answers to the water related questions in the questionnaire since water at that moment was scarce.

As shown in Figure 8, the most common way to meet shortages in the water supply was to change crops to ones requiring less water. One farmer had made a new bore well, but could not afford the installation at the moment. Other measures taken by two farmers were to use dried up failed crops for cattle feed or to reduce the amount of cultivated land. One farmer grew herbs beside the bore to make use of spillage water. Because of water scarcity one farmer went for vegetable production instead of paddy rice since these were less water demanding crops.

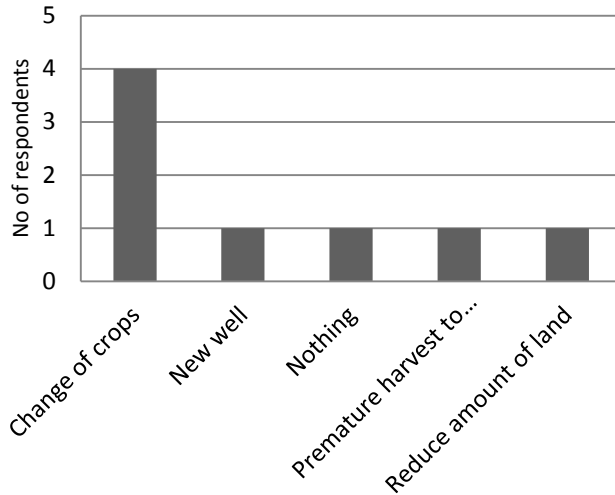


Figure 8. Measures taken in case of water scarcity.

Input usage

All ten farmers used manure and urea as their main fertilizers; eight of them also used diammonium phosphate (DAP). The questionnaire asked about compost and the result showed that nobody used compost and few seemed to have knowledge about it. Three of the farmers used mulching but not all had knowledge about this either.

Half of the farmers did not know the name of the pesticides that they were using. The numbers of sprays used varied from once per season to once each week and the answers seemed very approximate. The answers about which vegetable was in need of most pesticides were not very straightforward. Three answered tomato and three others answered brinjal which also were the most common vegetables grown. Other suggestions were okra which two respondents mentioned and also chili, cucumber and drumstick. The pesticide usage was said to be less in summer compared to other seasons.

Main costs

The main costs in the vegetable production were chemicals and labor. One farmer mentioned that he could not harvest in time because of lack of labor. Weeding was a high cost and the options available were to do it by hand or with herbicides which were both expensive alternatives. The most expensive crop to grow was also that requiring the most pesticides. Four of the respondents answered tomato and two each answered okra and brinjal. One respondent mentioned that the most expensive crops often were those that gave a high price in return.

Concerns with inputs

Concerns about fertilizer and pesticides were only admitted by four of the respondents. The farmers without concerns said that the chemicals were needed by the soil since it had gotten used to it and chemicals were required to get good yields. One mentioned that he was cautious when using pesticides, even if he at the same time claimed that it was not harmful. Two of the farmers said that they washed their home consumed vegetables carefully. One respondent mentioned that the fertilizer prices had increased too much and that new technology was needed. He was planning to use vermicompost the coming year.

One of the respondents said that he tried to reduce the usage of chemicals to get the native soil fertility back. He was concerned with the impact of inputs and weeded by hand instead of using pesticides as much as possible. The same farmer said he had been fooled by an officer from the Department of Agriculture a couple of years earlier. The officer recommended him to use a special fertilizer for his tomatoes but the result was no yield at all in two years afterwards. He also mentioned that farmers nowadays were lazier and unwilling to do the hard work which was partly a cause of shortages in labor and increased costs. Another farmer in his eighties said that when he was young no chemicals were used which led to people living longer than nowadays. Another farmer argued that since the government had approved the chemicals they could not be harmful.

The villages that were visited were located close to a number of factories which led to concerns about pollution. Half of the respondents were less concerned about industry pollution nowadays than before because of recent shutdown of the closest polluters. Before this they lived with regular air and water pollution which they claimed decreased the yields of their cropping.

Home gardens and home consumption

None of the farmers had a separate home garden but all of them consumed vegetables from their commercial cultivation. The benefit they could see from eating their own produce was mainly that it increased the total family consumption of vegetables. Farmers also claimed that home-grown vegetables were certainty of good quality and this cut down vegetable purchase costs. The reason for not having a home garden was lack of space which was not the case in the field where there also was better water availability.

None of the farmers made a difference in the way that they treated vegetables for home consumption as compared to those for sale. However they were careful which vegetables they chose to eat themselves. Three of the respondents said they took the best looking vegetables for home consumption, and sold the rest. One farmer said the opposite; to get as much income as possible he chose to sell the best looking vegetables and to use poorer quality for home consumption. A farmer with only one crop at the time in his fields grew some extra kinds of vegetables in the field only for home consumption.

4.2 Consumer interviews

The consumers were interviewed at Patancheru daily market. Two interviews were performed with couples; hence 12 persons were interviewed, but in the results the couples are considered as one respondent. Half of the respondents were residents of Patancheru, the others coming from nearby villages. Five women and seven men participated, and their ages ranged between 28 and 76 years, with an average of 42.6 years. The household size varied between 2 and 17 members, with an average of 6 members. The education level varied evenly between 5th to 12th grade.

Purchase of vegetables

The variety of vegetables bought by the consumers at Patancheru market was broad, as seen in Figure 9. It shows the main vegetables bought throughout the year. Tomato, okra, potato, leafy vegetables and brinjal were the main ones. Differences occurred between winter and summer season, where mainly leafy vegetables were consumed in bigger amounts in the winter.

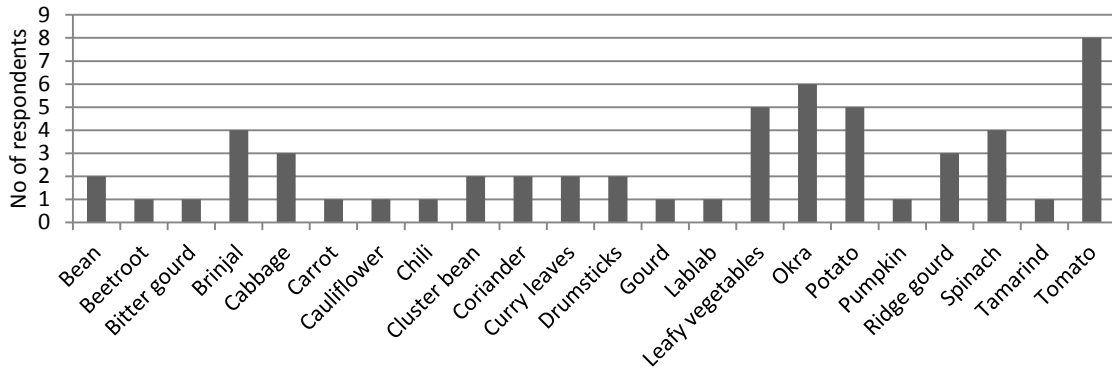


Figure 9. Vegetables bought by the consumers at Patancheru daily market.

Five of the respondents said all of the vegetables they bought were locally grown, three said most were local produce and the rest had no knowledge about the origin. Nine of the ten consumers found it unimportant where and how the vegetables had been grown, the availability was more important. One respondent commented that during winter the locally produced vegetables were preferable because of low price, but during summer the price was high for all vegetables. For nine of the consumers the main reason for purchasing vegetables at Patancheru daily market was because it was close to their homes. Other reasons for choosing Patancheru daily market were fresh produce, good supply and low price. The majority said they purchased all their vegetables at Patancheru market, since transport costs could be avoided in this way.

Vegetables eaten uncooked

Vegetables eaten uncooked were rare in the Indian kitchen. As seen in Figure 10 carrot together with beetroot is most frequently mentioned among vegetables that were eaten raw.

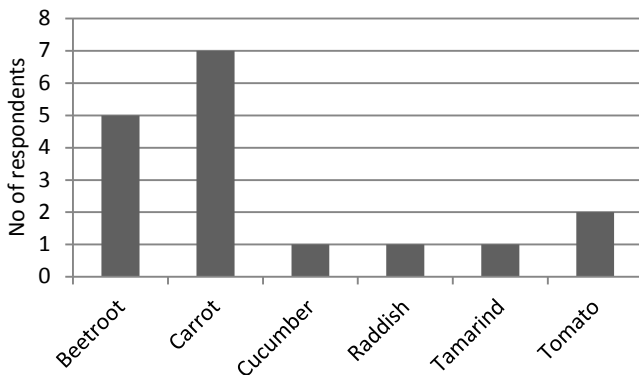


Figure 10. Vegetables eaten raw.

Price and supply issues

Six of the consumers said all vegetables were hard to buy because of high price or short supply in the summer season, and the other four said tomato, cauliflower, carrot, beans and chili were particularly hard to get. However, during the winter season the price and supply of all vegetables was not a problem for any of the consumers.

As shown in Figure 11, eight respondents said they bought the same quantities of vegetables independent of high or low prices, but one tried to increase the consumption of pulses because of the lower price of these compared to vegetables. One consumer said he would buy more if the price was lower, and yet another reduced the vegetable consumption during summer with approximately 50% because of high price.

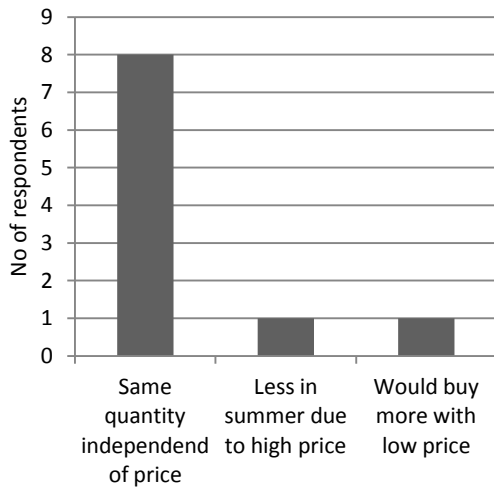


Figure 11. Purchasing habits of vegetables relative to price and supply.

Input concerns

Answers came quick from the consumers upon questions of concerns about the inputs used in vegetable production (pesticides, waste water, compost, fertilizers). As seen in Table 3, it was 50/50 between those who had no knowledge and those with no concerns about input usage. One respondent had neither knowledge nor concerns about it.

Table 3. Consumer concerns about inputs in vegetable production.

	No of respondents
No knowledge	4
No concerns	4
No knowledge, no concerns	1

Upon discussing a bit further though, six consumers seemed aware that inputs and “things” were used in vegetable production, but they did not know what and had no concerns about it. Two said they washed the vegetables carefully before cooking, and one commented he tried to ask the sellers about what had been used but did not get many answers. It seemed like appearance and price was more important than how the vegetables had been produced. Four consumers claimed that all vegetables are healthy, and that it is commonly known that they are good for the body. These persons did not mention any vegetables as particularly nutritious. However, the other six mentioned carrot, okra, leafy vegetables, beetroot, tomato, bitter gourd and spinach as nutritious.

Home gardens

Three of the respondents had a home garden, one of them only during the rainy season due to lack of water during summer. One man had coriander in small pots, and yet another shared a home garden of 32 m² with a family where tomato, brinjal and leafy vegetables were grown. According to these three persons, the main benefits for having a home garden were guaranteed good quality and increased family consumption. The woman with home garden only during rainy season mentioned reduced costs as a benefit. The three home garden owners only used drinking water for the vegetables grown.

The seven respondents who did not have home gardens mentioned different reasons for that. Figure 12 shows that a lack of space was the main reason. Two persons said that if they had more space they would have had a home garden in order to get guaranteed quality, and they would have been ensured that no “medicines” would have been used in growing their vegetables. A 63-year old man from Patancheru said that working people have no time for gardening, and a man from Bandlaguda said he would have had a home garden if the water in his living area had not been highly polluted.

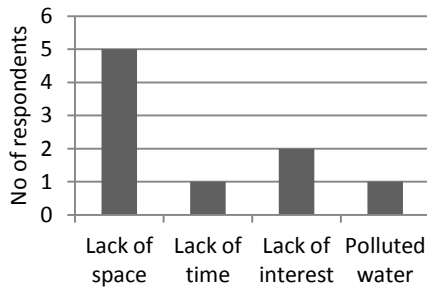


Figure 12. Reasons for not having a home garden.

4.3 Trader interviews

The gender diversity of the respondents in trader interviews was 50% male and 50% female. The age and experience of the traders varied widely. They were aged from 17 to 75 years with an average of 42 years and the years of experience varied from half a year to 50 with an average of 15 years.

Vegetable origin

The results from the interviews showed that 75% of the traders sold vegetables that they got from middlemen/wholesalers at other markets. Four of the respondents (20%) were farmers themselves and one sold produce bought directly from a farmer. Thirteen of the 20 respondents visited the market daily while six only visited weekly. Half of the traders chose the market because it was located close to their home, the others answered that it was a big weekly market that attracted lots of people and in the case of Kukatpally Rythu Bazaar because there only were farmers selling on site.

Vegetables traded

The most common vegetables sold on the markets were beans, brinjal, chili, ivy gourd and tomato. Most of these vegetables were locally grown according to the traders which are shown in Figure 13.

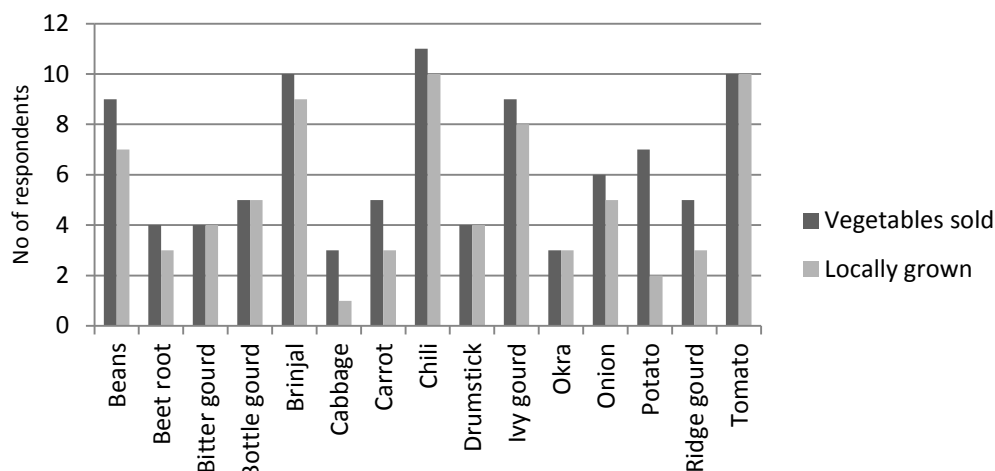


Figure 13. Vegetables traded on markets.

Home garden interest

Almost 45% of the respondents had no knowledge about home gardens or home garden produce, and 35% had no interest in it. Only one of the respondents had a home garden and three which were farmers ate their own produce. Many of the respondents mentioned space and water scarcity as the reasons why people did not have home gardens.

Input concerns

Table 4 displays the traders' concerns about inputs. Eleven of the respondents claimed that they were not concerned with the inputs used in vegetable production and four that they had no knowledge about it. Only five of the 20 respondents acknowledged that they were concerned. Four of the traders said that customers were concerned and sometimes ask about inputs but the rest claimed that costumers had no concerns about the input usage. One of the respondents said that "educated people" were concerned and asked but others were just interested in quality and price. Another respondent thought that people, including herself, gained weight because of the "medicines" used in vegetable production and people also got weak and sick from them. However, it was impossible to avoid them since farmers could not grow crops without them. Another respondent too mentioned that people got sicker because of farming inputs nowadays.

Table 4. Traders' concerns about input usage in vegetable production.

	No of respondents
Not concerned	11
Concerned	5
No knowledge	4

Interview with Vijetha supermarket manager

The manager was interviewed at his office. He was around 60 years old and had 30 years' experience in the retail industry. He claimed that he as well as the consumers had little interest in organic growing of vegetables. He said those vegetables usually were of poorer quality and there was no assurance that they had been organically grown. According to the manager, the main interest when trading and buying vegetables was low prices.

The manager had concerns about chemical inputs in the sense that they might be injurious to health, but he did not know in what way. Still he stated that they were needed in order to get the high yields that are demanded these days. Vegetables at Vijetha were received from selected wholesalers at big markets.

4.4 Field visit to Jharkhand

The field visit to Ranchi and Khunti districts in Jharkhand resulted in observations drastically distinct from the situation in peri-urban areas of Hyderabad, regarding vegetable production, consumption and the role that home gardens play for the population.

4.4.1 Peri-urban home gardens

In the peri-urban areas of Ranchi, home gardens were commonly used by people with both lower and relatively higher living standards. For people with higher income, the purpose of having a home garden was for increased home consumption and assured quality of the vegetables. For those living under poorer conditions, the home garden served as a main source of income, where a surplus after home consumption was taken to daily local vegetable markets. The main vegetables grown in the area were leafy vegetables, tomato, brinjal, herbs and okra. There was a problem among the home gardeners with seed supply. Many companies sold seeds of poor quality that were poorly adapted to the climate in Ranchi, which resulted in poor yields of vegetables. Another problem seemed to be that there were excess vegetables in the area so the sellers had sometimes difficulties to sell their produce. No chemicals or very few chemical inputs were used in vegetable production, partly due to high costs. In addition, one home gardener claimed that natural fertilizers such as cow manure increased the water holding capacity in the soil compared to chemical ones. Hence, mainly cow manure and well water was used in the home garden.

4.4.2 Rural home gardens

In Digri village, a rural community in Khunti district consisting of approximately 100 households, home gardens were seen to serve an indispensable role for the population. With the help of AVRDC, several home gardens had been installed in the village since 2008. An owner of a home garden said that her household's vegetable consumption had increased four times since the introduction of the home garden. They had more energy to work and got sick to a lesser extent since then. The size of the home gardens ranged from around 6 m² and upwards to around 20 m². No chemical inputs were used due to lack of money and proper knowledge, and since many villagers had cattle they used cow and goat manure as fertilizer. Waste water from kitchen and washing was used in the home garden and seeds were saved from one season to the next. The vegetables grown in the village were similar to those in the peri-urban areas of Ranchi. Instead of travelling a rather long and for them costly distance by bus from Digri to the local market, the villagers practiced exchange trading of vegetables with each other in order to get variation in the vegetable they consumed.

A lack of space was not a problem for home gardeners in either peri-urban or rural areas of Ranchi and Khunti districts. The major problem at this season appeared to be water scarcity together with getting suitable seeds and more vegetables in the markets than the demand required. In addition the infrastructure was poor outside the city center so the people were sometimes restricted to sell only on local markets in the area.

5 Analysis

Chapter 5 presents an analysis of results from the interviews and field visit. Revising the objectives of the study, the chapter first discusses home gardens and what role they play. Thereafter input concerns and the driving forces of the vegetable value chains are analyzed. The interpretation of the collected data and selection of relevant information was done by the researchers. The results and interpretation can therefore not be said to apply in general.

5.1 Home gardens

According to the farmer interviews no home gardens were to be found in the targeted area of Patancheru. In the consumer interviews three of ten respondents declared that they practiced home gardening to some extent and one of the ten traders as well. The mentioned benefits from these were guarantee of good quality and increased family consumption. The overall impression from the interviews is that home gardens do not exist to a greater extent in the area firstly because of lack of space. The villages in the peri-urban area are constructed in concrete and cement without any green spots. Secondly there does not seem to be much interest or knowledge about home gardening, and also the lack of time is viewed as a problem. Since there are plenty of markets in the area with a good supply of a wide range of vegetables there might be no need for it either. Water resources are also crucial to enable cultivation and this might be hard to supply in sufficient quantities close to the house or in the villages. The interviews were performed in the middle of the summer when water shortage is common in the area. This might have influenced the interviews as well as the attitude towards questions about home gardening.

The explanation to why the farmers do not have any home gardens is, according to them, that they have all they need for cultivating in their fields, and there is a lack of space at their house. This seems to be a fair explanation and was not very surprising. However they do not have a separate area in the field used for home consumption. This was unexpected, as it was assumed that they would segregate crops for home consumption due to concerns with inputs and possible avoidance of them. However, it is interesting to point out that the choice of vegetables for home consumption differs between the farmers, some choose the good looking ones to sell and consume the ones with less quality, and others do the contrary. This might indicate the state of life and wealth of the farmer, or possibly just the approach as a salesman.

Two of the respondents in the consumer interviews claimed that if they had space they would have had a home garden to be assured of good quality and to avoid the use of “medicines”. This indicates that there is an interest of home gardening because of its perceived ability to provide better quality vegetables.

The overall negative attitude towards home gardens found in the interviews could be due to lack of knowledge since this type of gardens seems to be unusual in the area. Perhaps the benefits with having the home garden have not crossed peoples mind, nor the potential as an income generating activity. An introduction of the concept might be needed in this area to encourage interest. Another reason could be lack of knowledge about the nutritious value of vegetables which makes the question overall uninteresting if vegetables are not seen as an essential part of the diet.

The traders were with few exceptions were not at all interested in home gardens. However there may be a commercial motivation for this as they would not mention it because promoting the practice could be detrimental to their own business. Admitting that home garden produce can be benefitting quality wise might also affect their business and livelihood.

While comparing the very few home gardens in the peri-urban area of Hyderabad with the findings in Jharkhand there were some distinct differences. In the area of Jharkhand, land is not scarce as in Hyderabad which makes it easier and more feasible to have a home garden. In the peri-urban area two home gardens were found where one served as the only source of income to the family while they were selling 70% of the produce. It is although doubtful if this should be called home garden or not while the owners as well could be called farmers. The second home garden was owned by a well-educated family which considered the time consuming feature of the home garden as the major drawback. In the rural areas of Khunti district in Jharkhand the main benefits of home gardens have been studied in AVRDC projects, and one of the test households declared that the vegetable consumption had increased by four times since the start four years earlier and they suffered less from sickness and health care costs were reduced. Surpluses from the home garden was sold or traded off with neighbors and served as an extra income for the family. Since the seed from the home gardens can be used for the next year and they have their own cattle manure the input costs could be greatly reduced. The family used their waste water from kitchen and washing in the home garden. This indicates that if land and water is accessible only a lump payment is needed to start a home garden which can then function fairly well in a couple of years at least. Still there must be some interest, knowledge and time available to get into operating.

While visiting Jharkhand the role of infrastructure in affecting patterns of vegetable consumption gets more obvious. In rural areas with poor road infrastructure and public transportation people are dependent on what they have in the surrounding of their home. This makes home gardens more fruitful than in peri-urban and urban areas where there is easy access to vegetables.

5.2 Input concerns

The trend during the interviews was that people in general did not have any major concerns about what has been used in the vegetable production. Still interesting conclusions could be drawn from the results.

The majority of the traders claimed they had no interest, knowledge or concerns whatsoever about what inputs are being used. This homogenous opinion is thought to be true to some extent. It seemed like many of the traders in the weekly markets saw their trading as moneymaking only; buying and selling an anonymous product without knowing its origin or effect on health and environment. This is thought to be one of the main problems in the vegetable value chain, creating a loss of knowledge and transparency between production and consumption points. However, doubts about the answers of some traders occurred since many often started to say that he or she knew that something was used but had no concerns, and thereafter that even if chemical pesticides and fertilizers were dangerous the farmers had to use them in the production to get high yield. This reasoning is contradictive, and the reason for this answer could be that the traders are suspicious and do not want to lose valuable customers. The same could be said about the farmers who claimed they had no concerns about pesticides, fertilizers and alike. Several said they had to use the chemicals to get yield and that the soil has

become dependent on them, which in many cases certainly can be true. But during the course of discussion it is suspected even here that some farmers modify their answers. Several farmers washed the vegetables they consumed carefully. They also used protection equipment when applying pesticides and fertilizers which indicates that they may have concerns about inputs and health after all. This type of answering might have reasonable explanations. One could be that the farmers during the interviews were exposed to social and cultural restrictions when other persons accidentally attended the interviews. Another reason for using chemicals even though they seem concerned could be that several of the farmers apparently have low incomes to support their families with, and together with lack of proper knowledge about alternative input sources this makes them dependent on the yield which forces them to use chemicals.

There seems to be a connection between education level and concerns about input usage. Farmers with low or no education appeared less conscious about the health impacts of chemical inputs than those with higher education. The farmer who was most concerned and actively made something about it had higher education level.

Consumers seemed moderately worried about the impacts on health and environment from different inputs. Although all answered that they had either no knowledge or interest, some were aware that “something” was used, but few reflected on that it actually could affect the health. Though some respondents said they usually ask the traders what has been used, the main factor that consumers seem to care about when purchasing vegetables is a low price combined with fresh produce. However, an interesting observation is that when discussing home gardens, several consumers mention that one of the benefits with growing their own vegetables would be the possibility to avoid “medicines” that otherwise are used in commercial production. This together with the consumers’ careful washing of vegetables before consumption indicates that also in this respondent group there is a possible input concern.

The consumers’ limited knowledge about the methods and chemicals used in the vegetable production could be a reason for their lack of interest. A common answer in the discussion was that the farmer has to use what he has to use in order to get yield and it is unavoidable for consumers to get exposed to it.

5.3 Value chain

The most distinguishable driver of the value chain is price and money. The shortages in farming labor as well as that labor are expensive in the surveyed area make the cost savings even more crucial. This creates opportunities to wholesalers and middlemen to make money since farmers are forced to sell their produce to the wholesalers at lower prices because of lack of time to sell by themselves. The absence of labor can as well force farmers to use more pesticides for weeding. After the wholesalers purchasing of the farmers produce they sell it further to retailer and then to a consumer, each of whom is also primarily interested in a low price. The lack of labor strengthens the role of the middlemen and wholesalers which weakens the farmer and his economy. At the same time the middlemen separates the consumer from the producer which may have negative impact on the consumers’ interest in vegetable production and quality.

To make the price to the main issue at yet another level the season chosen to perform this study was wrong in some ways. In the month of April there are big water scarcity problems in the area of Hyderabad and this affect the cultivation to a large extent. The yield is decreasing because of lack of water and the prices are going up which increases the attention even further.

If the study were performed during another season there might not be that much focus on the price and perhaps other quality parameters could have come forward.

Another driver is lack of education among all parts of the value chain. Lack of knowledge can lead people to put insufficient requirements on their purchased items as well as producers and sellers. With more knowledge they can have higher expectations and the production as well as selling system could be forced to improve.

When visiting Rythu Bazaar in Kukatpally, a difference in answers from the traders was expected since there are only farmers themselves selling. It turned out that this was not the case. Reasons for this might be lack of both money and time to care about such things.

Another thing that can be thought of as a driving force is location and transportation. The interviews showed that people in the area prefer and appreciate short distances, this includes both farmers and consumers. The majority goes to the markets which are located closest to their home. Even if the farmers have the choice to go to a Rythu Bazaar where they get a better price for their produce, it seems like they still prefer the closest market. There can be many explanations to this; it might be the time involved as well as transportation costs or just tradition and old habits. Comparing with Jharkhand infrastructure plays a major role in supply and vegetables and nourishing people in the rural areas.

6 Discussion

In interview studies it is crucial to find the most suitable respondents to get as fruitful answers as possible. In this study there were no contacts in beforehand with either farmers or home gardeners in the area. As foreign researchers without earlier experience in qualitative interview studies it was a difficult task to know what approach to use in finding the respondents. After finding suitable respondents there is need to building a relationship to get honest answers. Since this study was performed during only eight weeks there was no time for more than one visit to each respondent which prevented the relationship building part and often led to short answers, sometimes without desirable content.

Using a translator is a drawback when it comes to reading between the lines in the respondents' answers in an attempt to understand their attitude towards the questions. But since the relation with the translator worked out very well the losses are not reckoned as critical. Another essentiality which might have had impact on the answers in the questionnaires is the cultural difference between interviewer and respondent. A majority of the respondents were male, and also older than the interviewers.

The major disadvantage in the performed study was that only a few home gardens could be found in the peri-urban area of Hyderabad. The expectations were to find home gardens during the farmer interviews which took place at their field. Because only consumers and traders had home gardens these could not be visited since these interviews took place at the markets. The lack of home gardens resulted in difficulties in making a fruitful comparison with the rural home gardens in Jharkhand as well as making conclusion about the assessed role of home gardens. Anyhow the field visit in Jharkhand was very beneficial and interesting for the subject.

The study aimed at coming to conclusion about the respondents' concerns with inputs in the production of vegetables. This was to see if home gardens can provide improved quality and food security from the consumers' point of view. It turned out to be quite complicated to get rich and honest answers while the majority of the respondents answered that they didn't have concerns about inputs since they are not harmful according to them. Despite this the answers were often contradictory while the respondents at the same time were mentioning precautions taken. It was common to wash vegetables carefully before eating and the farmers often used protection while applying the pesticides. Anyhow none of the consumers seemed to adjust their consumption behavior because of input concerns or the cost of vegetables, and many mentions that it is impossible to avoid fertilizers and pesticides since they are widely used and needed in the cultivation.

Even though consumers claim that they have no concerns about the vegetable cultivation many mentions that it would be beneficial for them to have their own home garden because of increased family consumption as well as of quality assurance. This indicates that they are concerned about quality and believe that home garden produce without same input usage could have quality improving effects.

When it comes to the farmers' response about inputs they seem to have lack of knowledge in what they are using in their production. Many did not know the names of the chemicals they used, especially not the pesticides. This might indicate lack of knowledge and that farmers are

dependent on advice from sellers and department of agriculture in their cultivation. Another possibility is that farmers do not dare to tell their anxieties about the input usage in fear of consequences. Inputs are seen as expensive by the farmers and one of the main costs in the production. Knowledge about usage of compost is insufficient among the farmers, which is unfortunate since this might reduce input usage and costs.

A reason for not finding any concerns about input usage can be due to that this is luxury moralizing. The respondents might have neither time nor money to worry about these particular quality parameters and might be occupied with getting the money to cover what they need only to maintain their livelihood. The interviews showed that vegetables are rarely eaten raw in the region which could lead to less interest in the vegetable quality since most are cooked before consumption.

The most apparent driving force in the value chain of the vegetable sustenance system is the price. Shortages in labor forces the farmers to sell their produce to a wholesaler instead of a seller or direct to the consumer and this may lead to increased focus on price and less on quality and production system. Although nearly all consumers responded that they bought same amounts without impact of the price. Still concerns about other factors than price might be included in the theory of luxury moralizing and that people in this area do not have the possibility to care about such welfare concerns. The study was performed during the month of April which is the driest period in the area of Hyderabad and water shortage is a big problem. This leads to a high demand for vegetables, and price increases which might have influenced the answers.

When it comes to the results found in Jharkhand it was not feasible to make a thorough comparison due to the lack of findings in Hyderabad. Still conclusions from the projects there could be used with help of dialogue with a home garden owner. It appears that space availability is a crucial factor when it comes to the opportunity of having a home garden since this is a substantial difference between the two visited areas.

Finally it should be mentioned that the results and conclusions in this study cannot be applicable in general since it is performed in a small area with a small number of respondents. The time available for each interview was short which lead to only a few questions in each questionnaire, especially when it came to traders where time is money for them in more extent than the others when interviewed at the market.

7 Conclusions

Home gardens are rare in the surveyed peri-urban area of Hyderabad mostly due to lack of space. Because of this the home garden produce does not have a significant role in the sustantation system of vegetables in the area, nor a major impact on vegetable consumption. Lack of knowledge is suspected to contribute to absence of interest. Education is seen as a possible way to put more attention on home gardening and nutritional value of vegetables, maybe then the space issue could be dealt with.

Since almost no home gardens were to be found in the area of Hyderabad there were substantial differences to the ones visited in Jharkhand. When space is not scarce people in peri-urban areas are more likely to have home gardens. In the rural areas where the infrastructure is poor, people are more dependent on home or close to home produced perishable goods. By helping rural poor with seeds, education and equipment they can maintain a functioning home garden for several years after, if they just can find the time to take care of it.

The production systems' impacts on vegetables do not affect the consumers' purchasing habits to any significant extent. The interest from the consumers' point of view is mainly price and freshness. The strongest value chain driving force is money, especially in summer when water and vegetables are scarce which leads to increased prices.

In conclusion, home gardens could gain increased attention and interest if more knowledge and education were available as well as more research on the subject.

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9 Appendices

9.1 Appendix I – Complete farmer questionnaire

Section A handles information about respondent and each individual interview.

VEGETABLE PRODUCTION

- B1 What are the main vegetables that you grow at the moment? What have you grown before that (during the last 12 months)?
- B2 Which of your crops are most in demand by wholesalers? Which of your crops are most in demand by consumers?
- B3 What factors have most impact on your choice of vegetables to grow?
(demand, seed supply, water access, labor etc.)
- B4 To whom and/or at which market do you sell your vegetables and what's the reason for this choice?

WATER SUPPLY ISSUES

- C1 What water sources do you have access to and which is the main one that you use?
(About water quality: Does the quality differ between the water sources? Do you use this water source for all water demanding activities? Do you feed your animals with the same water? Do you drink this water?)
- C2 What do you do when you don't have enough water?
(stop cultivation, change of crops, buying water, use polluted sources etc.)

FERTILIZER AND PEST MANAGEMENT

- D1 What are the main fertilizers that you use?
- D2 Do you use compost or mulching?
- D3 Which are the main pesticides that you use?
- D4 Which are the main weedicides that you use?

PRODUCTION COST

- E1 What are the biggest production costs for your main crops?

CONCERNS WITH INPUTS

- F1 Are you concerned about any of the inputs that you use or the health impacts on pollution from nearby industries on your crops?
- F2 Have your wholesalers and/or customers raised any concern about your crop inputs or pollution?

HOME GARDENS

- G1 What do you choose to grow in your home garden and what is this choice based on?
(more diverse? water availability, seed availability, vegetables that are expensive on market, etc.)
- G2 What do you see as its main benefits for you and your household?
- G3 If you separate your home garden from your commercial garden, what is the reason for this?
(closer to the house, different inputs, different water source etc.)

HOME GARDEN INPUTS

- H1 Which inputs do you use in your home garden?*(and which are not used)*
- H2 Do you use any different inputs in your home garden compared to your other crops?

9.2 Appendix II - Complete consumer questionnaire

Section A handles information about respondent and each individual interview.

PURCHASE

- B1 Which vegetables do you buy in most quantities in the summer and winter seasons respectively?
- B2 Do you know if any of these are locally grown?
- B3 How important is it for you that you know where and how the vegetables are grown?

PREPARATION

- C1 How do you prepare the vegetables?
(Use 2 of the main vegetables from table 1.)(Boil, Fry, Dry, Pickle)
- C2 Are there any of the vegetables that you eat without cooking?

MARKETS

- D1 Why do you buy vegetables in this market?
(price, distance to home, fresh produce, reliable sellers, locally grown)
- D2 Do you buy all your vegetables here? If not, why?

QUALITY& PRICE

- E1 What are the most important things you look for when buying vegetables? (price, size, freshness, locally grown, inputs used, traditional vegetables)
- E2 Which vegetables are hard for you to buy because of high price and short supply at the summer season? At the winter season?
- E3 In general, would you buy and eat more vegetables if the price was lower?

HEALTH& INPUTS

- F1 Do you have any health or food safety concerns in mind when you buy vegetables?
(Industry pollution, fertilizers, pesticides, waste water, compost)
- F2 Are there any specific vegetables you try to avoid?
- F3 Have you been informed of the nutritive values of vegetables that you eat?
(If yes, who has informed about this? Health department/Department of Agriculture/ NGOs/SHG)

HOME GARDEN

- G1 Do you grow any vegetables on your own?
- G2 How does this benefit you and your household?
- G3 What types of inputs do you use in your home garden?
- G4 Are there any specific inputs you try not to use?

9.3 Appendix III – Complete trader questionnaire

Section A handles information about respondent and each individual interview.

TRADING

- B1 Which are the main types of vegetables that you trade this season and in which quantities?
- B2 Which ones do you obtain locally (within 10-15 km)? (Tick the L-column)
- B3 If you buy locally, is this direct from local growers or through a middleman?
- B4 What is the main advantage for you in selling in this location?
- B5 If you could buy vegetables from home gardens, would you then be interested in that?

QUALITY

- C1 What are the most important things that you look for when buying vegetables?

INPUTS & HEALTH

- D1 Are there anything in the vegetable production that you think can be harmful for humans or the environment? Do your customers talk or ask about this?
- D2 Do you and your customers think the use of compost or waste water in vegetable production affect the vegetable quality?