



Biogas Consortium Afghanistan (BCA)

گروه مشارکین بیوگاز



4 in 1 Biogas System

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The 4 in 1 biogas system

The 4 in 1 biogas system has been tested and implemented in the colder regions of China since the 1990's. The model is a combination of 1) biogas digester 2) pour flush squatting toilet, 3) animal (poultry, cow, donkey) house and 4) greenhouse in one system, giving it the name "4 in 1". The system combines principles of ecology, economics and system engineering, adapted specifically for rural agriculture (fertilizer) and energy needs in cold regions of Afghanistan.

maintained the 4 in 1 system have the potential to significantly increase energy supply in rural areas, increase income and improve the rural environment.

The greenhouse allows agriculture production even during cold weather. Research on temperatures in Afghanistan has not been published, data from China shows an average temperature inside the greenhouse of 16°C when outside ambient temperature is - of 15°C - - 25°C. The animals can be housed in the greenhouse which promotes natural growth and milk production longer in the season. Having the animals near the digester also increased the convenience of feeding the digester, reducing labor time. Both animal waste and human excreta are the main raw material for biogas production.

4 in 1 biogas systems in Afghanistan today 6 4 in 1 systems have been built in Afghanistan and currently research is being carried out on varying aspects of the system.



Figure 1. Biogas 4 in 1 system, Bamyan district, Afghanistan.

How does temperature effect biogas production?

Biogas is produced through the digestion of organic material by anaerobic bacteria. These bacteria function at a range of temperatures however their efficiency is reduced or halted at extreme high or low temperatures.

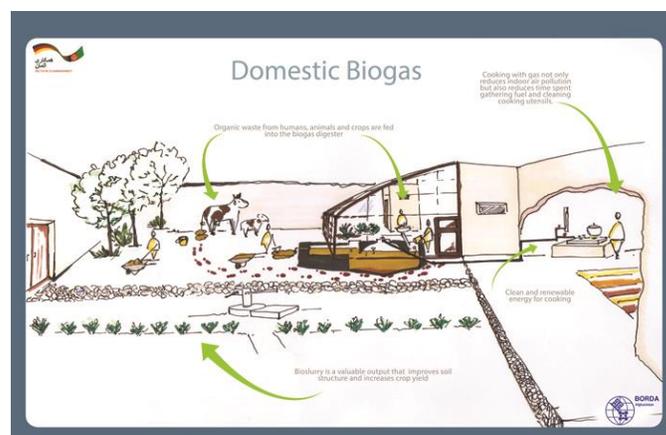


Figure 2. Typical domestic biogas greenhouse installation

Benefits of the 4 in 1 system

The 4 in 1 system has the potential to make complete use of natural and readily available resources; solar energy as power, biogas as the energy need, and combines animal husbandry and plant production. Thus forming an innovative integrated agricultural bio-energy system. If well-constructed, operated and



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