

# Is PES A Panacea To Poverty Reduction And Environmental Resources Conservation? A Case of Oyo State Rural Poor Farming Households Farm Settlers Perspectives

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**Abstract:** This study examined the perspectives of poor farming household farm settlers on the necessity of Land ownership Rights (LOR) as a condition for the environmental resource conservation. Previous studies argued that without property rights the poor will not be willing to participate in the environmental resource conservation. In this regards, the study argues that a Credit-based Payment for Environmental Services (PES) has the potential to tackle rural poverty and agricultural land degradation simultaneously, without the poor having absolute ownership rights of the agricultural land. To this end a choice experiment is employed to design the multi-attributes of PES. Findings of this study revealed that PES is a viable mechanism for rural poverty reduction and agricultural land conservation. The study discovers that tenancy security of the land for the occupants is sufficient to attract the poor to participate in land conservation programs, and not the absolute land ownership rights as argued by previous literature.

**Keywords:** payment for environmental services, property rights, agricultural land degradation

## I. INTRODUCTION

According to Derissen and Latacz-Lohmann (2011). Payment for environmental services (PES) is a market incentive mechanism for the provision of public goods within the field of environmental and resource issues. This definition can be more explicit, thus: Payment for environmental services (PES) is an incentive-based mechanism for sustainable resource conservation and management (i.e. it can be used for preservation, restoration, and creating new environmental services-conservation) as well as for poverty alleviation. There has been the need for a more vibrant resource conservation and management system. PES have been seen by many ecologists, environmental and development economists as a better option in the arena of environmental/ecological conservation (Hardner & Rice 2002; Ferraro & Kiss, 2002; Niesten & Rice, 2004; Scherr, White & Khare, 2004). Due to many induced human activities on environmental resources, natural habitat and forest are becoming degraded as the environmental services (ES) previously provided free by nature are becoming increasingly disappearing. The main idea of PES is that external environmental services beneficiaries make direct, contract and

conditional payments to local landholders and other users in return for adopting practices that secure environmental/ecosystem conservation and restoration (Wunder, 2009).

This conditional method is quite different from other known conservation methods. Instead of presupposing win-win solutions, this approach explicitly recognizes hard trade-offs especially in landscapes with acute land-use pressures. Where PES used as the medium to resolve conflicts through compensation of the parties involved. PES has been adopted in many developed countries as a ‘salvaging instrument’ for environmental/ecology, conservation and management, but it has not really gained much recognition in the developing nations, as noted by (Landell-Mills & Porras 2002; Pagiola, Bishop & Landell-Mills, 2002). There are various PES initiatives, of which the rewards could either be in-cash, in-kind assistance, exemption from taxes, skills training, and other types of compensation (Warner, 2000). Latin America PES schemes are characterized by cash type compensation, while in the South-Asia, other compensation means were employed. There are main four PES types that are currently in place.

- i. Carbon sequestration and storage (e.g. Northern electricity company paying farmers in the tropics for planting and maintaining additional trees).
- ii. Biodiversity protection (e.g. conservation donors paying local people for setting aside or naturally restoring areas to create a biological corridor).
- iii. Watershed protection (e.g. downstream water users paying upstream farmers for adopting land uses that limit deforestation, soil erosion, flooding risks, etc.).
- iv. Landscape beauty (e.g. a tourism operator paying a local community not to hunt in a forest being used for tourists’ wildlife viewing). The above environmental services is not exhaustive as it is possible to design PES for poverty reduction/environmental resource conservation. Examples are wilderness/forest areas, provision of pollination services to agriculture. Only the four identified above exhibit significant commercial scale

(Wunder, 2008). The critical element in a PES mechanism is that both sellers and buyers of ecosystem services must feel confidence and trust, also that the sellers will receive the agreed upon payments and benefits, and for the buyers, that the ecosystem services for which they are paying are indeed being provided.

Finally, for PES packages to be successfully designed and implemented, there is a need to be supported by institutions, legal frameworks, and policies that define the ecosystem services, sellers or providers (who has the right to utilize and benefit), buyers or fee payers, and financial mechanisms (including the fees and taxes that generate funds for payments).

1.1 Necessary Conditions for Environmental Service Payment

A widely accepted definition of payments for environmental services (PES) contains the following elements:

- i. A voluntary transaction: this means that it should be at the instance of the individual, who is interested in conserving the environmental resource.
- ii. A well-defined environmental service. The terms of the service involved should be explicit enough to be understood by the parties involved.
- iii. At least a buyer. It takes at least one service buyer to set up PES.
- iv. At least, a seller. It takes at least an environmental service seller to start up PES.
- v. If and only if the environmental service provider secures service provision (conditionality).
- vi. Wunder (2008) noted that these five PES principles hold for several real-world schemes. However, some PES schemes are self-organized; hence most of these assumptions of PES are not satisfied. “Example is the community and small holder carbon schemes worldwide or mushrooming watershed schemes in Latin America.

1.2 Conservation and Credit-based PES in the Farm settlement

Anderson *et al.*, (2002); Wild *et al.*, (2008), submitted that, the provision of credit through microfinance/agricultural

banks, could be effectively used to finance preservation of the natural environment resources such as agricultural land. In the Nigerian context, ecological funds could be borrowed to the potential farmers through the grass roots financial institutions such as Microfinance/Agricultural banks/Community banks. According to Cranford and Mourato (2012), there are three major ways by which the provision of credit could be linked to the conservation of ecosystem.

- i. Selective lending: Here, alternative livelihoods could be made for those that live on the products of ecosystem e.g. forest products. Also, micro credit could be provided to finance activities which will, have a positive impact on the provision of biodiversity or environmental services. This selective lending is better done at the household or even at the community level” (Wild *et al.*, 2008).
- ii. A Conditional environmental good behavior credit provision: Here the potential credit beneficiaries cannot be privileged to borrow, except a certain environmental behavior is first of all met (Anderson *et al.*, 2002), or such an individual must have previously met an environmental best practices agreement on the previous loans (Mandel *et al.*, 2009). Here the ecosystem resource conservation serves as the collateral for the borrowed microcredit value; this method is referred to as environmental mortgage.
- iii. Environmental behavior conditional micro-credit provision: The proportion of the amount that an individual micro credit beneficial farmer’s payback is a function of the performance of the farmers with respect to a particular environmental conservation. This approach is important in the developing countries, where the poor have limited accessibility to credit facilities (Nickerson & Hand, 2009).

From the table 1 below, 90-100 to 0 percent end of the conditionality: if an individual microcredit beneficiary farmer met all the contractual, environmental service conditions, the entire loan will be forgiven, and is therefore converted to PES (Van Ejik & Kumar, 2009). If 70-89% of the contractual agreements are met, 75% of the credit will be waived. If less than 70% of the contractual agreements satisfied, it will attract 0% loan forgiveness. Hence the entire loan will be paid by the farmers, and this will be considered as non-PES.

Table 1: Conceptualized Credit-Based PES (CB-PES)

|   |   |   |  |
|---|---|---|--|
| Proportion of periodic repayment” waiver” if condition is met | 90-100percent ←   | →   | 0 percent  |
| Credit vs. PES  | Convertible: Credit or PES  | Credit/ PES combined  | Credit without PES   |
| Maximum size of the micro credit                              | Constrained to the amount of money that can be used for 1 ha agroforestry set up and amount ES supplies willing to pay. | Subject to:<br>All environmental practices of 70-89% performance will have a certain amount of credit- waiving. Also will be determined by the amount the ES suppliers are willing to accept the offer of loan. | All environmental conservation performance less than 70% success with attracts the penalty of the concerned micro credit beneficiary farmers to pay back all the amount. |

## II. REVIEW OF LITERATURE

### *Links between Environmental Resource Conservation and Payment for Environmental Services*

Agricultural land degradation caused by over exploitation, unhealthy farming practices such as deforestation, bush burning and the likes, are responsible for eroding natural environmental resources in arable lands. This is predominant in the developing countries, where farmers solely depend on land for their livelihood (Swinton & Quiroz, 2003; Suyanto, Khususiyah & Leimona 2007). The effect of this is the reduction in the soil carrying capacity, which will lead to poor/low agricultural productivity. PES could therefore be used as the market-based incentive buffer to subdue this problem.

Pagiola *et al.* (2005) submitted that PES was originally designed and used as a mechanism to improve the efficiency of natural resource conservation and not as a mechanism for poverty reduction. The PES approach to land resource conservation is based on the theory of give and take. According to Pagiola and Platais (2000) as cited by Suyanto *et al.*, (2007) opined that PES approach is based on principle that environmental services providers should be adequately compensated and those who benefited from the services provided should pay for such services. For example, conversion of forest to agricultural land will cause imposition of costs on the downstream population that will no longer enjoy the benefits of natural ecosystem such as water filtration (Suyanto *et al.*, 2007). To make the upstream population provide the services of conservation of the water shield, for the provision of clean water for the downstream users, payment for such service is needful. The opportunity cost of such service for the environmental service providers, must be higher than the gain from the alternative non-conserved land use. Also the opportunity cost should also be less than the value, of the gain the environmental service beneficiaries will realize from the service; these are the conditionality of PES, which must be met by the players in PES scheme.

The poor farmers in the quest for survival, are engaged in sort of environmentally unfriendly practices, such as burning of crop residue, deforestation, bush burning, etc. all these led to declining in the cultivable land and pasture land for crop growing and animal grazing, since the incentive to invest in the land as to conserve soil fertility is conspicuously absent. Hence farmers have no option than to make do with the available marginal lands. While the remaining few livestock are contending with the humans for crop residues, which could have served as a good source of fertilizer for the soil nutrients replenishment and rejuvenation. Since the whole scenario is a chain of reaction, less manure is expected, as the stock of animals that defecate as they are grazing are small. The resultant effect of all these, is that it gives way for erosion to set in and soil degradation eventually causes low productivity, hence low income and poverty as the end product. Payment for environmental resources (PES) that is intentionally designed to address the two major players;

poverty and land degradation could be the antidote in this type of nexus.

## III. METHODOLOGY

### *3.1 Sampling Method*

A multi-stage sampling technique was employed for this study. Each of the farm settlement was classified as an Enumerated Area (EA) based on the National Population Commission (NPC); this is the first stage of the sampling. To ensure adequate representation of both rural and semi-rural localities, the farm settlements were stratified into rural and semi-rural. Prior to the second stage selection, complete listing of farming household units (and of household heads within household units) was carried out within each EA.

### *3.2 Data Collection and Instrument of Data Collection*

Primary data were collected through the use of a well-structured questionnaires and interview schedule for the literate and non-literate farmers respectively. A total of 395 questionnaires were distributed, but only 317 were useable in all the three farm settlements with the assistance of well-trained enumerators. Data for the respondents' preferences/perspectives of the set of PES attributes presented to them. Information was elicited from the respondents concerning multidimensional poverty on (i) education, (ii) consumption, (iii) housing/living conditions.

### *3.3 Perspectives of Respondents on Poverty Reduction and Agricultural Land Conservation of PES*

Respondent's opinion was categorized into five major classes:

#### *A. Perspective on PES effect on poverty and environmental resource conservation*

- i. POC= Do you think provisions of credit in the PES program could help to reduce poverty?
- ii. PPC= Is PES a promising mechanism for both poverty reduction and conservation of environmental resource?
- iii. PRU= Do you think participation in conservation of land through PES mechanism could reduce unemployment?

#### *B. Incentive provision*

- i. ISP= if you will participate in conservation of farm settlement through PES mechanism do you consider input subsidy (seedlings for planting) as a necessary reason for your participation?

#### *C. Conditionalities*

- i. 75% interest reduction,(will you accept 75% credit reduction, if you fulfil between 70% - 89%, contractual agreement)?

- ii. Will you accept total debt and interest rate forgiveness if you fulfill at least 90%-100% of the contractual agreement?
- iii. < 70%, paying of both principal and interest (paying of both interest and principal if only less than 70% of the contractual agreement is satisfied).

*D. Social capital*

MOC = Being a member of an organization (e.g. Community development association, conservation association) will enhance my participation.

*E. Agreement*

TBP= Do you think trust between the parties involved is a necessary factor for the PES program to succeed?

PTC=PES associated transaction costs could be an obstacle to my participation in the scheme. PTC=PES Associated Transaction Costs

Do you consider ownership rights of the land as a reason to participate in land conservation (LOR).

LOR=Land Ownership Rights

*3.4 Dimensionally Poor Respondents Perceptions about PES*

Respondents were asked some range of questions; this enables us to determine their opinions as regards their judgement of the potentials of Credit-based PES in rural poverty reduction and conservation of agricultural land. As shown in table 2 below, there exist differences in the interest of educational /consumption poor and educational/living standard poor respondents in respect of the provision of credit(POC). Majority of the respondents in this group strongly agreed to participate in PES program, if credit is provided. Also, many of the rural households (consumption/living standard poor, educational poor and living standard) agreed that PES could be a good mechanism for the reduction of both rural poverty and environmental resource conservation (PPC). Respondents in the group of educational/consumption poverty and educational/living standard are of opinion that PES mechanism could be used to reduce unemployment (PRU). However a good number of these respondents are indifferent about it. Question on input subsidy (ISP) as a reason for participation in PES, was only significant among the educational/consumption poor rural household farmers. Quite a large proportion of them favoured provision of input subsidy ( such as seedling for planting) as a necessary condition for

participation in PES program. The overwhelming majority of the respondents supported the need for the trust(TBP) among environmental services providers and buyers, nevertheless those poor in consumption and living standard have significant opinion. Being a member of an organization/association is viewed by respondents in the group of educational/consumption and educational/living standard poverty as an important factor enhancing participation in PES program. Poor in education, consumption and living standard demand for 75% interest reduction condition (if at least 70%-89% of the contractual agreement are fulfilled by the respondents). Debt forgiveness of both principal and interest (if 90-100%, contractual agreement are met) were supported by those respondents that are poor in education, consumption and living standard respectively. Surprisingly, the same set of respondents supported paying back both principal and interest if they could not fulfill up to 70% of the contractual agreement, submitted that PES transaction costs (PTC) will be an obstacle to their participation in PES program. Finally, land ownership as the pre-requisite for participation in PES were not supported by the majority of the respondents. Most of the respondents were neither agree nor disagree. The reason could be that land ownership may not be seen as a problem in this part of the world. Since, PES could offer the rural farmers additional source of income. Also, most of the respondents have little or no access to credit facilities this could prompt them to accept a credit-base PES, hence ownership rights may not pose a barrier to their participation in PES. In all the groups discussed above, there is an association between the categories of the poor respondents as indicated by the Cramer’s V statistic, which tests the null hypothesis of no association between the row and column variables (Agresti, 1984). Cramer’s V statistic shows how strong the association between the variables is. This is done after the Chi-square value might have indicated whether the relationships between variables are significant or not. The decision criterion is that; if the value of Cramer’s V is 1 or very close to 1. It means the association between the variables is strong. If it’s 0 or close to 0, it indicates no or weak association between the variables in question.

The results followed findings by Chaminuka *et al.*, (2012), they used Cramer’s V statistic on the domestic and international tourist groups with regards to question pertaining to rural development and conservation. The results showed that there were significant differences between the domestic and international tourist interest on the contributions of tourist to the rural development.

Table 2: Persepectives of Respondents on PES

|   | Strongly agree | Agree | Neither agree/disagree | Disagree | Strongly disagree | Chi <sup>2</sup> df(2) | Cramer’s V |
|---|----------------|-------|------------------------|----------|-------------------|------------------------|------------|
| If credit is being provided (POC), will you participate in PES? |                |       |                        |          |                   |                        |            |
| Educationally poor  | 54             | 55    | 25                     | 6        | 2                 | 5.35**                 | 1.00**     |
| Consumption poor  | 93             | 88    | 44                     | 9        | 3                 |                        |            |

|   |                |       |                        |          |                   |                        |            |
|---|----------------|-------|------------------------|----------|-------------------|------------------------|------------|
| Consumption poor  | 93             | 88    | 44                     | 9        | 3                 | 0.0011                 | 1.00       |
| Living standard poor  | 115            | 104   | 49                     | 12       | 3                 |                        |            |
| Educationally poor  | 54             | 55    | 25                     | 6        | 2                 | 6.30**                 | 1.00**     |
| Living standard poor  | 115            | 104   | 49                     | 12       | 3                 |                        |            |
| Is PES a promising mechanism for both poverty reduction and conservation of environment( PPC)   |                |       |                        |          |                   |                        |            |
| Educationally poor  | 68             | 37    | 32                     | 4        | 1                 | 4.16                   | 1.00       |
| Consumption poor  | 109            | 56    | 63                     | 7        | 2                 |                        |            |
| Consumption poor  | 109            | 56    | 63                     | 7        | 2                 | 8.41**                 | 1.00**     |
| Living standard poor  | 133            | 74    | 65                     | 6        | 5                 |                        |            |
| Educationally poor  | 68             | 37    | 32                     | 4        | 1                 | 5.04**                 | 1.00**     |
| Living standard poor  | 133            | 74    | 65                     | 6        | 5                 |                        |            |
| Do you think participation in conservation of land through PES mechanism could reduce unemployment( PRU)  |                |       |                        |          |                   |                        |            |
| Educationally poor  | 57             | 46    | 28                     | 7        | 4                 | 5.91**                 | 0.99**     |
| Consumption poor  | 96             | 71    | 56                     | 11       | 3                 |                        |            |
| Consumption poor  | 96             | 71    | 56                     | 11       | 3                 | 0.0011                 | 1.00       |
| Living standard poor  | 117            | 83    | 65                     | 13       | 5                 |                        |            |
| Educationally poor  | 57             | 46    | 28                     | 7        | 4                 | 6.24**                 | 0.99**     |
| Living standard poor  | 117            | 83    | 65                     | 13       | 5                 |                        |            |
| If you will participate in conservation of farm settlement through PES mechanism do you consider input subsidy(i.e. seedlings for planting) as a necessary reason for your participation(ISP) |                |       |                        |          |                   |                        |            |
| Educationally poor  | 55             | 48    | 28                     | 10       | 1                 | 5.30**                 | 1.00**     |
| Consumption poor  | 92             | 78    | 53                     | 11       | 3                 |                        |            |
| Consumption poor  | 92             | 78    | 53                     | 11       | 3                 | 0.0011                 | 1.00       |
| Living standard poor  | 111            | 91    | 63                     | 15       | 3                 |                        |            |
| Educationally poor  | 55             | 48    | 28                     | 10       | 1                 | 0.0011                 | 1.00       |
| Living standard poor  | 111            | 91    | 63                     | 15       | 3                 |                        |            |
| Do you think trust between the parties involved is a necessary factor for PES program to succeed ( TBP)   |                |       |                        |          |                   |                        |            |
| Educationally poor  | 88             | 40    | 12                     | 1        | 1                 | 4.24                   | 1.00       |
| Consumption poor  | 154            | 67    | 14                     | 1        | 1                 |                        |            |
| Consumption poor  | 154            | 67    | 14                     | 1        | 1                 | 6.39**                 | 1.00**     |
| Living standard poor  | 183            | 76    | 21                     | 2        | 1                 |                        |            |
| Educationally poor  | 88             | 40    | 12                     | 1        | 1                 | 3.81                   | 1.00       |
| Living standard poor  | 183            | 76    | 21                     | 2        | 1                 |                        |            |
| Being a member of an organization (e.g. community development association, conservation association ) will enhance my participation(MOC)  |                |       |                        |          |                   |                        |            |
| Educationally poor  | 25             | 34    | 51                     | 27       | 5                 | 5.11**                 | 0.98**     |
| Consumption poor  | 44             | 49    | 97                     | 40       | 7                 |                        |            |
| Consumption poor  | 44             | 49    | 97                     | 40       | 7                 | 0.0011                 | 0.99       |
| Living standard poor  | 50             | 59    | 118                    | 47       | 9                 |                        |            |
| Educationally poor  | 25             | 34    | 51                     | 27       | 3                 | 6.25**                 | 0.99**     |
| Living standard poor  | 50             | 59    | 118                    | 47       | 9                 |                        |            |
|   | Strongly agree | Agree | Neither agree/disagree | Disagree | Strongly disagree | Chi <sup>2</sup> df(2) | Cramer's V |
| 75% interest reduction = will you accept 75% credit reduction?  |                |       |                        |          |                   |                        |            |
| Educationally poor  | 19             | 45    | 50                     | 25       | 3                 | 5.30**                 | 1.00**     |

|  |     |     |     |     |    |         |         |
|--|-----|-----|-----|-----|----|---------|---------|
| Consumption poor   | 27  | 82  | 87  | 36  | 5  |         |         |
| Consumption poor   | 27  | 82  | 87  | 36  | 5  | 0.0011  | 1.00    |
| Living standard poor   | 37  | 91  | 107 | 43  | 5  |         |         |
| Educationally poor   | 19  | 45  | 50  | 25  | 3  | 6.35**  | 1.00**  |
| Living standard poor   | 37  | 91  | 107 | 43  | 5  |         |         |
| Total debt relief(if 90-100% contractual agreement is met)                                       |     |     |     |     |    |         |         |
| Educationally poor   | 58  | 47  | 29  | 4   | 4  | 5.30**  | 1.00**  |
| Consumption poor   | 99  | 86  | 43  | 6   | 3  |         |         |
| Consumption poor   | 99  | 86  | 43  | 6   | 3  | 0.0011  | 1.00    |
| Living standard poor   | 121 | 101 | 49  | 9   | 3  |         |         |
| Educationally poor   | 58  | 47  | 29  | 4   | 4  | 6.30**  | 1.00**  |
| Living standard poor   | 121 | 101 | 49  | 9   | 3  |         |         |
| Paying both principal and interest(<70%) contractual agreement met)                              |     |     |     |     |    |         |         |
| Educationally poor   | 24  | 28  | 51  | 17  | 22 | 5.20**  | 1.00**  |
| Consumption poor   | 36  | 42  | 88  | 39  | 32 |         |         |
| Consumption poor   | 36  | 42  | 88  | 39  | 32 | 0.0011  | 1.00    |
| Living standard poor   | 52  | 48  | 108 | 43  | 32 |         |         |
| Educationally poor   | 24  | 28  | 51  | 17  | 22 | 6.40**  | 1.00**  |
| Living standard poor   | 52  | 48  | 108 | 43  | 32 |         |         |
| PES associated transaction costs could be an obstacle for my participation in the scheme(PTC)    |     |     |     |     |    |         |         |
| Educationally poor   | 21  | 37  | 49  | 31  | 4  | 5.30**  | 1.00**  |
| Consumption poor   | 36  | 64  | 87  | 45  | 5  |         |         |
| Consumption poor   | 36  | 64  | 87  | 45  | 5  | 0.0011  | 1.00    |
| Living standard poor   | 50  | 84  | 90  | 53  | 6  |         |         |
| Educationally poor   | 21  | 37  | 49  | 31  | 4  | 6.35**  | 1.00**  |
| Living standard poor   | 50  | 84  | 90  | 53  | 6  |         |         |
| Do you consider ownership right of the land as a reason to participate in land conservation(LOR) |     |     |     |     |    |         |         |
| Educationally poor   | 48  | 5   | 43  | 45  | 1  | 4.16    | 1.00    |
| Consumption poor   | 81  | 74  | 12  | 69  | 1  |         |         |
| Consumption poor   | 81  | 74  | 12  | 69  | 1  | 8.52*** | 0.54*** |
| Living standard poor   | 13  | 80  | 88  | 100 | 2  |         |         |
| Educationally poor   | 48  | 5   | 43  | 45  | 1  | 5.16**  | 1.00**  |
| Living standard poor   | 13  | 80  | 88  | 100 | 2  |         |         |

Significant at \*\*\* 1%, \*\*5%, \*10% levels respectively

## V. CONCLUSION

The findings of this study showed that regardless of the category of poor, the respondents have majority of them favouring the disagree option followed by those that were indifferent about whether Land Ownership Rights(LOR) is a requisite factor which spur the respondents to be interested in agricultural land conservation in the study area. Few farmers were in agreement that LOR is a factor to be reckoned with environmental resource conservation in the study area. Hence the study conclude that though LOR is a necessary factor but not a compulsory an indispensable factor in spurring

environmental resource conservation, especially when an incentive is provided.

Based on the above, policy that will essentially incorporate concepts that will prompt farmers to be encouraged to conserve environmental resource e.g. agricultural land should be formulated. This could be enhance if cooperative societies were also encouraged to be involved, thereby promote more farmers to be concerned in the environmental resource conservation.

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