

REQUIRED PROFILE OF TRAINERS AND INSTRUCTORS OF FOREST WORKERS IN GREECE

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Abstract: *Teaching personnel plays a central role in vocational training systems. This paper presents the results of a study on the required profile of trainers and instructors responsible for the theoretical and practical part of the training, respectively, of forest workers in Greece. The data was collected by means of personal interviews of forest workers and a mailed questionnaire to forestry experts. According to the results, forest engineers and forest workers are the best choice for trainers and instructors, respectively. An average work experience of about 6 years is required for trainers, and it increases to 12 years for instructors of forest workers, and to 15 years for instructors of machine operators. All groups of teachers will be required to update their knowledge, as well as to acquire pedagogical skills. Information and communication technology is expected to play a significant role, and future teachers will be expected to implement it in the teaching process. The use of content analysis provides more insight into the perceptions and attitudes of the respondents, which were recorded during the interviews.*

Keywords: *vocational training, questionnaire, content analysis, forest operations, Greece.*

1. Introduction

The key role of Technical and Vocational Education and Training (TVET) in national development has been universally acknowledged [12]. It is considered to be one of the most productive elements of education, with focus on preparing individuals for the work environment by teaching them the skills and competences necessary for economic competitiveness [13]. In addition to the development of professional skills and

competences, TVET goes further as a factor for personal development by promoting the effective participation of its recipients in society [7].

Vocational education and training is an important part of social life, particularly useful in sensitizing young people in the framework of a holistic, sustainable development of society as a whole [23].

Training of forest workers refers to a specialized vocational training system initially focusing on the provision of trained personnel employed in forest

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operations, which still represents its core activity. However, in the course of time, forest workers' training has been partially modified and enriched as a result of forest mechanization [20], the introduction of new types of equipment and working methods, as well as the diversified needs of the forest sector around the world. Thus, new training needs have been identified (e.g. training of forestry equipment operators) and new fields requiring specific professional dexterities and knowledge have been added (e.g. urban forestry, green space management) to the "traditional" courses. Particularly worthy of mention in the context of vocational training are the modularization of training and the introduction of specializations [3]. Course content has been adapted to ongoing social and technical developments, resulting in increased emphasis on language skills, the improvement of business qualifications, the addition of competences in the area of mechanization and logistics, and expansion of methodological competences [3].

The forest workers training systems are under the constant pressure to provide up-to-date information under often changing conditions and considerable technological advancements. Nowadays, individuals must possess a combination of knowledge, practical and social skills, and positive attitudes, as well as the ability to think and act independently, creatively, and responsibly. Trained forest workers are to be regarded as collaborators in forestry, while embodying extended versatility, responsibility, and self-sufficiency [10].

If vocational training in forestry is to meet such diverse expectations, trainers and instructors responsible for teaching the theoretical and practical part, respectively, play a substantial role in a Forest Workers' Training System (hereafter FWTS). This is due to the fact that they are asked to facilitate the advancement to a new

professional life. They should possess a sound pedagogical and technical background which will enable them to plan, implement, and develop the teaching process [10]. At the same time, Information and Communication Technology (ICT) tools change the way we live and work, suggesting the need for transformations in teaching and learning in TVET [17]. Traditional teaching and learning models, which convey a formal, abstract process, are often far removed from the specificity of real world practice. This fact underlines the importance of having qualified and versatile teachers and trainers who can cope in a sufficient way with the demands set by the changing working environment [6].

In Greece, there is currently no offer of vocational training in forestry, despite its well-documented gains in terms of operational efficiency [11], ergonomics, [14] and quality of work [9]. A recent rise in the number of forest personnel is evident [18], in contrast to a steady decline until 2010 [16]. This is due to the economic recession which affected many production sectors and also increased the demand for firewood [1], a fact which initiated a new employment opportunity for young people. Such a development would imply a significant increase of the rural employment in this mountainous country.

As a result of the above, a FWTS is expected to contribute to the development of the national forestry and facilitate rural development. This study was carried out in order to explore the forestry experts' and forest workers' perception of the educational and professional background that teachers and instructors should possess in order to provide an optimum teaching experience.

2. Materials and Methods

2.1. Selection of Participants

Forest workers and forestry experts participated in this study. Forestry experts were selected according to the “experts sampling method”, in which the researcher is particularly interested in the experts’ perceptions of their fields [2]. Therefore, a list containing all the experts on forest operations was drawn, which consisted of university professors, researchers, representatives of the private forest owners’ union and experienced officers of the State Forest Service.

The selection of forest workers proved to be more difficult as the official data on the active members of the forest workers’ cooperatives was not updated. Therefore, various areas were visited and the situation was examined on site. In each visited prefecture, a list of the professionally active forest workers was compiled. The membership in a forest workers’ cooperative and the continuous employment in forest operations during the last five years were set as preconditions for the selection of participants in the study.

2.2. Questionnaire and Interviews

The results originate from a mailed questionnaire to forestry experts nationwide and personal interviews conducted with forest workers in 13 prefectures. Data collection was based on a structured questionnaire with the majority of questions common for both participant groups. The questionnaire was pre-tested to check for biased, misleading, or confusing questions, and to verify the quality and comprehensiveness of the information retrieved.

The questionnaire was accompanied by a cover letter explaining the background and purpose of the study. In its first part,

profile information was collected from all respondents. The last page of the questionnaire was intentionally left blank, so that the responding forestry experts could comment or make suggestions on the topic of the study. These comments were also considered for the content analysis. Personal interviews were conducted with the forest workers from the chosen cooperatives. Informal follow-up discussions were encouraged in order to assure the validity of the findings. Interview notes were taken by hand in order to carry out further analysis of the respondents’ perceptions.

2.3. Statistical Analysis

The responses were analyzed with the software SPSS Version 20. The criteria of normal distribution and homogenous variance of data were not met, as a result of the non-random sampling method used. Therefore, solely non-parametric analyses were used to explore comparisons between respondent sub-groups and the relationships between variables [22]. Maximum likelihood χ^2 test ($p \leq 0.05$) was also used to test whether statistically significant differences could be found between the answers of the two groups of participants.

2.4. Content Analysis

Content analysis stands for the study of content of communication [8], which in this case consisted in the comments provided by forest experts and forest workers. Such an analysis is very useful by providing additional information and, in some cases, supplementing the missing data or clarifying the available information, as this is not always possible in experimental or survey research [21].

Interview notes were taken by hand and entered into Microsoft Word as individual files corresponding to each respondent.

The transcribed material was read through several times to make sense of the data. Then, coding was performed by applying the same codes to identical or highly-related opinions [4]. Codes consisted of numbers which helped to identify the questions (dimension) and letters to identify the answers (category) [19]. For example, in the case of code “3a”, “3” represented the dimension (3 referring to the reason for the current forest workers inefficiency as future instructors), and the “a” was attributed to “on-the-job experience”. When possible, the number of categories was reduced, as they were merged into higher order categories based on similarities and dissimilarities [5]. One more read-through of the transcribed material was performed by another researcher after all the codes were finalized, in order to validate the interpretations and the categories.

3. Results and Discussion

For a more concise representation, the results of the content analysis are presented in connection to the respective results of the quantitative research.

3.1. Educational Background of the Trainers and Instructors

According to the forestry experts, the future trainers should have a forest engineering educational background as

“Forest engineers” (85.86%) or “Forest engineers with MSc” (82.83%) were the first choices (Table 1). “Forest technicians” could also teach the theoretical part of the training, according to 72.37% of the forestry experts. Although the difference was small, the forest workers ranked “Forest engineers with MSc” first (97.1%), followed by “Forest engineers” (91.4%) and “Forest technicians” (62.5%). Experienced forest engineers working for the State Forest Service would be a very good option, according to ten forestry experts as well as to the majority of forest workers. This is probably due to their close relationship with the State Forest Service, as the majority of the forest workers questioned have participated in short courses organized by the Forest Service and they have had a year-long cooperation with it regarding forest management.

Eight forestry experts suggested that medical doctors should teach “First Aid” and be the first option for “courses related to human anatomy and physiology”. This choice could also “increase the interest of the program participants due to the prestige related to the medical profession in rural areas” (four responses). According to the respondents, having an “MSc title in Forestry does not necessarily qualify them holder as a trainer, unless this MSc is on a topic related to forest operations” (four responses).

Suitability of various categories of trainers and instructors

Table 1

	Trainers of forest workers			
	Forest engineers with MSc	Forest engineers	Forest technicians	Forest workers
Forest experts	82.86%	85.86%	72.73%	75.76%
Forest workers	97.12%	91.35%	62.5%	97.12%
χ^2	11.657	1.520	2.42	20.063
df	1	1	1	1
p	0.001	0.203	0.135	0.000

Experienced forest workers could teach the practical part of the training according to 75.8% of the forestry experts and to 97.1% of the forest workers ($\chi^2= 20.063$, $df=1$, $p<0.001$). Despite the almost unanimous attitude of the forest workers, some experts tend to believe that “forest engineers would be more suitable to do the practical training” due to their “better theoretical background” (ten responses), their “ability to refer to interlinked subjects, not only to the working techniques” (seven responses), and their “ability to control the teaching process better than forest workers” (five responses). Respondents justified the inefficiency of current forest workers by categorising them as future instructors in their “on-the-job training” (seven responses) but that would not be the case for future forest workers “coming from proper vocational training, which applies to other countries” (five responses).

3.2. Professional Experience of the Trainers

Following the analysis of the forestry experts’ beliefs, an average professional experience of 7.19 years resulted for the future trainers. More specifically, 41.84% of them suggested a required experience of “3 to 6 years” and 32.65% of them suggested a required experience of “9-12 years”. The justification was that “ten years is an adequate time period for better understanding and teaching practical situations in forest operations” (seven respondents). A group of experts (nine respondents) insisted on “the importance of age difference between the trainers and the apprentices” especially in the case of “practical training”, where age difference is a “serious differentiation factor” by “adding more authority to the instructor”,

and thus making the apprentices more receptive to his/her teaching process.

Interestingly, the results of the forest workers’ analysis suggested a significantly lower working experience of 5.78 years with 52.94% of them choosing 3-6 years and 22.55% of them choosing 1-3 years ($\chi^2= 11.197$, $df= 4$, $p= 0.024$).

3.3. Professional Experience of the Instructors

According to the respondents’ perceptions, Figure 1 shows the professional steps of a forest worker in the case of an organized FWTS. Three levels can be identified: the trained forest worker / machine operator, the supervisor of forest works, and the instructor of motor-manual operations or machine operators. The respondents had the opportunity to express different opinions, such as the omission of a professional level, but that didn’t happen. According to the presented scheme, the progress to the next level requires a minimum number of years of work experience. Data gathered from forestry experts suggested 3.76 years of experience for a trained forest worker to become a trained machine operator, which was significantly higher than the 2.92 years based on the suggestions of the forest workers (Table 3). “Forest machinery is very expensive and damages can cost many lost workdays, so the more experience in forest operations “the better” (five forestry experts) may explain the conservative view on this topic. On the other hand, according to the forest workers “three years of experience is enough” (eleven responses), as “the more you work with a machine, the more you learn how to cope with difficult situations” (seven answers), and additionally, “machine operators should not start their professional career at an older age” (six answers).

Required professional experience of trainers

Table 2

	N	Range [years]	Mean [years]	Std. Deviation [years]	Mean s.e. [years]
Forestry experts	98	1.5 - 15	7.19 ^a	3.68	0.37
Forest workers	102	1-20	5.78 ^b	3.30	0.33

Different letters denote significant difference at $\alpha=0.05$

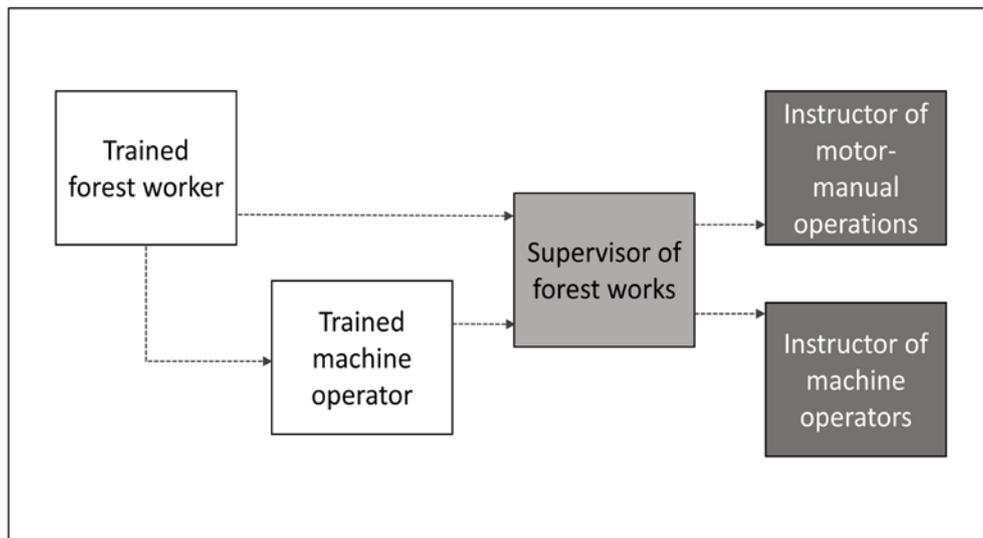
Fig. 1. *Proposed levels of professional development**Required experience for progressing to the next professional level*

Table 3

Professional level	Group	N	Mean [years]	Std. Deviation [years]	s.e. Mean [years]
Machine operators	FE	86	3.76 ^a	2.30	0.25
	FW	95	2.92 ^b	2.08	0.21
Supervisors of forest operations	FE	87	5.57 ^a	3.35	0.36
	FW	95	6.36 ^a	3.82	0.39
Instructors	FE	87	5.64 ^a	3.57	0.38
	FW	95	6.57 ^a	3.38	0.35
Total experience for MMO instructors	FE	87	11.21 ^a	6.20	0.66
	FW	95	12.94 ^b	5.55	0.57
Total experience for FMO instructors	FE	86	14.87 ^a	7.34	0.79
	FW	95	15.85 ^a	6.15	0.63

(MMO – Motor-manual operations; FMO – Forest machine operators; FE – Forestry experts; FW – Forest workers). Different letters denote significant difference at $\alpha=0.05$.

Analysis of the data gathered from the forestry experts proposed 5.57 years of experience required to move from trained forest workers / machine operators to

supervisor of forest workers, compared to 6.36 years as yielded by the responses of the forest workers. Becoming an instructor should prerequisite 5.64 years of experience

according to the first group, and 6.57 years according to the second group, respectively. In both cases, the majority of respondents suggested “2.5-5 years”, followed by “7.5-10 years” of experience, and no statistically significant differences were found.

The majority of respondents in both groups assessed the importance of ICT tools implementation in forest workers’ training from “Medium” to “Very high” ($\chi^2= 5.944$, $df= 4$, $p=0.203$). ICT can facilitate a “better teaching experience” (twelve responses) and it “complements the traditional class” (nine responses). Basic ICT skill development “should be offered in a FWTS” (seven responses) in order to enable forest workers’ access to online information and “to refresh their knowledge and be up-to-date” (eleven responses). “Websites dedicated to forest operations” can be very helpful (eight responses). Similar approaches have been used in other countries since the start of the new millennium [17].

3.4. Fields of Further Training

Forestry experts were asked to assess the importance of various training subjects on which the future trainers and instructors should be trained further (Table 4).

“Wood Harvesting” and “Ergonomics” were identified as disciplines which require special attention. More specifically, “forest practice differs from textbooks” (five responses) and “common mistakes and misconceptions regarding safety and health during work should be stopped” (eight responses). Special attention should also be given to “First Aid” (63.6%), due to “the large number of accidents every year” (twenty-one responses). “Forest work techniques” (55.6%), “Forest machinery operation and maintenance” (55.6%), and “Silviculture” (54.5%), as subjects closely related to the traditional work content of forest operations, were also suggested by the majority of respondents.

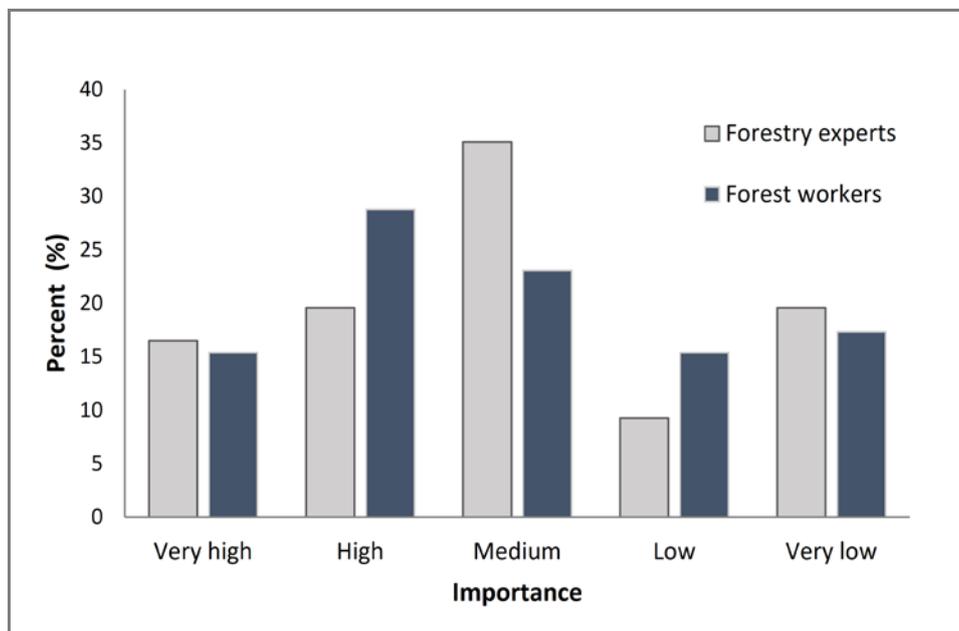


Fig. 2. Respondents’ opinions on the importance of ICT tools

Table 4

*Importance of training subjects as assessed by the participants
in the study*

Subject	Percent [%]
Wood harvesting	70,7
Ergonomics	70,7
First aid	63,6
Forest work techniques	55,6
Forest machinery operation and maintenance	55,6
Silviculture	54,5
Technical constructions	43,4
Pedagogic psychology	41,4
Reforestation	39,4
Developments in forestry	39,4
Forest fires	34,3
Didactics	33,3
Game management	29,3
Recreation works	23,2
Ecology	21,2
Forest plant diseases	16,2

Pedagogical psychology and didactics were also considered necessary, but to a lesser extent compared to the previous disciplines. Thus, respondents acknowledged that achieving high efficiency in teaching is “as important as the course content” (nine responses) and “it is absolutely necessary” (twelve responses). The training “should not be one-off but continuous according to the demands of the modern economy and needs” (seven responses). “Refresher training is also important for trainers and instructors” (five responses). In this context, short courses can also be used in informing the trainers and instructors about new technological developments in working techniques and new equipment, as well as in pedagogical aspects. The “cooperation with forest workers’ training schools abroad would be especially useful” (two responses).

However, it should be noted that the job definition of forest worker can vary significantly, from the logger of the past decades to the experienced worker whose

knowledge and dexterities can transform him into a useful forest management instrument [15]. In the case of a module-based training system, the module selection and duration can vary according to the needs of the group that will be trained. Such an approach should entail trainers and instructors who already have the required background, or ones competent and flexible enough to acquire it.

4. Conclusions

This study provides information on the required profile of trainers and instructors of forest workers in Greece. The discrepancies observed between the forestry experts and the forest workers can be explained by the different overview of the forest operations sector that the two groups of respondents have which should be taken into consideration. The originality of this paper lies within the use of content analysis in combination with a designated questionnaire. The majority of social research in forestry, and more specifically

in forest operations, makes almost exclusive use of quantitative research. However, this study has shown that content analysis can provide more insight into the perceptions and attitudes of the respondents, and reveal valuable information, as it has been collected during the interviews.

The analysis of the results has provided sufficient information about the requirements that should be fulfilled by the trainers and instructors of forest workers. The answers provided are complemented the respondents' justifications, which should be taken into consideration. Teaching personnel with a sound theoretical, practical, and pedagogical background can guarantee high teaching efficiency and, subsequently, a better level of forest utilization.

References

1. Arabatzis G., Malesios C., 2013. Pro-environmental attitudes of users and non-users of fuelwood in a rural area of Greece. In: *Renewable and Sustainable Energy Reviews*, vol. 22, pp. 621-630.
2. Battaglia M.P., 2008. Nonprobability sampling. In: *Encyclopedia of Survey Research Methods*, SAGE Publications, pp. 523-526.
3. Bernasconi A., Schroff U., 2011. Professions and training in forestry - Results of an inquiry in Europe and Northern America. Federal Office for the Environment, Bern, Switzerland.
4. Bogdan R., Biklen S.K., 2007. *Qualitative Research for Education: An Introduction to Theories and Methods*. Pearson International, Boston, U.S.A.
5. Burnard P., 1991. A method of analysing interview transcripts in qualitative research. In: *Nurse Education Today*, vol. 11(6), pp. 461-466.
6. Bünning F., 2007. Approaches to ction learning in Technical and Vocational Education and Training (TVET). InWent – Internationale Weiterbildung und Entwicklung GmbH Capacity Building International, Bonn, Germany.
7. Bünning F., Gleißner K., Jing M. et al., 2011. Initiatives to foster Chinese TVET and TVET Teacher Training. Zusammenarbeit D.G.f.I., Magdeburg.
8. Devi Prasad B., 2008. Content Analysis - A method in Social Science Research. In: Lal Das D.K. and Bhaskaran V. (eds), *Research methods for Social Work*, Rawat, New Delhi, pp. 173-193.
9. Efthymiou P.N., 2011. Harvesting of forest products - University lectures (In Greek). Aristotle University of Thessaloniki, Thessaloniki, Greece.
10. Evju O., 1989. Further training of professional forest workers. Jämsänkoski, FINNIDA.
11. Garland J.J., 1990. Assessing gains from woodworker training. In: *International Journal of Industrial Ergonomics*, vol. 5(3), pp. 227-242.
12. Pavlova M., 2014. TVET as an important factor in country's economic development. In: SpringerPlus, vol. 3(Suppl 1), pp. K3.
13. Rufai A., Kamin Y., Balash F., 2013. Technical vocational education: as a veritable tool for eradicating youth unemployment. International Organization of Scientific Research, New Delhi, India.
14. Spinelli R., Aalmo G.O., Magagnotti N., 2014. The effect of a slack-pulling device in reducing operator physiological workload during log winching operations. In: *Ergonomics*, vol. 58(5), pp. 781-790.
15. Tsioras P.A., 2004. Analysis and formation of modern forest workers' training systems for the Greek Forestry (In Greek). Dissertation. Thessaloniki, Aristotle University of Thessaloniki.

16. Tsioras P.A., 2010. Perspectives of the forest workers in Greece. In: *iForest*, vol. 3, pp. 118-123.
17. Tsioras P.A., 2013. Implementation of E-Learning in Forest Workers' Training for Sustainable Forest Management. In: Maumbe B.M. and Patrikakis C.Z. (eds), *E-Agriculture and Rural Development: Global Innovations and Future Prospects*, IGI Global, pp. 200-219.
18. Tsioras P.A., 2015. Organisational aspects of a forest workers' training system for Greece. In: *Bulletin of the Transilvania University of Brasov, Series II: Forestry, Wood Industry, Agricultural Food Engineering*, vol. 8(1), pp. 23-30.
19. Vaughan D., Mackes K., 2015. Characteristics of Colorado forestry contractors and their role in current forest health issues. In: *Forest Products Journal*, vol. 65(5-6), pp. 217-225.
20. Väyrynen S., 1982. Occupational accidents in the maintenance of heavy forest machinery. In: *Journal of Occupational Accidents*, vol. 4(2-4), pp. 175-175.
21. Woodram E., 1984. Mainstreaming content analysis in social science: Methodological advantage-obstacles and solutions. In: *Social Science Research*, vol. 13(2), pp. 1-9.
22. ***SPSS, 1998. *SPSS Base Applications Guide*. SPSS, Chicago, U.S.A.
23. ***UNESCO, 2012. *One decade of UNESCO-UNEVOC*. Bonn, Germany.