

Conversion of Invasive Grasses into Hand Made Paper for Artistic Creations

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Abstract

The devastating impact of invasive grasses has created serious challenges for casual workers who consistently deal with this nuisance. The paper explores the possibilities of converting invasive grasses which are prevalent at the Department of Painting and Sculpture, in the Faculty of Art, into hand made paper to enhance artistic creations. Two grasses were identified namely Goose grass (*Eleusine indica*) and Japanese Lawn grass (*Zoysia Japonica*). Basic experimental procedures such as boiling and retting were followed before achieving the desired results. Artistic creations made on the paper revealed appealing, interesting and natural results. In sum, the tensile strength, and opacity of the paper produced was standard and an artistic medium for art explorations. It is a new material that engenders new forms of contemporary sculptural and painting works and challenges traditional philosophical ideas of artists to go beyond to create new vistas in art.

Keywords: Art, invasive grass; papermaking; artistic creations

1.0 Introduction

The Department of Painting and Sculpture at the Kwame Nkrumah University of Science and Technology, Ghana was established to train students in becoming professional artist. The execution of students' artworks employs the use of a great deal of paper. According to Narh (2002), Ghana imports 59,806 metric tonnes of paper annually at a cost of 44 million dollars or about 317 billion cedis. Although some experiments have been done over the years to access the potential of the pulp and paper industry in Ghana, nothing significant has been done about it with exception of probably the only paper making factory of industrial proportions – Super Paper Product Company Limited - in the country that is best known for making toilet rolls. This company uses waste paper as its raw material. The feasibility study for the

potential of the country's capacity to produce its own paper needs was done in the area of woody plants such as *Gmelina Aborea*.

Also, another feature of concern that makes this research important is the nature of rural farming in Ghana. According to Winters (2008), comparing this nature of rural farming with respect to incomes in other countries such as Nigeria and Malawi points out that "by virtue of the seasonality of production, agriculture tends to lead to more casual work opportunities than non-agricultural activities. For all countries except Ecuador, non-agricultural activities are more likely to be full year and full time. These trends are more pronounced in Malawi, Ghana and the Asian countries, and least pronounced in the Latin American countries where time use trends for agricultural and non-agricultural activities are most similar. A clear feature of rural labour markets in Ghana is the lack of permanence in employment."

With this background coupled with the fact that the paper produced are from woody plants which are relatively expensive, these invasive grasses around the department is indeed a welcoming idea for conversion. This paper therefore explores the possibilities of converting these invasive grasses at the Department of Painting and Sculpture, KNUST, into useful paper for artistic creations.

1.1 Conceptual Framework

The underlying premise of this study is that art requires originality and better appreciated when the natural texture and effects are revealed in a work of art. This means that the texture of the paper made from these grasses would enhance the aesthetic appeal of the work to be produced by the artist. It implies that aesthetic and function are amalgamated in such a cohesive manner that the object is lifted out of the mundane even if its purpose for being is to serve as a drinking cup, a sculptural piece or any work of art (Delaquis, 2003).

Furthermore, another underlying premise of this study is to advocate and prepare prospective art teachers and students to approach art through critical thinking which are more important than teaching those instructional techniques (Henry, 1999). It is a commonplace within the fraternity of the art teachers that students are instructed in using a particular medium in producing assignments. This study educates on how to convert available invasive grasses into useful papers which would also enhance aesthetic appeals.

1.2 Identification and Harvesting of Invasive Grasses at the Department of Painting and Sculpture

In relation to this study, the invasive grasses at the Department were allowed to grow to the study's desirable limit in order for its harvesting. In this vein, permission was sought from authorities to enable the successful carrying out of the study. A careful observation revealed that there are two different grasses growing within the confinement of the department. The two grasses were harvested separately using a sharp knife and were sent to the Department of Theoretical and Applied Biology laboratory for identification and scientific data. Results showed that the grasses were Goose grass (*Eleusine indica*) in figure 1, and figure 2. Japanese Lawn Grass (*Zoysia Japonica*).

**Fig 1: Goose grass (*Eleusine indica*)
Japonica)**

Fig 2: Japanese lawn grass (*Zoysia*)

2.0 Materials and Methods

The conversion of the identified grasses at the department into paper for artistic creations employed very basic steps to enable the lay person understand and be able to reproduce using the basic steps. Obviously, the main material used for the study was the two grasses identified at the premises of the department. Initially, the study began on exploratory basis since the researchers knew little about these invasive grasses at the department.

Having studied the grasses for a period, it became evident that the descriptive and experimental method of research should be used in carrying out the study. The experimental method was used in ascertaining the possibilities of converting these invasive grasses into paper to enhance artistic creations whilst the descriptive research method was used in recording, describing, analyzing and interpreting the results of the study (Ndagi, 1984, Best, 1981). Bret (1990) intimated that a tool is a device used in the studio or workshop. Material and tools needed for such an enterprise are very affordable and available. The grasses are nuisance all over the place. Simple tools such as mortar and pestle are required. Palm baskets of various



sizes, water pellons, a locally constructed hydraulic press, machetes, scissors, enamel, iron or stainless steel cooking pots, even an old bath tub could be used, tables with wide surfaces for laying posts and a mallet for beating fibres. Alkalis for breaking down the fibres could be purchased at affordable prices from chemical shops. One can even make his or her own lye by boiling wood ash and sieving the water for cooking the fiber. The methods included harvesting, soaking, boiling, retting, drying, and beating into sheets.

3.0 Results and Discussion

3.1 Experimental Procedures (Goose grass)

This invasive grass was harvested from the surroundings of the department studio just after the major rainy season when grass is abundant (In Ghana, between the month of April and July is classified as the major raining season). For two days, it was intentionally exposed to the sun to dry. The dry fiber weight was approximately 1000gs. The grass was then soaked for the retting process in a cauldron fill with weak caustic soda solution from a previous fiber cooking. Fresh water was added to fully immerse the grass. This was left to stand for another two days. The retting period was quite short, a period of two days followed by cooking.

For the next step of fiber breakdown and suitability the grass was boiled for two hours after which approximately 340g of caustic soda was added to twenty litres of water for another two hour boiling resulting in a total of four hours of cooking time. The grass was then left in the pot overnight. The cooked fiber was drained off with a basket sieve and then washed under running water. This removed as much as possible the slimy soapy feeling that accompanies cooking with caustic soda by a vigorous rubbing action as in washing cloth by hand. (Fig. 3) During the washing under the running tap, much of the chlorophyll that gives the grass its green colour was washed off leaving a golden colour when the fibre was wet. Cooking with alkali helped to remove all non cellulose material from the grass. The presence of these materials in the grass fibre weakens, discolours as well as makes any paper made from them deteriorate fast. The fibre was left to drain off in the basket sieve for about an hour. The wet weight of the fibre was heavy; the reason being that the fibres swell by absorbing water. The drained fibre was then beaten into pulp in a Hollander for about an hour and half. The fibre was introduced into the beater in bits as it had to be separated from the clumpy nature by hand.

Sheets were formed on a 30 by 35cm western mould, deckle and couched on pellons also known as interfacing or stiffs used by seamstresses in sowing garments. 1/6 damp true felts were placed below and on top sandwiching the sheets in the post. It was then pressed in hand operated home built hydraulic press to remove excess water. The post was then removed and transferred unto disused photo printing plates for air drying. (Fig 3 & 4). The dried sheets were further placed between two felts and pressed together using a heavy old book press to remove the cockling overnight. This gave quite an interesting finish. One smooth side and the other surface grainy unique feel.

3.2 Converting Japanese Lawn Grass (*Zoysia Japonica*) into paper

Zoysia japonica is a dense low-growing, slow-growing perennial with stiff leaves. Excellent drought and heat tolerant, but turns straw coloured when temperatures drop below 50 degrees Fahrenheit. It is a good shade tolerant, prefers well drained soils with a pH between 6 and 7. It has a luxuriant appearance. It is good for checking erosion and also serves as fodder. The same basic steps in making paper from the goose grass were followed for the *Zoysia japonica* as in the goose grass. The marked difference was in the

soaking and cooking method of the dried *Zoysia* grass. This was done in fresh clear water and unlike that of the goose grass this was not left overnight. Preparation of fibre for paper is similar to cook book recipe. The researchers sought to determine the effect of the finished by not simply repeating the same process. The cooking was done for two hours with an addition of 400ml of caustic soda that helped break down the fiber to make it easy for pulping. Natural dyes from tree barks and earth colours were added during the pulping process to produce a sheet of paper that is not just a support for an artwork but the finished paper becoming the artwork it self.



Fig. 3: The fibre left to drain off in the basket. Fig 4: Open air drying (note the use of disused Photo printing plates)

3.3 Properties of the Paper

3.3.1 Tensile and Tear Strength

In order to test the tensile and tear strength of the paper produced, the hand paper was measured of a force (N) in elongation till it broke. The width of the test stripe was 15 mm. The tensile and tear strength was ascertained by the length of time the paper took to break (Here breaking has to do with the ease at which the paper tore along or against the grain).

3.3.2 Porosity and Air Permanence

In ascertaining the porosity and air permanence of the paper, the fibres and filler particles of the paper were agglomerated together to a strong and dense packing, but between the fibres and fillers is still some included air. With the process of calendaring, the porosity is significantly reduced by compressing the sheet and collapsing the fibres. The measurement of porosity describes the potential air flow through a sheet in z-direction; the porosity was measuring the air flow which is able to pass this porous structure of the sheet. The measurement was done with a defined air pressure.

3.3.3 Opacity

Opacity is a measure of a material's ability to obstruct the passage of light. Sufficient opacity is important to prevent printed text from showing through in a harmful manner on the reverse side of a paper (SCA Publishers, 2008). The opacity of a completely opaque paper is 100%. Opacity was measured with an instrument that emits C light, i.e. a light that is related to daylight but without UV content. The sample is illuminated vertical to its surface and the detector is located 2° from the vertical axis. Opacity is the ratio between the Y value of paper measured under conditions C/2 $^\circ$ and the Y value of a single sheet measured under the same conditions against a black backing.

4.0 Discussion

The results suggest that these invasive grasses which are prevalent and nuisance at the Department of Painting and Sculpture can be converted into something useful which would enhance artistic creations. Some important factors though that needs to be looked at when making paper are water purity. The pH of the water by acceptable paper making standards should be close to 7(neutral). It should be free from contaminants such as microbes, chlorine, iron, and copper. These would affect the quality and durability of the paper. The pH of the cooking solution should be 10–11. This is so because pH below 10 would not break down the cellulose and above 11 would damage the cellulose thus producing weak sheets of paper.

The implication of this project is that with the government's interests in encouraging SME's, it could tap in this area of hand papermaking and promote it. This has been and is being done with some success in South Africa. The success of art as a tool for alleviating poverty by government and many non-governmental agencies is a well attested fact. Craft such as tie-dye, and batik making have been taught to many who are making a decent living today.

The invasive nature of these two grasses is a worldwide phenomenon and could pose a threat to the balance of bio –diversity in the country as well as globally. Thus this research shows that if a community based industry is encouraged it will become and not only bring a natural chain of controlling these invasive grass but also simultaneously create value by recycling these grasses into handmade paper thereby creating new jobs and income.



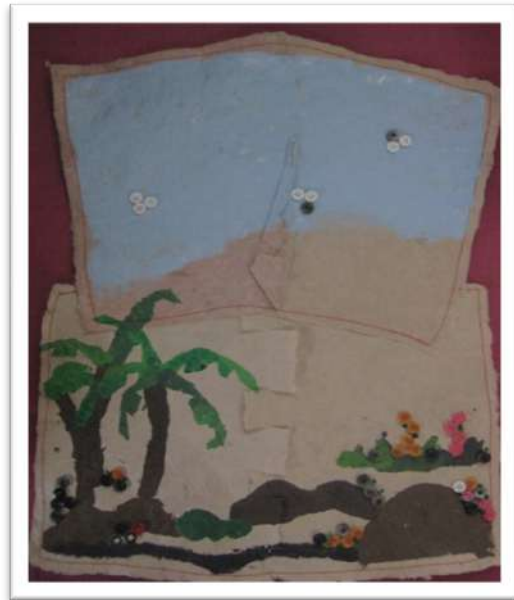
Fig. 5: An artistic collage piece untitled made with the paper



Fig 6: A work on the paper as a support



Fig.7: (a) Paper sculpture from moulds.



(b) Collage and print with hand made paper.



Fig 8: (a) Deco papers from goose grass.

(b) Deco paper used for a book cover



a



b

Fig 9 (a &b) showing two types of artist books made entirely from handmade paper



Fig 10: Book sewing from hand made paper

Fig. 11: An envelope made from hand made paper

5.0 Conclusion

The results of the test were very satisfactory as the papers made were strong. They have potential for artistic purposes, as shown in fig 5 and can be used in making other craft works by teachers in the kindergarten, primary and secondary school levels in teaching art, book arts, (figs 8a, b&9) making envelopes (fig. 11) and other Sculptural works.(figs 7a,b) Furthermore, potential of the pulp and paper from these grasses can be used for pulp painting, printmaking in graphic designing and painting alike. Artistically the papers have their own aesthetic quality which makes them art pieces by themselves. There is an interesting bonding that grows between the paper and its maker. Sometimes the paper dictates its own pattern which the artist has no control over. This many a times has surprising results making each paper a unique piece. However, with patience an artist can gradually make paper with consistent integrity in their quality.

The versatility of paper lends itself very much to the creative abilities of the artist both the painter and the sculptor. In fact its ability to blur the distinction between these two fields is very fascinating. Working with paper as a material unlike the traditionally known materials like cement, wood, clay and plaster of Paris is revolutionary in the annals of Ghanaian sculptural works. It is a new material that engenders new forms of contemporary sculptural works of art and painting challenges the traditional philosophical ideas of the artist to go beyond him/her to create new vistas in art. Paper has the malleability of clay a material used by sculptor in making armatures that will in most cases not end as fired pieces but a step in a process that will be finished in Portland cement for outdoor sculptures. This is a typical process used by artist in Ghana and elsewhere. Paper has recently become an indispensable material for sculpture pieces and installations both indoor and outdoor. It combines well with clay and other materials for art making. Such a ubiquitous material which can be made with minimal cost but to a high quality finish needs to be promoted in the country. The Faculty of Art, KNUST is pioneering this drive and hopes it will gain nationwide acceptance for the promotion of paper arts in Ghana.

As artists, we believe that researching and experimenting with these and other local botanicals as potential good papermaking material really enhances the creative process. Furthermore, the researchers aim at achieving some translucency as well as getting a near white colour through natural bleaching processes. There are an enthusiastic number of Art students who are fascinated by the process of hand papermaking as part of their course. One can always see the glee and pride with which they make paper with the limited resources available. They find it rewarding as they experience the transformation of grass into pulp and

then paper. The authors hope that many of these minds will continue to explore the possibilities to set up their own studios and paper mills to produce paper.

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