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FACTORS DETERMINING THE LABOUR AVAILABILITY ON SMALLHOLDINGS: A CASE STUDY IN RURAL SRI LANKA

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Abstract

Human labour can be divided into three categories; family, hired and shared labour which all contribute to the labour requirements on-farm at the smallholder level. The overall aim of this study was to identify the determining factors of labour availability on smallholder cropping systems in two different agro-climatic zones of Sri Lanka. Several different methods such as semi-structured interviews, direct observations of farmer practice and Rapid Rural Appraisal (RRA) were used and 96 households were selected. The series of associations between type of labour used and socio-economic indices were analysed using two-way chi-square tables. The research ascertained that villages differed significantly ($p \leq 0.001$) in terms of the type of labour used for on-farm activities. Also, there was a significant relationship between the type of labour used and educational level with hired labour more frequently used by the more educated households. Use of shared labour was significantly dependent on the strength of the social network measured in terms of proximity of close relatives

Keywords:
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Determining factors
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and the level of inter-familial relationship. The type of labour used was shown to be significantly related to the main occupation of the household including the head and offspring. The results and conclusions derived from this study will be useful for agricultural policy makers and on-farm researchers in Sri Lanka.

1. Introduction

Human labour can be divided into three categories; family, hired and shared labour which all contribute to the labour requirements on-farm at the smallholder level (Harwood, 1979; Hettiarachchy, 1984; Hirashima and Muqtada, 1986; NRI, 1993). Family labour is often classified as unpaid work because any wage income that is received is usually negligible in terms of the amount of time and effort expended. Consequently, most researchers tend to classify non-hired labour as family or shared labour (Hill, 1963; Benneh, 1970; Berry, 1975; Okali, 1983; Bassett, 1988; Mikel, 1991; as cited in NRI, 1993). Characteristically, a high proportion of labour in smallholder farming consists of family labour, but variations do exist between and within agro-climatic zones (Hettiarachchy, 1984; Jayasena and Herath,1984). Hired labour is supplied by those who have limited access to land and their main source of income is wage labour. There are two kinds of hired labour; casual and permanent, however, at the smallholder level, the majority of farmers use casually hired labour where people are paid on a daily basis or for parts of a day in cash and often a meal (Muqtada and Alam, 1986; NRI, 1993). Permanent hired labour where workers are hired on a monthly or yearly contract and paid in cash can be found in a few places in Sri Lanka but it was not considered in the present study because very few households used this type of labour in the study areas. Shared labour is known locally as '*attam'* and it is essentially a labour hiring arrangement where a few households (two or more) agree to exchange labour without involving payment of money, but often involving provision of meals and other minor requirements of the workers (Gunasinghe, 1976; Hettiarachchy, 1984; Muqtada and Alam, 1986; NRI, 1993).

Previous studies have shown that there are a number of factors determining the availability of family labour and/or investment in hired labour, including family size, education level, health, nutrition, access to alternative employment, knowledge, extension services and inter-familial relationships (Barker *etal*., 1985; Hirashima and Muqtada, 1986; Hill and Ray, 1987; NRI, 1993; Arega*et al*., 2005; Osugiri*et al*., 2012; Wilson *et al*., 2015; Nathalie, 2015; Erick *et al*., 2017). A higher education level usually results in better off-farm employment which in turn results in the migration of labour away from the farm. Traditionally, children contributed considerably to the agricultural labour pool, however, due to the expansion in educational opportunities and alternative employment opportunities, their contribution to the agricultural labour force has declined dramatically in many Asian countries (NRI, 1963). The inter-familial relationship is one of the most common factors influencing the availability of family labour in Sri Lanka and consequently, in some areas where the network is strongest, people are reluctant to use hired labour because of availability of ample shared labour (Haviland, 1990; NRI, 1993).

Despite its importance, there has been limited in-depth research on determining factors of labour availability in Sri Lanka. Most research has mainly focused on effects of labour availability on rubber-based cropping systems at the estate and smallholder levels (Tiffen and Mortimore, 1990; Rodrigo, 2001; Rodrigo *et al*., 2001; Stirling*et al*., 2002; Edirisinghe*et al*., 2005; Dissanayake*et al*., 2005a; Dissanayake*et al*., 2005b; Dissanayake*et al*., 2010; Dissanayake*et al*., 2012) and paddy cultivation, with little known regarding the effects of labour availability on homegardens in Sri Lanka, other than Kandyanhomegardens and chena cultivation. The overall aim of this study was to identify the determining factors of labour availability on smallholder cropping systems in two different agro-climatic zones of Sri Lanka (Wet and Intermediate).

2. Research Method

Four villages, two from the Intermediate Zone (*Pallekiruwa* and *Bookandayaya*) and two from the Wet Zone (*Kobawaka* and *Pannila*), were selected for comparison in this study, because of the important differences shown in land use systems, development, crops grown, social structure, history of the communities and type the extent to which family, hired and shared labour were used (Jayasundera, 1998; Thennakoon, 1998; Thennakoon, 2002). Stratified random sampling was used to derive a representative sample of households and 96 households were selected from all four villages.

Several different methods were used including; population studies, semi-structured interviews, direct observations of farmer practice and Rapid Rural Appraisal (RRA) (Thennakoon, 2002). In order to determine the association between the type of labour used and socio-economic indices, the total number of households (96) were divided into labour groups according to households using only family labour, hired labour, shared labour and those using a mixture of family and hired labour. Thereafter, socio-economic indices such as education level and occupation of the head of the households, occupation of the offspring, number of dependents, proximity to family relatives and level of inter-familial relationship in each labour group were recorded. The methods of data collection for each section are described below.

Data for the level of education were only collected for the active labour force defined as household members who were between 15 and 60 years of age and who provided labour for on-farm activities, which were then divided into three sub-groups according to their level of education: primary (<10 grade), secondary (grade 10-12) and higher (>12 grade). Data for the income sources were categorised according to the occupations of household members and were divided into two groups according to the occupation of the head of the household and the occupation of offspring living within the same house. For both groups, occupations were considered in terms of on-farm, a mixture of on-farm and casual labouring, off-farm activities inside and outside the village and government jobs. Family size and number of household members using different types of labour were recorded during the population survey. The members of the household were divided into three groups according to age <15, 15-60 and >60 years and were referred to as “children”, the “labour force” and “elders”, respectively. In order to determine the number of dependents in the family, children and the elders were combined into a single group referred to as “dependents”. Close family relatives refer to the brothers and sisters of the husband, wife, son and/or daughter-in-law, as these are the predominant source of on-farm labour compared with other, more distant relatives such as nephews and nieces. As a first step, brothers and sisters from each side were counted and households divided into three groups according to how many close relatives there were: 1-3, 3-5 and >5, denoted as 1, 2, and 3, respectively. In order to determine their proximity, the distance to each relative’s household was classified as those living (i) close <0.5 km (C) (ii) medium distance, that is, between 0.5 and 0.75 km (M) and (iii) far > 0.75 km (F) away from the household being described. As a result, both proximity of family relatives and number of relatives were

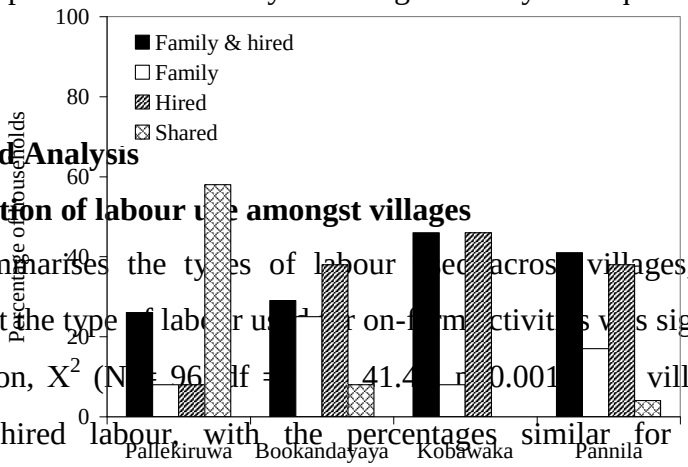
combined to give the following groups C1, C2, C3, M1, M2, M3, F1, F2 and F3. These groups were defined separately in respect of the husband, wife and any married offspring who remained part of the household. The level of inter-familial relationship of a target household with other households was assessed using several indicators. It was not feasible to collect these data from direct interviews with the families and instead direct observations were recorded over a period of time whilst undertaking the ethnographic research. Direct observations focused on the number of families that visited the household, how many close friends the household had, how many informal or volunteer organizations household members belonged to and a subjective assessment by the researcher of how easy was for the household to find labour on a shared basis for on-farm activities**.** In order to analyse the data, the level of inter-familial relationship was categorised according to four levels; well, medium, poor and very poor, using the above indicators.

Table 1. Summary of the indicators used to determine the level of inter-familial relationship; very poor,
poor, medium and well in the four selected villages.

Indicators	**Very poor**	**Poor**	**Medium**	**Well**
Number of families that visited the household	<2	2-4	5- 8	>8
Number of close friends	<2	2-6	7-10	>10
Number of informal and volunteer organizations that household belonged to	<3	3-5	6-8	>8
Degree of difficulty in collecting labour on mutual basis for on-farm activities	Very difficult	Difficult	Easy	Very easy

The series of associations between type of labour used and socio-economic indices such as education, occupation, proximity of family relatives, level of inter-familial relationship and

number of dependents were analysed using two-way chi-square tables (non-parametric data).



3. Results and Analysis

Spatial variation of labour use amongst villages

Figure 1 summarises the types of labour used across villages, with chi-square tests indicating that the type of labour used for on-farm activities was significantly dependent on village location, X^2 (N = 96, df = 9, 41.4, p = 0.001). Most villages used a mixture of family and hired labour, with the percentages similar for villages within zones (Intermediate Zone range of 25-28% and Wet Zone range of 40-46%). Similarly, hired labour was a notable feature of labour use in all villages, except Pallekiruwa whose main source of labour was shared. With this exception, family or shared labour accounted for the smallest share of labour use across villages (Fig. 1).

Factors influencing the type of labour used

Chi-square analysis revealed statistically significant differences between villages in terms of the occupation of the head of the household and offspring, level of connectedness, proximity to close family relatives and labour skills ($p \leq 0.001$). In contrast, there was no difference between villages in terms of the education level of the head of the household (Table 2a). Pooling data from all villages showed that the type of labour used was significantly related to all variables except the number of dependents (Table 2b). Furthermore, there was a significant association between the occupation and educational level of the head of the household ($p \leq 0.001$).

Figure 1.*Distribution of households using different labouring methods; family & hired, family, hired and shared labour. A single household can only belong to one labour category. Data are presented as the percentage of the total households interviewed (24 for each village) in Pallekiruwa, Bookandayaya, Kobawaka and Pannila.*

Level of education

Figure 2 summarises the relationship between education levels; primary (<grade 10), secondary (grade 10-12) and higher (> 12 grade) levels of education of the head of the

household and the different type of labour used (*i.e.* family, hired, shared and a mixture of family and hired labour). The most notable result was that *ca.* 90% of the total of 23 households with a higher education level used only hired labour, whilst most households with a secondary level education used a mixture of family and hired labour. Households with an education only to primary level tended to have a generally even spread of labour over family, shared and family and hired labour, the only labour group missing was labour that was solely hired (Fig. 2). Statistical analysis indicated that the type of labour used was significantly dependent on the level of education of the households, X^2 (N = 96, df = 6) = 72.24, $p \leq 0.001$.

Occupation of the household head

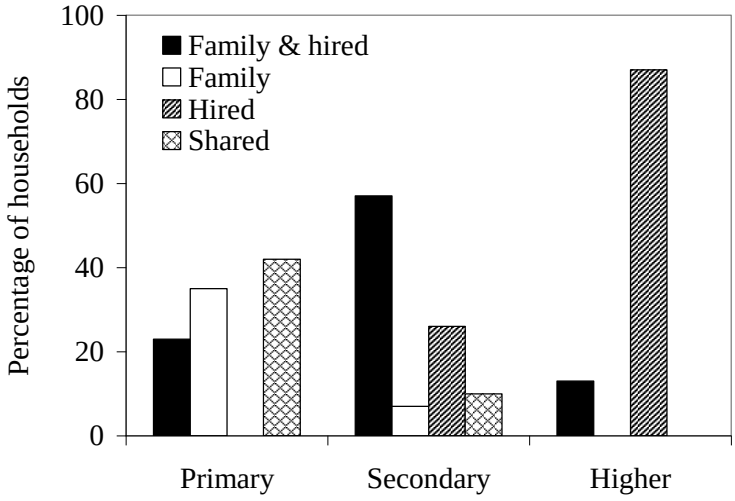
The type of labour used was shown to be significantly related to the main occupation of the household including the head and offspring ($p \leq 0.001$, 54.90; Table 2b). All households where the head engaged in government jobs used hired labour, whilst households engaged in on-farm labouring used the lowest percentage of hired labour (Fig.3). Also, households engaged in off-farm activities tended to use a mixture of family and hired labour and hired labour only. Family labour was used only in those households where the head was occupied in on-farm or mixed activities (Fig. 3).

Table 2. Statistical analysis **(a)** comparing villages in terms of socio-economic indices and **(b)** relationship between type of labour used and socio-economic indices across all four villages. A two-way chi-square analysis was performed using the null hypothesis that there was no association between villages, type of labour used and the socio-economic indices.

a. Comparison		Chi-square value	DF	P value
Villages:	Education level of the head	10.27	6	0.114
	Occupation of the head	57.20	9	<0.001
	Occupation of the offspring	35.53	9	<0.001
	Level of inter-familial relationship	57.20	9	<0.001
		79.50	24	<0.001
	Proximity to the relatives	180.59	9	<0.001

Labour skills			

b. Relationship		Chi-square value	DF	P value
Labour type:	Education level of the head	72.24	6	≤ 0.001
	Occupation of the head	54.90	9	≤ 0.001
	Occupation of offspring	55.74	9	≤ 0.001
	Dependents	18.68	18	0.412
	Level of inter-familial relationship	129.51	9	≤ 0.001
	Proximity to the relatives	79.64	24	≤ 0.001



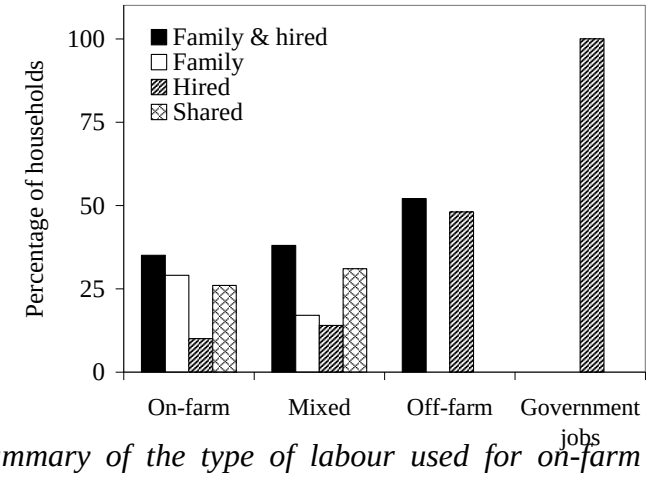


Figure 2.*Summary of the type of labour used for on-farm activities according to the educational level of the head of the household. Three categories were used; referring to primary (<grade 10), secondary (grades 10 to 12) and higher (>grade 12)educational levels. Data are pooled for the villages of Pallekiruwa,Bookandayaya, Pannila and Kobawaka and shown in terms of the % of 96 households interviewed in total.*

Figure 3.*Summary of type of labour used for on-farm activities according to the occupation of the head of the household. Type of labour used included; family, hired, shared and a mixture of hired and family labour. The term 'mixed' refers to households where the head was employed on-farm as well as undertaking casual labouring work.*

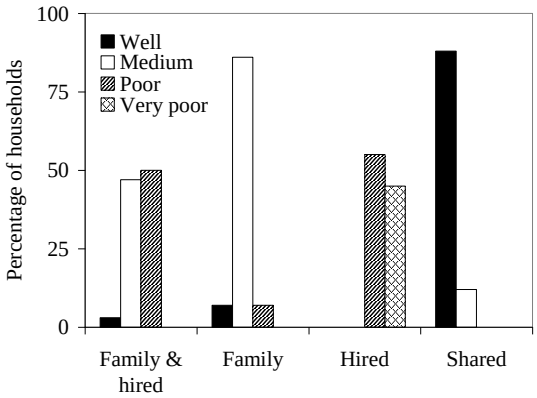
Level of inter-familial relationship

The type of labour used for on-farm activities (Fig. 4) was significantly dependent on the level of inter-familial relationship of the households, X^2 (N = 96, df = 9) = 129.51, p≤0.001.Those households that were well connected predominantly used shared labour, while those that were poorly or very poorly connected used mainly hired or a combination of hired and family labour (Fig. 4). Households classified as medium in terms of inter-familial relationship used the widest range of labour types, but mainly family and shared. Not a single household that was well or medium connected used hired labour (Fig. 4).

Figure 4. *Level of inter-familial relationship ofthe households using different types of labour; family, hired, shared or a mixture of family & hired for on-farm activities.*

Spatial variation of socio-economic indices amongst villages

A statistical analysis of the relationship between village location and the variables; level of inter-familial relationship, occupation of the head and number of close relatives living different distances from the household are shown in Figure 5. The level of inter-familial relationship differed significantly between villages X^2 (N = 96, df = 9) = 57.20, p≤0.0001, with a far greater percentage of households well connected in *Pallekiruwa* (*ca.* 65%) compared to other locations. No households were classified as very poorly connected in *Pallekiruwa*, compared with 20%, 38% and 12% in *Pannila*, *Kobawaka* and *Bookandayaya*, respectively (Fig. 5a).



Percentage of households

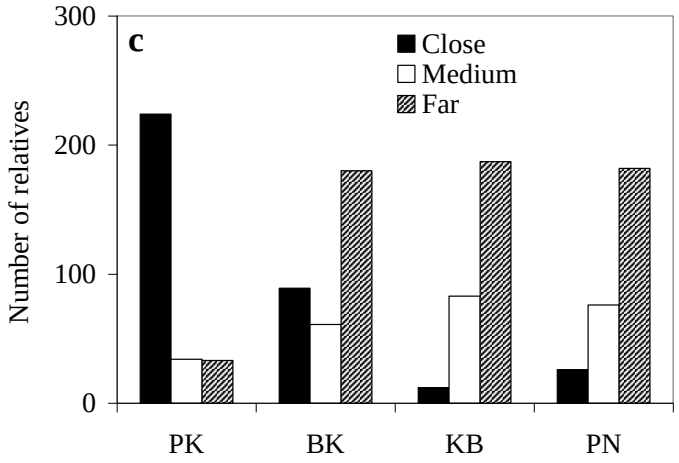


Figure 5.*Summary of comparing the villages of Pallekiruwa (PK), Bookandayaya (BK), Kobawaka (KB) and Pannila (PN) in terms of* ***(a)*** *level of inter-familial network; well, medium, poor and very poor with other families,* ***(b)*** *occupation of the head and* ***(c)*** *number of close relatives living different distances from the household; close (<0.5 km), medium (0.5-0.75 km) and far (>0.75 km) away.*

The occupation of the head of the household was dependent upon village location, X^2 (N = 96, df = 9) = 57.20, p≤0.000. The majority of households in *Pallekiruwa*, *Bookandayaya* and *Kobawaka* were dependent on farming as the main occupation of the household head, with mixed employment the second most important occupation in most locations. Only in *Pannila* was the employment pattern markedly different, with the majority of household heads employed off-farm (Fig. 5b). The proximity of close family relatives was strongly dependent on village location, X^2 (N = 96, df = 24) = 79.50, p≤0.001 (Table 2b), but the proximity of families of married offspring was not dependent on village location, X^2 (N =

96, df = 24) = 39.71, p= 0.1 (data not shown). Figure 5c summarises the number of relatives living at different proximities to the household in question. The majority of relatives were located close to the household in *Pallekiruwa*, but most relatives lived far away in *Kobawaka* and *Pannila*and only a few relativeslived close (89 out of a total of 390) in *Bookandayaya*(Fig. 5c).

Villages differed significantly ($p \leq 0.001$) in terms of the type of labour used for on-farm activities (Table 2). The predominant source of labour was a mixture of family and hired or only hired in all villages other than *Pallekiruwa*, which was exceptional in its extensive use of shared labour (Fig. 1). There was a significant relationship between the type of labour used and educational level (Fig. 2) with hired labour more frequently used by the more educated households which concurs with other studies (Hettiarachchy, 1984; Sanker and Samarakoon, 1998; Echibiri and Mbanasor, 2003; Nisikan*et al*., N.D.). Several authors (Ahmed and Sirageldin, 1993; Kazakbayev, 1999) contended that the relation between educational level and labour use reflects the greater migration that occurs with education to urban areas in search of higher wages in the government or private sectors. A greater number of household heads were found to be engaged in government jobs in *Kobawaka* relative to the other villages (Fig. 5b), most probably because of their close proximity to Colombo with the result that use of family labour was low whilst that of hired labour was high (Hettiarachchy, 1984; Sanker and Samarakoon, 1998).

Clearly, not every example of the use of hired labour could be explained solely in terms of educational level. For example, in all villages other than *Pallekiruwa* there were a few high-income households who depended solely on hired labour even though their main source of income was farming and the head of household had been educated only up to secondary level (Figs. 2 and 3). Where the head of the household was engaged in off-farm employment and there were no dependent infants, family labour in the form of the spouse was available in addition to hired labour, resulting in the use of both family and hired labour by a few households with a higher education level and income from off-farm activities (Figs. 2 and 3), as was noted by Palmer (1991; as cited in NRI, 1993) and Echibiri and Mbanasor (2003). Furthermore, even households in the very high-income group used family labour in order to supervise outside labour, because hired labour is generally less motivated and careful and this can have a negative effect on productivity. These results are consistent with studies of Levi and Havinden (1982) and NRI (1993).

Use of family labour was higher in *Bookandayaya* and *Pannila* than in *Kobawaka* and *Pallekiruwa* (Fig. 1), because of the relatively lower household income, which largely derived from casual labouring work on the estates and smallholdings of high-income farmers. As Palmer (1991; as cited in NRI, 1993) posited that low income would restrict the hiring of labour, and use of shared labour was also minimal in these villages. Use of shared labour was highest in *Pallekiruwa* and non-existent in *Kobawaka*(Fig.1). Shared labour was usually used in combination with family labour and served as an important means of solving problems of labour shortages, in particular for the low-income smallholders without sufficient labour (Gunasinghe, 1976; Muqtada and Alam, 1986; Luechai*et al*., 1986; NRI, 1993). In accordance with findings of several studies (Gunasinghe, 1976; Luechai*et al*., 1986), use of shared labour was significantly dependent on the strength of the social network measured in terms of proximity of close relatives and the level of inter-familial relationship (Fig. 4; Table 2b). Both factors were found to be positively related to use of shared labour, this was consistent with Hill (1963; as cited in NRI, 1993). In *Pallekiruwa*, the majority of relatives lived in close proximity to the household (Fig. 5c) and because of the poor quality of the road and transport facilities (Thennakoon, 2002) people tended to marry within the village, which in turn had a positive feedback on shared labour relative to the other villages (Fig.1). The level of inter-familial relationship amongst households differed significantly ($p<0.001$) between villages. The majority of farmers (*ca.* 75%) were well connected in *Pallekiruwa*whilst a similar proportion was poorly connected in *Kobawaka* (Fig. 5a). This is consistent with social networks and traditional institutions still being accorded higher priority in *Pallekiruwa* than in *Kobawaka*and with rural offspring tending to migrate urban areas because of its close proximity to Colombo and because the majority of households dependent were on commercial crops (Thennakoon, 2002). These reasons are consistent with earlier-work on social structure (Hettiarachchy, 1984, Luechai*et al*., 1986; NRI, 1993) in Sri Lanka and elsewhere.

4. Conclusion

This study clearly shows how type of labour used vary amongst villages. Labour availability varied between villages and in remote villages, where families were well connected and the majority of relatives lived in close proximity, problems associated with labour were overcome using the shared labour system. The most notable finding of this

study was that households with a higher education level used only hired labour, whilst most households with a secondary level education used a mixture of family and hired labour. Households with an education only to primary level tended to have a generally even spread of labour over family and shared. The type of labour used was shown to be significantly related to the main occupation of the household including the head and offspring. The results and conclusions derived from this study will be useful for agricultural policy makers and on-farm researchers in Sri Lanka in helping to identify the most important issues for raising smallholder agricultural productivity.

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