

Assessing the Status of Housing Conditions for Workers of Farms in Liwa within the United Arab Emirates

Fatima AlMehairbi
College of Sustainability Sciences and Humanities
Zayed University
Abu Dubai, UAE

Abstract

Background: Farmworkers in Liwa city, UAE, experience harsh environmental exposures, and poor living conditions that could have detrimental effects on health. **Aim:** This study aims to (i) assess the status of farmworkers' housing conditions, (ii) evaluate the quality of air within the farmhouses; (iii) provide guidance to local farm owners and local authorities on ideal requirements to ensure safety and suggest implementation of best practices. **Methodology:** This study employed a cross-sectional design and randomly assessed 31 farmworkers' houses in Liwa. A total of 67 workers from south Asia completed the satisfaction questionnaire adapted from Ndlambe Municipality Customer Satisfaction Survey (2011). Housing quality was evaluated based on building structure, exposure to chemical hazards and services provided as per guidelines from the European Union Programme for Employment and Social Solidarity 2007-2013 and WorkSafe New Zealand 2014. Quality of air was tested using a handheld 3016 IAQ Lighthouse particle counter. **Results:** The housing conditions were poor with high potential for accidents and risks. The air quality exceeded the WHO limits for both PM_{2.5} and PM₁₀. **Conclusion:** These findings support the need for action towards the improvement of housing conditions of farmworkers in Liwa through better planning and collaboration between the municipality and the hiring agencies that recruit these workers.

Keywords: Liwa Farmworkers, Housing Conditions, Air Quality.

1. Introduction

1.1. General Characteristics Of Liwa Region

Liwa is part of the Western Region in the UAE (Fig. 1), located in the southwest of Abu Dhabi Emirate. The Liwa region belongs to the tropical desert zone. According to Arthur & Al Qaydi¹, the production of crops in this region generated more than 4 billion AED in 2007. Local farms produce dates and vegetables such as tomatoes, onions, eggplants, cucumber and cabbage. Field crops, such as wheat and barley are also cultivated in this area.

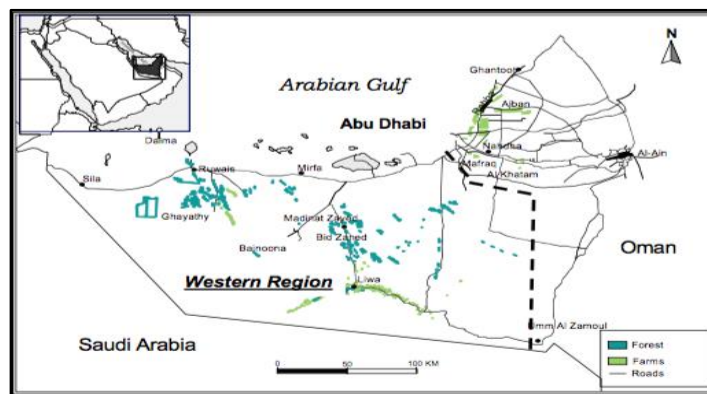


Figure 1. The geographical location of the Western Region of Abu Dhabi. Source: Arthur & Al Qaydi¹

1.2. Living Conditions Of Agricultural Workers In Liwa Region

Agricultural practices are categorized as hazardous industries^{2,3}. Farmworkers are exposed to numerous safety, health, environmental, biological, and respiratory hazards. These include vehicle rollovers, heat exposure, exposure to pesticides³, indoor and outdoor dust, flammable substances, noise^{4,5,6,7}, falls, musculoskeletal injuries, hazardous equipment, unsanitary conditions and many others.

Inadequate working conditions can result in physical and mental illness which affect the workers' performance^{8,9,10,11}. Bad environmental and hygienic conditions often affect the workers' health in the agricultural sectors^{8,12,13,14} and are associated both with the agricultural practices and the farmer's house^{15,16}.

There are more than 10,000 farms in Liwa with about 2 to 3 workers in each farm¹⁷. In the UAE, workers in the agricultural sectors are mostly from Pakistan, Bangladesh and India^{3,18}. The majority of farmers have low level of education and a lack the knowledge of best practices that would otherwise decrease the chance of injury¹⁹. A study done by Joshi et al.²⁰ showed that a large number of farm workers in the UAE suffered from recurrent headache and respiratory symptoms. The estimated annual incidence of occupational injuries in the work environment in the Al Ain region (UAE) was 136 per 100 000 person per year²¹.

1.3. Housing Quality

Farmers' houses should be clean, safe, fulfill the workers' basic needs and protect them from the outside environment^{22,23}. Furthermore, they should be free from hazards, risks, accidents and injuries.

Housing conditions can affect farmworkers' health in many ways. Noise in the sleeping rooms, high room temperature, crowding, poor sanitation and lack of functional windows and screens for ventilation can contribute to poor sleep quality²⁴ and increased chance of infectious diseases^{10,16,25}. Low-quality buildings could increase the morbidity rate, decrease life expectancy, increase the incidence of injury and the risk of physical and mental disabilities. In badly constructed shelters, workers can experience a psychosocial risk that influences their health and performance^{25,26}.

1.4. Air Quality Associated With Unhealthy House Condition.

Poor housing conditions can affect the indoor air quality (IAQ)¹⁰. The house construction and its characteristics are strongly associated with the health quality and performance of the workers. Observational evidence shows that poor air quality has been acknowledged as an occupant's health and comfort factor that can affect the worker's productivity²⁷. Sources of indoor air contaminants are heating, ventilation and air conditioning (HVAC) systems, building equipment, furnishings, and human activities^{28,29,30}. According to the World Health Organization guidelines³¹, particulate matter with a diameter of 2.5 μm or less (PM_{2.5}) should be less than 10 $\mu\text{g}/\text{m}^3$ (as annual mean) and less than 25 $\mu\text{g}/\text{m}^3$ as 24-hour mean, while particulate matter with a diameter of 10 μm or less (PM₁₀) should be less than 20 $\mu\text{g}/\text{m}^3$ annual mean and less than 50 $\mu\text{g}/\text{m}^3$ as 24-hour mean. Air pollutants (including organic compounds, inorganic compounds and microbes) can cause severe health problems³². For example, tiny particulate matter can penetrate deep into the lungs and lead to chronic obstructive pulmonary disease (COPD), acute respiratory diseases, lung cancer and interstitial lung diseases³³. Respiratory diseases are considered as a major issue in the UAE³⁴.

1.5. Existing Information On Accommodation For Farmworkers In The Liwa Region

The UAE government provided a construction standard that matches the international standards for worker's accommodation^{36,37}. For example, each house must be provided with at least a bathroom, refrigerated food storage facilities, adequate medical facilities, sewage systems, water and electricity systems. In addition, each house should be built with safe materials that minimize accidental injury^{36,38}.

According to the UAE Ministry of Labour³⁹ and Ministry of Foreign Affairs, UAE⁴⁰, all workers should be provided with a suitable accommodation that is regularly checked. The UAE Cabinet issued resolution No. 10 in 2012 and resolution No. 1178 in 2010. High fines must be imposed on firms that do not ensure the basic rights of workers.

1.6. UAE Legislation For Workers In An Occupational Environment

In 2010, there were 8.3 million annual migrant workers in the UAE¹⁸. It is predicted that the rate of annual increase in numbers of migrant workers will be 7%⁴². When migrant workers leave their home countries to secure their

work in the UAE, recruiters charge them up to \$4,000. These workers sign contracts written in Arabic or English that ensure a clear obligation (e.g. plans and resources) to provide adequate housing conditions that include a clean and healthy environment with adequate facilities that cover the workers' basic needs^{37,42}. The Ministry of Labor in the UAE sought to ensure the protection of workers based on enforcing the laws³⁹.

1.7. Study Aims, Objectives And Hypothesis

The study aims were to (i) carry out a risk assessment of farmworkers housing conditions and ascertain their satisfaction about of the quality of these houses; (ii) evaluate the air quality in the farmhouses; (iii) provide guidance to local farm owners on the ideal requirements to ensure safety and quality of living and (iv) provide suggestions to local authorities for the implementation of best practice. Towards this end, the study investigated the farmworkers' housing conditions in the Liwa region (UAE) in terms of health, quality and safety standards.

The hypothesis of this study was that farmworkers' houses at Liwa are unhealthy and unsafe to live in and do not meet the international standards of housing quality.

2. Methodology

2.1. Ethical Approval And Clearance

The study plan was evaluated and approved by the Institutional Survey Committee (ISC) at Zayed University (UAE). Participation in the study was voluntary. Privacy protection was associated with this study.

2.2. Study Design And Data Collection

The data used in this study were collected in October 2015 as an essential part of the assessment of farmer's house quality conditions in the Western Region of Liwa (UAE). The study focused on (i) the house quality conditions and (ii) farmworkers satisfaction status. Therefore, two types of questionnaires were produced. A descriptive questionnaire was drafted based on the guidelines of the European Union Programme for Employment and Social Solidarity⁴³ and the WorkSafe New Zealand guidelines⁴⁴. The descriptive questionnaire of the satisfaction status of the workers was based on the Ndlambe Municipality Customer Satisfaction Survey⁴⁵. The first questionnaire considered several factors that might need improvements in the farmhouse quality conditions. It included questions on the infrastructure and services, house quality conditions, house environment in general and indoor air quality measurements. The second questionnaire aimed to address the satisfaction status of workers in the current environment. It was developed to analyze the response of the workers towards their environment. This questionnaire contained nine questions. Four questions provided a description of the worker's background. The remaining ones gave the workers satisfaction response towards their living environment, which is referred to here as "farmer house". All respondents were informed about the objective of the study and a suitable consent was obtained. The farm houses were inspected by the author. Photographic records were obtained when farmworkers gave their permission.

2.3. Participants

The sample consisted of 31 farms in Liwa, with a total of 67 farmworkers from different Asian countries.

2.4. Measurements And Questionnaires

2.4.1. *measures of housing quality*

Four separate indices were used to assess house quality conditions including infrastructure and services, house quality characteristics, house environment in general and indoor air quality measurements. The overall housing quality conditions were based primarily on a descriptive scale; e.g., very poor, poor, moderate, good, very good and excellent. For instance, the sewage disposal facilities were rated from very poor to excellent.

The first index was "infrastructure and services indicators" which covered three items: sewage disposal, garbage disposal and reliability of electricity.

The house quality conditions indicators covered nine items including lighting quality, sunlight in the rooms, adequate WC facilities, adequate AC facilities, adequate storage facilities, chemical materials safety, fire safety and privacy.

The “house quality environment conditions” index included nine items, namely: presence of first aid, presence of safe windows/door, presence of safe ceiling/walls, presence of safe water containers, presence of seepage in walls, presence of insects, presence of mice, presence of mold and presence of exposed electrical wires. The subscales of house quality environment conditions were mainly based on the presence or absence of the item; i.e. exists or does not exist.

The indoor air quality index included four items, i.e. temperature (°C), relative humidity (%), PM_{2.5}, PM₁₀. A handheld 3016 IAQ Lighthouse particle counter was used in the farmer’s houses. Three measurements of 1 minute each were taken for each house. The four indexes were measured randomly in the farmer’s house to check the indoor air quality.

2.4.2. satisfaction status questionnaire

This questionnaire was devised with the aim of identifying the farmer’s house quality and the feelings of the workers within this environment. This would offer the community and stakeholders with an overview about the housing environment. This questionnaire contains information that can support the municipalities in their effort improve the quality of housing.

3. Results

3.1. Socio-Demographic Characteristics Of Liwa Farmworkers

Most farmworkers were from Bangladesh and Pakistan, were married, had a mean age of 33.7 years (SD= 9.39) and had elementary or primary education.

3.2. Satisfaction Status Of Farmworkers Towards Their Houses

A total of 45% of the workers were satisfied with the services provided in the house, 29% were dissatisfied, and the others were neutral or had no opinion.

The satisfaction status of workers toward their housing conditions indicated that 65% were satisfied, 23% were dissatisfied with the housing conditions, the rest were neutral or expressed no opinion.

In terms of house space and number of rooms, 70% of workers were satisfied, 11% were dissatisfied and the remaining were neutral or expressed no opinion.

The results of the satisfaction of workers for their house facilities were as follows: 38% were dissatisfied, 46% were satisfied. Those that were neutral or having no opinion accounted for the rest.

As far as house cleanliness in general, only a minority (30%) was satisfied.

3.3. Rating The Quality Of House Infrastructure And Services

Sewage disposal was rated as poor for 45% of the houses. The garbage disposal services were considered to be poor in 42% of cases. As far as the reliability of electricity supply, only 16% of houses scored a poor rating.

3.4. Rating The Quality Of Living Conditions In Farmers’ Houses

The rating of the quality of living conditions in the farmers’ houses included nine categories, i.e. lighting quality, sunlight in the rooms, WC facilities, AC (air conditioning) facilities, kitchen facilities, storage facilities, chemicals storage safety, fire safety and privacy. Most of the scores are between very poor and poor. The main problem was associated with the chemicals’ safety storage facilities and inadequate WC facilities. Privacy was considered to be lacking. The highest score in the good rating category was 42% for adequate AC facilities.

3.5. Ratings Of Environmental Conditions In Farmers’ Houses

The quality of environmental conditions in farmhouses was rated based on the presence or absence of First Aid, safe windows/door, safe ceiling/walls, safe water containers, seepage in walls, insects, mice, mold and exposed

electrical wires. The main issues were the presence of exposed electrical wires and seepage in walls, and the presence of insects and mold. First Aid was present in all cases.

3.6. Measurements of indoor air quality within farmers' houses

The components of indoor air quality measured within farmers' houses included temperature ($^{\circ}\text{C}$), relative humidity (%), $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) and PM_{10} ($\mu\text{g}/\text{m}^3$). The mean temperature and humidity of the houses were 28.1 (SD = 1.8 $^{\circ}\text{C}$) and 47.0% (SD = 7.6%), respectively. The mean $\text{PM}_{2.5}$ and PM_{10} were 55.0 $\mu\text{g}/\text{m}^3$ (SD = 35.8 $\mu\text{g}/\text{m}^3$) and 615.6 $\mu\text{g}/\text{m}^3$ (SD = 419.4 $\mu\text{g}/\text{m}^3$), respectively.

4. Discussion

The results of farmers housing conditions in Liwa region (UAE) showed that participants were suffering from inappropriate housing quality conditions that can affect their health and safety.

The house quality and characteristics associated with the satisfaction of the individuals are a requirement from the perspective of UAE Ministry of Foreign Affairs⁴⁰, of ILO⁸ and other international guidelines, but were not met in the houses that were surveyed in this work. The main issues include lack of privacy, poor garbage and sewage disposal facilities, lack of storage facilities for chemicals used in the farms, poor fire safety, exposed electrical wires, seepage on walls, presence of mold and insects. Visual inspection confirmed these issues and showed extremely dirty conditions. Nonetheless, the satisfaction results indicate that most workers were satisfied with these conditions. This could be either due to lack of knowledge of best practices and good standard conditions, or was an attempt to refrain from complaining in fear of being fired.

All recorded values of particulate matter exceeded the WHO limits for both $\text{PM}_{2.5}$ and PM_{10} . This is due to the general lack of house cleanliness, to indoor smoking and cooking. These conditions are likely to impact their respiratory system.

The indoor relative humidity was of good standards for the comfort of these workers⁴⁶ whereas some of the temperature readings were high due to the very high outdoor temperatures and inefficient AC facilities, inadequate windows and doors, and a poorly insulated house envelope.

According to the workers, the owners are more concerned about the agricultural practices and the profit of their farms, not the workers and their house conditions. This in turn leads to the workers neglecting their responsibility towards the house conditions.

The housing conditions could be upgraded if all stakeholders took their responsibilities seriously.

5. Conclusions And Recommendations

This study showed that the Abu Dhabi Municipality and government guidelines relating to building standard, infrastructure and services guidelines, and environmental conditions were not implemented in the surveyed farms in the Liwa region. Given the results of this work, the project hypothesis was accepted.

The authorities that are associated with the building process of these houses should be adopting the most recent standard for accommodation and occupational health and safety guidelines for agricultural workers to insure their health and safety as they work in a very harsh environment that could lead to illnesses if the basic needs are not met. In addition, the authorities should take action to follow up the housing conditions. For example, authorities should have a new action plan that would improve the conditions of these houses and provide a competition between the owners for "the best workers house" and give them an award. The owners should be provided with the guidelines that should be followed to insure the suitability of these houses for their workers.

Local municipalities and authorities need to create a new department responsible for responding to the concerns of housing quality by workers. This department must have the capability to assess whether the houses meet the required standard. Farm owners should be educated on how house conditions can affect the performance of their workers. New educational programs and improved guidelines should be introduced. If participation in educational programs does not lead to action by the owners, these should be followed by warnings and eventually by fines.

The examination of water quality should also be part of future investigations of the services provided to farm workers. Furthermore, this project can be carried out in the future by Abu Dhabi Municipality departments. In addition, the municipality could improve this project by adding more data on housing conditions and by implementing the required improvements. For example, if they extend the survey to a larger number of farms, the findings could be more representative.

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