

HOUSEHOLD LEVEL CORRELATES OF WOMEN'S LABOR INPUT IN FOOD CHAIN ACTIVITIES IN SELECTED AREAS OF SIDAMA ZONE

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This survey is an empirical study aimed at identifying the basic household level demographic, economic and social determinants of women's labor input in food chain activities in selected areas of, Sidama zone Southern Ethiopia. To this end, all the available literatures were reviewed which later helped the development of four important hypotheses and the conceptual framework. Information was collected from 615 sample women, who were selected through cluster sampling technique. Both descriptive and inferential statistical techniques were used to analyze the data. The univariate analysis was used to see the percentage share of background variables. The relative contribution or the net effect of each independent variable to the dependent variable (women's labor input), controlling all confounding factors, was examined using the multivariate analysis. The multivariate analysis using the logistic regression model clearly revealed that age of the respondent, household income, marital status, marital type, number of surviving children, type of crop grown, and migration status of the respondent were found to be important socio-economic determinants of the level of labor input of women in food chain activities. Finally, on the basis of the findings, few policy recommendations were given.

Keywords: *Women, Food chain, Sidama Zone, Correlates, Households*

Introduction

In many societies, women constitute half of the total population. They are important member of the household who play a great role for the existence and sustainability of the family's livelihood. The triple role of women including productive, reproductive and community roles consume most of their time and energy. As most of the authors agree upon, these roles have a negative effect upon women personal interest and the time they spend for personal improvement.

Once considered "invisible" in the agricultural economy, women constitute an important percentage of the world's total agricultural labor force. Rural women have many roles: wife, mother and agricultural producer involved in raising livestock and growing, harvesting, processing, marketing and preparing food. They cultivate subsistence crops for family consumption and may also work on cash crop production; or they may be landless and rely solely on wage labor. Women are also agricultural extension workers, production scientists and sometimes policy makers (FAO, 1990). It is important to note that such enormous contribution of this section of the population is not usually accounted in economic analysis of many developing nations. Above all,

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women's labor input in food chain activities, which extends from out door agricultural activities to household or in door food processing.

Among the nine federal states of Ethiopia (Amhara, Oromia, Tigray, Asfar, Somalia, Gambella, Benishangul, Region 14, and SNNPR), the Southern Nations, Nationalities and Peoples Region (SNNPR), which is the concern of this study, is located in the southern part of the country. With an area of 113,539 square kilometers, it accounts for about 10 per cent of the total area of the country. The region is constitute of twelve sub-regional administrative areas called 'Zones' classified on the basis of ethnicity (Sidama , Guraghe, Hadya , Wolaita , Bench Maji, Semen Omo, Dehub Omo, Gedeo , Keficho , Kembatta, Alaba Tembaro, and Silti). In the year 2000, the population of the region was estimated at about 12.5 million of which 6.2 million male and 6.3 million were female population. The region's population accounts for 20 per cent of the total population of the country which makes it the third populous region next to Oromia and Amhara federal states (SNNPR, 2000; CSA, 2000).

The population profile of the region is characterized by large number of children under 15 (46.7 per cent) while those in the age group 15-64 and above 64 account 50 and 3.3 per cent respectively. The median age of the population in the year 2001 was estimated to be about 17 years, which again indicates high prevalence of dependency and high population momentum in the years to come. Out of the total population of the region, women in the reproductive age (15-49) account for about 2,970,650 in the year 2000 (47.3 per cent of the total female population of the region). Out of these, only 8 per cent live in urban areas while 92 per cent reside in rural areas of the region.

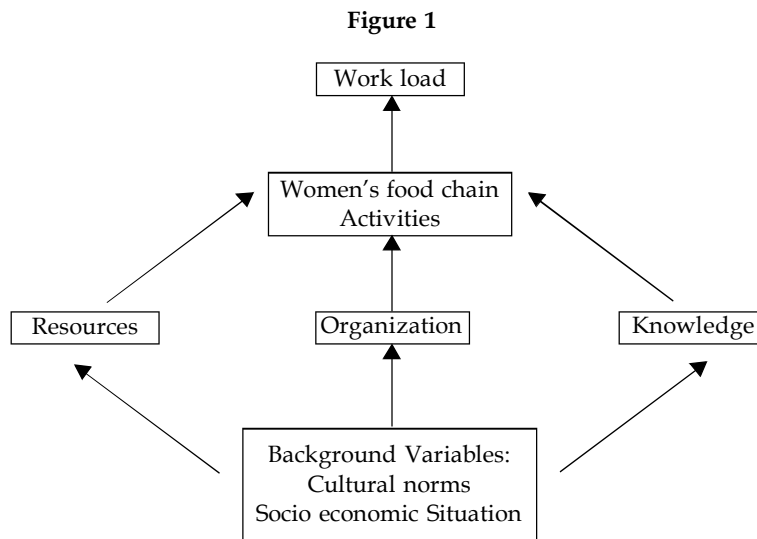
The region is one of those with uneven distribution of population with crude density of 110.2 persons per square kilometer. It is reported that the highlands of Gamogofa, Wolaita, Sidama, Hadya, Guraghe and KAT zones constitute about 45 per cent of the population of the region (SNNPR, 2001). Within these zones, population density ranges between 400 and 600 persons per square kilometer. The dense settlement observed in these areas is mainly due to inhabitable climate condition and fertile soil which also resulted in the increasing population pressure exacerbating serious negative impact on land use patterns. On the other hand, the sparsely populated areas of the region accounts for about 56 per cent of the total area with a population density of 3 to 10 per cent, 2.5 per cent of the population of the region (SNNPR, 2001).

The Sidama administrative zone, from which the 615 sample respondents were taken, is the most populous zone of the region with a total population of nearly 3.5 million. Sidama is the popularly known for low status of women, and where most of the demographic and socio economic indicators mentioned above are even worse as compared to the regional average.

The major objective of this study is to investigate the interrelations between household demographic and socio-economic factors and women's labor input in food chain activities.

Conceptual Framework of the Study

Figure 1 illustrates a conceptual framework which was employed to formulate research issues of relevance for the review of the literature and the discussion in this report.



Some studies have related these factors to the broader cultural norms and socio-economic setting of the society or to the ecological context.

On the basis of the review of literature and the above conceptual framework of the study, the dependent and independent variables of the study are defined:

- The Dependent variable of the study is the level of work load or labor input of women in food chain activities, as measured by the total number of hours spent on each out door and indoor activities.
- The independent variables of the study include selected household demographic structure (such as family size, sex structure, material status, types of marriage..) ...and socio-economic characteristics (such as income, land ownership, educational status of the women, headship employment status, property ownership pattern...).

Methodology of the Study

Data Source

The fact that secondary data are not available satisfying the topic under discussion, this study used primary data as a major source of information. The data were collected from 615 women in Sidama zone, the largest sub-regional administrative zone of the SNNPR.

Sampling Design

The sampling design used in this study is area cluster sampling, which is one of the probability sampling techniques. It is usually employed when the list of households is not available, and when the study population is classified into definite area blocks. In this study, the kebeles were taken as area segments from which sample sub-segments were drawn.

Data Collection

The only instrument used for the collection of the required data for the study was a questionnaire. So as to minimize potential complexities and data defects, many of the items were pre-coded with a great deal of caution. The first draft of the questionnaire was initially prepared in English and was checked in light of the objectives of the study and its ability in eliciting pertinent data. Since the study deals with illiterate community, the questionnaire was directly translated to the working language (Amharic) using very simple words and phrases (by keeping original meaning intact) so that certain inconsistencies and communication barriers could be avoided. The final Amharic questionnaire, which was ultimately administered for generating the required information was five pages long and consists of 64 items categorized into sections. Once training of field staff and pre testing were over, the questionnaire was duplicated and became ready for actual fieldwork. The fieldwork began on the fourth week of November and continued for 20 consecutive days. In interviewing the subjects, data collectors were instructed to go around and observe eligible respondents before picking up women for interview. Once identification of the eligible respondent was done, the investigators had to familiarize themselves in order to minimize hesitancy and any possible discomfort among respondents. This was one of the strategies used to elicit reliable information from respondents.

Data Processing and Analysis

To analyze the data, univariate, bi-variate and multivariate analytical methods were used. The data were analyzed with SPSS statistical packages by orderly applying analytic method beginning with simple descriptive statistical displays and summaries. In the descriptive part of the study, percentage distribution of respondents' background characteristics and differentials of women's participation in food chain activities are displayed using univariate analysis.

Multivariate analysis (logistic regression) was used to examine the relative effect of each independent variable (predictor) on the occurrence of the dependent variable. About eleven socio-economic and demographic variables were examined through the logistic regression (see table). The logistic regression method is used in the multivariate analysis since the dependent variable (outcome) of the study is dichotomous (binary), where outcome has only two values, i.e., an event can either occur or does not occur. A woman has either high or low level of participation in the food chain activities.

The result of the analysis is presented in the form of odds ratio (that is the ratio of the probability that the event will occur to the probability it will not). This model estimates the probability that the dependent variable will occur (or women will have high level of participation in the labor force of food chain activities). Regression estimates greater than one indicates that the risk of participation is greater than that for the reference category (p -value of ≤ 0.05 is used to determine the significance level).

Results and Discussion

In the first table, attempt is made to highlight the demographic, economic and social characteristics of the sample or the study population. Following this, the determinants of the levels of women's participation in food chain activities is presented.

Table 1
Percentage Distribution of Sampled Women by Major Demographic Characteristics

<i>Background variable</i>	<i>N = 615</i>	
	<i>Number</i>	<i>Per cent</i>
Age of respondents		
Less than 24	91	14.8
25-35	312	50.7
36-50	164	26.7
Above 50	48	7.8
Migration status		
Non Migrant	380	61.8
Migrant	235	38.2
Marital type		
Polygynous	227	36.9
Monogamous	388	63.1
Number of children alive		
0-3 Children	321	52.2
4-6 children	200	32.5
7+ children	94	15.3
Number of boys living		
0-3 children	516	83.9
4-6 children	90	14.6
Above 7 children	9	1.5
Number of girls in the household		
0-3 children	542	88.1
4-6 children	68	11.1
Above 7 children	5	0.8

Table 1 shows the percentage distribution of respondents for selected demographic variables. The age distribution of the respondents reveal that about half of them are in the early adult hood period while women in the age group 15-24 and over 50 account smaller proportion of the sample population. It can also be seen that about 60 per cent of the sample women are non migrant, that is, they are born in the study areas. Respondents were also asked if they are in monogamous marriage or not. Accordingly,

36.9 per cent of them are in polygamous marriage in which their husbands currently have two or more other wives. Questions related to the number of surviving children were asked, the percentage distribution of which, is presented on table above.

Table 2
Percentage Distribution of Sampled Women by Major Socio Economic Background Characteristics

<i>Background variable</i>	<i>N = 615</i>	
	<i>Number</i>	<i>Per cent</i>
Literacy status of the respondent		
Literate	252	41.0
Illiterate	363	59.0
Literacy status of the respondent's husband		
Literate	342	55.6
Illiterate	273	44.4
Religion		
Orthodox christian	104	16.9
Catholic	32	5.2
Muslim	31	5.0
Protestant	430	69.9
Others	18	2.9
Household income		
Income less than 100	527	85.7
Income 101-300	84	13.7
Income 300- 600	4	.7

In order to see its relationship with labor input, the respondents were asked about their literacy status which may be used as a proxy of educational level. As shown in the table, about 60 per cent of the women and 44 per cent are reported to be illiterate. With regard to their religious status, the majorities are protestant Christians (70 per cent) while the smaller proportion are the followers of orthodox, catholic Christian, and Islam. The income distribution of the households reveal that majority of the women are from lower income category. If one strictly takes the reported income as proxy of wealth status, it seems that majority of women are the poorest of poor whose average household income does not exceed 100 birr per month.

It can clearly be inferred from Table 3 that many women do participate in direct food production (47.2 percent), majority of whom spending an average of 1-3 hours a day (54.1%) Also, significant number of the sample women participates in harvest collection (see the table above).

Women have significant role in transporting harvest from field to home, and from home to markets. Table 4 clearly indicates the share of family members in the activities mentioned. Among others, purchase of household utilities, usually food items, is reported to be the major activities of women.

Table 3
Percentage Distribution of Women's Labor Input in Direct Agricultural Activities
(Out Door Food Production)

<i>Background variable</i>	<i>N = 615</i>	
	<i>Number</i>	<i>Per cent</i>
<i>Participation of women in land clearing, and preparation</i> <i>(Direct involvement in food production)</i>		
Yes	290	47.2
No	325	52.8
<i>Average number of hours women spent in agricultural/ outdoor activities</i>		
Less than three hours	333	54.1
4-6 hours	244	39.7
7-10 hours	22	3.6
Others	16	2.6
<i>Family member with higher share of labor input in harvest collection</i>		
Wife	163	26.5
Husband	329	53.5
Male children	27	4.4
Female children	12	2.0
Indeterminate	84	13.6

Table 4
Percentage Distribution of Respondents' Participation in Harvest Transportation and Marketing

<i>Background variable</i>	<i>N = 615</i>	
	<i>Number</i>	<i>Per cent</i>
<i>Family member with higher share of labor input in harvest transportation to home</i>		
Wife	193	31.4
Husband	298	48.5
Male children	24	3.9
Female children	10	1.6
Indeterminate	90	14.6
<i>Family member with higher share of labor input in harvest transportation to market</i>		
Wife	186	30.2
Husband	298	48.5
Male children	27	4.4
Female children	10	1.6
Indeterminate	94	15.3
<i>Family member with higher share of labor input in Purchasing materials for household consumption</i>		
Wife	454	73.8
Husband	102	16.6
Male children	26	4.2
Female children	19	3.1
Indeterminate	14	2.3

Determinants of Levels of Women's Participation in Food Chain Activities: Multivariate Analysis

In order to examine the relative importance (partial correlation or level of strength) of each independent variable to the dependent variable, by controlling all the confounding effects, multivariate analysis (using logistic regression technique) was employed.

The logistic regression technique is used when the dependent variable is dichotomous (binary) in which case the event either "occurs" or "does not occur". In this study, the dependent variable is "Level of women's labor input in food chain activities" where a women will fall in one of the two categories: a women either "has high labor input" or "low labor input". In logistic regression, we directly estimate the probability of an event occurring. For more than one independent variable, that is, for k independent variables (x_1, x_2, \dots, x_k), the model can be written as:

$$\Pi(X) = \frac{\exp(\beta_0 + \sum_{I=1}^k \beta_I X_I)}{1 + \exp(\beta_0 + \sum_{I=1}^k \beta_I X_I)} \quad I=1, 2, \dots, k. \quad (1)$$

Derivation of the logit model can be performed as follows.

Let $p = \Pi(X)$ and $Z = (\beta_0 + \sum_{I=1}^k \beta_I X_I)$.

Substituting for eq(1) would result

$$P = \exp(z) / \{1 + \exp(z)\} \quad (2)$$

$$1 - P = 1 / \{1 + \exp(z)\} \quad (3)$$

$$P / 1 - p = \exp(z) = \text{odds} \quad (4)$$

Taking the natural logarithm of eq(4) would result:

$$\ln \{P / 1 - p\} = \ln \{\Pi(X) / (1 - \Pi(X))\} = \log IT \{\Pi(X)\} = \beta_0 + \sum_{I=1}^k \beta_I X_I$$

$$\frac{P}{1 - P} = e^{\beta_0 X_0} * e^{\beta_1 X_1} * e^{\beta_2 X_2} * \dots \dots \dots e^{\beta_n X_n}$$

or equivalently,

$$\left(\frac{\ln Pi}{1 - pi} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta X_3, \dots, \beta_n X_n$$

Where P = chance of a women to have higher labor input (i.e. probability of the event occurring)

$1 - P$ = chance of a women to have lower labor input (i.e. probability of an event not occurring)

$\ln Pi$ = is the probability or risk of the event occurring which is the odds of higher participation.

$X_i = X_1, X_2, X_3, X_4, \dots, x_n$ are the independent variables used in the model.

$\beta_i = \beta_1, \beta_2, \beta_3, \beta_4, \dots, \beta_n$ are the regression coefficients indicating the magnitude of change (increased or decreased risk) in the independent variable.

In logistic regression, the parameters of the model are estimated using the maximum likelihood method. That is, the coefficients that make our observed result more "likely" are selected. In the logistic regression model, estimates of relative risk is computed either based on the odds ratios (which is defined as the ratio of the probability that the event will occur to the probability that it will not; $P/1 - p = e^{\beta} * e^{\beta_1 X_1} * e^{\beta_n X_n}$) or log of odds ratio (which is defined as the logarithm or logit of the ratio of the probability that the event will occur to the probability that it will not occur; $\log(P) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n$).

Since it is easier to think of odds, rather than log odds, this study will use the odds ratio through out interpreting the relative risk of each independent variable. In the odds ratio, e^{β} is the factor by which the odds change when the i^{th} independent variable increases by one unit. If β_i is positive, this factor will be greater than one, which means that the odds are increased (increased risk of higher participation), If β is negative, the factor will be less than one ($e^{\beta_i} < 1$), which means that the odds are decreased (decreased risk of participation); when β is zero, the factor equals one ($e^{\beta_i} = 1$) which leaves the odds unchanged.

For each variable, there is a reference category against which all other values are compared. For this study, the reference category for each variable was set to be "the first" in an ordinal series. By default, the values of the reference category are given a regression estimate of 1.00 by which the results of other remaining categories will either be higher or lower than the reference category (see Table 5). The significance level of regression coefficients or the cut off point for rejecting/accepting the null hypothesis used in this study is P -value of 0.05.

As shown on Table 5 above, about eleven variables were entered into the logistic regression model, and seven of them are found to have significant relationship with the level of labor input in food chain activities. Controlling for the effects of all other confounding factors, age has significant relationship with the dependent variable, that is, women in the age group 25-35 have 1.97 times greater labor input in food chain activities than the reference category. In general, the odds of labor input decreases as age increases and vice versa. Many empirical evidences also show that younger women in the age group 25-36 are yet involve in child bearing and rearing of their younger children, and hence, should spend more time in food processing and production activities. These group of women may not yet own matured children who will assist them in the in door activities.

Household income is another variable entered in to the logistic regression model. Controlling for the effects of all other variable, the odds of labor input decreases by 44.9 per cent for women from higher income households compared to the reference

Table 5
Results of Logistic Regression for Demographic and Socio Economic Variables

<i>Background variable</i>	<i>β</i>	<i>S.E</i>	<i>Sig. T</i>	<i>Exp (β)</i>
Age			0.48*	
Less than 24 ^{RC}	Reference	Reference	Reference	Reference
25-35	-.027	.414	.048	1.973
36-50	.617	.347	.175	1.854
Above 50	.373	.354	.292	1.452
Religion			.666	
Orthodox christian ^{RC}	Reference	Reference	Reference	Reference
Catholic	.701	.576	.223	2.016
Muslim	.641	.651	.325	1.898
Protestant	.723	.669	.280	2.060
Others	.807	.549	.141	
Household income			0.13*	
Income less than 100 ^{RC}	Reference	Reference	Reference	Reference
Income 101-300	-5.329	6.746	.430	.451
Income 300-600	-5.387	6.749	.042*	.551
Migration status				
Non Migrant ^{RC}	Reference	Reference	Reference	Reference
Migrant	.109	.176	.0537*	1.115
Living with the husband				
Yes ^{RC}	Reference	Reference	Reference	Reference
No	-.344	.236	.0145**	.709
Marital type				
Polygamous ^{RC}	Reference	Reference	Reference	Reference
Monogamous	.164	.180	.0363*	1.178
Literacy status				
Literate ^{RC}	Reference	Reference	Reference	Reference
Illiterate	.354	.179	.0548*	1.424
Number of boys living			.771	
0-3 children ^{RC}	Reference	Reference	Reference	Reference
4-6 children	.546	.773	.479	1.727
Above 7 children	.459	.757	.545	1.582
Number of girls in the household			.376	
0-3 children ^{RC}	Reference	Reference	Reference	Reference
4-6 children	1.397	1.158	.227	4.044
Above 7 children	1.128	1.171	.336	3.089
Type of crop grown			.010**	
Food crops ^{RC}	Reference	Reference	Reference	Reference
Chat	.380	.217	.059*	1.462
Coffee	-.506	.357	.156	.603
Vegt. and fruits	.096	.227	.673	1.100
Others	.380	.362	.294	1.462
Number of children Alive			.040*	
0-3 Children ^{RC}	Reference	Reference	Reference	Reference
4-6 children	-.385	.364	.290	.681
7+ children	-.630	.328	.055*	.533
Constant	2.405	6.899	.727	11.078

Note: B- Regression coefficient
S.E - Standard Error
RC- Reference category

category. Women with greater access to resource either by themselves or through the higher economic status of the husband could afford to pay for fuel, wood and water collected by other women. They can also buy labor for some demanding and labor intensive agricultural activities. However, the result of improved economic status is not always beneficial; it depends on how the head of the household distributes the labor product and the pattern of household budget utilization. Labor input of migrant women is 1.115 times greater than the non migrant women (see Table above). This is usually true due to the fact that migrant women participate in all kinds of paid and unpaid agricultural and household activities in order to survive.

Controlling for the effects of all confounding factors, the odds of labor input decreases by 29.1 per cent for divorced women as compared to currently married women. Dissolution of marriage usually leads to loss of all rights to land, the basic resource.

The net effect of marital form on the level of women's labor input was also tested in the logistic regression model. It is found out that the labor input of women in the monogamous marriage is 1.178 times greater than the women in the polygamous marriage. It is true that some polygamous households can act as extended families with women assisting each other in productive and domestic activities, and hence, reducing the daily work burden of producing and processing of food for household consumption and for sell. On top of this, women in the polygamous marriage experience relatively better decision making powers mainly due to temporary absence of the husband.

The type of crop grown was also entered in the logistic regression model to see its net effect on the labor input. Controlling for the effects of all other factors, women's labor input in *chat* farming is 1.46 times higher than the reference category. *Chat* plantation requires day to day frequent follow up particularly during the long months of harvest and marketing where women are the prime participant. From our field observation, most households grow only maize as food crop which require minimal labor input both during growing season and harvest period.

The net effect of family size on labor input in food chain activities became significant in the logistic regression model. It is observed that the odds of women's labor input decreases by 46.7 per cent for households having larger number of children. There are two arguments on this : First, larger number of children usually entails sharing of the work burden of the women in the household such as fetching of water, fire wood collection, harvest collection, food processing, selling and purchasing of household consumption and the like. Second, larger number of children usually entails small plot of land due to the fact that adult members of the household take a portion of the land during their marriage. On the contrary, however, having larger number of very young children may imply higher labor input by the women in food preparation and processing to feed these infants.

To sum up; there are many household level socio economic which affect the level of women's labor input in food chain activities. In addition to the variables included

in the above model, there may be some other factors affecting the labor input of women in food chain activities. As shown in the above model, few variables have no significant relationship with the dependent variable concerned.

Summary, Conclusion and Recommendations

Summary and Conclusion

This study was basically a survey type which examined the household level socio-economic correlates of woman's labor input in food chain activities. The study used primary data as source of information which was elicited through questionnaire. About 615 sample women were taken for this study from selected areas of Sidama zone. The selection of the sample women was made using cluster sampling technique which is one of the commonly used methods when the sampling frame of households is lacking. The data analysis was done by the use of logistic regression. On the basis of the collected data and analysis made, thus, the following major conclusions are made:

- Younger women (age 25-35) have higher labor input in food chain activities as compared to other age category.
- The odds of labor input decreases for women from better income households.
- Migrant women, compared to non-migrants, have higher labor input in the food chain activities.
- The odds of labor input decreases for divorced and separated women as compared to currently married women.
- Households which usually grow commercial crops (chat) demand higher labor input in food chain activities.
- The odds of labor input decreases for women with larger number of children.
- Women in the monogamous marriage, compared to polygamous, are more likely to exert higher labor input in food chain activities.

Recommendations

On the basis of the problems identified in this study, the following few recommendations are given;

- (a) *Introducing labor saving Technologies:* In order to decrease unnecessary labor input of the women, labour saving technologies for the production and processing of food need to be introduced.
- (b) *Provision of water and fuel:* It is clearly indicated in the report that women spend significant number of hours for fetching water and collecting fire wood. The scope for saving women's time and energy through improvements with regard to the so called " Food supporting activities " such as fetching of water and fire wood may be very large and essential.

- (c) *Improved access to extension services, direct participation of women in saving and credit schemes, improving the decision making powers, and legal changes in land use rights* are some of the important policy recommendations made at this juncture.

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