Egyptian J. Anim. Prod., 33, Suppl. Issue, Nov. (1996): 81-90

EFFICIENCY OF THE CURRENT CROP/LIVESTOCK PRODUCTION SYSTEM IN A RECLAIMED DESERT AREA IN EGYPT

A.M.Ahmed[1], Nayera.Z.Bedier[1], M.A.M.Ibrahim[2] and A.S.Abdel-Aziz[2]

1Desert Research Center, Mataria, Cairo, Egypt, 2 Department of Animal Production, Faculty of Agriculture, University of Cairo, Giza, Egypt

SUMMARY

The system approach was used to characterize the existing crop/ livestock production system, construct farm models that simulate the existing system in the newly reclaimed desert at South Tahreer Province and to assess its efficiency.

Three sites were identified, site 1 (Al-Rowad) which comprised very small farms of less than 5 feddans each owned by ordinary farmer, site 2 (Al-Fath) which included 8-24 feddan farms owned by early retired employees, and site 3 (Al-Tahaddi) which comprised 20-30 feddan farms owned by university graduates. A random sample of 155 farms was taken to represent the three studied sites. Data were collected over the agricultural year October 1991- September 1992. All farms were operated as mixed farms where animal and crop production were practised.

Data were analyzed using a fixed-effects linear model for all production traits. Gross margins per animal unit (AU), per feddan (F), and net farm income were also calculated for the current production system. Return per AU, per F and per labour unit (L) were used as criteria of the efficiency of the production system.

Farm size, family size, family labour, and herd size for the three studied sites were 4.6 feddan, 10.4 person, 6.0 person, and 2.32 heads for site 1; 13.8 feddan, 5.9 person, 2.8 person, and 2.4 heads for site 2; and 15.4 feddan, 6.7 person, 3.1 person, and 2.84 heads for site 3, respectively.

Groundnuts was the major summer crop in the three sites and represented 66.7%, 35.0%, and 30.4% of the total farm size, respectively. In winter, wheat represented 42.7%, 31.3, and 20.6% of the total farm size in the three studied sites, respectively. Berseem (*Trifolium alexandrinum*) represented 36.1%, 19.3%, and 16.5% of the total farm size, respectively.

The animal production traits for the three sites were estimated as 1007 kg, 1080 kg and 1187 kg for total milk yield (TMY), and 172 d, 196 d and 204 d for lactation period (LP) and 5.8 kg, 5.3 kg and 5.7 kg for daily milk yield (DMY), respectively.

The crop production per feddan in ardab for the three sites were estimated as 9.7, 5.5, and 4.9 for wheat, 8.0, 4.6, and 4.1 for maize, and 11.5, 5.2, and 8.3 for groundnuts, respectively.

Return per AU in LE of the three sites was 2608.2, 1565.7, and 1331.3, respectively. Return per F in LE for the three sites was 1215.6, 258.7, and 220.1, respectively. Return per L in LE for the three sites was 74.1, 42.1, and 98.8,

respectively. Cost per kilogram of milk produced in the three sites was LE 0.42, LE 0.79 and LE 0.44, respectively.

Comparison between the three sites revealed that, farmers of site 1 utilized their resources in a more efficient way than farmers of the other two sites.

Keywords: System approach, production system, crop/livestock, reclaimed desert, gross margin.

INTRODUCTION

Crop/livestock production system including both crop and animal components represent the dominant types of farms in most developing countries. Interactions between those components often have major impact on the productivity and efficiency of the crop/livestock production system.

About 95% of the buffalo and cattle population in Egypt are kept in small farms of less than five feddans. In these small farms, a mixed farming system is practised where cropping patterns are characterized by including fodder crops as major components. Farmers, in general, use simple techniques in farming. The production of small scale mixed farms is still low and have to be raised to adequate standards to generate satisfactory income.

The study followed a system approach to 1) characterize the current crop/livestock production system, 2) estimate the technical coefficients of both the crop and livestock components, 3) examine the effect of different types of farmers and farm resources on the efficiency of the crop/livestock production system, and 4) calculate the whole farm budget to be used in the financial assessment. Such a study would be useful in planning for improvement of the efficiency of the system.

MATERIALS AND METHODS

A. The Study Area

This study was carried out at South Tahreer Province, an old reclaimed desert area located at the West of the Nile Delta of Egypt at 120 Km North-West of Cairo. This area contains a variety of small scale mixed farms of different farm sizes and categories of farmers. All farmers operate mixed farms where animal and crop activities were practised.

Three sites were identified with respect to major farming schemes. The sites are Al-Rowad (farmers are traditional farmers who own no more than 5 feddans), Al-Fath (farmers are mainly the early retired employees, who own 8-24 feddan), and Al-Tahaddi (farmers are university graduates, and the farm size ranges between 20 and 30 feddan). These sites will be refereed to as sites 1, 2, and 3, respectively.

B. Data

A random sample of 155 farms of the local agricultural cooperatives was taken. Weekly visits aimed at identifying the variables and constraints which would be included in a questionnaire to cover available resources, activities, services, cost, and revenues. A field survey was performed and data on the agricultural year October 1991- September1992 were collected. Data included the following variables: 1) production resources; farm size, family size, labour, herd size, herd structure, and herd composition, 2) animal production performance; daily milk yield (DMY) in kg,

lactation period (LP) in days, and total milk yield (TMY) in Kg, 3) crop production performance ; main crops yield and by-product yield, and 4) farm budgets; gross output, variable costs which included hired labour, fertilizer , seed , feed costs, veterinary services costs and mechanical power, and fixed costs, which included permanent labour, property taxes, annual installments , farm maintenance and insurance.

C. Statistical Analysis

The data were analyzed by the least squares techniques using the general linear model procedure of SAS (1990) for statistical analysis. The fixed-effects linear model used to analyze production resources and technical coefficients of crop production was as follows:

$$Y_{ij} = \mu + a_i + e_{ij} \qquad \text{model 1}$$

where: Y_{ij} is the observation, μ is the general mean, common element to all observations in the population, a_i is the effect due to the ith site, i = 1, 2, 3, and e_{ij} is a random effect associated with the individual observation. This element represents the effect of all the unidentified factors that may affect the trait under investigation , and are not included in the model

All factors in the model are assumed to be fixed effects except (e) which is assumed to be independent and normally distributed with mean = 0 and variance = σ^2_e.

The factors included in model 2 were thought to exert an effect on DMY, LP, and TMY are site, breed and site x breed interaction.

The fixed-effects linear model used to analyze DMY, LP, and TMY was as follows:

$$Y_{ijk} = \mu + b_i + c_j + (bc)_{ij} + e_{ijk} \qquad \text{Model 2}$$

where : Y_{ijk} is the observation, μ is the general mean, common element to all observations in the population, b_i is the effect due to the ith site i = 1, 2, 3, c_j is the effect due to the jth breed j = 1, 2, 3, $(bc)_{ij}$ is the interaction between the ith site and the kth animal breed, and e_{ijk} is a random effect defined as in the previous model.

D. Farm Budget

Whole farm budget was used as a tool for the financial assessment of the recent production system. The gross margin is estimated for each single unit of the enterprise as the difference between total income and total variable costs. The return per unit of the limiting resource is found by dividing the gross margin by the number of resource unneeded.

One of the main problems in calculating gross margins per head and farm budget for livestock enterprises is that the herds may differ in their structure and composition. A herd usually constitutes of different categories of livestock at different ages, and may combine different types of animals. So, to make it easy for computation, the equivalent of animal units (AU) were used to identify the herd size.

RESULTS AND DISCUSSION

Characterization of the production system in the studied area included results of the field survey derived from the questionnaire, production resources, current

management practices and production performance. Production resources which could be considered as direct inputs in the farming activities are discussed later as technical coefficients and/ or budget items. Specific characteristics for each site are presented separetely.

Least squares analyses of variance were performed to test the differences in production resources among sites, and to compute constants (means) of the inputs and outputs. The constants were utilized as technical coefficients to calculate gross margin per animal unit (AU) for livestock production, per feddan for the major crops, and whole farm budgets for each site.

A. Characterization of the Current Production System

1. Results of the field survey

The crop/livestock production system is the dominating system and is practiced in the small and medium farms where a major proportion of the farm area is allocated to fodder production, especially in winter. The remaining area is allocated to other cash crops. The farm buildings include a house, a barn, and a store. Most farmers own a small number of cows or/and buffaloes. Sheep, goats, and poultry may also be raised on the farm.

Manpower is divided into two main classes, family and hired labour. The family labour is used within the house and on the farm, and can be employed elsewhere. Family members participate in all the activities related to livestock and crop production. The majority of the family members in site 1 were agricultural workers (57.6%), while less than half of the family members in sites 2 and 3 were engaged directly in agriculture (47.0% and 46.1%). .Hired agricultural labour (casual and permanent) comes mainly from the neighboring governorates of Menofia and Beheira.

Irrigation water is mainly obtained from the El-Nassery canal which comes from El-Beherie branch of the Nile. Underground water also, represents another source of water for Al-Fath and Al-Tahaddi sites (sites 2 and 3). The area is susceptible to irregular irrigation because of occasional failure in water pumping stations.

Three types of herds were differentiated according to the composition of herds in the studied area: cow-herds, buffalo-herds and mixed-herds which included both cows and buffaloes. About 40% of the herds were mixed. Only 25.2% of the herds comprised cattle only, while buffalo herds represented 34.8%.

The cattle breeds raised in the area are native breeds and crossbreds, in addition to few numbers of small ruminants and poultry. The farmers used to obtain their animals either from the village market or from replacement animals raised on the farm. Female buffaloes and cows were kept for milk production, and males were kept for fattening. Animals were housed in small enclosures connected to the family house. Cattle may be used as draft animals, but buffaloes are seldom used for this purpose. Live animals were sold when cash is needed, or when they were due for culling or sale. Buffalo male calves are sold for slaughter at a very young age to save their dams' milk mainly for family consumption. Surplus fresh milk and/or milk products were sold at the village market or to the middlemen.

The highest percentage of the farmers in the three studied sites cultivated groundnuts (100.0, 100.0, and 87.1) followed by wheat (100.0, 90.0, and 82.3) then Berseem (94.4, 75.0, and 83.9) and maize (90.4, 33.3, and 33.9).

2. Production resources

Available resources in each site of the studied area included farm size, family size, persons who would be considered as labour, and herd size.

The least squares means (X), standard errors (SE), and analysis of variance for the production resources among sites are presented in Table (1). R^2 was estimated on each site to show the amount of variance due to site as a percentage of the total variance.

Table 1. Least squares means (X), standard errors (SE) and analysis of variance for production resources in the three studied sites.

Classification	N	Farm size		Family size		Family labour		Herd size	
		X	SE	X	SE	X	SE	X	SE
Overall mean	155	10.1	.63	8.3	0.29	4.4	0.18	2.54	0.17
Site									
(1)	73	4.6	0.92	10.4	.42	6.0	0.27	2.32	0.25
(2)	20	13.8	.75	5.9	0.80	2.8	0.51	2.40	0.47
(3)	62	15.4	0.99	6.7	0.46	3.1	0.29	2.84	.27
Mean squares									
Site		2129**		302**		173**		4.8NS	
Residual		61		12.9		5.2		4.5	
Degrees of freedom		152		152		152		152	
R^2		0.32		0.24		0.30		0.014	

**: Highly significant ($p < .01$). , NS: Non significant R^2 : contribution of site to the total variance.

Site 1 had smaller farm size and larger family size than the other two sites. Consequently, the share of feddan/person in sites 2 and 3 was about 5 times greater than that in site 1. Labour availability at the household level varies from site to site, and even within sites. The effect of site on farm size, family size and family labour was found to be highly significant. Site 1 had the smallest and site 3 had the largest herd size as compared to the other two sites. No significant effect was detected for site on herd size.

3. Current management practices

a) Animal production

Animals were taken care of by family labour, mainly women. In most cases cows and buffaloes were served naturally with bulls available in the village. Matings were arranged in such a way that cows and buffaloes would calve within the clover (Berseem) season (October - May). Animals were hand milked and the milk was used mainly for family consumption either fresh or in the form of processed milk (cottage cheese, butter and ghee).

Egyptian clover (*Trifolium alexandrinum*) was the main source of feeding in winter. In summer, animals were fed on fodder maize, wheat straw, sorghum stalks and by-products of other crops, in addition to some concentrates purchased from the market. Farm produced manure was transferred from the barn (by means of draft animals or tractors) and was used for fertilization.

b) Crop production

The cropping pattern results from the interaction of farmers' objectives, natural factors, government policies, managerial capabilities and financial capacities. Allocation of land for various crops was left to the farmer. In site 1 irrigation water is available in canals, and the surface method of irrigation was commonly used.

Sprinkler irrigation was dominatng in site 2 and site 3, where inavailability of water for regular and sufficient irregation represnted a serious problem. Most farmers were using machinery, particularly in preparing the soil for cultivation. The equipment were owned by farmers or rented.

The main winter crop was wheat in addition to clover. Maize and groundnuts are cultivated in summer. Cultivation date of wheat and berseem is in October, while for maize and groundnuts is in April. Harvest date for the same cropping pattern are in April and in August, respectively.

Different inputs needed for each crop varied from one site to another. Total labour used in crop activities depended on crop and area. In site 1 labour was mainly family labour in all the studied crops, while, in site 3 farms depended mainly on hired labour. Site 2 was the highest among sites in utilizing mechanization in cultivation and harvest process. Results on utilization of chemical fertilizers showed that non of the farmers used potassium except sites 2 and 3, which only used chemicals in groundnuts fertilizati. Non of the farmers of sites 1 and 2 added manure to berseem, while 75% of farmers of site 3 added manure to that crop. Most of the farmers in the studied area utilized manure which was mainly produced from their own farms. When additional quantities were required manure was purchased.

4. Production Performance

a) Animal production

Most of the published estimates on the productive performance of buffaloes and native cattle were derived from state and experimental farms. It is of interest to find out how these animals performor on the small farms under the crop/livestock production system.

The least squares means (X) and standard errors (SE) for total milk yield (TMY), lactation period (LP), and daily milk yield (DMY) in the three studied sites are presented in Table (2).

The least squares mean for TMY of buffaloes was estimated as 1166 kg. The estimate of the present study is lower than those reported by Abdel-Aziz and Hamed (1979), of 1969 kg, Mostageer et al. (1981), of 1227 kg, Nigm et al. (1986) of 1246 kg and Abdel-Aziz (1993) of 1250 kg.

The least squares mean for TMY of native cows was estimated as 792 kg. The estimate of the present study is higher than those reported by Nigm et al. (1986) of 638 kg. and Abdel-Aziz (1993) of 640 kg.

The least squares mean for TMY of crossbred cows was estimated as 1316 kg. This estimate is lower than that reported by Abdel-Aziz (1993) of 1600 kg. under small farms conditions. These differences may be due to different management.

Site was found to have only highly significant effect ($p<.01$) on LP. Breed was the only factor among those studied that exerted highly significant effect ($p<.01$) on TMY, LP and DMY. All Factors in the model contributed 27 % of the total variation of TMY, 25 % of the total variation of LP and 24 % of the total variation of DMY.

Table 2. Least squares means (X), standard errors (SE), and analysis of variance for milk production in the three studied sites.

		Total milk Yield		Lactation period		Daily milk yield	
Classification	N	X	SE	X	SE	X	SE
Overall mean	210	1095	28	188	2.6	5.7	0.12
Site							
(1)	104	1007	57	172	5.3	5.8	0.23
(2)	15	1080	134	196	12.3	5.3	0.54
(3)	91	1187	50	204	4.7	5.7	0.21
Breed							
Buffalo	112	1166	52	203	4.8	5.7	0.21
Native breed	52	792	92	168	8.5	4.6	0.37
Crossbred	46	1315	112	200	10.3	6.5	0.45
Meansquares							
Site		481683NS		15304**		0.85NS	
Breed		1415705**		9535**		16.6**	
Site x Breed		312652NS		1838 NS		5.6 NS	
Residual		169193		1491		2.6	
D.F.		201		201		201	
R^2		0.27		0.25		0.24	

**: Highly significant ($p < .01$). NS: Non significant. R^2 : contribution of site and breed to the total variance.

b) Crop production

The crop yield/feddan is a composite trait resulting from natural factors, rotation design, weed control, soil fertility and structure, depth of sowing, seedling rate, system of irrigation and timing of each operation.

The least squares means (X) and standard errors (SE) for the field crops yield per feddan in the three sites are presented in Table (3). Berseem was not included in the analysis as it was offered directly to feed the animals and the crop yield was not estimated because it was not considered in most cases as a cash crop but as an input for livestock. So, when computing the gross margin it was assumed that feddan of Berseem produced 24 tons in 4 cuts. Site showed highly significant effect on crop yield of all field crops studied. Site contributed 45% of the total variance of wheat, 33% of the total variance of maize, and 27 of the total variance of groundnuts. Site 1 had the highest crop yield (in ardab) of all the studied crops.

B. Farm budgets

A complete production system analysis requires the examination of productive and financial data in order to provide a complete assessment of the performance of the system (Boast, 1991).

A comparison of the efficiency of applying the current crop/livestock production system in the three studied sites are presented in Table (4). The comparison was based on whole farm budget. The budget was prepared in terms of gross margins of the different activities on the farm and per unit level of each activity.

Comparison between the three studied sites revealed that, farmers of site 1 utilized their resources in an efficient way than the other two sites, as they achieved the

highest return per feddan, the highest return per AU, output/input ratio and the lowest cost per kg of milk. They also ranked second after site 3 in return per labour.

Table 3. Least squares means (X), standard errors (SE) and analysis of variance for crop production per feddan in the three studied sites.

	Wheat			Maize			Groundnuts		
Classification	N	X	SE	N	X	SE	N	X	SE
Overall mean	136	7.5	0.22	90	7.0	0.26	147	9.5	0.31
Site									
(1)	73	9.7	0.30	66	8.0	0.31	73	11.5	0.44
(2)	12	5.5	0.75	5	4.6	1.11	20	5.2	0.84
(3)	51	4.9	0.36	19	4.1	0.57	54	8.3	0.51
Mean squares									
Site		367**			130**			368**	
Residual		6.7			6.1			14	
Degrees of freedom		133			87			144	
R^2		0.45			0.33			0.27	

**: Highly significant ($p < .01$). R^2 :contribution of site to the total variance.

Table 4. Comparison of the efficiency of the production system in the three site.

Criteria	Site 1	Site 2	Site 3
Return per feddan	1215.6	258.7	220.1
Return per animal unit	2608.2	1565.7	1331.3
Return per labour	74.1	42.1	98.8
Cost per Kg of milk	0.42	0.79	0.44
Output/input ratio	2.48	1.88	1.74

ACKNOWLEGDGEMENT

This study was carried out as a part of the National Agricultural Research Project No. CA AN 128 ES 12. The authors appreciate the cooperation of directors and staff of Central Fund for Animal Wealth Development for their sincere help in collections the data.

REFERENCES

Abdel-Aziz, A.S. 1993. Production Systems In: Animal Protein Foods System, increasing efficiency of production, processing and marketing. Winrock International Institute for Agricultural Development Project No. 263-0202, Cairo, Egypt.

Abdel-Aziz, A.S. and M.K. Hamed. 1979. The effect of region, season and year of calving on complete milk records of Egyptian buffaloes. Egypt. J. Anim. Prod. 19: 227.

Boast, C. M. 1991. Factors affecting farm profitability. In: V.R. Squires and P.G. Tow (Ed.) Dryland Farming, A systems approach. pp176-197. Sydney University Press, Australia.

Mostageer, A., M.A. Morsy and R.R. Sadek. 1981. The production characteristics of a herd of Egyptian buffaloes. Sonderdruck aus Zeitschrift für Tiezüchtung und Züchtungsbiologie Bd. 98:220.

Nigm, A.A., I. Soliman, M.K. Hamed and A.S. Abdel-Aziz. 1986. Milk production and reproduction performance of Egyptian cows and buffaloes in small livestock holdings. Proceeding of The 7th Conference of Animal Production, Sept. 16-18, Cairo, Egypt.

SAS, 1990. User's guide. 6.03 Edition, Statistical Analysis Systems Institute Inc. Cary NC 27511- 8000, USA.

كفاءة نظام الانتاج الزراعى المختلط الحالى (محاصيل/حيوانات مزرعية) فى منطقة صحراوية مستصلحه فى مصر

على مصطفى أحمد[1] - نيره ذكى بدير[1] - محمد عبد العزيز محمد ابراهيم[2] - أحمد سعيد عبد العزيز[2]

١- مركز بحوث الصحراء، المطريه، القاهره، ٢- قسم الانتاج الحيوانى - كليه الزراعه - جامعه القاهره.

تم استخدام منهج دراسه النظم لتوصيف نظام الانتاج الحالى، وبناء النماذج التى تحاكى نظام الانتاج الحالى فى منطقه جنوب مديريه التحرير،وتقييم كفاءته.

تم تحديد ثلاثه مواقع داخل منطقة الدراسة: (١) الرواد وتضم المزارع الصغيرة الأقل من ٥ أفدنه ويملكها الفلاحين التقليديين ، (٢) الفتح وتشمل المزارع التى تتراوح بين ٨ - ٢٤ فدان ويملكها الموظفون الذين أنهوا خدمتهم بالحكومة،(٣) التحدى وتشمل المزارع التى تتراوح بين ٢٠ - ٣٠ فدان ويملكها خريجو الجامعات.

وقد اختيرت عينة عشوائية حجمها ١٥٥ مزرعة تمثل مواقع الدراسة الثلاثة. تم جمع البيانات عن السنة الزراعية اكتوبر ١٩٩١ - سبتمبر ١٩٩٢ من المزارع التى يمارس بها نشاط الانتاج الحيوانى وانتاج المحاصيل الحقلية معا.

استخدم فى تحليل جميع الصفات الانتاجية نموذج التأثيرات الثابتة الخطى.كما استخدم هامش الربح للوحدة الحيوانية وللفدان وصافى العائد للمزرعة كمقاييس مالية. وأخذ العائد بالنسبة للوحدة الحيوانية ولوحدة الفدان ووحدة العمل كدلائل لكفاءة النظام تحت الظروف المختلفة للمواقع الثلاثة التى تمت دراستها.

كانت تقديرات متوسطات حجم المزرعة، حجم الاسرة، العمالة العائلية، وحجم القطيع لمواقع الدراسة الثلاثة على التوالى كانت ٤,٦ فدان، ١٠,٤ فرد، ٦,٠فدان، و٢,٣٢ رأس للموقع (١)، ١٣,٨ فدان، ٥,٩ فرد، ٢,٦ فرد، و٢,٤ رأس للموقع (٢)، و١٥,٤ فدان، ٦,٧ فرد، ٣,١ فرد، و٢,٨٤ رأس للموقع (٣) على التوالى.

يعتبر الفول السودانى هو المحصول الصيفى الرئيسى فى مواقع الدراسة الثلاثة ويمثل ٦٦,٧٪، ٣٥ ٪، ٣٠,٤٪ وفى الشتاء يمثل القمح ٤٢,٧ ٪، ٣١,٣ ٪، ٢٠,٦ ٪ ويمثل البرسيم ٣٦,١٪، ١٩,٣٪ من اجمالى مساحة المزرعة، على التوالى.

بلغت متوسطات الصفات الانتاجية للانتاج الحيوانى لمواقع الدراسة الثلاثة ١٠٠٧ كجم، ١٠٨٠ كجم، و١١٨٧ لانتاج اللبن الكلى و١٧٢ يوم، ١٩٦ يوم، ٢٠٤ يوم لطول موسم الحليب و٥,٨ كجم، ٥,٣ كجم، ٥,٧ كجم لانتاج اللبن اليومى، على التوالى.

وبلغت تقديرات متوسطات الانتاج الرئيسى بالنسبة لوحدة الفدان فى مواقع الدراسة الثلاثة ٩,٧ اردب، ٥,٥ اردب، ٤,٩ اردب بالنسبة للقمح، ٨,٠ اردب، ٤,٦ اردب و٤,١ اردب بالنسبة للذرة الشامية، و١١,٥ اردب، ٥,٢ اردب و٨,٣ اردب بالنسبة للفول السودانى، على التوالى.

كانت قيمة العائد بالنسبة للفدان فى مواقع الدراسة الثلاثة ١٢١٥,٦ جنية، ٢٥٨,٧ جنية، ٢٢٠,١ جنية، على التوالى. وقيمة العائد بالنسبة للوحدة الحيوانية ٢٦٠٨,٢ جنية، ١٥٦٥,٧ جنية، ١٣٣١,٣ جنية على التوالى. تكلفة انتاج كيلوجرام من اللبن فى الثلاث مناطق ٠,٤٢ جنية، ٠,٧٩ جنية، ٠,٤٤ جنية، على التوالى.

أوضحت المقارنة بين مواقع الدراسة الثلاثة أن مزارعى الموقع الأول يستخدمون الموارد الانتاجية بكفاءة أعلى من مزارعى باقىالمواقع.