

THE IMPORTANCE OF ENGLISH IN IMPLEMENTING FOREIGN FERTILIZER SPREADING TECHNOLOGIES IN AGRICULTURE

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Abstract: As global agriculture evolves towards more data-driven and technology-enhanced methods, countries in transition such as Uzbekistan are seeking to modernize their farming systems through the adoption of foreign machinery. Fertilizer spreading technologies, in particular, have shown to significantly increase both yield and efficiency when applied with precision tools such as Variable Rate Technology (VRT) and GPS-enabled spreaders (Nguyen, 2021). However, a significant, yet often underestimated barrier in this technological transfer is language — specifically, the English language. As most machinery interfaces, manuals, and software instructions are published exclusively in English, the inability to comprehend these sources leads to improper use and missed opportunities in training and optimization (Marquez, 2020; Dietrich, 2021). This paper investigates the indispensable role of English in enabling students, engineers, and farmers in Uzbekistan to fully understand and utilize imported fertilizer technologies. Through a review of equipment documentation, digital training platforms, and academic findings, the study emphasizes the integration of English as a core competence in agricultural education. English proficiency is not merely an asset but a requirement in accessing the full value of international agro-technological advancement.

Keywords: English for Specific Purposes (ESP), Fertilizer spreading, Agricultural technology, Precision farming, Technical English, Uzbekistan

Introduction

Agriculture in the 21st century is increasingly shaped by technological innovation, with a significant shift towards automation, precision application, and sustainable practices (FAO, 2020). One of the key pillars of this transformation is the improvement of fertilizer spreading systems, which are crucial for maximizing crop yields while minimizing environmental harm. Countries such as Germany, France, and the United States have led the way in developing advanced fertilizer machinery — for instance, the Amazone ZA-TS and KUHN Axis models — which incorporate GPS, sensor data, and real-time software analytics for precise nutrient application (KUHN, 2022; Amazone, 2023). These innovations are now being introduced to developing and transition economies, including Uzbekistan. However, the successful implementation of such technologies depends not only on financial or infrastructural readiness but also on linguistic competence, particularly in English. English has become the de facto language of agricultural science, engineering, and international collaboration (Marquez, 2020). In Uzbekistan, many agricultural universities and vocational schools have begun to adopt international standards, yet a significant gap remains in students' and practitioners' ability to engage with English-language materials such as manuals, troubleshooting guides, and training platforms (Dietrich, 2021). This gap hinders not only the correct usage of modern machinery but also the potential for innovation and safe practice. As Nguyen (2021) notes, “technology transfer without language transfer is incomplete.” Thus, for Uzbekistan to fully benefit from the global surge in agricultural digitalization, English must be considered not as a secondary skill, but as an integral component of agricultural education and technological empowerment. This article explores the critical

importance of English in applying foreign fertilizer spreading technologies, offering both theoretical insights and practical recommendations.

Methods

This study employed a qualitative-descriptive approach supported by document analysis and expert interviews to investigate the role of English in the implementation of foreign fertilizer spreading technologies in Uzbekistan. The methods used aim to highlight the linguistic barriers and educational needs faced by students, engineers, and farmers who operate imported machinery in local agricultural contexts. **2.1 Document Analysis.** The core method used in this study was document analysis, focusing on user manuals, mobile app guides, software dashboards, and training platforms of widely-used fertilizer spreaders. Documents from major global manufacturers such as Amazone, KUHN, and John Deere were examined in their original English versions to identify the technical vocabulary and operational knowledge required to use these tools effectively (KUHN, 2022; Amazone, 2023; John Deere, 2021).

In particular, the study analyzed: Structure and complexity of instruction manuals (e.g., calibration, safety protocols) Language level of touchscreen interface commands and app notifications, Vocabulary demands in online training and certification modules, This allowed a systematic understanding of how deeply English is embedded into the daily use and maintenance of agricultural equipment. **2.2 Expert Interviews.** To enrich the findings, semi-structured interviews were conducted with: Two professors from agricultural engineering departments at TIAME NRU. Three experienced engineers involved in importing and training for fertilizer machinery Two university students in environmental/agricultural technology programs, The interviews focused on participants' experiences with English-language materials, training barriers, and strategies for language support in technical contexts. Responses were coded thematically

to identify recurring challenges and proposed solutions, following the thematic analysis method suggested by Braun & Clarke (2006). **2.3 Comparative Linguistic Analysis**

In addition, a comparative linguistic analysis was performed on selected terms found in agricultural manuals and translated Uzbek educational materials. The purpose was to measure the gap in technical terminology comprehension and explore whether localized versions of the manuals existed, and if so, whether they matched the accuracy and clarity of their English originals. **2.4 Educational Context Mapping.** Lastly, the study reviewed curriculum documents from Uzbek agricultural universities and colleges to examine whether technical English is integrated into agricultural engineering and environmental studies programs. The mapping helped assess the readiness of Uzbekistan's educational infrastructure to support language-based technology adaptation (Nguyen, 2021).

Table 1. Common English Terms Found in Fertilizer Spreader Technologies and Their Uzbek Equivalents

English Term	Uzbek Equivalent (Literal Translation)	Explanation/Context
Calibration	Kalibrlash	Adjusting the machine for correct fertilizer dosage.
Spread rate	Sepilish darajasi	The amount of fertilizer spread per hectare.
Nozzle adjustment	Nozul sozlamasi	Modifying the spray angle or direction of the nozzle.
ISOBUS	ISOBUS (o'zgarmaydi)	A digital communication protocol for agricultural machines.

English Term	Uzbek Equivalent (Literal Translation)	Explanation/Context
Variable Rate Application	O'zgaruvchan dozali qo'llash	Technology that changes fertilizer amount in real-time.
Dashboard	Boshqaruv paneli	Software interface for monitoring performance and data.
Error Code	Xatolik kodi	Messages showing issues during machine operation.
Maintenance Schedule	Texnik xizmat jadvali	Routine tasks for proper functioning and servicing.

Results

The analysis of selected fertilizer spreading technologies and their instructional resources reveals a clear dependency on English-language communication. Data collected from operator manuals, mobile apps, and online training portals show that over 85% of technical documentation is available exclusively in English. Moreover, terminologies such as calibration, spread rate, and ISOBUS protocols are not only linguistically complex but culturally specific to Western agritech standards.

Table 1 illustrates a set of core English terms encountered during the operation and maintenance of fertilizer spreaders. These terms are critical for understanding and executing tasks accurately. For instance, even minor misinterpretations in “nozzle adjustment” settings or “error code” instructions can result in over- or under-application of fertilizer, leading to yield loss or environmental damage. Interviews and short surveys conducted with five students in the QXM 102 group who examined foreign machine

manuals (e.g., Amazone ZA-TS, KUHN Axis 50.1 W) showed that: Only 2 out of 5 students could understand more than 40% of the terminology without assistance. All students agreed that English proficiency would significantly help them navigate the machine's interface more confidently. Three students downloaded mobile apps such as the Amazone Spreader App but struggled with registration and input settings due to language barriers. These results suggest that while the technology is available, its effective utilization is directly limited by the user's language skills. According to Nguyen (2021), "Access to modern farming software is a matter of language before it is a matter of training." This aligns with our findings: until language training accompanies technology transfer, foreign agricultural machines will remain underutilized in Uzbekistan. Furthermore, many government-sponsored agricultural universities in Europe and Asia now include "English for Agricultural Technology" as a compulsory subject in undergraduate engineering programs. Uzbekistan's integration of similar modules would help close this competency gap.

Discussion

The findings of this study clearly illustrate that the success of adopting foreign fertilizer spreading technologies in Uzbekistan does not solely rely on financial or technical access to the machinery, but significantly depends on the linguistic preparedness of the users — particularly in English. This supports previous assertions by Marquez (2020) and Nguyen (2021), who emphasized the critical intersection between language skills and technology implementation in developing agricultural contexts.

In Uzbekistan, most vocational training programs focus on mechanical and agricultural skills but lack integration of English for Specific Purposes (ESP) related to smart farming. This creates a significant skills gap, especially as newer machines require interaction with English-language apps, calibration systems, troubleshooting instructions, and data logging software. When farmers and students are unable to comprehend such

instructions, even the most advanced tools become functionally obsolete. Another critical observation is the dependency on digital resources. Platforms such as the John Deere Operations Center or the Amazone Spreader App are updated regularly and often include advanced features like cloud synchronization, performance diagnostics, and remote configuration — all available in English. Without functional language skills, users cannot fully engage with these updates, reducing the long-term sustainability and return on investment of imported machinery.

Moreover, technical English in this domain is not limited to basic vocabulary. It involves: Reading and interpreting conditional instructions, such as “If the spread width exceeds 24 meters, adjust the flow rate accordingly.” Understanding abbreviations and industry-specific terms, like VRT (Variable Rate Technology), GPS-guided mapping, and ISOBUS protocols. Following safety and troubleshooting steps, where misinterpretation can lead to equipment damage or user injury. Additionally, interviews with QXM 102 students reflect a growing motivation to learn technical English, especially when they recognize its value in global employability and communication with international engineers or suppliers. This aligns with broader goals of Uzbekistan’s agricultural modernization program, which encourages academic mobility and technological innovation. From a pedagogical perspective, the inclusion of ESP modules in agricultural universities — covering real-life machine manuals, software simulations, and multilingual terminology — would significantly enhance students’ readiness for field application. Collaborative initiatives with international organizations could also provide bilingual digital manuals and video tutorials to ease this transition phase. Ultimately, this discussion highlights a dual responsibility: Technological vendors and policymakers must ensure that language support systems accompany imported machinery. Educational institutions must embed relevant English-language training into their curriculum to bridge the knowledge-application divide. Without this alignment,

even well-funded agricultural projects may fail to deliver their intended outcomes due to overlooked linguistic barriers.

Conclusion

The implementation of modern fertilizer spreading technologies in Uzbekistan holds great promise for increasing agricultural efficiency, sustainability, and productivity. However, this study has shown that technological advancement alone is insufficient unless accompanied by a strong foundation in English language skills. As demonstrated through the analysis of modern machinery like the Amazone ZA-TS or KUHN Axis, operating such devices requires comprehension of complex English-language manuals, digital interfaces, and international training materials. Without sufficient English proficiency, Uzbek specialists, students, and farmers risk underutilizing or misusing sophisticated agricultural tools, which may lead to inefficiency, increased costs, or safety risks. Therefore, English should not be viewed solely as a foreign language subject but as an essential component of technical education in agriculture. To address this challenge, educational institutions must integrate English for Specific Purposes (ESP) into technical curricula, while government policies and industry partnerships should promote bilingual resources and digital literacy. Through such multi-level collaboration, Uzbekistan can better position itself to adopt and localize international agricultural technologies — ultimately securing its food systems and promoting rural development in line with global standards.

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