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Değerli Okuyucular,
Hitit İş Sağlığı ve Güvenliği Dergisi'nin yeni sayısı ile sizlerle buluşmaktan büyük bir onur duyuyoruz. Dergimiz alanında ilerlemesi siz okuyucuların desteklerine ve teveccühlerine bağlı. Dergimizin kalitesini artırmak ve devamlılığını sağlamak amacıyla alanında uzman kişileri editöryal kurulumuza eklemiş durumdayız.
Dergimizin her sayısında, İş Sağlığı ve Güvenliği alanının çeşitli çalışma alanlarında makaleler yayınlamayı hedefliyoruz. Derginin bu sayısında literatüre katkı sağlayacağını düşündüğümüz 1 orjinal araştırma makalesini sizlerle paylaşıyoruz.
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Saygılarımızla,

Prof. Dr. Dursun Ali KOSE
HJOHS Editöryal Kurul adına

From the Editor

Dear Readers;
We are greatly honored to meet you with the new issue of the Hittite Occupational Health and Safety Journal. The progress of our magazine in its field depends on the support and favor of you, our readers. In order to enhance the quality of our journal and ensure its continuity, we have added experts in their fields to our editorial board.
In each issue of our magazine, we aim to publish articles on various fields of Occupational Health and Safety. In this issue of the journal, we are sharing 1 original research articles that we believe will contribute to the literature.
We wish all our readers enjoyable and productive reading.
Sincerely,

Prof. Dr. Dursun Ali KÖSE
On behalf of the HJOHS Editorial Board

INDEX

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The Examination Of Traditional and Modern Methods Used in Rice Production Through Risk Assessment Methods: Example of Çorum Province

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Abstract

Rice, one of the main staple foods for approximately 5,000 years, is expected to become even more critical, considering the population growth rate. Rice production, which relies on traditional methods and human labor, is challenging. Given the increasing population and labor difficulties, it has become crucial to use technological advancements in rice production that will increase yield per unit area and reduce human labor. In this research, it was observed that in the districts of Kargı and Osmancık, which are our study area, producers are using modern methods in rice production and still working with traditional methods. It was considered that there might be differences between these methods in terms of production quality, productivity, and occupational diseases and work accidents that farmers in the sector may experience. These differences were identified through risk assessment methods, and an effort was made to determine which method provides a better working environment in terms of Occupational Health and Safety for the farmers. During this study, the farmers' production stages were observed on-site. Studies related to Occupational Health and Safety in different agricultural fields and those related to the rice production process were reviewed. Literature studies conducted on these topics were included in the research. This study is significant both regionally regarding the importance of rice and the benefits it can provide farmers, as well as being an original study.

Keywords: Agricultural Sector, Rice Production, Workplace Accidents, Occupational Health and Safety, Occupational Diseases

INTRODUCTION

Occupational Health and Safety and Its Purpose

If we consider Occupational Health and Safety a general concept, it is about proactively identifying and preventing problems arising from the working environment. These precautions aim to ensure the safety and well-being of workers, as well as production efficiency and workplace safety (Sungur, 2019).

When considering occupational health and safety from the employer's perspective, first and foremost, protecting the health and safety of employees is a moral duty. Additionally, neglecting Occupational Health and Safety can lead to significant financial losses for the employer and cause workplace accidents and occupational diseases, which could result in a loss of prestige for the business (Dursun, 2019).

Risk Assesment

According to the Occupational Health and Safety Law No. 6331, published on June 30, 2012 (Kodaloğlu & Akarslan, 2022), employers/employer representatives are obligated to conduct or have a risk assessment to ensure employees' health and safety and the continuity of production in the workplace. Risk assessment is defined as "the efforts to prevent and control the negative consequences that potential hazards, either from within the workplace or from external sources, may cause to employees, the workplace, and the surrounding environment," while risk management refers to the preventive measures taken against risks that have the potential to harm employees, the business, and the environment (Şimşek, 2020; Yavuz et al.,2024: Yavuz, 2021).

Matrix Risk Assessment

Matrix risk analysis is a method defined by the relationship between two or more variables, and it is one of the most commonly preferred methods by experts. It is understandable for the risk assessment team, and the evaluation of the results is more straightforward (Ölçücü et al., 2019). L-Type (5x5 Type) and X-Type methods are example applications.

L-Type Matrix Risk Assessment

Generally known as the 5x5 Matrix, this method is called the L-type matrix. Due to its simplicity and ease of understanding, and because a single analyst can easily apply it, this technique makes it an ideal risk analysis method for small businesses. With this method, the probability of an event occurring and the severity of its impact in case it happens are rated and measured. Quantitative data corresponds to the qualitative information of the L-type matrix (Kabakulak, 2019).

Table 1. L-Type Matrix Analysis Probability Table

Value	Level	Frequency
1	Very Small	Almost never
2	Small	Very rarely (once a year), only in abnormal situations
3	Medium	Rarely (a few times a year)
4	High	Frequently (once a month)
5	Very High	Very frequently (once a week, daily), under normal working conditions

Table 2. L-Type Matrix Analysis Damage Severity Table

Value	Outcome	Rating
1	Very Light	No loss of work hours, requires first aid
2	Light	Loss of work hours but no loss of workdays, requires outpatient treatment and first aid
3	Medium	Minor injury, requires treatment
4	Serious	Death, serious injury, occupational disease
5	Very Serious	Multiple deaths, permanent disability

Table 3. L-Type Risk Score Rating Matrix

Result (Severity)						
Probability		5 Critical	4 Severe	3 Moderate	2 Minor	1 Negligible
5	Very High	25	20	15	10	5
4	High	20	16	12	8	4
3	Medium	15	12	9	6	3
2	Low	10	8	6	4	2
1	Very Low	5	4	3	2	1

Table 4. Evaluation of the Risk Score

Result	Actions to be Taken
Unacceptable Risk (25)	Work should not start until the identified risk is reduced to an acceptable level. If an ongoing activity exists, it must be immediately stopped. If it is not possible to Work should not start until the identified risk is reduced to an acceptable level. If an ongoing activity exists, it must be immediately stopped. The activity should be stopped if reducing the risk is impossible despite the activities.
High-Level Risks (15,16,20)	Work should not start until the identified risk is reduced. If an ongoing activity is involved, it must be immediately stopped. If the risk is related to continuing the work, urgent measures should be taken, and based on these measures, a decision should be made regarding whether the activity can continue.
Medium-Level Risks (8,9,10,12)	Activities should be initiated to reduce the identified risks. Risk mitigation measures may take time.
Low-Level Risks (1,2,3,4,5,6)	Additional control processes may not be required to eliminate the identified risks. However, existing controls should be maintained, and it should be monitored that these controls are being sustained.

Agricultural Sector

Agriculture is of great importance both for sustaining life and for economic prosperity. The developments in the agricultural sector have the potential to increase the income of poor people by 2 to 4 times compared to other sectors. Approximately 65% of the adults working in agriculture make their livelihood from agricultural production. Additionally, over the years, the increase in the number of people who lack access to food and the impact of global climate change have made this issue even more serious (Şimşek, 2021).

If we examine the revolutionary agricultural developments under four main headings; (Pakdemirli et al., 2021).

The first period, between 9500 B.C. and 700 A.D., is known as the "Man Power" era. In this age, the more human contributions there were, the more work could be done.

The second period, between 700 A.D. and 1800 A.D., is known as the "Land Power" era. In this period, the abundance of arable land directly increased power.
The third period, between 1800 and 2000 A.D., is known as the "Hard Power" era. Those with many machines and raw materials gained significant advantages during this period.

The current period we are experiencing is known as the "Smart Power" era. In this age, it will not be determined by land, people, or the number of machines, but by environmental science, biology, and biological data analysis, and those who can produce knowledge will dominate.

Occupational Health and Safety in the Agricultural Sector

When focusing on the various hazards and risks in the agricultural sector, it stands out as one of the sectors with the highest potential for occupational health and safety hazards. The sector is distinguished from others by risks such as tractors, agricultural machinery, pesticides, fertilizers, toxic and allergic pests, substances that may cause cancer, ergonomic hazards, noise, vibration, animal and parasite-borne diseases, harsh weather conditions, wild or poisonous animals, and hazards related to working conditions (Kanvermez and Sümer, 2021).

Until the Occupational Health and Safety Law, which came into effect on June 30, 2012, the provisions regarding Occupational Health and Safety were regulated under the Labor Law No. 4857, which included general provisions on occupational health and safety. This law applies the occupational health and safety provisions to agricultural and forestry enterprises with more than 50 employees. However, agricultural enterprises employing 50 or fewer workers were excluded from the scope of this law. This situation led to limitations in the efforts made in occupational health and safety in the agricultural sector (Sert and Nazlıoğlu, 2021).

Importance and Production of Rice

Rice, which has been cultivated for approximately 5,000 years, holds global value among cereals due to being the only cereal grown in water and, after being processed into rice, becoming one of the main staple foods for many people (Özşahin, 2001).

The rice plant can be grown in many world regions, except Antarctica. However, 90% of rice production occurs in Asia, where approximately 60% of the world's population resides. China, India, and Indonesia are the leading countries in rice production (Kaya et al., 2017).

Many regions of Turkey are ecologically suitable for rice production. When looking at the regional distribution of rice production in Turkey, the most significant planting and production areas are the Black Sea, Southeastern Anatolia, and Western and Eastern Marmara regions. The provinces with the highest rice production in Turkey are Edirne, Balıkesir, Samsun, Çorum, and Çanakkale. The production percentages are shown in Figure 1.1 (Kaya et al., 2017).

Rice Production Stages

Regional differences can cause variations in rice variety, planting period, seed dosage, and harvesting techniques in rice production. In traditional and organic production systems, soil fertility (crop rotation, fertilization, etc.), weed control, disease and pest management, harvesting, threshing, drying, and storage may differ. However, other cultivation techniques are generally similar (Sullivan, 2003).

Rice Production Stages;

Soil Preparation: Soil preparation begins with plowing the field. During this process, the goal is to deeply plow the soil, clean it of weeds, and aerate it. Leveling the field is the most important aspect of soil preparation for successful rice production (Sullivan, 2003).

Seed Sowing: In rice cultivation, rice seeds can be directly sown into the field or grown in a nursery and then transplanted later (Taşlıgil & Şahin, 2011).

Fertilization: To satisfy the nutritional requirements of the rice plant, suitable fertilizers should be chosen based on

soil analysis and applied in the recommended quantities (Beşer and Sürek, 1999).

Pest and Disease Control: Agricultural pesticides are commonly used to control weeds and certain diseases affecting rice (Sirat et al., 2012).

Harvesting: Rice can be harvested using various methods worldwide and in our country. These methods include harvesting with a sickle, motorized mowers, and combined harvesters, where harvesting and threshing are done simultaneously (Sirat et al., 2012).

Drying: The moisture content of the harvested product is quite high, particularly when harvested with a combined harvester. To store the crop safely, the moisture level must be reduced to 14%, and drying is carried out (Sirat et al., 2012).

Risk Factors in the Agricultural Sector and Rice Production
If we examine the factors that can be considered risks for the entire agricultural sector, specifically in rice production;

Exposure to high temperatures and cold due to working outdoors and thermal comfort conditions.

Accidents caused by the use of tractors and agricultural machinery on agricultural fields and roads, as well as accidents that may occur during their adjustment, repair, and maintenance, are among the areas with the highest accident rates in the agricultural sector.

Electrical accidents are caused by using electrical tools and overhead power lines in agricultural areas.

Ergonomic risks arise from working in the same position for long periods and heavy lifting.

Chemical risk factors include poisoning, allergies, and carcinogenic agents from the application of pesticides and fertilizers.

Biological risk factors, including bacterial and viral risks from animal and plant sources.

Noise factors that may cause hearing loss are caused by agricultural machinery and tractors.

Vibration factors caused by agricultural machinery and tractors.

Diseases result from the inability to access clean drinking water and meet personal hygiene conditions in some environments.

A high number of informal workers and child labor.

Psychological risk factors faced by workers due to harsh working conditions and inadequate compensation for their work.

Vulnerability to wild animal attacks and natural disasters such as floods and storms due to open and unprotected working areas.

Since the majority of agricultural workers are involved in family-based economies and there is a high concentration of young and female workers who have often never participated in the workforce, it is important to provide training and informational programs to increase their safety culture. Additionally, example practices and risk assessment studies, along with occupational health and safety training for agricultural workers both in the field and as part of vocational education, will significantly reduce the number of work accidents and occupational diseases (Sert and Nazlıoğlu, 2021).

MATERIAL AND METHODES

In this study, the rice production process in the districts of Osmancık and Kargı, which are two important centers for rice production in Çorum province, was observed from the perspective of an occupational safety expert with sector experience. The study compares traditional methods that farmers have used in the past and continue to use today with modern methods that they are likely to use in the future. Additionally, this study examines the identified hazards and risks, which were scored using the 5 X 5 L-Type Matrix method. Based on the obtained scores, the study evaluates which of the research methods provides a more advantageous working environment.

FINDINGS

The risk assessment tables obtained using the 5 X 5 L-Type Matrix method related to the study are provided in the additional information section (in Supplementary File).

RESULTS

Technological advancements have saved human labor in every aspect of our lives and significantly reduced the use of human labor in agriculture. Our country has benefited from these developments and continues to do so. As an agricultural nation, these technological advancements in agriculture are of great importance to us.

The agricultural sector is a challenging industry, which causes the young population to be unwilling to engage in agriculture. Additionally, factors such as informal work, workplace accidents, and occupational diseases, which put agricultural workers in challenging situations and can negatively affect people's futures, have made the agricultural sector endure tough times.

Rice is a crucial product for our country, particularly in the districts of Osmancık and Kargı in Çorum, where it significantly contributes to the local economy. A decline or halt in rice production, which is vital for sustaining the region's economy, would have severe negative effects. To prevent such issues, it is essential to incorporate technology into production processes and to engage younger generations of producers in this field.

Based on our observations of the regional producers, we

can evaluate that older producers are still persistent in using traditional methods, while younger producers, who are more open to innovation and closely integrated with technology, are turning to modern methods in production. The primary justification for producers who insist on traditional methods is the belief that rice with high yield and efficiency can only be produced using these methods. In contrast, producers who use modern techniques state that they can work in larger agricultural areas with less human labor and much less effort. Although both viewpoints may have valid points, our focus in this study will be to evaluate both methods from occupational health and safety perspectives. Based on the outcome of this evaluation, we aim to provide those advocating for traditional or modern methods with a viable option in terms of occupational health and safety.

The rice production stages in the Osmancık and Kargı districts were observed during our study. As much as possible, modern and traditional methods were followed separately throughout the production process.

If we examine the identified risks and risk scores;
In the first stage of rice production, the field plowing process, the traditional method done with a tractor with a driver, was found to have four medium-level risks. On the other hand, the modern method, which uses a tractor with autonomous driving features, was evaluated to have one low-level risk.

In the second stage of rice production, the leveling process, the traditional method was found to have four medium-level risks, while the modern method was considered to have two medium-level risks.

In the third stage, rice sowing, the traditional method presented three medium-level risks and one low-level risk, while the modern method was predicted to have one medium-level risk.

In the fourth stage, the spraying phase, four risks were assessed for the traditional method, three of which were medium-level and one low-level. For the modern method, two risks were predicted: one medium-level and one low-level.

In fertilization's fifth stage, two medium-level risks and one low-level risk were predicted for the traditional method, while one low-level risk was predicted for the modern method.

In the sixth stage, harvesting, five risks were evaluated for the traditional method, including one high-level risk, three medium-level risks, and one low-level risk. One medium-level risk and one low-level risk were predicted for the modern method.

In the final stage of rice production, the drying process, the evaluation of the traditional method predicted two medium-level risks and one low-level risk. In contrast, one medium-level risk and one low-level risk were anticipated for the modern method.

In these risk assessments, 27 risks were evaluated using traditional methods, including one high-risk risk with a score of 16, 21 medium-level risks with scores of 8, 9, and 12, and 5 low-level risks with a score of 6. Among these risks, 10 related to noise, dust, and biological risk factors could have their risk scores reduced through personal protective equipment (PPE). In contrast, the remaining risks could be mitigated by working carefully, taking breaks, and adhering to safety precautions.

In the modern methods we examined in our study, seven medium-level risks were identified with risk scores of 8 and 9, while four low-level risks were found with scores of 4 and 6. A total of 11 risks were anticipated in the modern methods. Among these risks, four can be mitigated using PPE, while seven can be reduced by providing necessary training and information to the operators.

CONCLUSION AND FUTURE PROSPECTS

According to statistics, while workers who use PPE and have received the necessary training can reduce risks regarding occupational health and safety (OHS), the likelihood of accidents and diseases increases as more human resources are required. Studies suggest that 98% of workplace accidents could be prevented, meaning that it is not possible to eliminate all of them. This means that a higher number of workers in a job naturally increases the risk of accidents.

As a result, both the number of risks identified, and the risk scores indicate that modern methods are safer in terms of occupational health and safety compared to traditional methods. While production quality and production costs are separate discussion topics regarding the use of these methods, considering that the agricultural sector is a challenging one for workers and the risks it carries in terms of occupational health and safety, the spread of modern methods could reduce the rate of farmers leaving the sector. Additionally, considering the statistics showing that the agricultural sector is one of the riskiest sectors in terms of work accidents, the introduction of modern methods to the sector seems likely to help break this negative image.

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SUPPLEMENTARY FILES

1.THE STAGE OF PLOWING THE SOIL IN RICE PRODUCTION.

NO	METOD	ACTIVITY	HAZARD	RISK	RISK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					Probability	Severity	Risk score	Definition of risk		
1	TRADITIONAL	Plowing the soil with a plow	Repetitive Movements and Ergonomically Unfavorable Working Conditions	Musculoskeletal Disorders, Occupational Disease	**2**	**4**	**8**	**Medium Level Risk**	Operators are exposed to long-duration repetitive movements with a tractor during plowing and must work while constantly looking backward.	
			Inappropriate Conditions and Movements in Tractor Work	Injury, Death Resulting from Tractor Accident	**2**	**4**	**8**	**Medium Level Risk**	The possibility of tractors being used by unlicensed individuals, the failure of tractors' auditory and visual signals, and the operation in uneven and off-road areas create the likelihood of accidents.	
			Equipment that Emits Noise and Vibration	Hearing Loss, Musculoskeletal Disorders	**3**	**3**	**9**	**Medium Level Risk**	Since tractors are equipment that emits noise and vibration, tractor use can lead to discomfort caused by these risk factors.	
			Fatigue and Insomnia Caused by Overwork	Work Accident, Injury	**3**	**3**	**9**	Medium Level Risk	The desire to complete tasks on time and as quickly as possible sometimes leads to extended work periods.	
2	MODERN	Plowing the Soil with Automatic Steering	Failure of the Automatic Steering System	Work Accident, Injury	**1**	**4**	**4**	**Low Level Risk**	In the case of signal interference, the steering system may lose control. While the older systems require the operator to be present on the tractor as a precaution, the newer systems allow for intervention through smartphones in emergencies, making the system safer.	

2.THE STAGE OF LEVELING THE SOIL IN RICE PRODUCTION.

NO	METHOD	ACTIVITY	HAZARD	RISK	RISK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					Probability	Severity	Risk score	Definition of risk		
1	TRADITIONAL	Eyeballing leveling of the soil.	Repetitive Movements and Ergonomically Unfavorable Working Conditions	Musculoskeletal Disorders, Occupational Disease	**2**	**4**	8	Medium Level Risk	Operators are exposed to long-duration repetitive movements with a tractor during field leveling and must work while constantly looking backward.	
			Equipment that Emits Noise and Vibration	Hearing Loss, Musculoskeletal Disorders	**3**	**3**	**9**	**Medium Level Risk**	Since tractors are equipment that emits noise and vibration, using a tractor can lead to discomfort caused by these risk factors.	
			Inappropriate Conditions and Movements in Tractor Work	Injury, Death Resulting from a Tractor Accident	**3**	**3**	**9**	**Medium Level Risk**	Tractors may be operated by unlicensed individuals, their auditory and visual signals may fail, and they may be operated in uneven and off-road areas, which can increase the likelihood of accidents.	
			Fatigue and Insomnia Caused by Overwork	Work Accident, Injury	**3**	**3**	**9**	**Medium Level Risk**	Due to the desire to complete tasks on time and the attention required for the work, in some cases, work is carried out for extended periods	
2	MODERN	Laser leveling of the soil	Equipment that Emits Noise and Vibration	Hearing Loss, Musculoskeletal Disorders	**3**	**3**	**9**	**Medium Level Risk**	Since tractors emit noise and vibration, using a tractor can cause discomfort due to these risk factors.	
			Inappropriate Conditions and Movements in Tractor Work	Work Accident, Injury	3	3	9	Medium Level Risk	The possibility of tractors being used by unlicensed individuals, the failure of the tractors' auditory and visual signals, and the operation in uneven and off-road areas create the likelihood of accidents.	

3.THE SOWING STAGE IN RICE PRODUCTION.

NO	METHOD	ACTIVITY	HAZARD	RISK	RISK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					Probability	Şeverity	Risk score	Definition of risk		
1	TRADITIONAL	Sowing by hand and with a backpack motor.	Repetitive Movements and Ergonomically Unfavorable Working Conditions	Musculoskeletal Disorders, Occupational Disease	3	4	12	**Medium Level Risk**	During the sowing process, whether done by hand or with a backpack motor, lifting loads and working in water and mud present ergonomic risks.	
			Disease-causing Agents and Animals Found in Water	Disease, Death, Injury	3	3	9	**Medium Level Risk**	In addition to bacteria and viruses found in stagnant waters, diseases caused by aquatic animals such as water snails and mosquitoes may also occur. Furthermore, injuries can occur due to animal attacks, such as snakes found underwater.	
			Equipment that Emits Noise and Vibration and Thermal Comfort Conditions	Hearing Loss, Musculoskeletal Disorders, Sunstroke	3	3	9	**Medium Level Risk**	Since the backpack sprayer used in sowing is equipment that emits noise and vibration, it can cause discomfort due to these risk factors. Exposure to heat during sowing can lead to sunstroke.	
			Fatigue and Insomnia Caused by Overwork	Work Accident, Injury	2	3	6	**Low Level Risk**	The desire to complete tasks on time and the fact that the work is done under difficult conditions can extend working hours and lead to risks arising from fatigue.	
2	MODERN	Sowing with a drone	Drone losing control	Work Accident, Injury	2	4	8	**Medium Level Risk**	During sowing, accidents can occur if the drone loses control and crashes into people or falls on them.	 Anadolu Agency (2023)

4.THE PESTICIDE APPLICATION STAGE IN RICE PRODUCTION

NO	METHOD	ACTIVITY	HAZARD	RISK	RISK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					Probability	Severity	Risk score	Definition of risk		
1	TRADITIONAL	Backpack Spraying	Repetitive Movements and Ergonomically Unfavorable Working Conditions	Musculoskeletal Disorders, Occupational Diseases	3	4	12	Medium Level Risk	Working with a backpack sprayer while lifting loads and in mud brings ergonomic risks.	
			Pesticide-Related Chemical Exposure	Illness, Death	3	3	9	Medium Level Risk	Pesticides from agricultural chemicals can enter the body through respiration, skin, eyes, and mouth and may cause pesticide-related health issues.	
			Equipment that Emits Noise and Vibration and Thermal Comfort Conditions	Hearing Loss, Musculoskeletal Disorders, Sunstroke	3	3	9	Medium Level Risk	Since the backpack sprayer used in spraying is equipment that emits noise and vibration, it may cause discomfort due to these risk factors. Exposure to heat during spraying can lead to sunstroke.	
			Fatigue and Insomnia Caused by Overwork	Work Accident, Injury	2	3	6	Low Level Risk	The desire to finish tasks on time and the need to perform work under challenging conditions can extend working hours, leading to fatigue-related risks.	
2	MODERN	Pesticide Spraying with Drone	Drone Losing Control	Work Accident, Injury	2	4	8	Medium Level Risk	During spraying, accidents may occur if the drone loses control and crashes into people or falls on them.	
			Pesticide-Related Chemical Exposure	Illness, Death	2	3	6	Low Level Risk	Being near the drone during spraying increases the likelihood of exposure to the adverse effects of pesticides.	

5.**FERTILIZATION STAGE IN RICE PRODUCTION**

NO	METHOD	ACTIVITY	HAZARD	RISK	RISK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					Probability	Severity	Risk score	Definition of risk		
1	TRADITIONAL	Fertilization by Hand and Backpack Sprayer	Repetitive Movements and Ergonomically Unfavorable Working Conditions	Musculoskeletal Disorders, Occupational Diseases	**3**	**4**	**12**	**Medium Level Risk**	Fertilization is done with a backpack sprayer and by hand, which presents ergonomic risks due to heavy lifting and repetitive movements.	
			Equipment that Emits Noise and Vibration and Thermal Comfort Conditions	Hearing Loss, Musculoskeletal Disorders, Sunstroke	**3**	**3**	**9**	**Medium Level Risk**	Since the backpack sprayer used in fertilization is equipment that emits noise and vibration, it may cause discomfort due to these risk factors. Exposure to heat during fertilization can lead to sunstroke.	
			Fatigue and Insomnia Caused by Overwork	Work Accident, Injury	**2**	**3**	**6**	**Low Level Risk**	The desire to complete tasks on time and work under challenging conditions can extend working hours, leading to fatigue-related risks.	
2	MODERN	Fertilization with Drone	Drone Losing Control	Work Accident, Injury	**2**	**4**	**8**	**Medium Level Risk**	During fertilization, accidents may occur if the drone loses control and crashes into people or falls on them.	

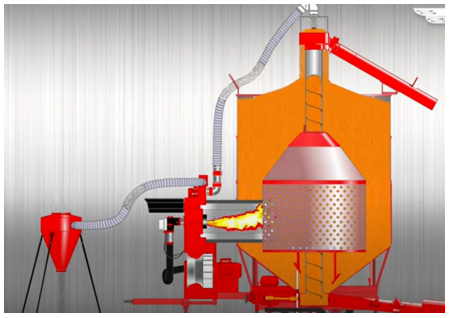
6.RICE PRODUCTION HARVESTING STAGE-1

NO	METHOD	ACTIVITY	HAZARD	RISK	RISK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					probability	Severity	Risk score	Definition of risk		
3	TRADITIONAL	Harvesting with a Handheld Motor and Thresher	Repetitive Movements and Ergonomically Unfavorable Working Conditions	Musculoskeletal Disorders, Occupational Diseases	**3**	**4**	**12**	**Medium Level Risk**	During the harvesting with a handheld motor and separating grains with a thresher, numerous repetitive movements, and actions strain the musculoskeletal system.	
			Equipment that Emits Noise and Vibration and Thermal Comfort Conditions	Hearing Loss, Musculoskeletal Disorders, Sunstroke	**3**	**3**	**9**	**Medium Level Risk**	These risk factors are important because the equipment used during manual harvesting and threshing generates significant noise and vibration. During these tasks, workers are also exposed to heat.	
			Fatigue and Insomnia Caused by Overwork	Work Accident, Injury	**2**	3	6	**Low Level Risk**	The desire to complete tasks on time and work under challenging conditions can extend working hours, leading to fatigue-related risks.	
4	MODERN	Harvesting with a Combine Harvester	Equipment that Emits Noise	Hearing Loss	**2**	**3**	**6**	**Low Level Risk**	Although the combine harvester is noisy, the operator inside the enclosed cabin is less affected by the noise.	

6.RICE PRODUCTION HARVESTING STAGE-2

NO	METHOD	ACTIVITY	HAZARD	RISK	RISK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					Probability	Severity	Risk score	Definition of rsik		
1	TRADITIONAL	Harvesting with a Handheld Motor and Thresher	Contact with Rotating Parts and Pinch Hazards	Injury, Death, Limb Loss	**4**	4	16	**High Level Risk**	During manual harvesting and threshing, the exposed rotating parts of the equipment are in a position where workers can come into contact with them. In particular, the risk of a worker falling into the thresher increases the risk of death.	  Made in China (2024) T24 Haber Sitesi (2023)
			Dusty Working Environment	Respiratory Diseases	**3**	**4**	**12**	**Medium Level Risk**	Especially during the threshing process and harvesting with a handheld motor, exposure to rice dust may occur.	
2	MODERN	Harvesting with a Combine Harvester	Improper Positions and Movements While Working with a Combine Harvester	Injury, Death Resulting from a Combine Harvester Accident	**2**	**4**	8	**Medium Level Risk**	The possibility of combine harvesters being operated by unlicensed individuals, the failure of the combine harvester's audio and visual signals, and the work being carried out in uneven and off-road areas increase the risk of accidents.	

7.DRYING STAGE IN RICE PRODUCTION

NO	METHOD	ACTIVITY	HAZARD	RISK	RİSK VALUE				CURRENT SITUATION	EXAMPLE ACTIVITY
					Probability	Severity	Risk score	Definition of risk		
1	TRADITIONAL	Sun Drying	Repetitive Movements and Ergonomically Unfavorable Working Conditions	Musculoskeletal Disorders, Occupational Diseases	3	3	9	**Medium Level Risk**	Taking foreign materials from rice and drying it with hand tools involves repetitive movements, which can pose ergonomic risks.	
			Dusty Working Environment	Respiratory Diseases	3	3	9	**Medium Level Risk**	The dust released during manual threshing can enter the lungs through the respiratory tract and cause respiratory diseases.	
			Fatigue and Insomnia Caused by Overwork	Work Accident, Injury	2	3	6	**Low Level Risk**	The desire to complete tasks on time and work under challenging conditions can extend working hours, leading to fatigue-related risks.	
2	MODERN	Drying with a Dryer Machine	Noise-Emitting Equipment	Hearing Loss	2	3	6	**Low Level Risk**	Since the dryer is noisy, hearing loss can be felt when standing beside it.	 Fratelli Pedrotti Tutorials (2015)
			Fire	Injury, Death	2	4	8	**Medium Level Risk**	The drying process typically uses coal for heating, posing a fire risk if dust from the paddy ignites in the environment.	