Avances de la Agricultura de Conservación en Junín

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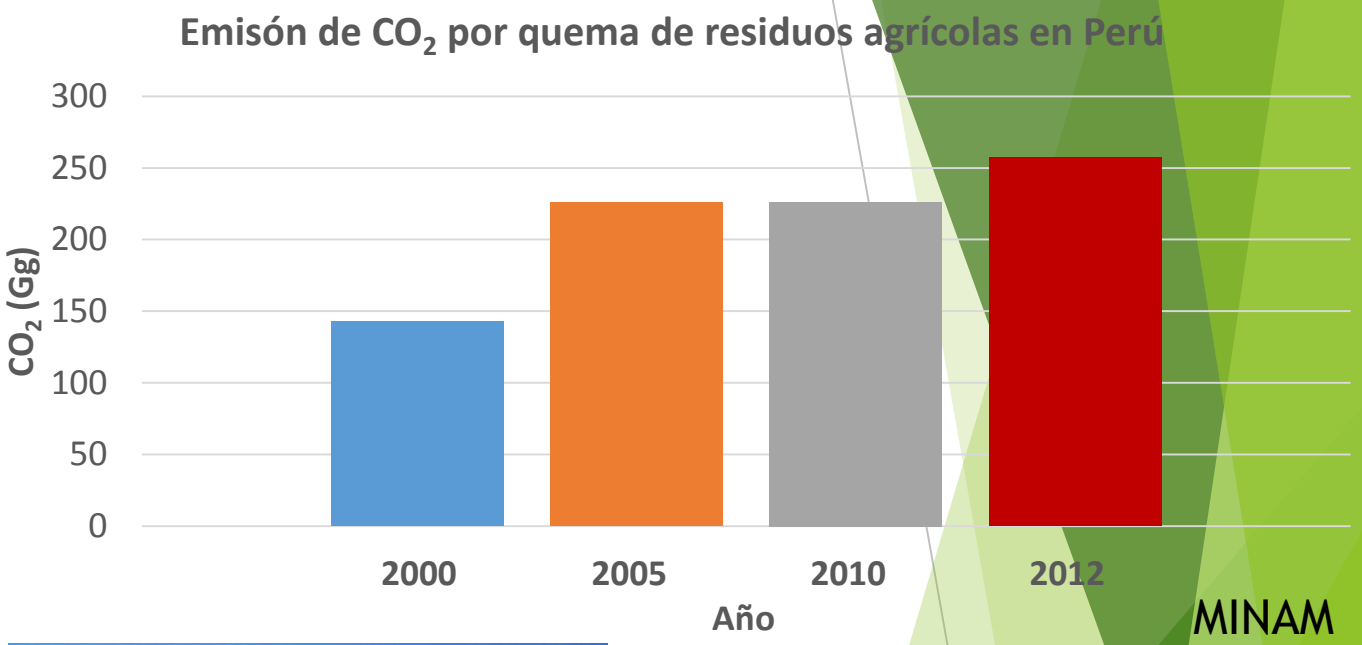
Prácticas agrícolas tradicionales en la sierra de Junín (sierra de todo Perú)

consecuencias

Quemas de residuos agrícolas

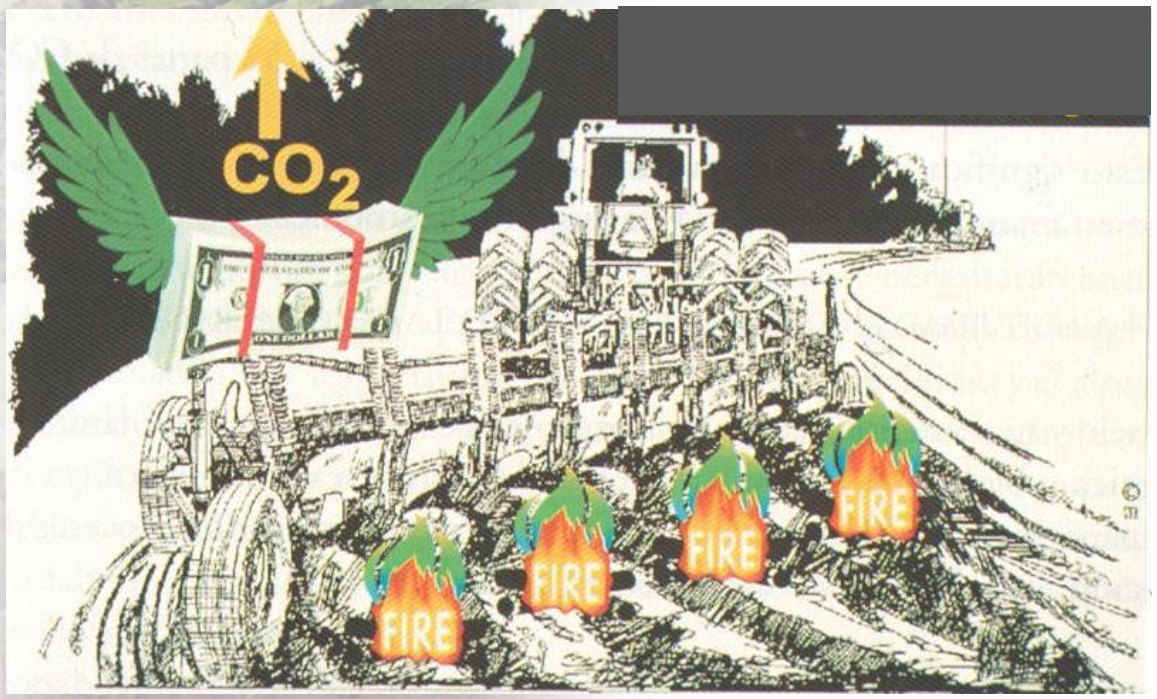
Huayao – Chupaca 2019

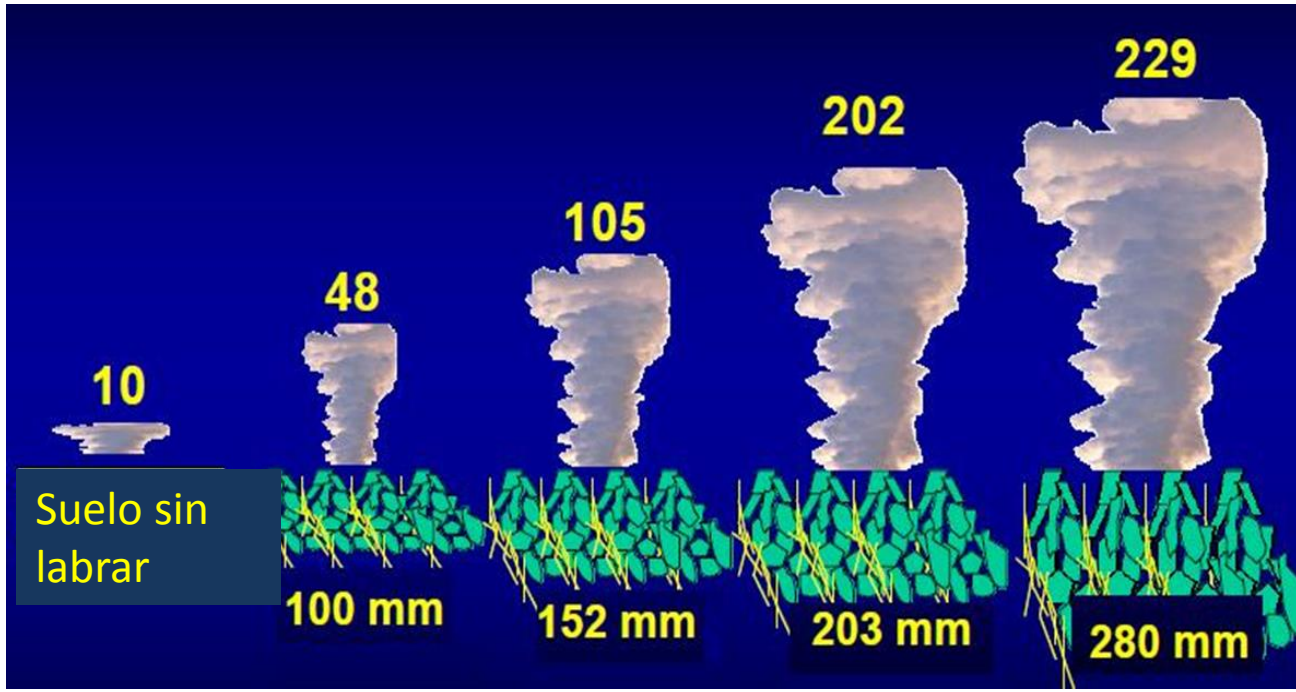


MINAM

El glaciar del nevado Huaytapallana se redujo un 63.08 % hasta el 2017 (INAIGEM 2017).

CONSECUENCIA DE AT





Efecto de la profundidad de la labranza y la emisión de CO_2 en 24 horas [g CO_2/m^2]

(**Fuente: Reicosky 1997**)

EPG
Especialidad de Suelos

CONSECUENCIA DE AT

+ 65 % suelos sierra Perú presentan erosión severa (INRENA)

Erosión hídrica en AT en suelos ligeramente inclinados - Junín

Chupaca 2019

Alto requerimiento de trabajo para la labranza y cultivo/aporque (Ej. algunas regiones de Perú)

Región sierra	maíz			arvejas			Fuente
	labranza	cultivo/aporque (jornales)	total (soles)	labranza	cultivo /aporque (jornales)	total (soles)	
Huánuco	11 yuntas	30	1615	14 yuntas	45	2260	DRA HCO 2018
Ayacucho	6 hr mq	23	1195	6 hr mq	14	880	DRA Ayacucho 2015
Arequipa	9 hr mq	12	1740	6 hr mq	15	1995	DRA Arequipa 2018

Implementación Agricultura de Conservación - Junín

AC en Huancayo dic 2017 – dic 2019

COMPARACIÓN DE PLÁNTULAS ENTRE LA AC Y AT, SEMBRADAS EL MISMO DÍA

Huayao - Chupaca 2019

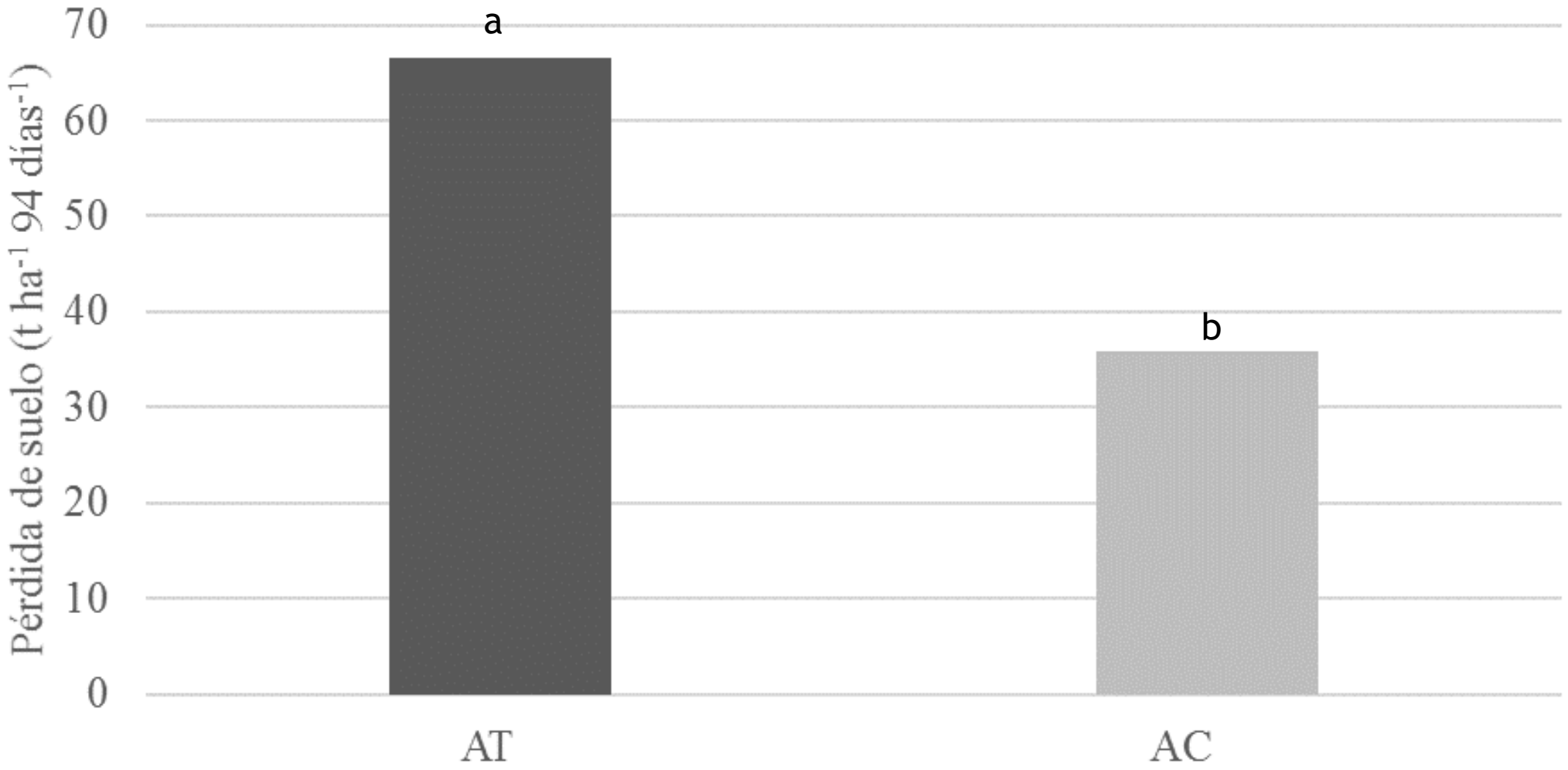
3041

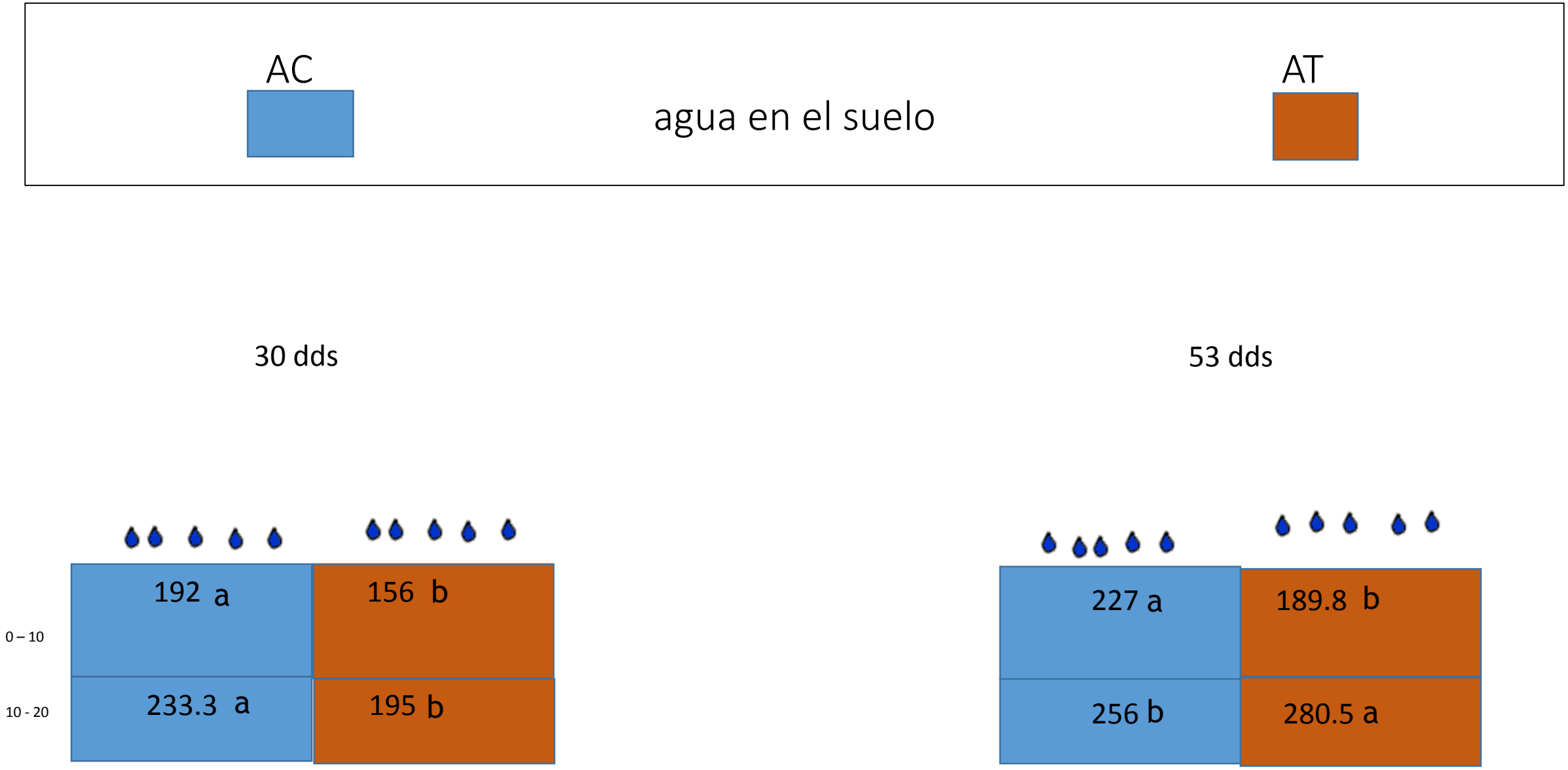
AC

AT

Repeticiones (10 muestras)	profundidad (cm)	rastrojo de rábano - siembra de maíz (2018)		rastrojo de maíz - siembra de arveja (2019)	
		AC	AT	AC	AT
		Lombrices m^{-2}			
promedio	0- 10	84.5 a	13.5 b	96.5 a	6 b
	10 - 20	8	2.5	11	2

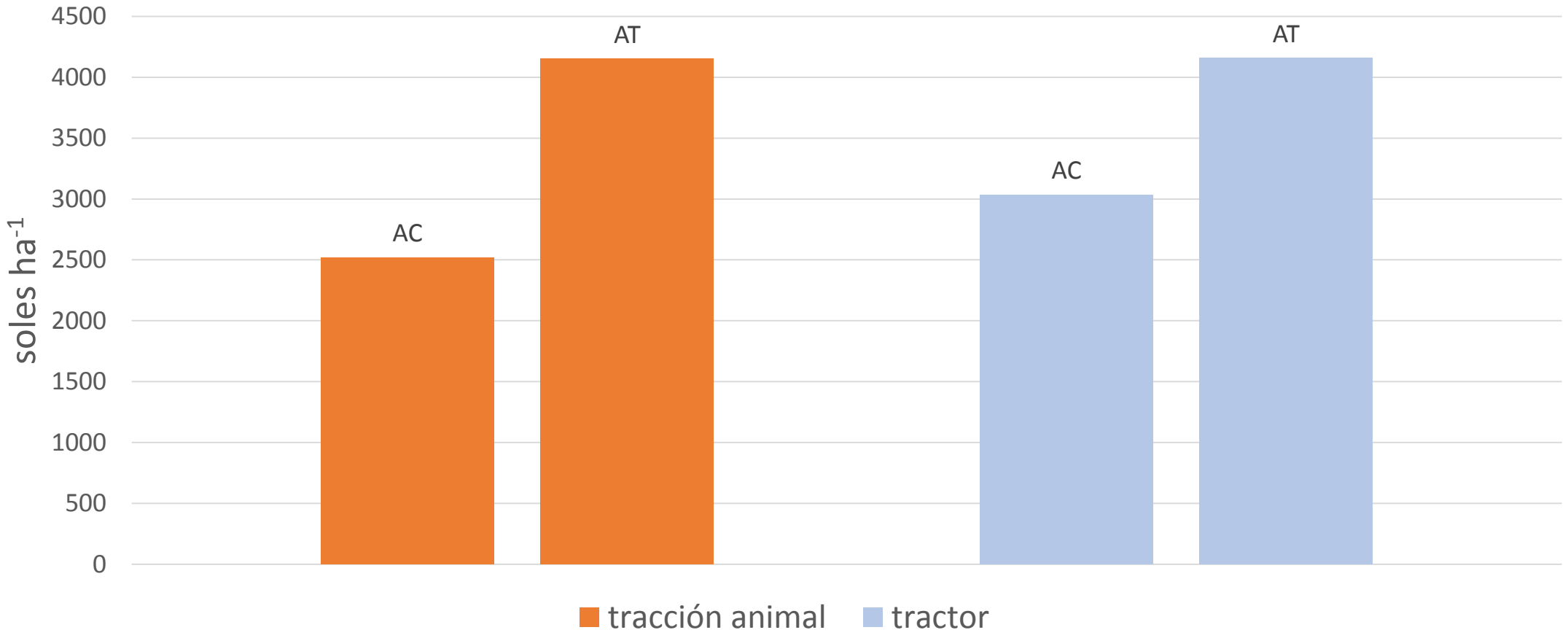
Efecto de la AC y AT sobre la erosión del suelo con el cultivo de maíz




AC
agua en el suelo
AT
30 dds
53 dds
192 a
156 b
0 – 10
233.3 a
195 b
10 - 20
227 a
189.8 b
256 b
280.5 a

Nombre del productor	Cultivo	Área del cultivo (ha)	Rendimiento (t ha^{-1})
Campaña 2018			
Nazario Rojas	Maíz choclo	1.2	9.9
Parcela comunal	Maíz choclo	0.5	14.6
Campaña 2019- I:			
Marco Navarrete	Vainas de arveja	4 diferentes parcelas	14 (semilla certificada)
Luis Garagatti	Vainas de arveja	1	11.2
Manolo Rojas	Vainas de arveja	0.5 diferentes campos	9.8 (semilla no certificada)
Reynaldo Inga	Vainas de arveja	0.1	8.8 (semilla no certificada)
Nazario Rojas	Vainas de arveja	0.7	7.1 (semilla no certificada)
Campaña 2019 – II:			
Alejandro Ricse	choclo	0.5	Estado vegetativo
Chamisería	choclo	1	Estado vegetativo
Manolo Rojas	choclo	2	Estado vegetativo
Nazario Rojas	choclo	1.5	Estado vegetativo
Luis Garagatti	choclo	1	Estado vegetativo
Marco Navarrete	choclo	0.5	Estado vegetativo

COSTOS DE PRODUCCIÓN DE CHOCLO EN LA AC Y AT CON TRACCIÓN ANIMAL Y TRACTOR (1 ha)



Parcela de monitoreo de Huayao – Chupaca 2018 - 2019

Comparación cualitativa de erosión del suelo

8 años AC

AT

THEME 2

Best practices and policies in action to face soil erosion

Conservation and Traditional Agriculture Impacts on Soil in the Peruvian's highlands

Ocaña Reyes J.A.[1], Zelarayán Muñoz O. [1], Albertengo J.[2]

[1]CARE PERU, [2]International Cryosphere Climate Initiative

INTRODUCTION

The 49.8 % of the Junin rural population has as main economic activity the agrarian item (INEI 2018), most of them produce crops through TA practice on 202184 ha (DRA JUNIN 2017). The main trouble of the agricultural production in the Peruvian´s highlands is soil erosion, 60 % of the soils are severely eroded (Brack and Mendiola 2006). Intensive tillage and vegetables residues burning causes soil deterioration (Kirk and Olk 2000). Conservation agriculture (CA) is characterized minimum mechanical soil disturbance, permanent organic soil cover and crops rotation, which led to reduction of soil erosion and increase soil water storage. Traditional agriculture (TA) practices encourage soil structure degradation, causing higher soil erosion and run off (Benites and Bot 2014). CA practices storage more water inside soil than TA soil, also they physically protect soil, decreasing soil erosion (Ghosh et al., 2015).

OBJECTIVES

The main objectives of this experiment were determinate and compare the soil erosion, bulk density (Db), volumetric moisture (θv) and corn grain yield between CA and TA.

METHODOLOGY

Soil erosion was determined through a completely randomized design with 3 replications of erosion pins groups (5 x 10). Db was determined through cylinder method, 20 samples from each plot were collected at 0 – 10 and 10 -20 cm depths in two opportunities at 30 and 53 d.a.s., registering θv weights. Samples were dried in an oven at 105°C for 24 hours.

$$Db = \frac{dried\ soil\ mass\ (g)}{total\ volume\ (cm^3)}$$

$$\theta v = \frac{moist\ weight\ (g) - dried\ weight\ (g)}{dried\ weight\ (g)}\ x\ Db\ x 1000$$

MAIN RESULTS

TA soil Db in both soil depths and sampling days were significantly less than CA, exception of Db at 0 – 10 cm depth at 53 d.a.s. (Table N° 1), simultaneously, all Db at 10 – 20 cm depth were higher than upper layers Db. TA and CA Db of lower layers showed an increase at 53 d.a.s. CA and TA soil Db of upper layers were constant and decreased, respectively (Table N° 1).

CA soil θv at 0 – 10 cm depth at 30 and 53 d.a.s. were 36.1 and 37.3 $m^3\ ha^{-1}$ of water more than TA soil, respectively (Table N° 1), representing a 23.07 and 19.54 % more water than TA and according to LSD test, CA soil θv at 0 – 10 cm depth is significantly higher than TA.

CA soil erosion at 94 d.a.s. was 30.71 t ha^{-1} of soil less than TA (Graphic N° 1) and according Tukey´s HSD test ($p < 0.05$) the TA soil loss was significantly higher than CA. CA grain yield was 87 % higher than TA.

CONCLUSION

CA soil Db was constant without need to till soil as TA. CA soil θv presumably with a suitable water infiltration was higher than in TA, being it a goodness for crop on eventual days of water shortage.

CA soil erosion was far less than TA and it will be probably even less due to greater cover crop in next sowings.

The results demonstrated CA potential for conserving natural resources, to increase crop yield and CA application is feasible in conditions of minifundium of the Peruvian's highlands.

Table 1. Averages of the Db, θv and erosion under the AC and AT

Variables	Depth (cm)	CA	TA			CA	TA		
		Days after of sowing (d.a.s.)							
		30		CV(%)	$LSD_{0.05}$	53		CV(%)	$LSD_{0.05}$
D_b ($g\ cm^{-3}$)	0 – 10	1.280	1.23	4.80	0.049	1.28	1.200	8.30	0.082
	10 – 20	1.420	1.29	7.20	0.060	1.48	1.390	7.20	0.071
θ_v (m ha^{-1})	0 – 10	192.0	155.9	17.4	21.11	227.1	165.8	22.2	36.71
	10 – 20	233.3	195.4	13.1	18.02	255.8	216.5	22.9	52.24
		CA				TA			$LSD_{0.05}$
Corn grain yield (kg ha^{-1})		681.12				701.1			425.09

Graphic 1. Effect of CA and TA on soil erosion with corn sowing

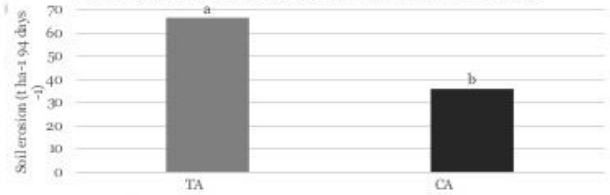


TABLE 1: Traditional agriculture. CA: conservation agriculture. a, b: Values on graphic's column with the same letter are not statistically significant, according to Tukey's HSD test ($p < 0.05$).

GRACIAS