

## **REVIEW**

of the thesis by **Alua Oralovna Omarova** on the topic of  
**Assessment of safe drinking water provision in rural areas of Karaganda region: a case study from Bukhar-Zhyrau district**  
in candidacy for the Degree of Doctor of Philosophy (PhD)  
in 6D110200 – Public Health

### **1. Relevance of the research topic and its relationship with general scientific and national programs (challenges of practice and development of science and technology).**

Omarova has investigated how the rural area of a district in the Karaganda region is supplied with drinking water. The state of Kazakhstan has integrated the SDG6 of UN into several programs for regional development to improve the supply of water in rural areas. Kazakhstan is a semiarid country with limited water resources. Safe drinking water provision is central for improving health and preventing diseases among the population, not least infants and children in the age 0-5 years, who are most vulnerable to inferior water quality. In the thesis, Omarova describes well the background and relevance of the research topic and relate the discussion to the scientific and national programs for provision of safe drinking water, particularly in chapter 1, Drinking water as a risk factor to public health and chapter 3, Challenges of drinking water provision in rural areas of Karaganda region. In my opinion, these chapters give sufficient background and explanations to put the work into its scientific and national policy context.

### **2. Scientific results in the framework of requirements for theses.**

A thesis should bring new and original research results to the scientific community and make available methods and analyses used in the research for other researchers. The work should be accessible for the research community, preferably through international sources. Omarova has written the thesis in English and also co-authored six papers in international peer-review scientific papers. The output of Omarova is according to my judgement sufficient to meet the general requirements for a PhD thesis.

### **3. The degree of validity and reliability of each result (scientific findings), summary and conclusions formulated in the thesis.**

The validity and accuracy of the statements submitted to the defense are confirmed by a literature review in chapter 1, a clear description of the materials and methods used including data processing and statistical analysis in chapter 2, and scientific findings of the survey of the provision of drinking water in the study area as well as an epidemiological characterization of the Karaganda region and the study area in chapter 3. The tasks presented in the work have been solved and confirmed by the findings and conclusions. The statements to be defended are in accordance with the stated objective and tasks.



**4. The degree of novelty of each scientific result (findings) and conclusion formulated in the thesis.**

Provision of safe drinking water as a measure to improve health in a population is of course not a novel observation. But the thorough survey and detailed interviews with persons living in the Bukhar-Zhyrau district is new and the results relevant not only for Kazakhstan but for all countries struggling with how to solve rural water supply for its population. The conclusions are based in the empirical results from the fieldwork and also from the extensive literature review. They are made available for the first time and provides important and relevant information on the topic.

**5. Assessment of the internal unity of the obtained results.**

The thesis is written as a book with separate chapters logically ordered. It is possible to read the book as a comprehensive manual for public health aspects of rural drinking water supply, which I think is in full accordance with the requirements. All sections of the thesis are logically interrelated and characterized by a consistency of materials. There is compliance of the conclusions with the results and tasks of the thesis. Thus, my assessment is that the thesis has an internal unity.

**6. The orientation of the results obtained by the candidate to the solution of the relevant topical problem or a theoretical/applied task.**

Omarova has combined interviews and surveys with literature reviews with the ambition to present the actual state of mind among the rural population. In the results, ways to assess the drinking water supply coverage, the system approach used to improve WASH and measures to strengthen the capacity among authorities and population to develop WASH for rural areas are well described and discussed. This setup is relevant to the key question for how to improve health in rural areas by improving the provision of drinking water to all.

**7. Confirmation of the completeness of publication of the main provisions, results, findings and conclusions of the thesis.**

Omarova's thesis presents full results and extensive conclusions from the empirical study of rural water supply. The thesis is thus at least as complete as can be expected for a research output, if not more.

**8. Compliance of the thesis abstract with its content.**

The abstract summarizes well the content of the thesis.

**9. Deficiencies in the content and design of the thesis.**

A thesis is seldom perfect. Overall, the thesis is written in proper English and well edited. But also in this thesis, it is possible to identify typos, some grammatical errors, or repetitions. Any deficiencies in the text do however not alter my general assessment of the quality of the work, nor reduce the value of the research or limits its relevance for the field.



**10. Conclusion on the possibility of awarding the degree of Doctor of Philosophy (PhD) in the relevant specialty.**

The thesis of *Alua Oralovna Omarova* on the topic of *Assessment of safe drinking water provision in rural areas of Karaganda region: a case study from Bukhar-Zhyrau district* in candidacy for the Degree of Doctor of Philosophy (PhD) in 6D110200 – Public Health is a complete and independent scientific work. Considering the relevance of the topic, the scientific novelty and the practical significance of the findings, I believe that this thesis work meets the requirements of the Rules for Award of Degrees approved by order from the Minister of Education and Science of the Republic of Kazakhstan. The thesis is recommended for public defense.

**Reviewer:**



Kenneth M Persson

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Professor, Lund University, Sweden