

Environmental and Social Responsibility Performance in 2016



UPM Fray Bentos



Through the renewing of the bio and forest industries, UPM is building a sustainable future across six business areas: UPM Biorefining, UPM Energy, UPM Raflatac, UPM Specialty Papers, UPM ENA and UPM Plywood. Our products are made of renewable raw materials and are recyclable. We serve our customers worldwide. The group employs around 19,300 people and its annual sales are approximately EUR 10 billion. UPM shares are listed on NASDAQ OMX Helsinki. UPM – The Biofore Company – www.upm.com

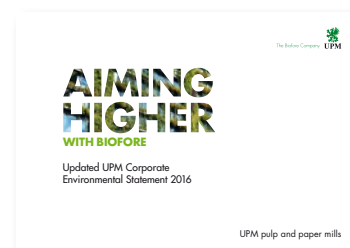
UPM Fray Bentos

The pulp mill is located on the coast of the river Uruguay, 5 Km away from the city of Fray Bentos.

Construction of this state-of-the-art pulp mill began in 2005 and the total investment was of 1.2 billion US dollars. The initial Environmental Authorization for Operation was granted by authorities on November 8th, 2007. The environmental authority in Uruguay is the Ministry of Housing, Territorial Planning and Environment (MVOTMA) through the National Direction for the Environment (DINAMA). Through the use of modern techniques high quality pulp is efficiently produced, most of it for the Asian and European markets.

The annual capacity of the mill is of 1.3 million tons of bleached eucalyptus pulp, and the mill uses approximately 4.5 million cubic metres of wood. Wood procurement is under the responsibility of UPM Forestal Oriental, which has been pioneering the development of eucalyptus plantations in Uruguay for over 25 years, since 1990. UPM has a 91% ownership in the Fray Bentos pulp mill and 100% in UPM Forestal Oriental. The UPM mill complex also accommodates the operations of four chemical plants that supply the bleaching chemicals for the process. These plants are under the responsibility of Kemira, which operates three of them (hydrogen peroxide, sodium chlorate, chlorine dioxide) while the fourth (oxygen) is operated by Praxair.

Maintenance of pulp mill operations is outsourced to Andritz, which supplied most of the production equipment for the construction of the mill.



UPM Fray Bentos Environmental Performance 2016 is a supplement to the Corporate Environmental Statement of UPM's pulp and paper mills (available at www.upm.com) and provides mill-specific environmental performance data and trends for the year 2016. The annually updated mill supplements and the UPM Corporate Environmental Statement together form the joint EMAS Statement of UPM Corporation. The next Corporate Environmental Statement and also this supplement will be published in 2018.



Production capacity	1,300,000 ADt
Personnel	180
Products	UPM Euca (bleached eucalyptus kraft pulp)
By-products	Electricity
Certificates	<p>EMAS – EU Eco-Management and Audit Scheme</p> <p>ISO 14001 – Environmental Management System Standard</p> <p>ISO 9001 – Quality Management System Standard</p> <p>ISO 50001 – Energy Management System Standard</p> <p>ISO 22000 – Food Safety Management System Standard</p> <p>OHSAS 18001 – Occupational Health and Safety System Standard</p> <p>PEFC™ Chain of Custody – Programme for the Endorsement of Forest Certification</p> <p>FSC® Chain of Custody – Forest Stewardship Council®</p> <p><i>All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility).</i></p>
Environmental labels	UPM pulp products have the approval for use in EU Ecolabel and Nordic Ecolabel paper products.



The mark of responsible forestry

For FSC products, visit www.fsc.org



For PEFC products, visit www.pefc.org

Environmental year 2016

Performance

The Fray Bentos pulp mill continued to achieve in 2016 a high level of capacity utilization, maintaining its reliability in pulp quality as well as a high level of environmental performance.

Two events with permit non-compliances occurred during the year. In February 2016 the cleaning of the safety and equalization basins of the wastewater treatment plant after the annual shutdown, which is a legal requirement of the mill's permit, caused a high incoming phosphorus load in the raw effluent to the secondary treatment. As a consequence, the monthly effluent discharge of total phosphorus was 116 kg/d, exceeding the permit limit of 74 kg/d. Later in the year, during the start-up after the annual shutdown the functioning of the secondary effluent treatment was disturbed: in one day of December the suspended solids concentration exceeded the permit limit of 150 mg/L (actual result was 168 mg/L) and in the whole month the average phosphorus load exceeded the permit limit of 74 kg/d (actual result was 87 kg/d as a monthly average).

None of the non-compliant discharges posed any potential risk of damage to the environment and corrective actions were implemented at the mill in agreement with the authorities.

Emissions into the air remained at good levels and handling of malodorous gases was at very good level in 2016, in accordance with internal targets. The main challenge during the year has been the generation of odours in the equalization and safety basins of the effluent treatment plant, causing nuisances to neighbours in Fray Bentos in several occasions. The cause of the unusual odours was found to be in the raw effluent stored in the safety and equalization basins. Due to the changes in the raw effluent after the treatment with lime to remove phosphorus, conditions in the basins favored the growth of

anaerobic microorganisms that produce odorous sulphur compounds. Surface aerators were installed in the basins to minimize the generation of those compounds and therefore reduce the probability of odour perception outside the mill limits.

At the mill's landfill it was necessary to continue the disposal of excess biosludge from the biological effluent treatment to avoid excessive build-up in the aeration basins. A biosludge dryer is being built in order to utilize the dried biosludge as a soil improver in the forestry plantations. It is expected that the dryer will be operative in the third quarter of 2017.

UPM Fray Bentos pulp mill is self-sufficient in electrical consumption through the energy generated by burning black liquor.

The mill's emissions are within the ranges associated to Best Available Techniques (BAT) as established in the European Commission Implementing Decision of 26 September 2014.

Environmental monitoring

Environmental monitoring activities under the responsibility of UPM Fray Bentos and implemented by several external experts continue to show, nine years after the startup, that there is no negative impact on the environment related to the operation of the pulp mill.

Updated results of the environmental monitoring activities are available in our website: www.upm.com.uy.

Transparency

The mill participated in 2016 in the session of the follow-up commission, which includes community and national stakeholders and was established in March 2007. Material presented by the company and by the authorities in these meetings is available in DINAMA's webpage. (<http://www.mvotma.gub.uy/comision-de-seguimiento-upm.html>)

The results of monitoring activities carried out separately by the Uruguayan authorities, who also perform monthly inspections at the mill, confirm the ones obtained in the mill's monitoring program. Those results are periodically presented to the follow-up commission in Fray Bentos. Additional information on compliance with legal requirements can be found both in UPM's and DINAMA's webpages.

The environmental product declaration for Fray Bentos pulp was updated and made available to customers.

The mill has arranged a system of weekly visits to the site which is open to the general public free of charge. Since 2008, over 25,000 people from Uruguay and several other countries has visited our facilities.



Juha Kääriäinen,
Vice President, UPM Uruguay Operations



Gervasio González,
Environmental Manager

Air

Emissions into the air remained at very good levels, with all parameters within the conditions of the environmental permit.

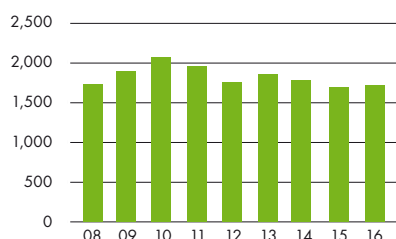
Handling of malodorous gases from the production process was at good level in 2016, and in accordance with internal targets.

The main challenge during the year has been the generation of odours in the equalization and safety basins of the effluent treatment plant, causing nuisances to neighbours in Fray Bentos in several occasions.

Seven periods with odour events were recorded in 2016. Usually the odour events during those periods had a duration ranging from minutes to a few hours, with varying odour intensity. The period with more odour events occurred in the month of April, when odour complains were received several times per week, depending basically on the weather conditions.

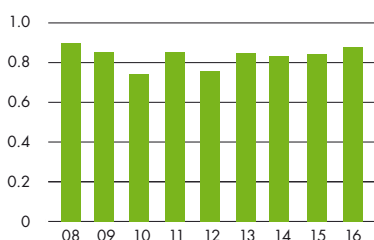
Nitrogen oxides, NO_x

t/a (measured as NO₂)



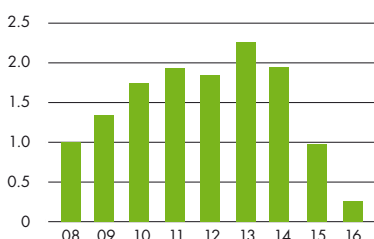
Evolution of fuel oil consumption

(tons, relative to 2007)



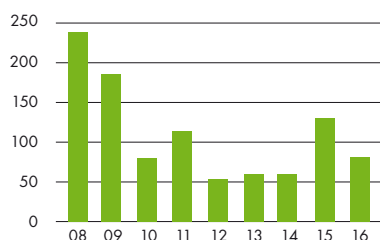
Evolution of electricity supplied to the national grid

(GWh, relative to 2007)



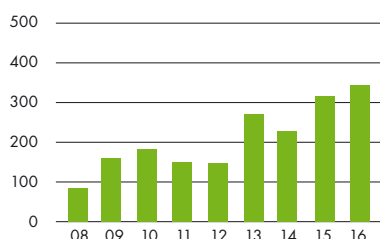
Sulphur dioxide, SO₂

t/a



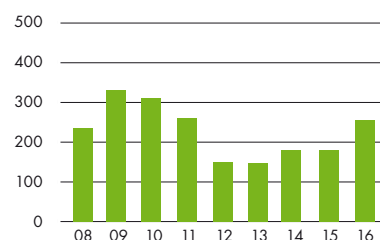
Dust

t/a



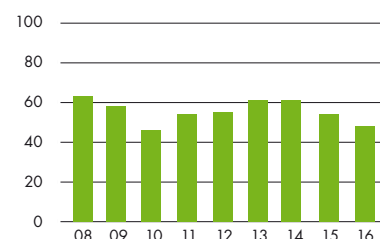
Biological oxygen demand, BOD₅

t/a



Nitrogen (inorganic), N

t/a



Water

UPM Fray Bentos acquires raw water from the Uruguay river. The operations required about 0.91 m³ of water per second and generated about 0.68 m³ per second of treated effluent.

In February 2016 the legally required cleaning of the safety and equalization basins after the annual shutdown caused a high incoming phosphorous load in the raw effluent to the secondary treatment. As a consequence, the monthly effluent discharge of total phosphorus was 116 kg/d, exceeding the permit limit of 74 kg/d.

During the start-up after the annual shutdown the functioning of the secondary effluent treatment was disturbed: in one day the suspended solids concentration exceeded the permit limit of 150 mg/L (actual result was 168 mg/L) and in the whole month the average phosphorus load exceeded the permit limit of 74 kg/d (actual result was 87 kg/d as a monthly average).

In all cases authorities were informed and corrective actions taken. None of the non-compliant discharges posed any potential risk of damage to the environment.

During the second half of the year 2016 the construction of a new drying plant for the excess sludge from biological efflu-

ent treatment, or secondary sludge, was started. The works are expected to be completed by July 2017, and the drying of the biosludge will allow its disposal in forestry plantations as soil improver, and possibly in the future, its use as an alternative fuel.

Because of the high phosphorus content of eucalyptus raw material, compliance with the internal target for phosphorus load in the final effluent continues to be a challenge and was exceeded in four months. Increased experience in the operation of the new phosphorus removal unit may allow for the phosphorus discharge to stay at lower levels during 2017.

Water quality monitoring results show that there is no significant variation between the sampling points located upstream and downstream from the mill that could be caused by its operation. Variation in time is similar in all sampling points, either reference points or near receptors of the mill's effluents.

Fish monitoring results continue to show that the amount of different fish species found after the start-up of the mill is at the same level found during the baseline studies, and the situation is the same at all three study areas, either upstream or downstream from the mill. The condition

of fish caught has been observed to be good without any macroscopic deformities or abnormalities. There are no differences in the general condition of fish caught from the different study areas.

The fish bile investigations indicate that the concentrations of chlorophenolic compounds and phytosterols are within the variation limits as observed during the baseline studies and there are no indications of changes in the concentration levels caused by the effluent discharged from the UPM pulp mill or any other sources.

Muscle concentrations of dioxins, furans and PCBs were below the Total Daily Intake recommendations and, based on the observed concentrations and international recommendations there would be no limitations to human consumption of the studied fish.

The results indicate that the effluent discharge from the UPM Fray Bentos mill has not caused any impacts on the fish community and species diversity, or on the exposure level of fish, as compared to the situation prior to the mill operation.

Waste

The UPM Fray Bentos landfill site is located inside the mill complex. In 2016 the landfill received 47,000 t of waste on dry basis.

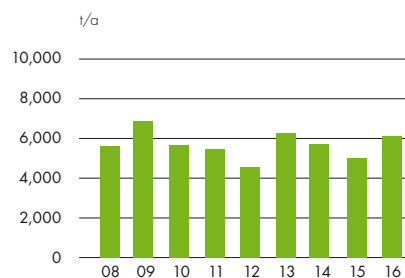
Green liquor dregs represented approximately 47% of the total dry weight of solid waste bound for the landfill site.

Wood waste (mainly bark and wood fines) continues to be returned to plantations for soil improvement, as well as sludge from the primary clarifier. In 2016 about 25% of the wood waste was used as a biofuel for electricity generation in external facilities.

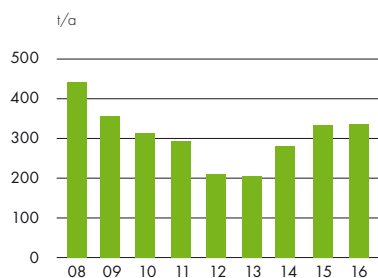
While secondary sludge, i.e. excess biosludge from the activated sludge system, continues to be burned in the recovery boiler by mixing it with the black liquor, in 2016 it was necessary to dispose most of it at the landfill site to avoid excessive buildup in the aeration basins.

The generation of hazardous waste in 2016 amounted to 178 t, of which more than 80% corresponded to filtration cake from the production of sodium chlorate at the chemical plant, filtering media from chemical processes, and used lubricating oils.

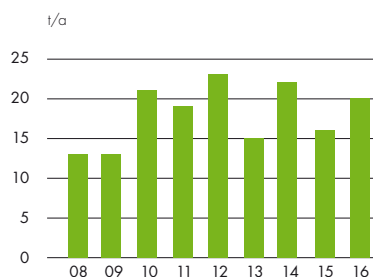
Chemical oxygen demand, COD



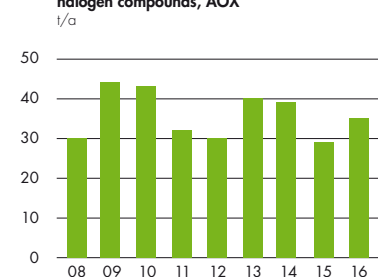
Total suspended solids, TSS



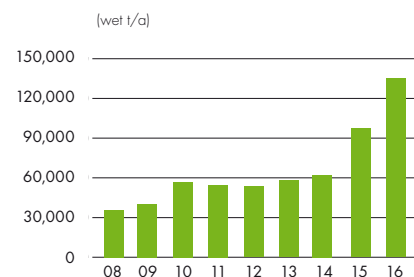
Phosphorus, P



Adsorbable organic halogen compounds, AOX



Solid waste to industrial landfill



Environmental parameters 2016

The figures related to production as well as raw material and energy consumption are published as aggregated figures on group level in the UPM Corporate Environmental Statement.

Production capacity	Pulp	1,300,000 t
Raw materials and additives	Wood Pulping and bleaching chemicals	See UPM Corporate Environmental Statement for more information
Energy	Biogenic fuels Fossil fuels	93% 7%
Emissions to air	Carbon dioxide, CO ₂ (fossil) Nitrogen oxides, NO ₂ Sulphur dioxide, SO ₂ Dust Total reduced sulphur, TRS	142,732 t 1,716 t 81 t 342 t 5 t
Water intake	Process and cooling water	28,859,000 m ³
Discharges to water	Process wastewater Process wastewater quality indicators – Biological oxygen demand, BOD ₅ – Chemical oxygen demand, COD – Suspended solids, TSS – Nitrogen, N (total) – Phosphorus, P (total) – Adsorbable organic halogen compounds, AOX	21,544,000 m ³ 254 t 6,102 t 335 t 48 t 20 t 35 t
Waste*	Waste to landfill Green liquor dregs Wastewater sludge Water treatment sludge Others Waste recycled Wood and bark waste Primary sludge (fiber sludge) Others Hazardous waste	 21,941 t 23,323 t 1,228 t 1,319 t 72,645 t 6,749 t 294 t 178 t
Size of mill area		500 ha



* Dry weight

Environmental objectives

Among the objectives set for 2017, the following can be highlighted:


- Continue transparent and effective communication of environmental issues to all stakeholders.
- Contribute to UPM's corporate commitment to environmental responsibility, including implementation of Clean Run campaign.
- Promote environmental awareness within the mill, its main suppliers and partners, and all subcontractors working in mill area.
- Successful start up of the secondary sludge dryers and implementation of sludge disposal in forestry plantations, according to the requirements of the authorities.
- Comply with the key environmental indicators defined for 2017 (see below).

Performance against targets in 2016

	Target	Performance
COD discharge to the river (annual average)	≤ 5 Kg/ADt	achieved
Effluent discharge to the river (annual average)	≤ 20 m ³ /ADt	achieved
Total phosphorus discharge to the river (monthly average)	≤ 60 Kg/d	not achieved: over target in 4 months
Availability of strong odorous gases handling (annual average)	≥ 99.9%	achieved
Availability of mild odorous gases handling (annual average)	≥ 99.5%	achieved
Amount of permit exceedances	None	not achieved: 2 incidents

Current targets

	Target
COD discharge to the river (annual average)	≤ 5 Kg/ADt
Effluent discharge to the river (annual average)	≤ 20 m ³ /ADt
Total phosphorus discharge to the river (monthly average)	≤ 60 Kg/d
Availability of strong odorous gases handling (annual average)	≥ 99.9%
Availability of mild odorous gases handling (annual average)	≥ 99.5%
Amount of permit exceedances	None



Validation statement

As an accredited environmental verifier (FI-V0001), Inspecta Sertifiointi Oy has examined the environmental management system and updated UPM Fray Bentos Environmental Performance 2016 report as well as the information concerning UPM Fray Bentos in the Updated UPM Corporate Environmental statement 2016. On the basis of this examination, the environmental verifier has herewith confirmed on 2017.05.02 that the environmental management system, the updated UPM Fray Bentos Environmental Performance report and the information concerning UPM Fray Bentos in the Updated UPM Corporate Environmental Statement are in compliance with the requirements of the EMAS Regulation (EC) No 1221/2009.

Social Responsibility

The Regional Technical Institute in Fray Bentos celebrated official inauguration



The first Regional Technical Institute (RTI) in Fray Bentos was inaugurated on Sunday 28 August, 2016. The RTI will have the capacity to accommodate 2,000 students from the littoral region of Uruguay. The contribution of UPM shows the company's commitment to strengthen the communities in which it operates by supporting education and the development of the local forestry sector.

The ceremony was led by the President of Uruguay, Dr. Tabaré Vázquez, the Minister of Education and Culture, Dr. María Julia Muñoz, the Mayor of Río Negro, Oscar Terzagui, members of the Board of Directors of UTEC, the Vice President of UPM's Uruguay Operations, Juha Kääriäinen, among other national and local authorities.

The building is located in the industrial landscape of Fray Bentos and has an area of 3,400 m². Currently, the RTI has over 80 students studying mechatronics. By 2017, the Technical University of Uruguay, UTEC, plans to expand its educational offering in Fray Bentos with new study programmes such as Biomedical Engineering and Information Technologies.

During the ceremony, Juha Kääriäinen along with Javier Solari, VP Uruguay Platform Development, unveiled a plaque to commemorate the inauguration and the contribution of UPM together with the President of Uruguay. "The contribution to the sustainable development of Uruguay through education in different areas of expertise, with an innovative profile, is strongly in line with our company values", said Kääriäinen.

The event ended with the speech of the Minister of Education and Culture, Dr. María Julia Muñoz. "This project was only possible through joint efforts of a very committed group of people and stakeholders. The donation of the Chinese Embassy and the cooperation agreement with the Finnish company UPM, have played a key role to make UTEC a reality", says Muñoz.

"We hope that this new RTI contributes on the development of skills of hundreds of young people, becoming a center of excellence that promotes innovation and research in the future", added Muñoz.

After the official ceremony, guided tours through the building were organized to the community.



10-year monitoring confirms that UPM effluents do not affect fish community structure, diversity and abundance in the Uruguay River

In the framework of the fish community monitoring activities in the areas of Nuevo Berlín, Fray Bentos and Las Cañas, a study based on Canadian EEM (Environmental Effects Monitoring) regulations, conducted by Faculty of Sciences and international experts, and reviewed by the National Environment Directorate (DINAMA), revealed there are no differences in fish number, abundance or biomass between the reference areas and the receiving area adjacent to the pulp mill effluents.

The overall condition of fish has always been considered good, with no deformities, macroscopic anomalies or diseases observed in fish, and no impacts on the diversity of species in all three areas.

Canadian EEM is based on many years of experience in scientific studies monitor-

ing the impact of pulp mill effluents (information available at <http://laws-lois.justice.gc.ca>). According to this program, reproduction, condition and survival indicators of fish exposed to effluents should be monitored at the population level and compared to fish in reference areas where the effluent is not present (in this case, the area of Nuevo Berlín).

The process of production and effluent treatment in the pulp mill has been shown to apply Best Available Techniques (BAT) defined by the European Union. To date, no negative effects have been found on fish communities due to effluents from pulp mills using BAT techniques.

During the sampling period, a total of 49 species were collected among the three sites. The fish community structure, in terms of richness and specific compo-

sition, has stayed relatively stable over the 10 years of study, with the same 10–15 dominant species always present in all sites and showing slight variations in dominance of one or other species at certain times, probably due to environmental factors or different migratory periods.

The study on fish community structure and species diversity is part of the annual environmental monitoring carried out by UPM without interruptions since 2005. It is conducted in three areas of the Uruguay River: Nuevo Berlín, considered a reference area given its location about 24 km upstream of the site where UPM's pulp mill effluents are discharged; Fray Bentos, as adjacent receiving area, given its location immediately downstream of the effluent discharge area; and Las Cañas, a distant receiving area located about 15 km downstream of the effluent discharge.



Supporting teacher education in Uruguay

The UPM Foundation in Uruguay supports in-service training of teachers in Río Negro Department to update and strengthen their pedagogical skills.

"So far, we have discussed various topics and methods of evaluating pupils. We have also practiced new teaching methods and learned to organize students' learning in a new way," says history teacher Pablo Rohner, one of 28 participants in the training programme. "In addition to practical tips, the course has provided new theoretical skills I can apply to my everyday work".

Rohner works in the village of Nuevo Berlín, which has a population of about 2,500. The local school has roughly 200 pupils. Participants in the two-year training programme teach their normal classes from Monday to Friday, and then travel to Fray Bentos once a month to participate in weekend workshops.

The UPM Foundation's support offers us an excellent opportunity to develop our teaching skills," Rohner adds.

Follow-up training is hard to find in the inner parts of Uruguay, as classes focusing on pedagogical skills are usually only available in the capital. The course is the first in-service training programme offered to teachers outside Montevideo, co-organized with local education authorities and the Catholic University of Montevideo. The participating teachers range from recent graduates to experienced veterans.

Sparking interest in books

Another key project supported by the UPM Foundation is the Cuenta Quien Cuenta programme supporting new teachers in Paysandú Department. "The programme is designed to support student teachers working with children in rural areas as well as promoting literature and reading to children and their parents," says Magdalena Ibañez, Manager of the UPM Foundation.

In 2016, nearly 40 student teachers have participated in the training, applying their new skills in practice in 16 schools in Paysandú Department. "The focus is on encouraging children to become interested in books and learn to read as early as possible, which in turn accelerates the development of their writing skills. Parents are encouraged to read stories out loud to act as role models and motivate their children," Ibañez adds.

The programme is a great success – a survey reports that 84% of parents now read a story to their children every day. Since 2012, over 1,800 children have attended approximately 150 workshops, with almost 500 families involved.

In addition to UPM Foundation, the programme is supported by public and private organizations such as the MATE NGO, communal leaders, the teacher education institute of Paysandú and the Department's education authorities.

Bringing teenagers back to school

One of the UPM Foundation's latest successes has been bringing 15–18 years old teenagers living in rural areas back into the educational system in Uruguay.

Due to lack of opportunities and long distances, some children living in the rural areas leave school at 12 years old. The early exit will weaken their opportunities to continue education later and makes it difficult for them to enter into professions that require a higher degree or special vocational training.

To tackle the problem, the UPM Foundation has launched several initiatives to improve the future prospects of these children. One of the latest examples is a project with the Technical University of Uruguay (UTU) to organise secondary level studies with an emphasis on mechatronics in Fray Bentos.

"We are organising a basic course that will prepare these young students for repairing and maintaining machines used in agriculture and forestry," explains Rodolfo Merello, director responsible for regional technical education from UTU. "In the first year they will concentrate on general subjects and then they will pursue more detailed technical studies during the second year. In addition to concluding the current course, we are also planning to organise a new course for the next generation in the coming year."

The demand for technological and mechanical studies has expanded recently and public funding has not been able to follow the growing trend. "Therefore, these kinds of private sector initiatives to offer complimentary resources are very important in the field of education," states Merello.

Planning the future

Alejandro González (18) is one of the young students taking part in the programme. The UPM Foundation has organised bus transportation that picks him up from his village every Monday morning and brings him back home on Friday. Students live in a campus in Fray Bentos during the weekdays.

"I am very content with the programme. We are studying in modules so after we have completed one course we can take another. We have several subjects like Spanish and mathematics but my favourite subjects to study are mechanics and electronics."

Alejandro started his programme together with some 20 students in August 2015. His school days start at around 8 in the morning and he continues up to 3 in the afternoon. He will do his homework later and might take part in sporting activities or visit the city centre.

After completing his studies Alejandro is determined to find a job. "I am interested in working with everything that moves on four wheels. Preferably, I would like to gain employment at UPM," he says.

Lobbying for education

Stakeholder and community engagement are focal elements of UPM's responsibility agenda. The UPM Foundation acts as a facilitator and coordinator working together with local stakeholders, such as social organisations, public institutions and departmental and national authorities.

"Especially in this case, our work concentrated on communicating with the authorities to restructure the education for

the needs of these youngsters," explains Foundation Manager Magdalena Ibanez while discussing the project.

Normally, secondary level education takes three years to complete in Uruguay. The ministry of education had to approve a proposal to compress the three-year programme into two years. The more compact term will also ensure that the students will not abandon their studies before the graduation.

Providing tools and expertise

Furthermore, the UPM Foundation provides necessary tools through the practical training in the course. In the second phase there will also be technical experts like harvester operators from UPM working as teachers.

"Thanks to this opportunity, in the future these youngsters will be capable of finding well-paid, high-quality jobs in agriculture or forestry in their home region. Likewise, we as a business need a well-prepared workforce in rural areas where we have jobs to offer," says Ibanez.

In principle, all the UPM Foundation actions are carried out to support the development and improve the wellbeing of the communities in long term.

"The interest in and attendance of the programme proves that when these kids do have a chance to study, they will take the opportunity. We are confident that education is the key element when aiming to develop communities in rural areas," she emphasises.

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