S.E.C.U.R.E.D: Practices On Bioarts Education At Work

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Abstract : The study sought answers on the practices of the bioarts education at work in term of site selection, establishment process, conservation of rainwater, utilization of raintree leaves, the 4 R's reuse-recycle-reduce and redesign, entrepreneurship and do-it-alone. (S.E.C.U.R.E.D) The study showed that site selection considered the topography, type of soil, vegetation, nearness to market, drainage, free from flood, water supply, easy means of transportation, supply of fish, poultry and livestock, cheap skilled labor, peace and order. The study also indicated that the establishment process included the sound site selection, planning-designing and lay-outing, labor and material inputs, fish-crop-poultry and livestock establishment, production-care and feeding , harvesting and marketing practices. The study further showed that it saved 400.80 cubic meters of rainwater used for fishponds, 14.4 cubic meters of garden soil used in a potted marcotted citrus for 4 years operation. With the applied 4 R's, it saved 12,567.25 pesos from the market cost of 15, 530.00 pesos. And the do-it-alone saved 18,104.00 from the 240,649.00 development and operational cost and 53,850.00 from 96,000.00 expenses on the arts thus it provided 41% return of investment.

Index terms: bioarts, conservation, do-it-alone, entrepreneurship, establishment process, site selection, 4 R's

INTRODUCTION

BioArts education at work is the showcase of artistry of life interactions and the arts for F.A.I.T.H (Food Available-In-The-Home), additional I.N.C.O.M.E (**I**ntelligent use of **N**atural resource and **C**onservation for gainful **O**utcome to draw out **M**oney in small business farm **E**nterpreneurship) and the wise conversion of energy into useful work. The concept used is D.R. C.A.N.E.N.C.I.A B.I.O.A.R.T.S F.A.R.M. M.O.D.E.L defined as **D**evelopment of the immediate **R**esources for the **C**onservation and **A**mplification in the utilization process of meeting the human **N**eeds as means of **E**ducating love and care of the **N**ature through **C**reative **I**ntegration of **B**iology and **A**rts by **B**eating **I**nsufficiency with optimism and positive **A**ttitude for self **R**eliance **T**owards food **S**elf-sufficiency on **F**ostering **A**bundance from **R**euse, recycle, reduce and redesign approaches on **M**anagement in the **M**aximum maximization on its **O**peration and **D**evelopment for an **E**ntrepreneurial **L**evel.

Objectives

To carry out the S.E.C.U.R.E.D practices from the established BioArts Farm model, the educational learning objectives were formulated:

1. To select area that possessed sound site selection;
2. To create a farmer's based establishment process for a productive and sustainable bioarts farm model
3. To quantify the amount of rainwater conserved in the 4 years operation of the ponds;
4. To determine the volume of rain tree leaves utilized as a main medium of the soil component of the potted marcotted citrus.
5. To identify materials and structures to be recycled, reused, reduced and undergone a renovation.
6. To show case small based farming entrepreneurship on small bioarts farm as an learning instructional model on teaching biology education

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Methodology

The research design used was a case study. The study laid out in the development of the bioarts farming practices to an area of three hundred square meter (300 m^2) at Cebu Technological University-Barili Campus from 2006-2010. The study was able to provide data on selected sound site, created a farmer's based establishment process, quantified the amount or rainwater conserved in the 4-year operation and determined the amount of soil utilized on potted marcotted citrus. It also identified recyclable, reusable, "reduceable" materials and "renovatable" structures. It further provided a sound practices on bioarts farm model as a good avenue for entrepreneurship. It used instruments to carry out the objectives of the study, the following instruments were used:

1. Sound site selection was identified in terms of 1) water supply, 2) type of soil, 3) topography 4) vegetation 5) drainage 6) free from flood 7) easy means of transportation 8) nearness to market 9) supply of poultry and livestock, and 10) cheap supply of skilled labor 11) peace and order.
2. Establishment process was next step after site selection careful consideration. This was followed by 1) plan, design, and lay out 2) material and labor input 3) fish, crops, poultry and livestock establishment 4) production, care and feeding practice, 6) harvesting and 7) marketing.
3. Quantification of rain water and cost. The amount of water was quantified by unit volume by calculating the total volume of 15 fishponds and the number of frequency of change water for 4 years multiplied by commercial water work cost.
4. Soil utilization as it was replaced by rain tree leaves as main component medium. Soil utilization was determined by converting unit of mass of an ordinary substance in kilogram to a unit volume in cubic meter. This was done by weighing the 8"x8"x 10" size of garden plastics (polyethylene bag) filled with soil. The mass was multiplied by the number of garden plastics used in the potted marcotted citrus to get the total mass.
5. Identification of recyclable, reusable, "reducable" from household and farm materials to lessen environmental problems that can used for waterer,

improvised incubator, sealant, fertilizer, or foods from fishes, vermi worms and livestock and “renovatable” structures to provide space and aesthetic value of the farm.

6. Entrepreneurship. This categorized as small farm business entrepreneurship were products will be sold in the neighborhood.

7. Show case on SECURED practices on bioarts farm model as an instructional medium**.**

The sequential activities performed in creating a bioart farm as followed: (A) Farm plan,design and layout, (B) Pond construction, (C) Plant establishment, (D) S.E.C.U.R.E. D Practices (E) Tabulation and analysis of gathered data and, (F) Output development.

A. Farm plan design and layout is the blue print of the actual picture, shape, position and location of the farm with respect to the pond structure, land topography and plant arrangement. Designing and planning required sound and systematic set of activities, program of works including the necessary material, labor and other technological requirements needed for Bioarts formulation. To make a design required creative arts with harmony with respect to arrangement and interrelationships and interactions of the fish, crops and animals within the farm

B. Pond construction is crucial and tedious works. It required precise measurement and enough pond strength to hold water. It is tedious for it required a big amount of energy to carry the following sequential activities as shown in Figure 1.

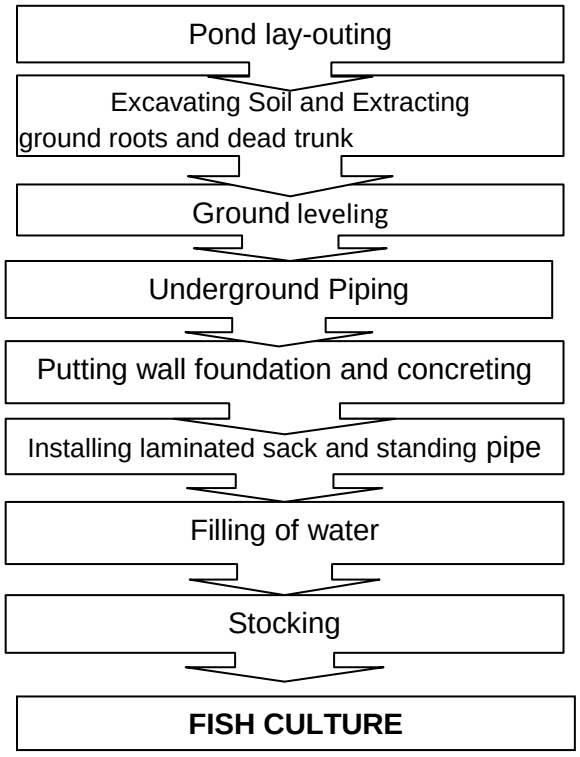

Figure 1
Steps in Making a Pond

Figure 1 shows the steps on making a fishpond. The diagram gave the direction and procedures in constructing a pond. The following are steps involved in making a pond. Excavating of soil for dike formations, extracting of weeds, and underground roots and dead trunks. Leveling is an activity took place with the used of leveling instrument such as the used of transparent hose commonly used by construction worker to find the correct land level. This is very important for the pond to have well leveled pond bottom in order to have uniform water level in both sides of the pond Piping is done through setting of underground pipes to serve as water passage during the pond undergone change water. The pond water will be drained out when standing pipe inside the pond will be temporarily removed which allowed water to pass through the hole that passed to connected pipe lines designed for drainage. Wall concreting of the pond measured 16 ft by 5 ft by 1.5 feet on its height , This height can be the water deep when the pond is filled with water. The study used ratio of cement, sand and gravel was 1:4:2. This means one sack cement, 4 sack of sand and 2 sacks of gravels for the wall construction. Installing a laminated sack on 16ft by 5ft by 1.5 ft. The sack was firmly fixed on the pond size. It was then clipped by a bamboo strip or nailed with rubber strips to keep the sack attached to the hollow blocks walls. The standing pipe was installed to the center by making a hole of the sack where drainage pipe is located. The standing pipe located at the center to get water balance from both sides of the pond that served two functions as a overflow pipe and a drainage pipe. Water filling and stocking were done after laminated sack was carefully fixed. The pond was ready to be filled with water at 20% level. After it stood for 5 days, the pond was ready for stocking. The fry should be acclimatized first by letting the vessel used temporarily submerged with entrance wide open in the pond water for 10-15 minutes until the fry adjusted the pond water parameter and swam freely.

C. Plant establishment

After the pond construction. The plant establishment followed. It undergone the following activities such as preparing soil for potting media, marcottingcalemonden and planting crops. The soil medium was composed of 90 % decaying rain tree leaves, 5% soil and 5% animal manure was practiced in this study. This was put in a 8 inches by 8 inches by 14 inches polyethylene bag and watered for 5 days before these were planted with the specified crops and marcotted calamonden (Citrus). Figure 2 below shows the arrangement of the marcotted calamonden in the bioarts.

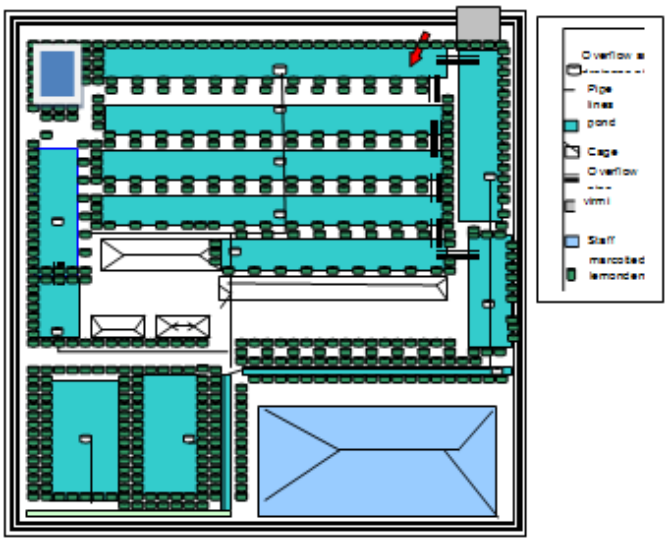

Figure 2.
Arrangement of Potted Citrus and the Establishment of Animals Cages

Figure 2 shows the arrangement of the marcotted citrus in the BioArt farm. The small green cylindrical vessel was presented by the potted marcotted citrus in a polyethylene bag or garden plastic. As shown on the Figure, the bagged marcotted citrus were arranged around the pond compartment that provided shade for the fish and the laminated sack from prolonged exposure to the sunlight. It showed also the location of the establishment of animals cages for chicken, quails, lovebirds, rabbits and earthworms.

D. S.E.C.U.R.ED Practices of the bioarts The SE.C.U.R.ED practices of the BioArts farm focused to the seven (7) concerned such as the site selection, establishment process, conservation or rain water, utilization of garden soil, the 4R's, entrepreneurship and the do-it-alone as it performed the masonry, carpentry, plumbing and painting. The conservation or rain water was quantified through the total volume of 15 ponds that can be translated into cost for the amount saved if the fish farming used the commercial water work system within 4 years production operation as intended for the study. The utilization of garden soil was determined for how much peso was saved of using rain tree leaves as main component of the medium for the potted marcotted citrus in a 8"x8"x10" garden plastics. For the 4 R's practices was translated into an amount of peso saved as an alternative replacement of ready-made products and the creative design and renovation of farm structures such as the landscape and cages. And the entrepreneurship was done selling goods after all costs calculated from gross income minus total expenses divided by the total expenses multiplied by 100% to show a net income and profit of every peso invested.

E. Tabulation and Analysis. This part was presented by the tabulation and analysis of the data gathered.

F. Output development**.** The result of the study was a showcase of a small based peri-urban bio-integrated farming.

RESULTS AND DISCUSSIONS

Practiced Number One: Site Selection

Water Supply. Ideally in establishing a fishpond, water should be clear and clean. It must be well oxygenated. The flow should be continuous all year round and it must be rich in aquatic plants which serve as food of fishes. In this study, the farm was established in a very limited water supply for it advocated that fish can still be grown productively at 30 centimeters deep at scare water supply. It negated of what is ideal. Soil. The soil should be sticky or clay loam which was enough to hold concreted water and dikes as the site possessed. Topography. This is a relied feature of the land or the physical appearance of land area whether it is a plain or mountainous. A good site should be elevated from the lowest level of the land surface. The site more than met the elevation for it has an elevation of 30^{o}. Vegetation. This characteristic included the growth of trees, grasses and other plants covered in a certain area . A good and productive site must have scanty vegetation. The dike should be free from tree's roots. Drainage. The site must be at least 2-3 ft higher than the lowest land level, so it can be easily drained. Proper drainage is important to make harvesting , leveling of the pond, and change water easy. The site greatly met the ideal land elevation for drainage specification. Free from flood. The suitable area should be free from flash floods Fishponds located along riverbanks are usually flooded during the rainy seasons and are usually less productive that those located in plains where flood water is not known. The site met it. Market survey. Farm products command a good price if these reach to the consumers/buyers in a very healthy conditions which travel at the least possible time. The site is on the university compound, consumers were all around at anytime. Supply of crops, poultry and livestock materials. The supply of stock is important. The availability of the crops, poultry and livestock materials all year round make the BioArts can possibly run under all conditions. The place is located in between Carcar City and Barili Town were agrivet supplies and public markets available at all times. Cheap supply of skilled labor. Supply of cheap skilled labor is available all year round to make production continuous. The skilled labor such as the carpenter and the mason were used to perform in the cage and pond construction activities such as following: excavating and extracting underground roots and dead trunk, ground leveling, underground piping, putting wall foundation, cutting the corrugated bars, placing the cut bars to the layout, mixing masonry material and filing the hollow blocks, Installing the laminated sacks, measuring the perimeter of the ponds, cutting of lumber into specific measurement, carpentry on frame, floor, siding, and roof. The study used the researcher as the cheap skilled labor. Peace and Order. Political stability made peace and order stable. Economic movement in the locality is continuous. And since the farm site is in the University compound and it is beside the researcher's staff house, it minimized the stealing problem and trespasses on property that will incur mechanical injuries to the cultured stocks.

Practiced Number Two: Establishment Process

In every single work there's always a process flow that served as the sequence of activity to be done in order to facilitate work and expect better outcome. In this study the

process flow undergone by the study in establishing a BioArt farm were the following 1) the site selection 2) plan, design, and lay out 3) material input 4) fish, crops, poultry and livestock establishment 5) production, care and feeding practice, 6) harvesting and 7) marketing.. And each of these major processes contained specific activities that was performed in the development of farm. It required the list of sequential activities performed such as the site selection, planning, designing and lay outing, procurement of materials, fish, crops, poultry and livestock establishment, production, care and feeding practice, harvesting and marketing.The specified different activities in the establishment of fish, crops, poultry and livestock. started with the canvassing and purchasing of the needed materials and tools, planning and lay outing, measuring, and performing masonry and carpentry works and then stocking of the intended animals.. Meanwhile in the establishment of main crop, remarcotting of citruses was practiced. BioArts planning designing, and lay outing was focused particularly to the pond and cage construction. It planned the area for contour terracing and designed for fish, crops, poultry and livestock were raised. Inputs. These were the needed materials and labor in establishing crops, poultry and livestock. The list of materials, tools and labor were specified as these were needed with varying units, quantity, cost per unit , the total cost and its technological uses and the total budgetary allocation cost for the whole BioArts farm construction in the entire duration of the study. Here the steps involved in the construction of fishponds were the following: lay-outing, excavating the soil , extracting underground roots and dead trunks, pond leveling, installing underground pipes, filing a hollow blocks for the wall formation, installing and fixing a laminated sack, putting a standing pipe, filling of water and stocking of fry. Fish monitoring and feeding were became a routine activities until the fish reached the marketable size. Percentage of the allocated cost in the development of fishpond is presented in Figure 3.

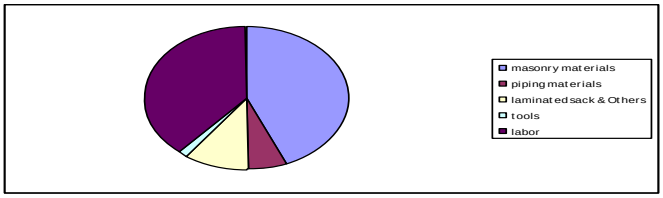

Figure 3
Percentage of the Allocated Cost in the Development of Fishpond

Figure 3 above indicates the allocated cost for the masonry materials, piping materials, laminated sack and accessory and the labor needed for the development of fish. It was observed that the masonry materials had the highest percent cost allocation of 49 %. And it showed also that the labor cost was next with 37% budgetary allocation cost in the development of fishponds. This implied that greater number of masonry materials were very much necessary for the development of fishponds. The price was also considered quite expensive which contributed much to high percentage of the allocation cost. Labor cost was second from the masonry materials yet this was overcame since the researcher did it alone for he put himself to the shoes of the farmers. This means that this study was farmers' based bioart farm model since farmers were considered well rounded and knew everything in the construction of farm. The material inputs needed in the development of crops were the six major items needed in the development of crops such as the number of polyethylene bags, enumerated planting media and planting materials, number of tools and a number of work force. The percentage allocated cost in the development of crops is shown Figure 4.

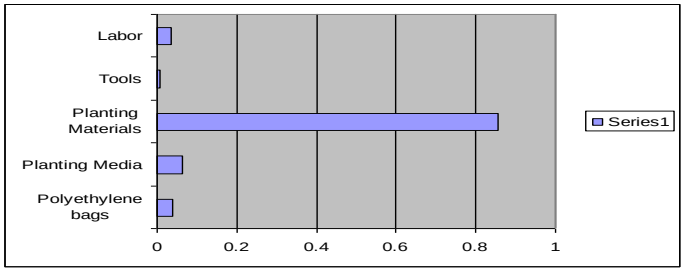

Figure 4.
Percentage of the Allocated Cost Needed in the Development of Crops

Figure 4 presents the percentage allocated cost for the polyethylene bags, planting media, planting materials, tools and labor needed for the technological requirements in the development of crops. A close looked to the bar graph provides a succinct idea that the planting materials have the highest allotted budget of 85.55% for the development of crops which mainly contributed by the price of marcotted citrus. This was followed by the cost of planting media of 6.47% from the total cost. It can be directly observed that planting media, marcottedcalemonden contributed to a big amount of cost if these were bought in the local market and the labor cost if the two persons have been compensated for 14 days used in potting the media and planting the crops. If this study could be done alone by the farmer itself re-marcotted the marcotted calemonden, utilized the planting media found and wasted in the ground and the wise used of time and energy potting the planting media and the planting of the crops, then it evidently showed that it saved an amount of 64,700 from the cost of 71,040. Ninety one and eight hundreth percent (91.08%) was saved in establishing the a crop. This implied that marcotted citrus as the secondary crops of the BioArt farm and the labor were costly and expensive. Yet, in this study the marcotted calemonden were re-marcotted and the wise conversion of researcher energy through a hobby of collecting manure from the raised rabbits and vermi worms and from decayed rain tree leaves and acacia aure made the study became inexpensive. Vermi composting was also established for the utilization of the household and backyard waste. This means that planting materials and labor cost could be eliminated from the list of the budgetary allocation through mother seeds and re-marcotting technique and do it alone with full of fun, initiative, common sense, perseverance, skills, positive attitude and outlook to have a purposive work. The inputs needed in the development of poultry and livestock is presented in Figure 5.

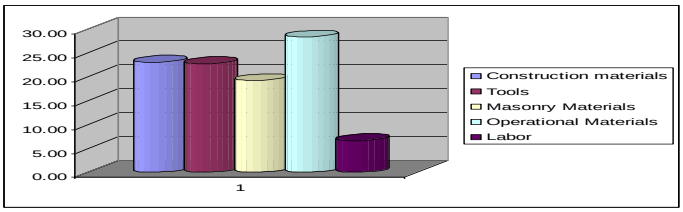

Figure 5
Percentage of the Allocated Cost Needed in the Development of Poultry and Livestock

Figure 5 presents the percentage of the budgetary allocation cost needed in the development of poultry and livestock . It was noticed that operational materials got the highest percentage allocation cost of 28.32 %. Then these were followed closely by construction materials with 23.06% and masonry materials with 22.76%. Tools budget allocated only with 22.76% including the optional tools cost and the labor cost was 12.68%. As observed, there was no labor cost allotted for it replaced the acquisition of tools in the construction of all the cages and houses of animals. The idea was farmers did not have labor budget for they knew all labor works. The high percentage of operational materials implies that raising livestock had greater budgetary allocation cost especially the food consumption. Therefore number of livestock that required feed pellets should be limited specifically number of chicken.

4. Crops, Poultry and Livestock Establishment Creeping plants were planted in the ground near at the interling fence while selected potted crops were arranged in perimeter of the ponds while table banana at the corners. Cages for lovebirds, quail and chicken were installed at the top of the strategically located ponds. Vermi-rabbit pens was uniquely designed at considerable distance little away from the neighbor residence. The activities and number of days in establishing an IBF of fish, crops, poultry and livestock is presented in

5. Production, Caring and Feeding Practiced. Production of fish, lovebirds, chicken, and rabbits was quite easy for these animals reproduced naturally and produced young with little care. And for quail, since it did not sit down the egg, an improvised incubator worked to produce a number of young quail Meanwhile fast growing crops were produced favorably by seeds and other produced by stem and buds like citrus. It started only out of forty marcotted one was again remarcotted to reach thousands of it. Caring of crops, poultry and livestock was one in the heart-a central tendency to care living things. For caring crops was done by monitoring the growth, infestation of diseases, and applying supplemental organic and inorganic fertilizers. Watering and removing of weeds was also done everyday especially during summer and rainy days. Transferring of crops to the ground, from small pots to bigger pots and also adding of new soil were practiced. And the caring of fish, lovebirds, chicken, and quail was required a little care for this just merely provided with foods, space, resembled habitat, water and periodic clean up of the cage and pens. Feeding of chicken, quail, lovebirds, and rabbits of course required specific feeds and enough amount in the number heads. Basically it depended on the condition, feeding habit, size of animal as well as the time it became active and inactive. It required a keen observation from time to time and day to day basis. There were times not to feed, underfeed and overfeed them.

Pre Harvest, Harvest and Post Harvest. In the pre harvest of tilapia fish, the matured and the same size fishes were caught with the used of push net and swing net and was transferred to smaller size ponds filled with one day old clean water . This fishes were fed with azolla or floater feeds. These fishes were allowed to spend 3-5 days in the pond before it was sold. For ornamental fishes, the newly caught were put to the different sized aquarium, ready to be packed. In the pre harvest of crops was done by mapping out of matured crops and the clean-up of pathways began and for the animals were the selected pairs In the harvest of crops was not quite difficult for these crops were man's tall that can be done by hand picked and can be slowly laid down in the smooth leveled ground or either place in a basket or in a flat basin. For fish was harvested with the used of push net or swing net. There was no total harvest in which pond water was completely drained for the reasons that water was limited and expensive and also there were many weeks old fry or the newly hatched eggs still left. In the post harvest of crops, poultry and livestock was done just a thorough cleaned up, made repair of cage and pens. For fish was the partial removal of sludge and the repair of the laminated sack and the sidings.

6. Marketing. The products were sold directly through farm visit or by orders. And some products were displayed in the established store. As enumerated in the establishment process, BioArts farm plan, design and layout was the actual picture, shape, position and location of the farm with respect to pond structure. land topography, development, and the plant and animal cages and pens arrangement.. The farm layout was constituted mainly of fishponds constructed in contour terracing farming style. It is the best way to be done in an elevated land surface. The layout required an art of commons sense and technique to fit in the number of crops, cages, and pens of poultry and livestock materials such as potted and ground crops, fish, chicken, quail, lovebirds, and rabbits.

Practiced Number Three: Conservation of Rain water
Rainwater conservation was an essence of establishing a backyard fishpond rather than it was just water ran off. It conserved a considerable amount of rainwater every times it rained. Rainwater conservation was closely related to cost cutting of expenses of the water used. Table 1 below shows the computed volume of rainwater conserved in the fish farming operation.

Table 1
Volume of Rainwater Conserved in the 4 Years Fish Farming Operation

Substance	Computation Details								
	Unit	Volume of water per pond (m^3)	Number of Ponds	Total Volume of Water (m^3)	Number of Change Water	Volume of Water Used per Year (m^3)	Volume of Water Used for 4 Years (m^3)	Cost/m^3	Total cost
Rain water	m^3	1.674 m^3	15	25.056	4x/yr	100.224	400.80	20.00	8,000.00

It can be gleaned directly from the Table 1 that rain water conserved was about 400.80 cubic meters for four years operation. If every cubic meter costs 20 pesos in the commercial waterworks system then it saved money at around eight thousand pesos (8,000.00). Table 2 below shows the utilization of garden soil as it utilized the used of decomposing rain tree leaves as main component of the soil medium of the potted marcotted citrus as a sound BioArts farm practiced number 4.

Practiced Number Four: Utilization of Rain Tree and Acacia aure Leaves

Table 2
Utilization of Rain tree and Acacia aure Fallen Leaves

Item	Quantity	Size	Mass of Soil (kg) per size	(Kg) Total Mass	Total Volume of (m^3) Soil	% Volume of -90% Raintree leaves &etc	Cost /m^3	Total Cost
1	500	10"x 10"x 14"	24	12 000	12	10.8	2, 000.00	21, 600.00
2	500	8"x8 "x10 '	8	4 000	4	3.6	2 ,000.0 0	7, 200.00
Tota l	100 0			16,,0 00	16	14.4		28, 600.00

As shown in Table 2 that the total mass of soil utilized in the development of an IBF was 14,400 kilograms or equivalent to 14.4 cubic meters. If this soil was bought at an amount of 2,000 pesos per cubic meter, it has a total cost of 28, 600 pesos. In this case, it used the fallen leaves of rain tree (Semania saman) and Acacia aure found immediately in the vicinity instead of soil with the ratio of 90% leaves, 5 % manure and 5% soil. The practiced number 5 is presented in Table 3 that explains the 4 R's of the available resource and the amount saved.

Practiced Number Five:. Recycle, Reduce, Reuse and Redesign (4R's)

Table 3
Recycle, Reduce, Reuse and Redesign (4R's) of the Available Resource and the Amount Saved

Recycle Item	Quantity	Description	Unit	Unit Price	Total Price	Alternative Unused/ Recyclable Household Material	Quantity	Unit	Unit price	Total Price	Amount saved
1	4	poultry plastic waterer	pc	60.00	240	* 1.5 liter of softdrink plastic bottle	4	pc	none	240.00	
	1					* glass sealant	1	pc	120.00	120.00	
2	1	read- made incubator	pc	5,000.00	5,000.00	* 24'x1' glass	8	sq. ft	80.00	640.00	5000.00
						* 24'x1' carton	1	pc	0.00	0.00	
						* 24'x1' 1/4"plywood	1	pc	0.00	0.00	
						* water	3	L	0.75	2.25	
						* 40 watts bulb	1	pc	25.00	25.00	
						* # 16 stranded wire	2	m	20.00	40.00	
						* male plug	1	pc	15.00	15.00	
						* glass sealant	1	pc	0.00	0.00	
3	3	pet rat waterer	pc	80.00	240.00	* water	3	L	150.00	450.00	
						* softdrink plastic bottle	1	pc	0	0	
						* glass sealant	1	pc	0	0	
REDUCE									subtotal	722.25	
4	1	13-13-13 fertilizer	sack	1,200.00	1,200.00	manure and vermi cast	2	sack	0	0	1200.00
5	100	potable water	cu.m	22.00	2200.00	rain water	100	cu.m	0	0	2200.00
REUSE											
6	500	4"x4"x6" garden plastics	pc	0.8	400.00	re-plantme of the used zarden plastics	500	pc	0	0	400.00
7	80	laminated sack	pc	50.00	4,000.00	partially ruined parts were used to cover grounds for the potted seedlings for the roots protection to spread to minimize stress	50	pc	0	0	2500.00
				Total	13,780.00	minus			Total	10,817.75	
		Actual amount expense			2,962.25						
Renovate/redesign		* redesign landscape from mere rough elevation to contour terracing for artistry and aesthetic value and for space									
		* renovate cage structure from traditional to collapsible removable cages for a special purpose (designed is withheld)									

Table 3 displays the item, the quantity, material description, unit, the unit price and the total price, the corresponding alternative unused/recyclable household materials and the amount saved in the heading cells. It can be directly seen the total amount of the material cost and the amount saved. It showed that the total cost of the ready-made materials is Thirteen thousand seven hundred eighty pesos (13,780.00) and the total amount saved of using the recyclable/unused household materials at an amount of Ten thousand eight hundred seventeen pesos and twenty five centavos (10, 817.25). As shown in the said table that the actual amount expense was Two thousand ninety two pesos and twenty five centavos.

Practiced Number 4. Entrepreneurship

The BioArt farm productivity was determined yearly. These were the production income earned from the fish, crops and animals. Fish income contributed mainly of the following fishes such as tilapia, platys, sword, black molly, moor, koi, and guppy while for animals were the chicken, quail, rabbits, lovebirds, and earthworms. Income came from the crops were highly contributed by marcotted citrus, citrus and banana fruits and veggies. Figure 6 displays the percentage of the organisms comprised of the income from the first year operation as details on the Bioarts farming practiced on entrepreneurship.

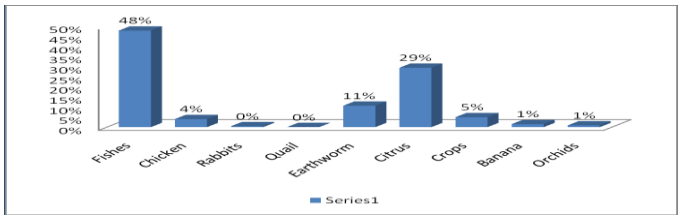

Figure 6
Percentage of Organisms Comprised of the Income in the 1st Year Operation on the BioArt Farm

It can be looked forward from the Figure 6 that fishes had the highest percent income contributed at 48% and which was followed by citrus of 29% and the earthworm of 11% of the first year production operation. It showed that the first year operation of theBioArts farm had the total production income of **28,157.50**. This income was contributed by 9 major products namely these were the Tilapia and Aquarium fishes, chicken, rabbits, quail. earthworm, banana, crops and orchids. It was observed that marcot

citrus provided big sales but it was not been sold for the purpose that it will be subjected for remarcotting to increase exponentially the number of marcot citruses. This implied that little of everything can provide additional income and food to the farmers than those without anything. The computed return of investment per annum is 13.31 %. Most of these crops were planted on the pots using the polyethylene bags and few were planted in the ground especially vines. Income of the second year operation of the BioArt farm is presented on Figure 7.

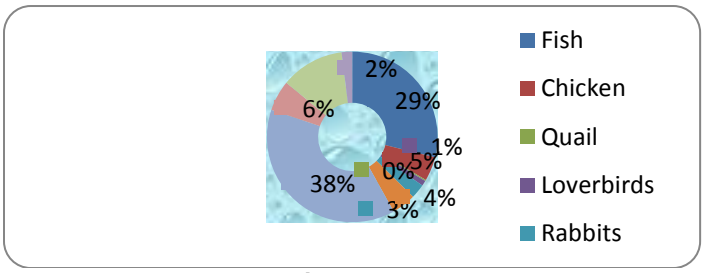

Figure 7
Percentage of the Organisms Comprised in the Income from the 2nd Year Operation of the BioArt Farm

It can be gleaned directly from Figure 7 that citrus, fishes, banana and earthworm and chicken garnered 38%, 29%,, 6% and 5% respectively have greatly contributed in the second year production income of the BioArt farm with the amount of 54,950.00. It was noticed that there was an increase of an annual production income from 28,157.50 to 54,950.00 as it started from 2007 to 2008. This income mainly contributed by the increase population of Tilapia and Aquarium fish and the increase number of marcotted citrus and other crops productions. This implied that there was an annual growth income of 30,048.00 pesos or 54.68 % production income for the second year operation. Figure 8 below shows the percentage and the organisms comprised in the Third year production income.

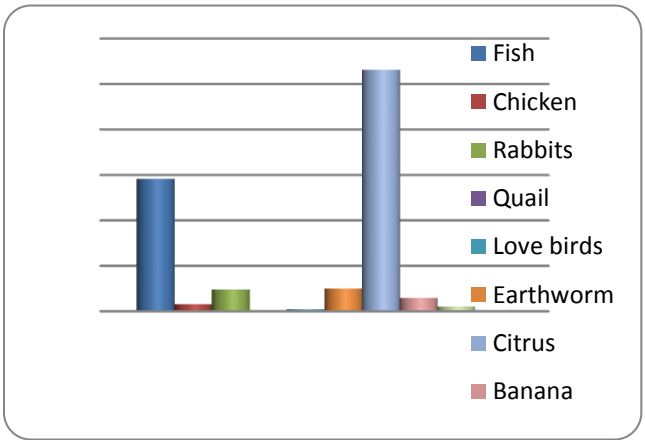

Figure 8
Percentage of the Organisms Comprised of the Income from the 3rd Year of Operation of the BioArt Farm

Figure 8 reveals the third year production operation of the BioArt. It showed that citrus was the highest with 53%, fishes 29% and banana 5% had contributed much in the production with an aggregate income of 80,027.50. . It was noticed that there was increased of an annual production income from 54,950. 00 to 80,027.50 for the year 2008 to 2009. This income mainly contributed by the increase population of Tilapia and Aquarium fish and the exponential increase of marcotted citrus which can be sold at 100.00 pesos each in the local market. This implied that there was an annual income growth of 25,077.50 pesos of the third year operation or an increase of 42.38 % for the yearly production with a computed return of investment of 31.34%. Figure 9 shows the percentage of the organisms comprised in the fourth year operation of the BioArt farm.

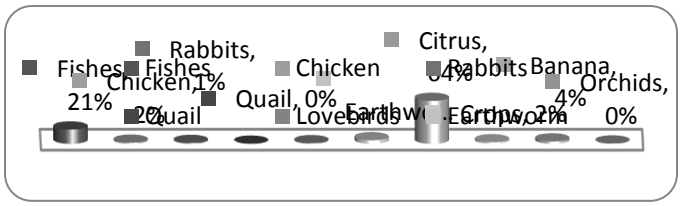

Figure 9
Percentage of the Organisms Comprised of the Income from the 4th Year of Operation of the BioArt Farm

It can be directly observed from the Figure 9 that citrus with 64% and fishes with 21% contributed much in the production of IBF from the total amount of 66,095.00. production income of the BioArt Farm. It was noticed that there was decreased of an annual production income from 80,027.50 to 66,095.00 from the inclusive years 2009 to 2010. Natural problems occurred like dissolved oxygen depletion caused the sudden death of fish and the prolonged warm and the unpredictable changed of weather condition sprung out diseases that caused death of plants and animals. But still this income was mainly contributed by the Tilapia and Aquarium fish and the marcotted citrus which can be sold at 100.00 pesos each in the local market.

Return of Investment (ROI)

This portion determined the study whether in gained or lost. With the revelation of the total development and operational cost of the BioArts of fish, crops and animals, the returned of investment was then calculated based from the formula which was the gross income minus the total expenses to extract the net income. And finally, to find the return of investment then the net income is divided by the total expenses multiplied by 100%. The result of the yearly incomes and the return of investment is presented in Table 4.

Table 4
Incomes and ROIs of the BioArts Farm

Operation Year	Cost	Yearly Income	ROI
1st	119,099.40	28,157.00	-46%
2nd	39,699.80	54,950.00	8%
3rd	19,849.90	80,027.00	30%
4th	19,849.90	66,095.00	23%
Total	198,499.00	**229229.00**	16%

Table 16 exhibits that the cost from the first year to fourth year at 60-20-10-10 percent were 119,099.40, 39,699.80, 19,849.90 and 19,849.9 pesos respectively with the total cost of 198,499.00 pesos. This means that there was a

greater cost percentage entailed in the first year and it lowered down its cost from the 2nd to 4th years of operation decreased the developmental costs in the following years.. The table further showed the yearly incomes of the BioArt farm kept increasing from its first to third year of operations and decreased its figure to 66,095.00 in the fourth year. Although the yearly income suddenly decreased its figure with negative return of investment in the first year and yet still provided an ROI of 16% of the four year production operation. And the do-it-alone saved 18,104.00 from the 240,649.00 development and operational cost and 53,850.00 from 96,000.00 expenses on the arts thus it provided 41% return of investment in the overall operations. This means that despite of the common crops, poultry and livestock problems, there was still an amount of 0.16 centavo will be returned in every peso invested. presents the number Do-it-alone done in the BioArts is presented in Table 5.

Table 5
Practiced Number 5: DO-IT-ALONE

A. ARTS and AQUARIUM MATERIALS					
ITEM	QUANTITY	DESCRIPTION	UNIT	UNIT PRICE	TOTAL PRICE
1	1	glass cutter	pc	550	550
2	3	3/16" glass	L	1400	4200
3	1	3 " Paint brush	pc	40	40
4	2	1" artist brush	pc	150	300
5	3	Chinese brush	pc	15	45
6	30	1/4 colored paints	L	65	1950
7	30	canvass cloth	m	90	2700
8	20	3/16 flat bars	L	65	1300
9	24	1/2 G.I pipes	L	175	4200
10	36	3mm x 3" bolt and nuts	pc	6.5	234
Labor 2			person	850/day For 48 days	40800
B. Wood working Materials					0
1	10	2x6x8	pc	250	2500
2	8	4x6x7	pc	350	2800
3	10	1x8x7	pc	230	2300
4	10	2x4x8	pc	210	2100
5	3	4 " concrete nail	kg	80	240
6	2	wood glue	L	130	260
7	2	wood stain	L	140	280
8	2	epoxy primer	L	128	256
9	1	electric planer	pc	8000	8000
10	1	electric drill	pc	3500	3500
11	1	electric grinder	pc	3200	3200
12	1	electric sander	pc	1500	1500
13	6	#80 sand paper	pad	70	420
14	5	# 1000 sand paper	pad	80	400
15	1	natural super varnish	can	540	540
Labor 2			person	550/day For 20 days	11000
C. Miscellaneous					650
			GRAND TOTAL		96265

Table 5 presents the specific materials and labor costs. It showed that labor costs cost so much in the arts for it required craftsmanship skills and techniques to make works better. Since the researcher done it alone labor cost was

saved at amount of 51, 800+ from the grand total expenses. Thus, it directly indicated that personally worked it alone can save a lot of money and it spent time and energy productively worthwhile.

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

BioArts best practices were the sound site selection, establishment process, conservation of rain water, utilization of rain tree (Semania saman and Acacia aure) fallen leaves, the 4 R's entrepreneurship, and the Do-It-Alone. BioArts sound site selection considered the topography, water supply, nearness to market, vegetation, type of soil, cheap labor force, source of supply, means of transportation, free from flood, drainage and the peace and order of the locality. The establishment process required sequential of activities to be done on planning, designing and lay-outing of the farm, materials and labor inputs, stocks establishment, production and management, harvesting and marketing practices. The study showed that the conserved rainwater was 400 cubic meters for four years operation of fishpond, it saved an amount of 8,000.00 pesos of using the potable water from commercial waterworks system. It also showed that it utilized 14.4 cubic meters of using garden soil thus it saved at an amount of 28, 600.00 pesos. The 4 R's saved 12,567.25 pesos from the cost of ready-made materials at an amount of 15, 530.00. And the do-it-alone saved 18,104.00 from the 240,649.00 development and operational cost and 53,850.00 from 96,000.00 expenses on the arts thus it provided 41% return of investment.

Conclusion

Best farming practices saved money, spent time productively, converted energy into useful works, and showcased one's artistry expressively.

Recommendation

1. To trace the BioArts productivity, it is recommended that it should be extent to ten (10) years study.
2. It should be integrated with exotic animals to add aesthetic value on the area that invites more visitors to visit with given entrance fee to be used for further development.
3. Biology and Arts Integration. (BioArts Integration): An Agro-Industrial Enterprise should be conducted as further study.
4. Impacts Assessment on Technical, Social, Environmental and Financial Adaptability: Rural Community Development

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