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KLIMATSKE PROMENE I POLJOPRIVREDNA PROIZVODNJA U SRBIJI

**Drugi nacionalni skup o očekivanim promenama klime u
Vojvodini i njihovim efektima**

-ZBORNIK REZIMEA-

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Adaptation measures in agriculture – situation in Serbia

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Increased temperature sum and reduced rainfall during growing season (April-October) are bound to cause a number of changes of other climatic (weather) parameters, in the first place an increase in potential evapotranspiration and decreases in soil humidity and rainfall sum.

The above factors will primarily affect the duration of growing season. The production of spring crops (soybean, sunflower, corn, sugarbeet, potato, etc.) will obviously start earlier. Spring crops will be planted earlier, in late winter or early spring. Accordingly, the planting of winter crops (rapeseed, barley, rye, triticale, etc.) will be possible or will have to be moved to October - November, in order to make the crops reach timely the stage of growth and development optimum for overwintering.

Temperature increase during growing season does not automatically exclude the occurrence of low temperatures in winter, i.e., while plants are dormant. Consequently, winterhardiness of winter crops remains as a point of scientific interest.

Increased temperature during growing season affects positively the intensity of physiological processes in plants (photosynthesis, organic matter production, growth and development of plant tissues and organs, transpiration, etc.). Simultaneously, the duration of these processes becomes shorter. Since intensity cannot compensate for duration, the volume of organic matter production, i.e., yield, will inevitably be reduced. Furthermore, plants will produce more stress-causing free radicals..

General adaptation measures involve also changes in soil tillage (primary and pre-sowing) and in the system of application of NPK nutrients. Main purposes of soil tillage are creation of conditions favorable for maximum accumulation of moisture outside of growing season and its efficient use during growing season. If the climate change goes in the direction of increased evapotranspiration and reduced rainfall during growing season, adaptation of the current fertilization systems is indispensable. Emphasis will be placed on primary fertilization (pre-plowing application of NPK nutrients) at the expense of top dressing. Foliar dressing will gain in importance. It will exact extra expenditures at the beginning of production, which may imply a necessity to take bank loans. Use of NPK nutrients will increase because the rate of their utilization will be reduced.

Especially helpful would be to focus breeding programs on improved tolerance to abiotic stresses. Breeding should be targeted on development of genotypes capable efficiently using the accumulated biomass for grain filling (improved harvest index). Nitrogen harvest index, i.e., rapid nitrogen remobilization and translocation from older plant parts into grain is equally important. As a rule, cultivars with a low transpiration coefficient are efficient users of NPK nutrients.

A more reliable weather forecast before or during growing season will enable farmers and the extension service staff to take appropriate measures. In some cases, these measures will be preventive, such as determining the planting rate on the basis of available soil moisture, success in the control of diseases, pests or weeds, nitrogen dose used for top dressing, etc.

Intervient crop care measures (rolling, crust breaking, additional pollination of open-pollinated plants, etc.) will be more frequent, in response to critical events or conditions.

Extension service will play an important role, but it will have to cooperate closely with local research centers.

Adaptacione mere u poljoprivredi – situacija u Srbiji

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Povećanje sume temperatura i smanjenje ukupnih količina padavina u vegetacionom periodu (april-oktobar) prouzrokuje čitav niz promena kod ostalih klimatskih (vremenskih) parametara. Pre svih, to je povećanje potencijalne evapotranspiracije, povećanje deficita vlage i smanjenje intenziteta padavina.

Navedeni činioci će najpre uticati na dužinu vegetacionog perioda. Verovatno će se stvoriti mogućnost ranijeg zasnivanja proizvodnje prolećnih kultura (soje, suncokreta, kukuruza, šećerne repe, krompira i sl.). Setva jarih kultura će se pomeriti bliže zimi, odnosno početku proleća. Shodno tome će i setva ozimih biljnih vrsta (uljane repice, ječma, raži, triticale i sl.) moći, ili čak morati da se pomeri ka oktobru - novembru, zbog postizanja optimalne faze rasta i razvika biljaka za prezimljavanje.

Povećanje temperatura u vegetacionom periodu ne isključuje mogućnost pojave niskih temperatura tokom zime tj. tokom mirovanja vegetacije. Zbog toga se o otpornosti prema prezimljavanju jesenjih kultura i dalje mora voditi računa.

Povećanje temperatura tokom vegetacionog ciklusa utiče pozitivno na intenzitet fizioloških procesa u biljci (fotosinteza, stvaranje organske materije, rast tkiva i organa biljaka, transpiraciju i dr.). Istovremeno se međutim skraćuje vremensko trajanje tih procesa. Intenzitet ne može kompenzovati vreme trajanja što neminovno dovodi do pada produkcije organske materije, odnosno prinosa. Istovremeno će se u biljkama stvarati više tzv. slobodnih radikala koji izazivaju stres.

U opšte mere adaptacije se ubrajaju i izmene sistema obrade (osnovne i predsetvene) zemljišta kao i sistema unošenja NPK hraniva. Obrada zemljišta ima za cilj stvaranje uslova za maksimalnu akumulaciju vlage u prekidu vegetacije i njeno racionalno trošenje (tokom vegetacije). Ako se ostvare promene klime u pravcu povećanja evapotranspiracije i smanjenja intenziteta padavina u vreme vegetacije, adaptacija sistema đubrenja je obavezna. Težište će se staviti na osnovno đubrenje (unošenje NPK đubriva pre oranja) na račun prihranjivanja. Prihranjivanje preko lista će dobiti na značaju. Između ostalog to će uticati na veće finansijsko opterećenje farmera u momentu zasnivanja proizvodnje i angažovanju kredita kod banaka. Upotreba NPK đubrenja će se povećati jer će se smanjiti stepen njihovog iskorišćavanja.

Posebno dobre mogućnosti pruža prilagođavanje programa oplemenjivanja u pravcu unošenja tolerantnosti na abiotičke stresove. Ciljevi oplemenjivanja treba da budu genotipovi koji iz stvorene biomase brže formiraju zrno (poboljšanje žetvenog indeksa). Ovo se može reći i za azotni žetveni indeks (N- Harvest Index) jer je brža remobilizacija i translokacija azota iz starijih delova biljke u zrno veoma važna. Kultivari sa manjim transpiracionim koeficijentom po pravilu efikasnije koriste NPK hraniva

Pouzdanija prognoza (najava) vremenskih promena pred ili u toku vegetacije, pružiće mogućnost farmerima i savetodavnoj službi da preduzmu odgovarajuće mere. One će u nekim slučajevima biti preventivne, kao što su zasejavanje odgovarajućeg broja biljaka na osnovu raspoložive zemljišne vlage ili suzbijanja bolesti, štetočina i korova, veća ili manja upotreba azota u prihranjivanju i sl.

Interventne mere nege će biti češće kao reakcija na akutno stanje (valjanje, razbijanje pokorice, dodatno oprašivanje stranooplodnih biljaka itd.)

Savetodavna poljoprivredna služba će imati vrlo važnu ulogu, ali neće moći da je ostvari bez oslonca na naučne centre.