Research:

(a) Completed**:**

(i) Design and construction of rendering plant for the production poultry/meat meal from chicken and cow waste
(ii) Operation of the fixed biogas plant of Songhai Farms in Republic of Benin
(iii) Design of Fish Feed Extruder
(iv) Evaluate the performance of the fluidized bed dryer
(v) Performance Evaluation of Animal feed Fat Coating Machine
(vi) Evaluation of Growth Performance of African Catfish (*Clarias gariepinus*) using Plantain Peel Based Aqua feed.
(vii) Effect of Maize Soaking Time on the Physical and Mechanical Properties of Extruded Feeds
(viii) Design and construction of the Loading Capacity/rate of Coraf/Wecard Smoking Kiln
(ix) Performance evaluation of manually operated aqua feed pelletizer.
(x) Replacement of maize using African locust bean (*Parkia biglobosa*) pulp in extruded aqua feeds for African catfish (*Clarias gariepinus*)
(xi) Growth performance and nutrient utilization of *Clarias gariepinus juveniles* fed graded levels of extruded bambara groundnut (*Vigna subterranea* (L.) Verdc.) meal-based diets
(xii) Performance evaluation of manually operated fruit juice extractor

(b) In Progress

(i) Optimization of the process variables of a single screw extruder for the production of pineapple pomace (*Ananas comosus* [l.] merr.) aqua feed. The extrusion method still restricts the use of extrusion cooking to a few new ingredients. We are currently investigating the use of a possible agricultural waste substitute ingredient to produce fish feed with good potential for extrusion cooking. This research has recently been extended to determine the physical properties of the extrudates. Laboratory studies have been ongoing since 2016 and several products have been tested. Energy utilization of the total operation and the biological evaluations of the extrudates are now being investigated.
(ii) Performance evaluation of manually operated aqua feed pelletizer. This study was on the design and fabrication of a manually operated aqua feed pelletizer. The manually operated aqua feed pelletizer was constructed and it will be tested under industrial conditions. The energy consumption will be found to be very economical with a very high throughput compared to corresponding values obtained from two existing manually operated aqua feed pelletizer. The quality of the extrudates

produced from the new pelletizer will be evaluated. The research will be concluded in December, 2019.

(iii) Development of biogas-feedstock shredder. The biogas feedstock shredder was designed by examining the properties of agro waste (cassava peel, fruit waste) and water hyacinth for determination using appropriate equations and then fabricated. The optimization of the parameters of cassava peel and fruit crushers to improve shredding efficiency and capacity is currently under investigation. Since 2017, laboratory tests and evaluation of anaerobic fermentation of the waste are on-going. Study on the rate of gas wear on the devices. Pilot gas technology for the production of energy from kilns is currently under investigation.