MORE SUSTAINABLE PEST MANAGEMENT

CASE STUDY IN AGADIR, MOROCCO | FLORENCE ESTUBLIER
LEIDEN UNIVERSITY | INSTITUT AGRONOMIQUE ET VÉTÉRINAIRE HASSAN II

WHY? 1

Population grows annually and is expected to reach 9.6 billion people in 2050 [1]. This makes food security essential; in quantity as well as in quality. However, climate change is making sufficient food production challenging due to unpredictable weather with very low or high temperatures, and insufficient or extreme rainfall which may lead to periods of floods or droughts [2]. Morocco is one of the countries facing these challenges and has developed intensive cultivation in the last few decades [3]. More specifically, the Souss Massa Valley is the country's largest region for vegetable production with 451,165 ha of cultivated land of which most production is for export [4]. Tomatoes are the most common crop and this year more than 22,000 ha of tomato plantations have been placed for an expected production of over 1.6 million tons of fresh tomatoes [3,4]. However, due to these intensive cultivation technologies, tomato crops can be highly infested by pests and diseases which result in a high loss of quality fruits [5]. In consequence, compared to last year, 20% fewer crops have been harvested this winter [5].
To avoid and try to control this problem now many pesticides are applied to crops which have a serious impact on people's health, food quality, the environment and also the production costs [6,7]. While pesticide use is a significant challenge in food safety, research on current practices of pest management in the Souss-Massa region is lacking.

HOW? 2

This study can help sustainable horticulture in Morocco by serving as a baseline for a first step in this knowledge inventory which would help the ImpactCluster in making actual step-wise improvements on this theme possible in practice. Moreover, this study would highlight the need for further investigations on this subject for the development and placement of more sustainable pest management. This is extremely important for the protection of food security, human health, the environment as well as international trade.

RESEARCH QUESTIONS 3

How can we grow tomatoes in a more sustainable way in terms of pest management in Agadir?

- How are pests & diseases currently managed?
- What is the biology and ecology of the pests & diseases?
- Which biological solutions could be implemented?

METHODOLOGY 4

Grounded theory qualitative data analysis

- Online questionnaire Google Forms to tomato exploitations
- Reports of IAV II on tomato crop
  - Coding and with QDA software ATLAS.ti
    See Figure 1 for the steps within QDA
- ONSSA phytosanitary database
  - Pesticides commercial names
  - Active materials
  - Dosages
  - Application Limitations
- Literature database with inclusion criteria
  - Biology of pests & disease
  - Ecology of pests & disease
  - Biological alternatives
    - Natural enemies
    - Biopesticides
    - Varieties or clones

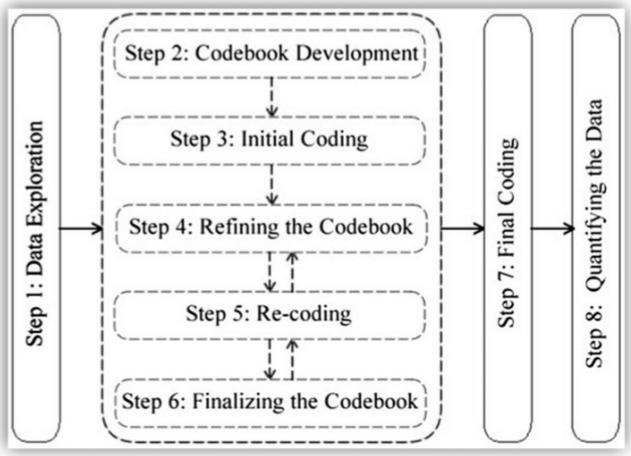

Figure 1. Step-wise flow of coding for QDA [8].

RESULTS 5

CONCLUSION 6

Loading...

REFERENCES

[1] U. Nations, "ONU: la population mondiale devrait atteindre 9,6 milliards en 2050 | Nations Unies," Accessed: Jun. 26, 2023. [Online]. Available: https://www.un.org/fr/desa/un-report-world-population-projected-to-reach-9-6-billion-by-2050.
[2] "Moroccan agriculture: Facing the challenges of a divided system - Sustainable Food Trust." https://sustainablefoodtrust.org/news-views/moroccan-agriculture-a-divided-system/ (accessed Jun. 27, 2023).
[3] "Agriculture | Région Souss Massa." https://www.soussmassa.ma/fr/agriculture (accessed Jun. 21, 2023).
[4] "Moroccan tomatoes continue expansion | Article | Fruitnet." https://www.fruitnet.com/eurofruit/moroccan-tomatoes-continue-expansion/248510.article (accessed Jun. 21, 2023).
[5] "Tomato production costs have risen sharply this year – AgriMaroc.ma." https://eurs.dayfr.com/business/301567.html (accessed Jun. 26, 2023).
[6] R. Salghi et al., "Pesticide residues in tomatoes from greenhouses in Souss Massa Valley, Morocco," Bull. Environ. Contam. Toxicol., vol. 88, no. 3, pp. 358–361, Mar. 2012, doi: 10.1007/S00128-011-0503-9.
[7] H. Chaabane, A. Ouakhssase, A. Chahid, M. Taourirte, and A. Aamouche, "Pesticides in fruits and vegetables from the Souss Massa region, Morocco," Food Addit. Contam. Part B Surveill., vol. 15, no. 2, pp. 79–88, 2022, doi: 10.1080/19393210.2022.2028196.
[8] A. Karabulut-Ilgu, S. Yao, P. Sovakinen, and C. Johren, "Student Perspectives on the Flipped-Classroom Approach and Collaborative Problem-Solving Process," J. Educ. Comput. Res., vol. 56, no. 4, pp. 513–537, Jul. 2018, doi: 10.1177/0735633117715033.

Universiteit Leiden The Netherlands
TU Delft Delft University of Technology
Erasmus University Rotterdam