

MAHSULOTLARGA SOF SOLIQLAR HAJMINI TREND MODELLARI YORDAMIDA PROGNOZLASH

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Annotatsiya: Ushbu maqolada Surxondaryo viloyati mahsulotlarga sof soliqlari hajmi eksponensial, chiziqli, polinomli, darajali, logarifmli trend modellari yordamida 2028 yilga qadar prognoz qilingan hamda iqtisodiy jarayonga eng mos model turi aniqlangan.

Kalit so'zlar: eksponensial, chiziqli, polinomli, darajali, logarifmli trend modellari, regressiya.

Ko'rsatkichlarni yillar oralig'idagi o'zgarishini o'rganish ahamiyati katta. Sababi ular vaqt davomida o'zgarib turadi. Bunday holatlarda trend modellari bilan prognozashtirish ko'rsatkichlarning nazariy qiymatlarini aniqlash orqali kelgusi holatni tadqiq etish imkonini beradi. Trend modellari tajribalarda keng qo'llaniladigan eng sodda prognozlash modellaridan biri hisoblanadi.

Trend – tasodifiy ta'sirlardan holi holda vaqt bo'yicha harakat qonuniyatidir. Trend vaqt bo'yicha regressiya bo'lib, doimiy omillar ta'sirida yuzaga keladigan rivojlanishning determinik tarkibiy qismidir. Trendlardagi chetlanishlar tasodifiy omillar sababli yuzaga keladi. Unda natijaviy belgi sifatida o'rganayotgan ko'rsatkich, omil belgi sifatida esa kuzatuv davri soni olinadi. Odatda trend modellari umumiy ko'rinishi quyidagicha bo'ladi¹:

$$y_t = f(t) + \varepsilon_t \quad (1)$$

¹ Фукина С.П. Трендовые модели в экономических исследованиях // Экономический анализ: теория и практика. 2011. №11. URL: <https://cyberleninka.ru/article/n/trendovye-modeli-v-ekonomicheskix-issledovaniyah> (дата обращения: 28.11.2023).

bu yerda, $f(t)$ - jarayonlarning vaqt bo'yicha yo'nalishining doimiy tarkibiy qismi; ε_t - tasodifiy tarkibiy qism;

Trend modellarining keng qo'llaniladigan quyidagi turlari mavjud^{2 3 4 5}:

- $y = a + bt$ - chiziqli trend modeli
- $y = ae^{bt}$ - eksponentsial trend modeli
- $y = a + b_1x + b_2x^2$ - 2-darajali polinom
- $y = at^b$ - darajali
- $y = a + blnt$ - logarifmik trend tenglamalari

Odatda, trend parametrlari eng kichik kvadratlar usuli yordamida baholanadi. Egri chiziqli trend modellari logarifmlash yo'li bilan chiziqli trend ko'rinishiga keltiriladi va tegishli hisob-kitoblar amalga oshiriladi.

Eng maqbul modelni tanlash uchun ularning determinatsiya koeffitsienti va xatoliklariga ko'zdan kechiriladi.

Surxondaryo viloyati mahsulotlarga sof soliqlari hajmini eksponentsial, chiziqli, darajali va 2-tartibi polinom trend modellari bilan modellashtirish uchun Microsoft Excel dasturiy ta'minotining «Анализ данных» paketidan foydalangan holda amalga oshirildi. Dastlab tahlil uchun 1-jadvaldagi ma'lumotlardan foydalanildi.

1-jadval

Surxondaryo viloyati mahsulotlarga sof soliqlar hajmi (mlrd so'm)⁶

Yillar	y	Yillar	y
2010	113,6	2017	372,5
2011	109,2	2018	528,7
2012	149	2019	880,6
2013	168,6	2020	701,6

² Tuychiyeva, M. K., & Turayev, B. E. (2024). Trend modellari yordamida elektron tijorat aylanmasi hajmini modellashtirish va prognozlashtirish. Technical science research in Uzbekistan, 2(2), 193-199.

³ Mirzohidovna, P. M., & Turayev, B. E. (2024). Surxondaryo viloyati asosiy kapitalga kiritilgan investitsiyalar hajmini trend modellari orqali modellashtirish. Journal of Universal Science Research, 2(2), 296-302.

⁴ Xursanova, S. A., & Turayev, B. E. (2024). Hudud dehqonchilik mahsulotlari ishlab chiqarish hajmini trend modellari yordamida prognozlashtirish. Technical science research in Uzbekistan, 2(2), 200-208.

⁵ Tulaganova, M. H., & Turayev, B. E. (2024). Asosiy kapitalga kiritilgan investitsiyalarni trend modellari yordamida prognozlash (Surxondaryo viloyati misolida). Technical science research in Uzbekistan, 2(2), 223-230.

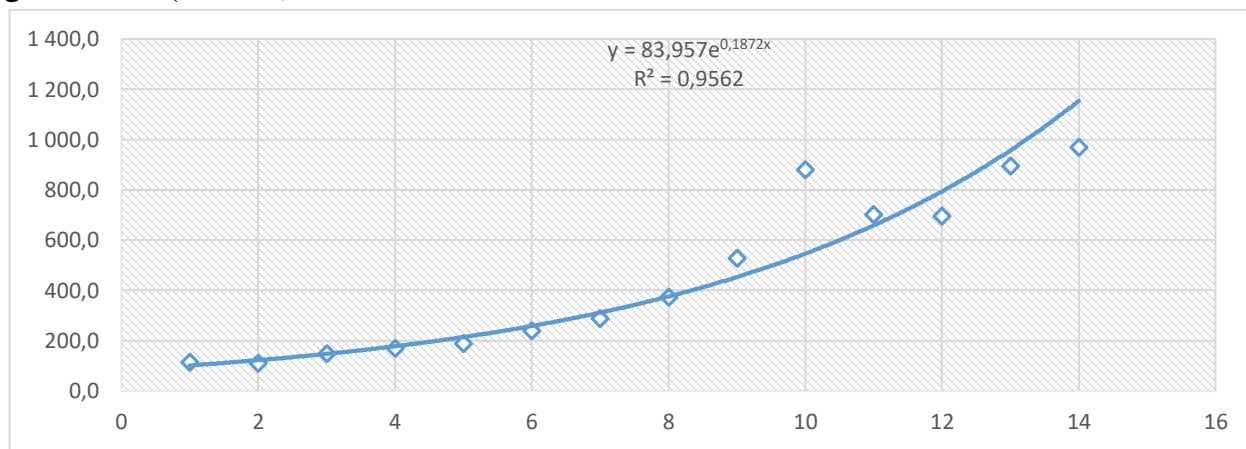
⁶ Surxondaryo viloyati Statistika boshqarmasi rasmiy sayti www.surxonstat.uz ma'lumotlari.





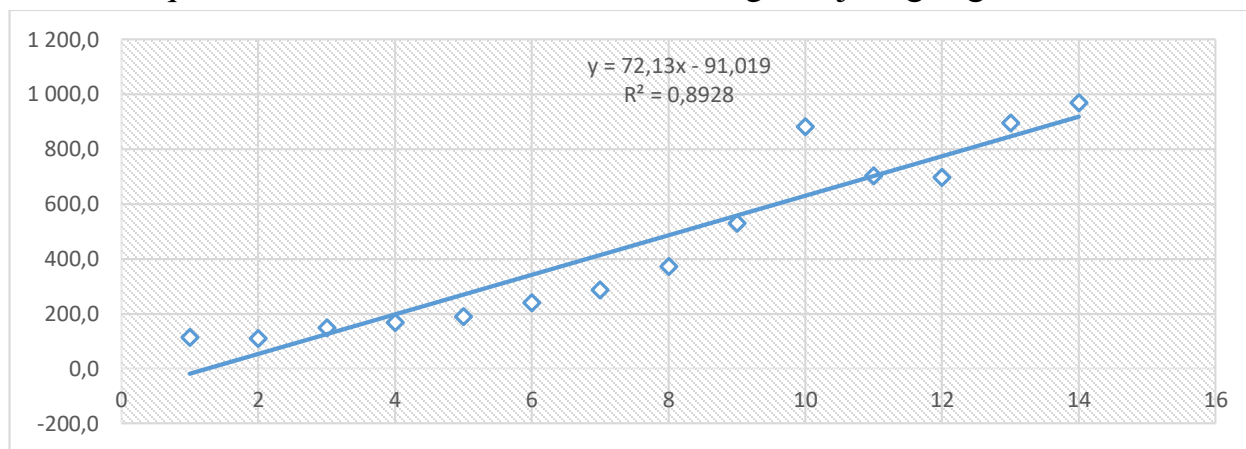
2014	188,5	2021	696,5
2015	11114,4	2022	34385,3
2016	12179,6	2023	40909,8

Tajriba uchun ma’lumotlarni MS Excelga yuklab oldik. Ma’lumotlar oraligini belgilab olib, “Вставка – Диаграмма – Точечная – Точечная” diagrammasini, keyin esa, istalgan nuqtani belgilab, sichqonchanning o’ng tugmasini bosish orqali hosil qilinadigan menyudan “Добавить линию тренда...” ni tanladik. Natijada quyidagiga ega bo’ldik (1-rasm).



1-rasm. Eksponensial trend modeli⁷

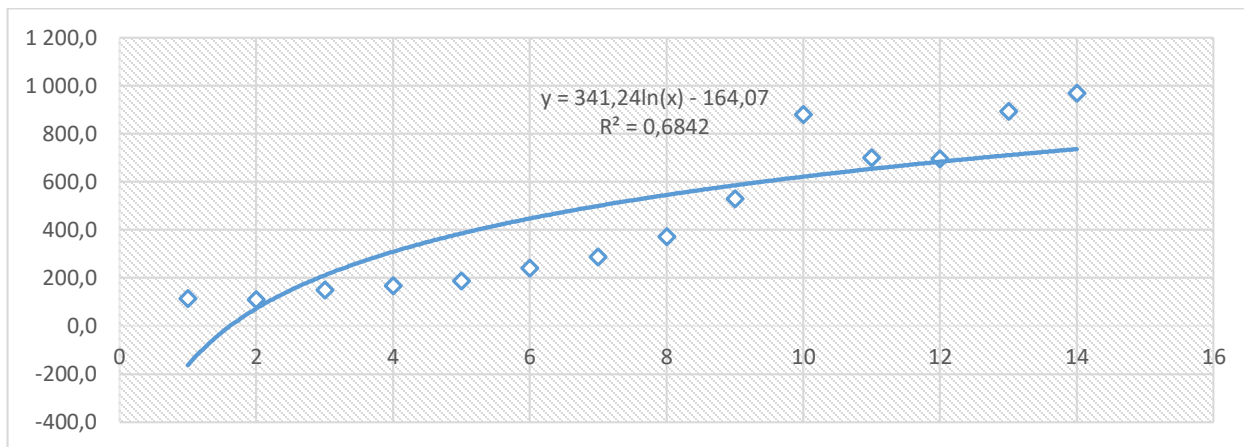
Boshqa model turlarini tanlab 2-5-rasmlardagi natijalarga ega bo’lamiz.



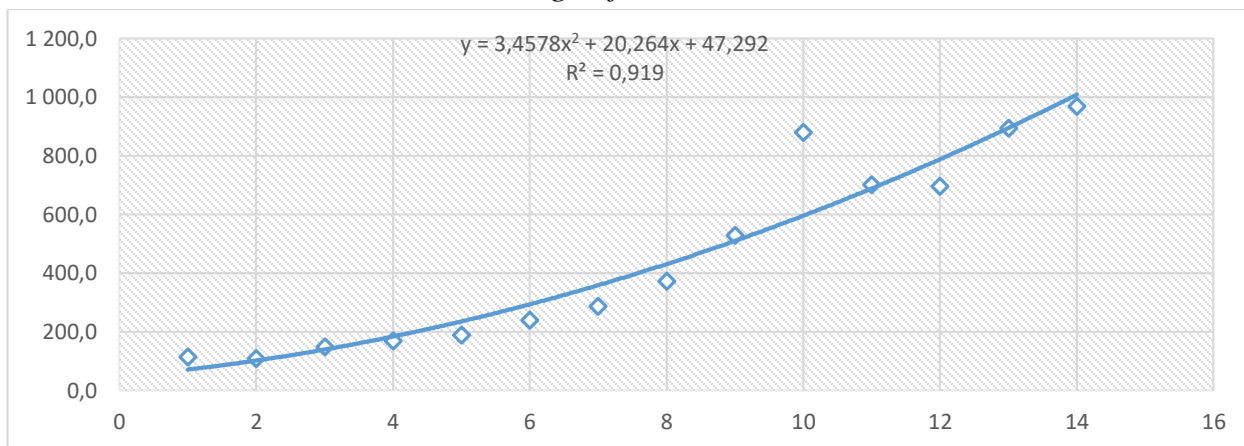
2-rasm. Chiziqli trend modeli

⁷ Muallif ishlanmasi

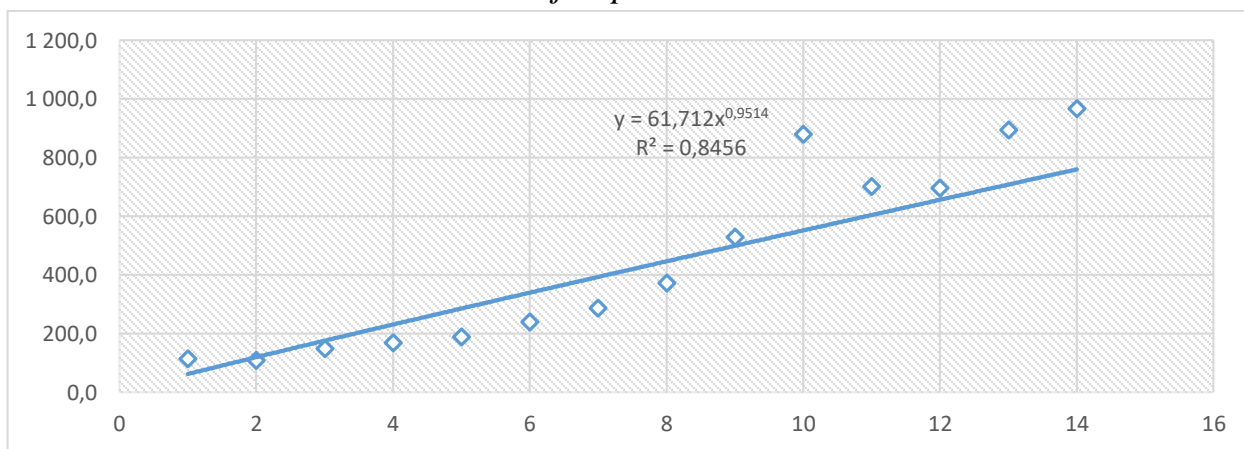




3-rasm. Logarifmik trend modeli

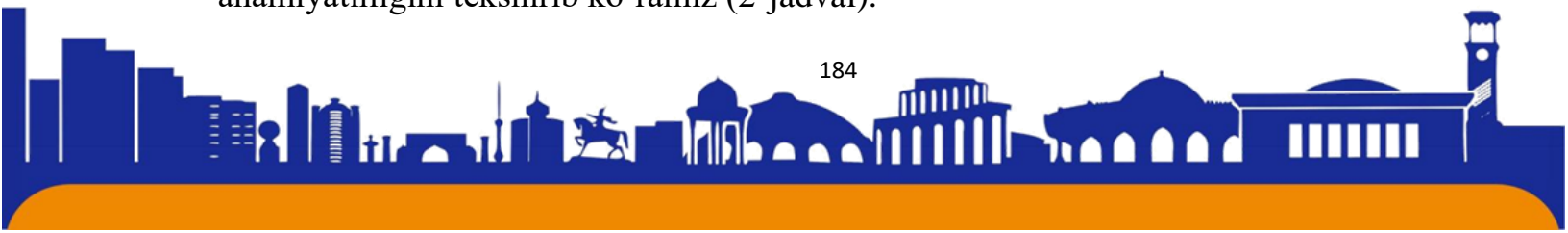


4-rasm. 2-darajali polinom trend modeli



5-rasm. 2-darajali trend modeli.

Shunday qilib, barcha turdagi modellarni tuzib oldik. Endi ularning sifatini va ahamiyatlilikini tekshirib ko'ramiz (2-jadval).





2-jadval

Regression tahlil natijalari⁸

T/r	Model turi	Model tenglam,asi	Determinatsiya koefitsienti
1	Ekspontentsial	$y = 83,957e^{0,1872t}$	0,9562
2	Chiziqli	$y = 72,13t - 91,019$	0,8928
3	Logarifmik	$y = 341,24 \ln(t) - 164,07$	0,6842
4	Polinomli	$y = 3,4578t^2 - 20,264t + 47,292$	0,919
5	Darajali	$y = 61.712t^{0.9514}$	0,8456

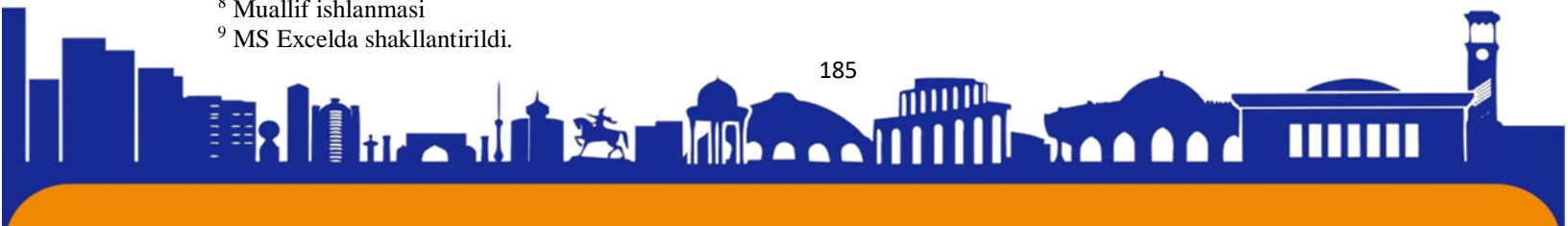
2-jadvaldan eksponentsial trend modeli bo'yicha determinatsiya koefitsienti eng katta. Demak, model sifati boshqalarga qaraganda yuqori. Modelning ahamiyatini Fisher mezon bilan va parametrlari statistik ishonchliligini Student t mezon bilan tekshirildi (3-jadval).

3-jadval

Regression tahlil natijalari⁹

ВЫВОД
ИТОГОВ

<i>Регрессионная статистика</i>	
Множественный R	0,978
R-квадрат	0,956

⁸ Muallif ishlanmasi⁹ MS Excelda shakllantirildi.



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Нормированный R-квадрат	0,953
Стандартная ошибка	0,175
Наблюдения	14

Дисперсионный анализ

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Значимость в F</i>
Регрессия	1	7,974	7,974	261,749	0,000
Остаток	12	0,366	0,030		
Итого	13	8,339			

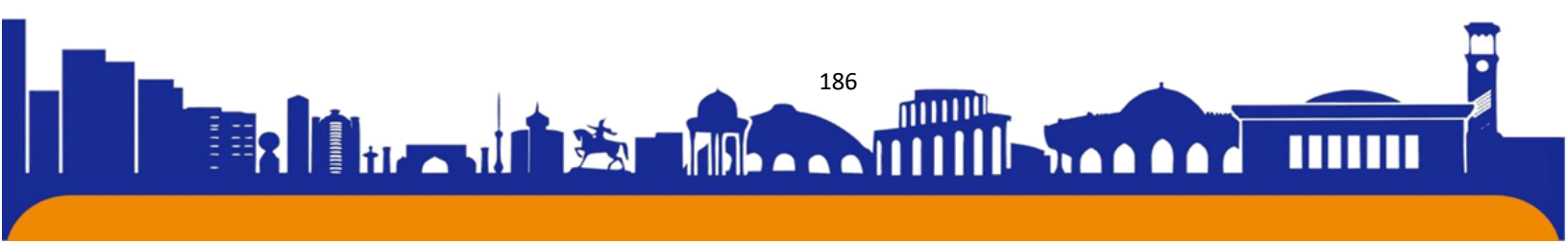
	<i>Коэффициенты</i>	<i>Стандартная ошибка</i>	<i>t-статистика</i>	<i>P-Значение</i>	<i>Нижние 95%</i>
Y-пересечение	4,430	0,099	44,964	0,000	4,216
Переменная X 1	0,187	0,012	16,179	0,000	0,162

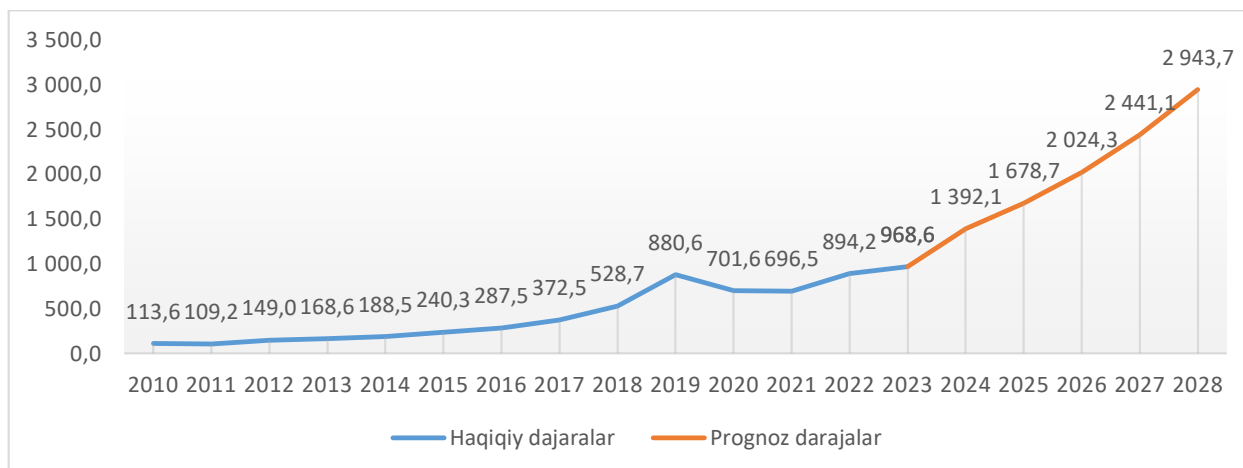
3-jadvalga ko'ra, Fisher F mezonni qiymati 261,749. Bu qiymat jadval qiymatidan katta. Sababi, p-qiymat 0,000 ga teng. Shuningdek, parametrlarining Styudent t mezonni bo'yicha qiymati esa 44,964 va 16,179 ga teng. Bunda p-qiymat 0,05 ahamiyatlilik darajasidan kichik. Demak, model iqtisodiy jarayonga mos.

Shunday qilib, Surxondaryo viloyati mahsulotlarga sof soliqlar hajmi bo'yicha modeli umumiy ko'rinishi quyidagicha bo'ldi:

$$y = 83,957e^{0,1872t} \tag{2}$$

Bu modeldan foydalanib keyingi bo'limlarda hudud mahsulotlarga sof soliqlar hajmini prognoz qilindi. (6-rasm)



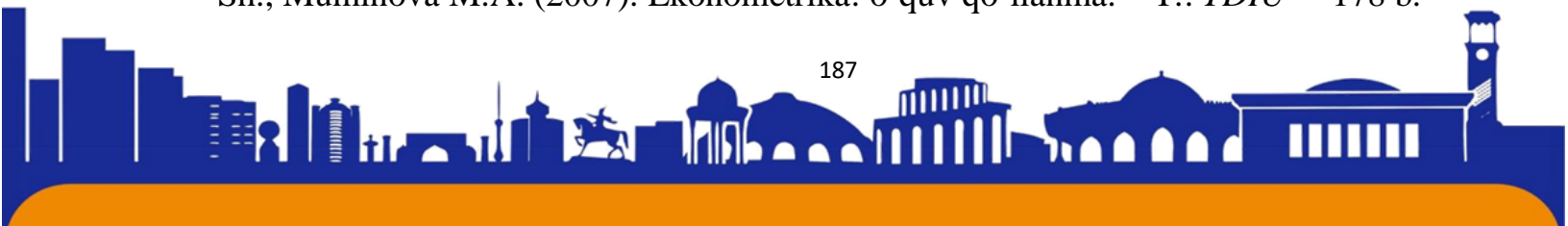


6-rasm. Surxondaryo viloyati mahsulotlarga sof soliqlar hajmi prognozi (mlrd so'm).

6-rasmga ko'ra 2028 yilga kelib, hudud mahsulotlarga sof soliqlar hajmi 2943,7 mlrd so'mni, o'sish esa 3 barobarni tashkil etishi kutilmoqda.

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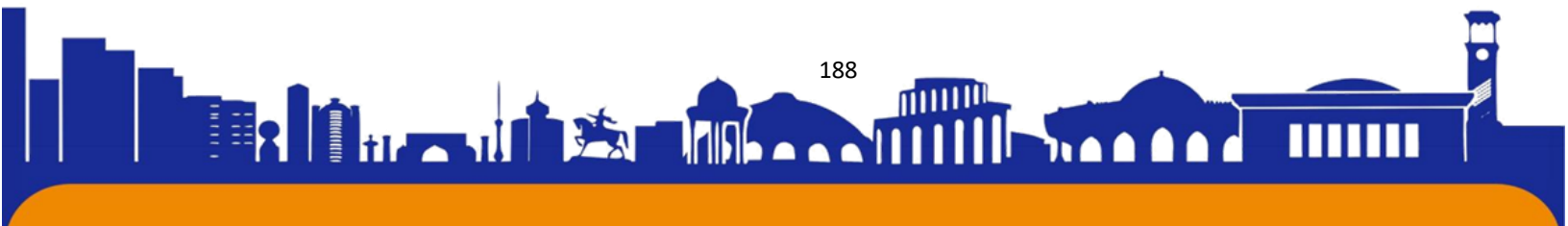
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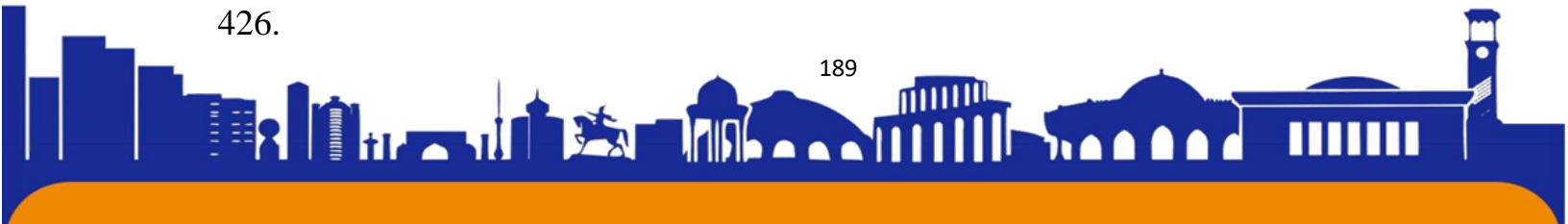
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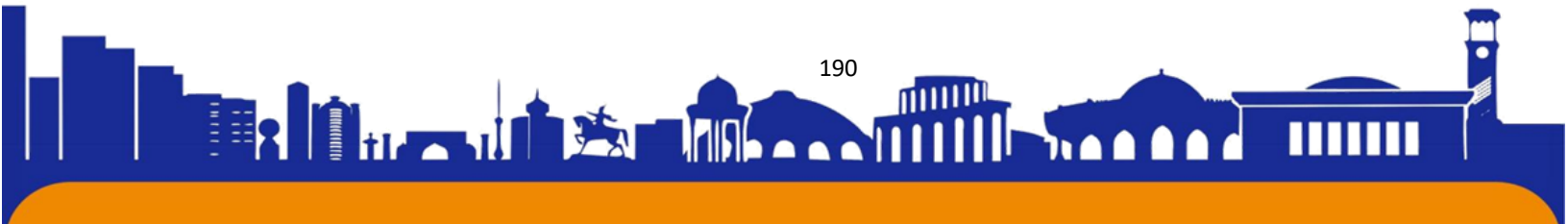
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