

Some of the Use of Intelligent Systems in Agriculture

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Abstract: The world's population rapidly increased, but agricultural areas are rapidly declining. In order to meet the food requirement for the growing population, increasing the quantity of the product to the unit area is inevitable. In this case, it is the importance which increasing of production used in the entries. Chemicals, agricultural production are one of the largest shares of the inputs. In terms of human health, directly affect the cost of the product, have great importance. The European Union member countries will be 50% reduction of the use of chemicals in agricultural production until the year 2017. In order for this goal in developing the use of information and communication technologies in agriculture, it is a necessity.

In this study, to reduce the use of chemicals in some agricultural activities, the predictive system is discussed. Reducing the use of chemicals in agricultural production in the results, but the use of innovation in information and communication technologies in agricultural production was determined to be possible with the.

Keywords: Precise Farm, GPS, DGPS, Sensors.

Bazı Tarımsal Faaliyetlerde Akıllı Sistemlerin Kullanımı

Özet: Dünya nüfusu hızla artarken, tarım yapılan alanlar ise hızla azalmaktadır. Artan nüfusun gıda gereksiniminin karşılanması için, birim alandan alınacak ürün miktarının artırılması kaçınılmazdır. Bu durumda üretimde kullanılan girdilerinin önemi artmaktadır. Kimyasallar, tarımsal üretimin en büyük paya sahip girdileridir. Ürün maliyetini doğrudan etkilerken, insan sağlığı açısından da büyük öneme sahiptirler. Avrupa Birliğine üye ülkeler 2017 yılına kadar tarımsal üretimde kimyasal kullanımının %50 azaltılmasını hedeflemiştir. Bu hedefin gerçekleştirilmesi için gelişen bilgi ve iletişim teknolojilerinin tarımda kullanımı bir zorunluluk olmaktadır.

Bu çalışmada, bazı tarımsal faaliyetlerde kimyasal kullanımının azaltılması için, kullanılan akıllı sistemler ele alınmıştır. Araştırma sonucunda tarımsal üretimde kimyasalların kullanımının azaltılmasının, ancak bilgi ve iletişim teknolojilerindeki yeniliklerin tarımsal üretimde kullanılması ile mümkün olacağı belirlenmiştir.

Anahtar Sözcükler: Hassas Tarım, GPS, DGPS, sensörler.

1. Introduction

Today one of the most important problems of the world is growing the population fast. According to the FAO reports, people need 15-20 million ton food elements. The area of the world is always same, not changed though pop-

ulation is growing every day. Because of that, producing of the food is not enough to live well in the world. In order to be produced much more, agricultural products are accepted not to discard for using in the fields. Insects, herbicide, fungicides and rodenticides are called as pesticide which includes all using chemicals.

The pesticides have been used for a long time. On a papyrus which is in BC 1500 was found the records about preparing the insecticides for insects and bees. Inorganic pesticides were used for the pests in 19 century. After 1940s, organic chemistry was derived at producing pesticide. Besides, because of using pesticide unconsciously and intensively, you can find the pesticide parts on the soil, air and water. The negative effects can be seen on other organisms and people, not target, the importance of the pesticide parts were understood in 1948 and 1951 with being found the remains of organics and chlorine pesticides on the body of human. While some of the pesticides are not pestilent, it is found that some are very pestilent for our health such as toxic, affecting of nervous system and even contracting the mutation. the most important source of the remains of pesticides is foods. So, FAO and WHO founded the Pesticide remains Codex organization in 1960 and in the end of this organization studies, some definitions, dealing with this subject, were done. According to the scientific research data's, maximum remains, given permission to be on the food, were found.

2. Effects of the pesticides on people

Because there are some toxics on people, all people working in this area must be protected from the negatives affects of them. As people expose the pesticides, poisoning and health problem are occurred on body.

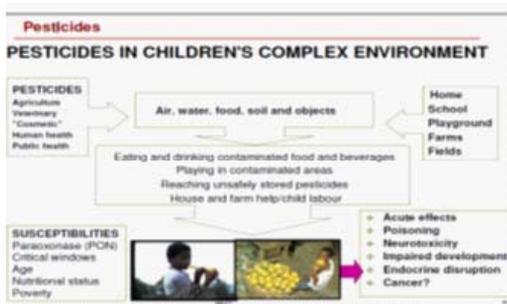


Figure1. Effects of the pesticides on children's.

These summary slide shows the complexity of the issues related to children's environmental exposure to pesticides and the effects on their health. Pesticides used in agriculture, treatment of animals, on lawns ("cosmetic"), and for protection of human and public health may enter the air, food, water and soil in the places where children spend most of their time (e.g. at home, at school, in playgrounds, on farms and in fields) and may also contaminate their toys, floors, carpets and materials in their playgrounds. Children become exposed by:

- eating and drinking contaminated food and beverages
- playing in contaminated areas
- gaining access to unsafely stored pesticides, or pesticides stored in attractive, colorful containers
- helping in the house and on the farm or as child labor
- Contact with clothing or shoes of working parents

3. Effect on Environment

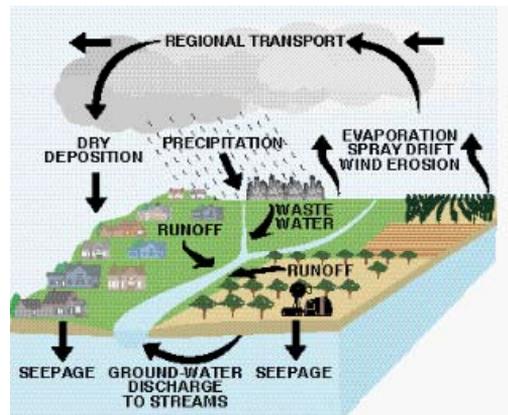


Figure 2. Effects of pesticides on atmosphere and water.

The US Geological Survey (USGS) monitors ground and surface water for 76 pesticides and seven pesticide breakdown products. A recent survey found that 90% of streams and 50% of wells tested were positive for at least one pesticide.

Pesticides are considered an important environmental threat to people's health in rural, especially, areas. This is because:

- A large variety of chemicals and mixtures are used as pesticides.
- Many pesticides are used at the same time in the same place (agricultural regions).
- They are ubiquitous in the environment – and in individual environments (microenvironments) of people – there may be several sources of exposure to the same or a different chemical.
- Multiple exposures may occur from the preconception period throughout the child's growth into adolescence and adulthood. Pesticides may also be heavily used indoors in urban areas, so this is not solely a rural issue.

4. Result and discussion

What recommendations can be given?

1- Drifting: Drifting makes effects of the insecticide reduced. And then, repeating the applying insecticide causes economic losses. In addition that,

as a result of these applications, plant which is target on, increases amount of the remains.

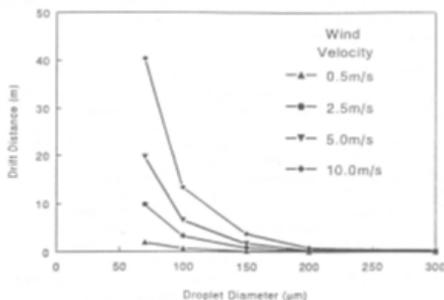
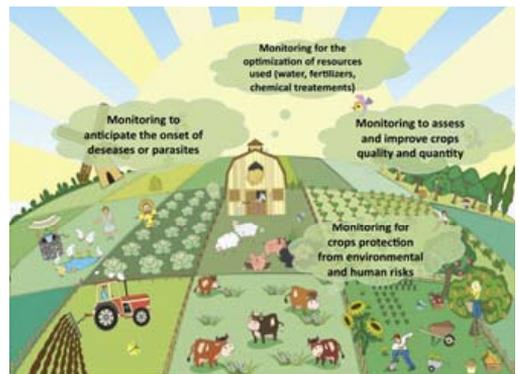


Figure 3. Drops of different diameters vary depending on wind speeds measured drift the distances (ASABE Page 572).

Finally, food is coming to the unused position or it treats consumers seriously. In order to solve these problems, these problems can be decreased the minimum with machines used in the field and with knowing the techniques of using. Machines used must be done calibration regularly. Operating pressure and drop diameter selected is affecting way for drift. While thin and medium size drops on insecticide and Fungusit operations are being worked with, larger drops are preferred to the Herbisit operations. Drops which are 200 m μ -sizes are the easiest drifting. If the diameter is bigger than we want, drop cannot be hanged on the target.



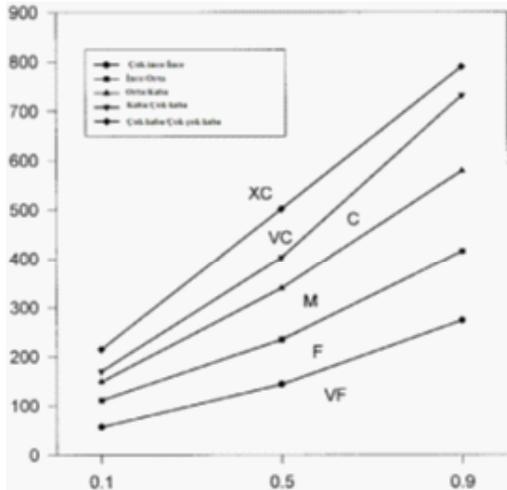
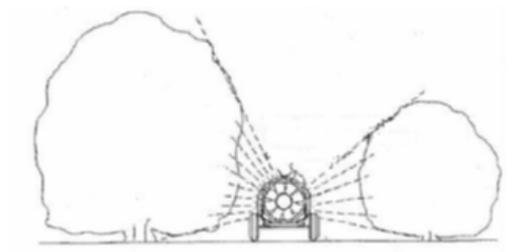
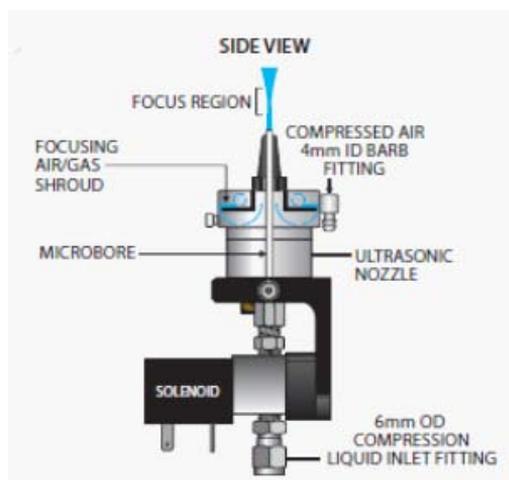
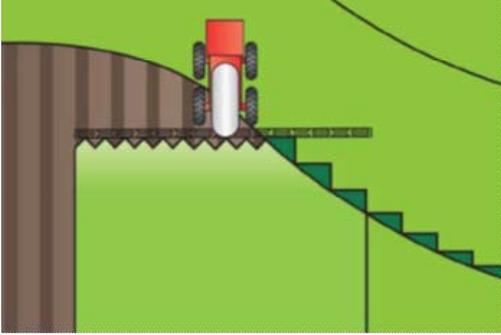


Figure 4. Drops of spray nozzles according to the classification ranges (ASABE Page 572).

2- Smart Systems: used chemicals can be decreased with smart system on pesticides. Height can be controlled with ultrasonic sensors. As a result of this, amount of the pesticides are equal to every plant. If there is no plant, there is no pesticide. So there is no risk for health. With the smart system we can use little pesticide to the small leaf, for large leaf we can use more pesticides. So it not only makes productivity increased but also decreased the using the pesticides.



3- Precision Farming: GPS and DGPS are used on the precision farming. by means of them, we don't need to pesticide on the same area, we shouldn't be any area without pesticing.



4- Low Drifts: Low drifts are used on the machines used for pesticides.

The two main areas of focus are residue and drift reduction. While we continue working to reduce residues, cisgenesis technology GM varieties are being developed that don't need as many pesticides. Once this technology is accepted we can move on to other challenges, but in the mean time we will still need to spray for the foreseeable future. The issues that are going to shape sprayers of the future are:

- Public perception
- Deposition efficacy
- Environmental contamination
- Operator safety

If we assume that the average orchard sprayer sprays about 20ha a year and average spray costs are about £1100 per ha, then the average sprayer is used to apply about £22,000 worth of product a year (Doug Hutton-Squire, 2010).

5- Educated Farmers: We should tell the advantages and disadvantages of the pesticides and how to use the machines very effectively. Besides, if there is no need to use, nobody must use and save the life of the members of family while you are using.

5. Reference

Anonymous, 2010. "Climate-Smart" Agriculture. FAO.

Anonymous, 2012. "Energy- Smart Food at FAO" FAO.

Anonymous, 2013. "World Health Statistics 2013" WHO.

Güler, H., Urkan, E., Tozan, M., Tekin, A. B., Caner, Ö., 2010. Tarımsal Savaşım Mekanizasyonunda Teknolojik Gelişmeler. Ziraat Mühendisliği VII. Teknik Kongresi Bildiriler Kitabı 1- Ankara.

Hutton-Squire, D.,2010. "Precision Farming in Orchard Crops" Nuffield Farming Scholarships Trust A Worshipful Company of Fruit-er's Award.

J.C. van de Zande, H.J. Holterman, M. Wen- neker, 2008. "Nozzle Classification for Drift Reduction in Orchard Spraying: Identification of Drift Reduction Class Threshold Nozzles". Agricultural Engineering International: the CIGR E journal. Manuscript ALNARP 08 0013. Vol. X. May, 2008.

Sayılı, M., Z.Akman., 1994. Tarımsal uygulamalar ve Çevreye olan etkileri. Ekoloji Dergisi Sayı 12.

