URBAN AGRICULTURE: CASE OF URBAN SNAIL FARMERS IN WESTERN NIGERIA.

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ABSTRACT

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The study examines the Urban and Periurban Snail production in South Western part of Nigeria. A cross-sectional data of 50 respondents was utilized in the analysis. In the final analysis 46 samples were analyzed.

The socio –economic characteristics of the farmers reveal that 87.2 % of the farmers are males, 79% of the farmers are below 50 year s of age and 58% are High School graduates.

The R-squared for the model is 0.76. Seven variables were controlled for their effect on Net revenue of which five were significant at 1%, 5% and 10%.

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Chapter one

1.0 Introduction

Urban and peri-urban agriculture[1] (UPA) occurs within and vicinity of cities through out he world .Major activities include crops and livestock production, fisheries and forestry and of recent small livestock farming.

UPA is estimated to involve 800million urban residents worldwide in income earning and/or food production activities[2].Findings of household survey and research projects have shown that up to two thirds of urban and peri-urban households are involved in agriculture. Much of the food produced is for consumption, with occasional surpluses sold to local markets.

Agriculture in peri-urban areas is gradually spreading in Africa. Farming is done in city core areas, wedge areas and corridors out of the city, and on the periphery. Part of the reason for growth in UPA is its adaptability and mobility compare to

[1] UPA refers to agricultural practices within and around cities which compete for resources –land, water, energy, labor –that could also satisfy other requirements of the urban population.
[2] FAO report January 1999

rural agriculture. As cities expand physically, the frontiers between urban, peri-urban rural activity are burring and merging, creating opportunities as well as risks. The need arises as a result of increased population and demand for food and also the enlarged market for animal products.

Baun (1997) noted that by 2020 the demand for meat in developing countries will double or triple. The increased population has resulted in a short supply of the product.

Rearing of snail in peri-urban areas readily becomes an alternative means of improving supply and fostering the sustainability of production. Since the unconventional sources of animal protein are much cheaper than the conventional sources of protein.

Peri-urban agriculture does not only serve as a means of livelihood to the poor, through access to food, improved nutritional status, employment and income generation, it also makes use of “scarce resources” like land, gardens, backyards and water . They also serve as a source of small livestock, vegetables and fruits (Rabinavitch, 1997). Maxwell, (1997) also reported that periurban agriculture secures access to food for the urban dwellers. He also noted that the farmers could attain higher

nutritional status by their involvement in peri urban snail production. (Ajayi *et al* 1978)

The urbanization and explosive population have reduced the urban access to land; farming in the vicinities of cities is therefore an alleviating factor to scarcity of land.

1.1 Problem Statement and Justification of Study

Peri urban snail production plays an important role in food supply, income generation and employment; it is however subject to a number of constraints. Access to land and feed, water, poachers and pests are perceived problems that affect snail production. This study is important because of the following reasons.

Firstly, because of the increasing pressure on land as a result of population explosion, there have been scarcities of land available for production. In other to break even with the input constraints, the farmers have evolved means of putting land into maximum use. The study will therefore want to see how the farmers have been able to achieve these goals.

Secondly, the study will contribute to existing literature on Periurban snail farming. It is necessary to see what these farmers

are producing and see if they are meeting up with general aspiration of increasing food accessibility and availability to all and sundry.

In doing this, the study will be searching for answer to the following pertinent questions: what is their pen size? How do they feed or fatten up their hatchlings? How many years experience do they have in snail farming? Do they employ hired labor or family labor to take care of the animals? What risks/problems are they exposed to? How much revenue do they make? Which farming practice is more profitable etc? The specific objectives are to

1. identify and describe various production systems of snail production in the study area.
2. examine the profitability of the production systems.
3. evaluate the revenue of the farmers based on their farming practices
4. come up with suggestions based on the findings for policy consideration.

1.2 Organization of work

Chapter one introduces the topic and also provides general information on the topic. Chapter two discusses more on

the importance and threat to urban agriculture. This is followed by Chapter three which discusses the methodology and chapter four highlights the characteristics of the households and presents the result of regression. In chapter five recommendations are made based on the findings.

Chapter Two

2.0 Importance and Scope of urban agriculture

Evidence of spatial growth and economic importance of UPA in general, and urban livestock production in particular in many African cities and capitals are well documented in the literature .According to Mosha (1991),livestock population in and around Dar es Salam increased dramatically between 1985 and 1989,with poultry population going from 500,000 to about 800,000.During the same period ,swine and dairy cattle populations in many parts of the continent ,increased three fold from 2600 to over 6000.This is confirming that the cities are indeed feeding the people.

About 25% to 36% of surveyed households carried out by Lee smith and Memon (1994) which covered 6 cities in Kenya, showed that 17% of the respondents kept livestock they estimated 1.4 million herds of livestock kept in all Kenya worth about $17 million USD. Also, according to Baah (1994), 25% of the 4.5 million small ruminants in Ghana (West Africa) are raised by people living in the and around cities and towns. He opined that urban producers holding these animals not only contribute

substantially to the animal protein needs of the urban community, but also benefit economically, with a resultant improvement in their standard of leaving.

Furthermore, Centers (1991) also noted that the economic benefit accrues to a large number of people that supply inputs and marketing services to households that rear animals in and around Bamako in Mali. National statistics quoted by Van der Bliek (1992) for the livestock population in Nairobi :25,000 cattles,30,000 small ruminants,30,000 pigs,8,500 rabbits and 350,000 poultry hint points to the fact that UPA contributes greatly to the protein needs of the urban population.

A research carried out by Gefu (1992) in Zaria ,a northern Nigerian University town, showed that 80% of the respondents keep livestock, raise goats, poultry and sheep, mainly to meet immediate household needs, and also to augment family income. These findings and others therefore buttress the growing importance of this sector in various aspects of the economy and the population at large. These roles include:

1. provision of employment and income to the unemployed or low income urban dwellers and families;

2. generation of supplementary income for the employed, poorly paid and middle class urban families;
3. contribution to the food security of urban households that cannot afford to purchase all of its food requirements;
4. on the global perspective, the sector reduces the gap between food demand in the city and supply from the rural areas where production is declining[3] ,and the marketing and distribution are inefficient because of inadequate infrastructure; and
5. Source of commercial and economic activity for all the rich who can invest in intensive urban based meat and milk production to cater for the specific demands of the city dwellers.

2.1 Factors responsible for the rapid growth of the sector:

It has been observed that the rapid growth and expansion of UPA in Africa is a response to the market demands arising from the rapid urbanization and, paradoxically, economic impoverishment of the population .Sub-Saharan Africa as a whole is experiencing

[3] until recently majority of food products were produced in rural areas and transported to the cites. The decline is manly as a result of increasing demand for white collar jobs

a fairly high rates of urbanization .Currently, 30% of the population leaves in the cities, a figure that may reach over 50% by the year 2025(refer to Table 1).

Table 1: Urbanization rates I Sub-Saharan Africa).

TABLE 2.1

Urbanization rates in Sub-Saharan Africa	
Year	**Urban population (% of total population)**
1960	11.8
1965	13.7
1970	15.9
1975	18.8
1980	22.0
1985	25.4
1990	29.0
2000	36.3
2010	43.5
2025	54.2
Source: United Nations 1985	

Such a rapid urbanization has, in many countries, led to rapid increase in food demand accompanied by a change in food habits, often not satisfied by the rural production, UPA as a result emerged as an alternative strategy to respond to this increasing, and sometimes specialized, market demand.

The increasing prominence of the sector has also been promoted by the economic improvement in many countries. The economic crises of 1990's have had the combined effect

drastically lowering the income and purchasing power .The urban household which was most hard hit and stretched to the limit, responded by engaging in urban farming; diversify sources of income, and family nutrition.

The world's current population of 5.9 billion is split about equally between cities and rural areas, with urban areas expected to surpass rural areas in population around the year 2005. Regionally, there are significant differences in the degree of urbanization. Just over three-quarters of the populations of North America, Latin America, and Europe live in urban areas, while only slightly more than one-third of the populations of Asia and Africa are urban.

Until recently poverty was synonymous with rural conditions, but the rapid urbanization of many developing countries has given birth to a large class of urban poor. The worldwide urban population is expected to double in 30 years, but the numbers of urban poor are expected to increase at a greater rate. The World Bank has estimated that the 1990s would see an increase from 400 million to one billion urban people living in absolute poverty; UNDP estimated a 76 percent increase in urban poor during the 1990s and a decrease in rural poor

during the same period. Estimates based on health and environmental conditions suggest about 600 million people in cities live in unhealthy conditions. Hence, as Africa and parts of Asia will become increasingly urban over the next 25 years, urban poverty and food insecurity could worsen if preventive measures are not taken.

Expansion of cities is driven by economic growth and/or by migration from rural to urban and peri-urban areas as agricultural and rural employment opportunities decline or lag behind population growth. Other factors which, in some cases, have contributed to the rapid urban expansion are: social unrest, natural disasters (drought), and lack of educational opportunities and medical facilities in rural areas. Peri-urban areas are those areas surrounding cities which are in most ways integrated with the city. These areas also have high growth rates and receive up to 70 percent of the migrants from rural areas as well as migrants from the city itself.

The challenge of supplying nutritionally adequate and safe food to city dwellers is substantial. Accomplishing this task under conditions of growth and congestion demands that policy-makers seize opportunities for integrating resource management

and planning efforts, understanding potential linkages between rural and urban areas, and anticipating the changing needs of a country's citizens - both rural and urban. Part of the reason for the observed growth in UPA is due to its adaptability and mobility compared with rural agriculture. As cities expand physically, the frontiers between urban, peri-urban and rural activity blur and merge, presenting opportunities for beneficial linkages.

2.3 Constraints and opportunities

In none of the systems reviewed above is performance optimum nor is the potential economic returns achieved. Technical, institutional and policy-related constraints are responsible for this less than optimum performance. Opportunities exist, however, to alleviate these constraints and make peri-urban livestock production, particularly dairy production, more attractive.

Technical constraints: In general, peri-urban dairy production in Africa is characterized by low milk yields. In comparison to production levels in other regions, milk yields in Africa have been reported to be 2.5 times lower than in Latin America and Asia, 10 times lower than in Europe, and 15 times lower than in

North America. Following a two-year evaluation of three major milk production systems around Bamako in Mali, Debrah (1993) concluded that feeding, marketing and labor costs were too high, relative to milk output, for the enterprise to be profitable, and that milk off take/cow/day was too low. Technical constraints responsible for such low productivity revolve around three factors:

1) limited milk production potential of local genotypes,

2) seasonal quantitative and qualitative feed shortages,

3) poor management and health care.

Many local indigenous breeds of cattle have developed adaptive traits for disease resistance, heat tolerance and ability to utilize poor quality feeds. This adaptation to the natural environment is often not accompanied by high performance traits, and neither have these breeds been selected for high milk production. Low genetic potential for milk production is therefore a limiting factor, which could be, and is being addressed on a short-term basis, by cross breeding with proven milk producing breeds. This short-term action must, however, be accompanied by longer term selection and breeding plans that

incorporate the conservation of desirable indigenous germplasm. In the short run, therefore, urban producers who have the financial means and management know-how should exploit animals that have been crossbred towards the local breed to increase milk output, and economic returns. Such crossbred animals benefit from the local breed adaptation to local feeds, diseases and the environment.

Seasonal quantitative and qualitative feed shortage is perhaps the major constraint to improved production and productivity of peri-urban dairy enterprises, and farmers usually cite it as a priority problem to be tackled by research. Appropriate feed packages suitable for urban dairy producers are available and continue to be developed. These are built around improved fodder cultivation including leguminous forages, where land is available, the improvement of poor quality forages and crop residues, including the utilization of multi-nutrient blocks, and efficient supplementation of grazed pastures (Smith 1993). What are often lacking are policy incentives that encourage their adoption and utilization.

Institutional constraints: A weak infrastructural base and poor support services have been repeatedly shown to adversely affect

output and economic returns of urban-dairy units. Inadequate infrastructure such as poor feeder roads, unreliable power supply, inefficient cooling and processing capacity can discourage production or result in economic losses. According to Shapiro *et al*. (1992), these factors that constitute formidable constraints to distribution and marketing, could discourage production because of the perishability of milk. Small-scale peri-urban dairying is often linked to, or engages in, the collection of milk from rural areas. Adequate infrastructural facilities are needed for linking rural supply to urban demand, to allow for an efficient network of milk collection, processing and distribution.

Institutional support services in terms of credit facilities, health delivery, input supply and distribution, and technical advisory services are of crucial importance to the successful management of peri-urban dairy units, but are often not adequately provided. While a high incidence of disease entities, particularly in tropical areas, is known to constitute a serious barrier to high animal productivity, poor delivery of veterinary services in many African countries complicates the situation. Available services are thinly spread and ineffective, as are drug availability and distribution. A suggested solution which is gaining acceptance is

the privatization of veterinary delivery services. Because farmers have demonstrated willingness to pay for efficient services, private veterinary services are gaining grounds, giving farmers the confidence to make the necessary investments for improved productivity.

Access to credit facilities is necessary to cover the comparatively high cost of establishing and running even small-scale dairy farms. Credit would be required for upgrading local cattle, and even where the production system is based on indigenous breeds, substantial investment would still be required to ensure adequate nutrition, disease control and an effective product marketing strategy. According to Winrock (1992), the ties between extension services and research institutions that generate new agricultural technology are weak, thus the two-way communication needed between research workers and farmers is poorly developed in most countries. In other words, there is a need to develop strong technical advisory services that will ensure a successful transfer of appropriate technologies to farmers for improved performance. The current lack of such cost-effective means of transferring technology constitutes a serious constraint.

Policy-related constraints: According to the World Bank (1981), government policies play a crucial role in livestock development. They not only affect the economic environment, but also directly affect production, marketing, consumption and external trade in livestock products. Policy issues that may constrain or promote the dairy industry performances include: foreign exchange, dairy import, and commodity price policies.

Jansen (1992) noted that in Nigeria, smallholder dairy production and processing near urban areas were not well developed, because until recently, imported milk products were so cheap in Naira (local currency) terms that there was hardly any incentive to produce milk locally in urban areas.

After the devaluation of the Naira, however, the situation changed, and production and processing of local dairy products have become increasingly attractive. In other words, high currency exchange rates may discourage local production and development of the dairy industry. Import and consumer-price subsidy have the same effect of reducing local production, because although domestic consumption increases as a result of cheap imports, local production, sales and profits decline (Shapouri and Rosen 1992).

Direct commodity price control by government is a common phenomenon in Africa. Shapouri and Rosen (1992) listed a number of criteria used for the determination of commodity prices: cost of production, fair return to producers, fair price to consumers, import-export parity price, commodity profitability, food security and political acceptability. Fair price to consumers and political acceptability apparently have always received major consideration, and this is particularly true for dairy products pricing which is often tailored to satisfy the politically vocal urban dwellers. Such pricing controls are often inadequately enforced, particularly at the informal market where the majority of local producers market their output. The high transaction costs in such markets penalize local production (Winrock 1992).

Staal and Shapiro (1994) illustrated the above scenario with the situation in Kenya in the 1980s, when the Kenya Cooperative Creameries (KCC) dominated the formal dairy sub-sector from producer to retailer, as it had official monopoly on processed milk sales in urban areas, and was the major buyer of raw milk at the farm gate, paying the official Kenya Dairy Board controlled price. The informal market, initially disadvantage in

terms of volume sales, gradually acquired a larger share of the market, for two main reasons. Firstly, input prices paid by the producers increased faster than the official farm-gate milk prices, and secondly, raw milk prices on the informal market rose relative to the official prices. Most producers therefore channeled their products to the informal sector. The end result, apparently, was a severe shortage of dairy products on the formal market. This underscores the need for more favorable price policy and market liberalization in order to stimulate dairy development.

Such a policy change was implemented in the 1990s in Kenya when dairy prices were decontrolled. In a study of the impact of these changes on smallholder peri-urban producers using the Policy Analysis Matrix approach, Staal and Shapiro (1994) reported that the price policy reform removed 20% - 30% of the negative policy effects of producer price controls, and that although producer profits and welfare were improved, producer disincentives still existed. They concluded that evidence from their studies and from elsewhere, confirm that non-price factors such as regulations and credit restrictions may continue to hinder dairy development in spite of favorable price policies.

Chapter Three

3.0 Methodology

3.1 The Study Area

Oyo State is in the Western part of Nigeria. It came into being in 1st April 1976 as a result of creation of three states out of the former Western State of Nigeria.

Oyo State covers an area of approximately 3.57 ha out of the total land areas of Nigeria which has a total land area of 92.5 million ha.

It is bounded in the south by Ogun State, in the North by Kwara State, in the East by Osun State and in the West by Ogun State and Republic of Benin (Dahomey). Ibadan is the capital of Oyo State. Ibadan is on of the largest cities in Africa. According to 1992 census, the population of the state is 3.5 million.

Oyo State lies in the rain forest belt of Western Nigeria. This zone abounds in wide varieties of National resource like land and water. The presence of green pasture also facilitates the livestock production like cattle and piggery and snailry. Rainfall varies from 114cm per annum in the Northern area to about 254 cm in south

eastern part of the state. Relative humidity is high ranging from 50^{o}F to 95^{o}F.

3.2 Data Collection

The study used 50 cross-sectional data collected from 10 local governments in Ibadan metropolis. The 50 respondents data were obtained through stratified simple random technique .Data were collected on demographic and socio economic characteristics of the farmers. Demographic variables included age, farming experience, marital status while socio economic variables included farm size, labor, cost of hatchery and cost. Consideration or more weights was given to areas where there were more farmers.

3.3 Analytical Techniques and Models

A combination of analytical tools was employed. They include descriptive statistics (e.g. means, frequency distribution, percentages, tables etc), budgeting; technique, statistical test of significance and profit function analysis.

3.3.1 Descriptive Statistics

This was utilized in analyzing and making comparisons on the socio-economic variables of the farmers, farming practice and the different production systems.

3.3.2 Budgetary Analysis

This was used to analyze the cost and returns of the farmers in other to determine the profitability of peri-urban snail production. The budgeting technique will provide information on farm input use and cost, output and prices etc.

The budgetary technique formulation is:

$GM = \sum p_i q_i - \sum r_j x_j$ ---------- (3.1)

Where:

GM = gross margin/Net revenue

P_i = Unit price of output i

q_i = quantity of output i

r_j = unit cost of the variable input j

X_j = quantity of the variable input j

3.3.3 Double log production function

The double log production was utilized to control for the effect of some variables on the net revenue of the farmers. These variables are farm size, use of hatchery, calcium

supplement, labor cost, feed cost, educational level, and family size, on the gross revenue or margin of the farmers.

Model

$$Lny=b0+b1x1+b2lnx2+b3lnX3+b4lnX4+b5Xln5+b6X6$$

$$+b7X7+ b8X8+ b9X9 + b10X10 +e$$

Where:

Y = Average Net Revenue (ANR)

X1 = Age

X2 = Average Capital Investment (ACI)

X3 = Average Farm Size (AFS)

X4 = Average Feed Cost (AFC)

X5 = Average Labor Cost (ALC)

X6 = Hatchery (1for use and 0 for otherwise)

X7 = Calcium supplement (I for use and 0 for otherwise)

X8 = Educational Level (EL)

X9 = Family Size (FMS)

X10 = Sex (1 for male, 0 for otherwise)

e = Error term or random variable.

Chapter Four

4.0 Result and findings

4.1 Socio economic Characteristics of Household

4.1.1 Age

Table 4.1		
Age	Frequency	Percentage
< 40	20	42%
41-50	18	37%
>50	10	21%
Total	48	100%
Source :Computed from Field Survey Data ,2001		

Many of the snail farmers are young and agile. They are using the snail farming as a means of augmenting their income. As revealed from Table 1, more snail farmers (79%) are within ages 28 to 50 while 21% are above the age of 50. The average age of the respondents is 42 years.

4.1.2 Educational level

Table 4.2		
Educational level	Frequency	Percentage
<6	4	8%
6 to 10	24	50%
>10	20	42%
Total	48	100%
Source :Computed from Field Survey Data ,2001		

As revealed in Table 4.2, 58% of the farmers have spent high school education while 42% old a university degree. The ratio is quite close owing to the fact that snail farming is not that very demanding. Most farmers with High school education or lower tend to have lower income which justifies their involvement in other revenue generating activities in other to argument their income. However, the increasing cost of living as also forced the so called educated to embrace to other revenue generating activities like farming.

4.1.3 Farm Size

Table 4.3		
Farm Size	Frequency	Percentage
< 259	30	63%
259 -550	13	27%
>550	5	10%
Total	48	100%
Source :Computed from Field Survey Data ,2001		

From the table, 63% of the farmers of the snail farmers rear about 259 snails.27% rear between 259 and 550 snails while 10% raise more than 550 snails. This figure is quite large since

snails are very prolific. This type of enterprise does not require much investment in terms farm size.

4.1.4 Sex

Table 4.4		
Sex	Frequency	Percentage
Male	41	87.2
Female	6	12.8
Total	47	100.0
Source :Computed from Field Survey Data ,2001		

There are more male snail rearers than the female. The figure shows that 87.2 5% are male while 12.8% are female. More males are taking to farming to meet their subsistence needs. It not uncommon to see family heads in Nigeria having a small business to make ends meet. Women however are more involved in marketing than production. This explains why there are fewer women involved in production activities.

4.2 Results of regression.

The double log functional form was used for the Regression. This was based on economic, statistical and econometric criteria. Double log has been proved to be the best fit for analysis production functions. The best line was selected based on the magnitude of the R-squared, statistical significance and the signs of the coefficients. In the final analysis three

variables were removed (Age, Hatchery & Sex) because they were not significant at 10% and did not contribute to the overall goodness of fit of the model.

Table 4.4 shows the estimates of the regression analysis. The R-square for the model is 0.76 .This shows that 76% of the variations in the average net revenue are explained in the model. 24% of the variations in Net revenue are due omitted variables and errors of measurement.

As expected, the sign of the Farm size is positive and significant at 1% .This shows that farm size has a direct positive effect on net revenue. Farmers with larger farm size are making more revenue compared to smaller size. This agrees with economic reasoning.

Also, Family size has a positive sign and is significant at 1%. This shows that larger families are making more revenue. This might not be unconnected with the fact that large families have more children that assist on the farm.

The sign of educational level agrees with economic reasoning it is significant at 10%.This indicates that more educated farmers are better able to manage their farms.

The sign of feed cost variable is negative it is however significant at 5%. As farm size and revenue increases, it becomes more expensive to buy the feedstuff since at this stage domestic sourcing is insufficient. Smaller farms depend mainly on their farm products.

Dummy for supplement is negative and significant at 5%.Result indicates that farmers that do not use supplements have more revenue than the users. The idea of using supplements is still knew to some of the farmers and are not aware other cheaper sources of the supplements.

The variables capital investment and labor cost are positive but are not significant at 10%.According to a priori expectation capital investment and labor cost are expected to have positive effect on Net revenue.

The result of the estimate shows that Farm Size, Family size and educational level have positive effects on the Net revenue. However, reduction of use of supplements and Feed cost will increase the Net revenue. Capital Investment and Labor cost have no significant effects on the Net Revenue.

Table 4.4: Result of regression

Variables	***Coefficients***	***Coefficients Beta***	***Standard Error***	***t- Stat***
Intercept	0.772	0.772	0.921	0.839
logAFS	0.987	0.743	0.198	4.996***
logAFC	-0.476	0.149	0.213	-2.237**
logALC	0.202	-0.277	0.137	1.470
dumsupp	-0.580	0.160	0.250	-2.323**
EL	0.0543	-0.200	0.031	1.753*
FMS	0.210	0.151	0.056	3.741***
LogACI	0.343	0.322	0.285	1.203

Observations = 46
R Square = 0.76
F Statistics = 17.149
Residual Sum of Square = 15.837

*** 1% level of significance

** 5% Level of significance

* 10% level of significance.

Source: Filed survey data, 2001

Chapter Five

5.0 Conclusion and recommendation.

5.1 Conclusion

The study has clearly revealed that farm size has a significant positive effect on net revenue. The net revenue increases with farm size. Supplement and feed cost have negative effects on net revenue.

The socio economic variables of educational level and family size are also important variables that have significant positive effects on net revenue.

5.2 Recommendation

Urban snail farming will be more profitable to farmers that have larger family size since labor will come from the family.

There is need for awareness in snail farming among the more educated. They will be better managers than the less educated.

The need for cheaper alternative sources of calcium supplement and feed is suggested. As farm size and profit increases farmers have been facing an uphill task getting these resources. Cheaper sources will definitely reduce cost and increase revenue.

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