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ENVIRONMENT-INDIA: Sanitation Concerns Shift Into Space

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 - Bush at War

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 - HIV/AIDS
- Indigenous Peoples
- Economy & Trade
- Labour
- Population
 - Reproductive Rights
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- Arts & Entertainment
- Education
- ExPress Freedom
- Columns
- In Focus

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- Email News
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- FRA NÇAIS
- ARABIC
- DEUTSCH
- ITALIANO
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NEW DELHI, Nov 21 (IPS) - India may be grappling with problems of basic sanitation but, at another level, its top scientists are turning their attention to human pollution in space.

India's four-decade-old space programme, that successfully landed a spacecraft on the moon on Nov. 4, 2008, is now concerned about polluting space with human and other debris, said top Indian aerodynamics scientist, V. Adimurthy of the Indian Space Research Organisation (ISRO).

"Sanitation aspects also play a significant role in space," said Adimurthy, "And if not managed, can cause serious difficulties for future generations. "

Adimurthy was addressing the third conference on sanitation in South Asian nations (SACOSAN), convened here by India, from Nov 18-21, in its capacity as chair for 2006-08.

With the theme, 'Sanitation for Dignity and Health,' the conference examined such issues as Sanitation and Sustainability, Sanitation and Development, and Sanitation Beyond Toilets.

Eight nations, Bhutan, Nepal, Maldives, Sri Lanka, India, Bangladesh, Afghanistan and Pakistan, have signed on to achieve toilets and safe hygiene for their citizens. SACOSAN's objectives are to accelerate the progress of sanitation and hygiene in the region enhance peoples' quality of life in fulfillment of the United Nation's Millennium Development Goals.

According to Lizette Burgers, who heads water and sanitation at the United Nations Children's Fund (UNICEF) in New Delhi, only 28 percent of people in India's rural areas -- who make up two-thirds of India's billion plus people -- had access to toilets in 2006.

Of the 2.5 billion people across the globe who do not have access to toilets, 50 percent of them are in the South Asian region and India's rural population is lagging behind those of its big neighbours, Pakistan and Bangladesh.

But India has a space programme to think of. "Our astronauts too have the same hygiene needs as us on earth," Adimurthy reminded SACOSAN delegates. Humans generate an average of 4.98 kg of waste per person per day.

The world's astronauts first began with nappies to hold their wastes, then progressed to flushes. To deal with the issue of weightlessness and lack of gravity, men have bags to hold their urine, whilst women have funnels that have air flows to draw out the urine into flushes that use centrifugal force to flush down the wastes.

All these wastes are from 'open cycles' or those that are not recycled and either stored in tanks and brought back to earth in short duration missions of seven days or dumped into open space to avoid health hazards inside the craft, but adds to space debris.

The 'closed system' of re-use and recycle for future long-duration mission has not been perfected yet.

"Handling wastes in space poses great problems," says Adimurthy, because over 200 species of microbial species grow far more aggressively in a space environment.

"Imagine what would happen if, in that gravity-less situation, wastes went flying around inside the craft", Adimurthy said in all seriousness, adding that having these wastes moving around in space was equally dangerous to man.

Man made debris is also a concern.

Over 29,000 objects in space have been officially catalogued, but there are at least 100,000 smaller objects below 10 cms in size that remain undocumented and are causing pollution.

Currently there are also 1,600 rocket bodies, 1,500 objects, 3,100 spacecrafts and 6,400 fragments of spacecrafts in space, with a projected annual increase of at least 210 objects.

Debris falling from space has so far, and luckily so, not done any human and environmental damage. Woven material, a pressure vessel, cylindrical tanks, mostly from the Delta II programme of the U.S. have fallen on Latin America, Australia and in the Middle East.

But there is now an international campaign against waste in space after a NASA Canadian astronaut jettisoned a 640-kg ammonia tank, called the Early Ammonia Servicer (EAS), in July 2007.

The campaign, which is tracing the EAS, has India, Russia, NASA, China, Italy, U.S., Germany, France, Britain and Japan as partners.

The EAS, according to NASA, reached earth's orbit in October this year and is causing apprehension about where it will fall.

The Inter Agency Space Debris Coordination Committee now has mitigation guidelines for all nations with space programmes.

The IADC rules call for limiting release of wastes of any type in Space, limiting the potential for breakup of space crafts and objects, having preventive measures for 'orbit collusion' (much like traffic accidents) and having a post-mission disposal programme.



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Adimurthy says ISRO is conducting its own research for solid waste management in Space, such as proximity analyses of space objects, to determine their collision potential.

ISRO is also providing global inputs on health and hygiene in space. "Maybe we can produce cost-effective technologies for the future", Adimurthy hopes.

India's space programme has completed 26 vehicular launch missions and 58 spacecraft missions in its 40 years of existence, providing the country with data on natural resources, physical and life sciences.

"Space is a community resource calling for a very broad vision and service without distinction between rich and poor," said Adimurthy.

(END/2008)

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